

## ABSTRACT

Title of Dissertation: EXAMINING THE IMPACT OF STUDENT-LEVEL AND SCHOOL-LEVEL VARIABLES ON THE DISPROPORTIONATE REPRESENTATION OF MINORITY STUDENTS IN SPECIAL EDUCATION USING DATA FROM THE EARLY CHILDHOOD LONGITUDINAL STUDY – KINDERGARTEN COHORT

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The purpose of this study was two-fold: (a) to examine the influence of student- and school-level demographic, economic, academic, and behavioral variables measured in the third grade on a student's probability of not receiving special education services in the fifth grade and (b) to examine the differences among students who have received special education services and then exit out of special education, students who remain in special education, and students who never received special education services. Variables were selected from kindergarten, third, and fifth grade data from the restricted ECLS-K dataset and the dependent variable was the dichotomous variable of whether or not a student was in receipt of special education services as recorded by the field management supervisor for ECLS-K. Prior to conducting the analyses, the appropriate cross-sectional or panel weight was applied; therefore, all results are nationally representative of students who began kindergarten in the 1998-1999 school year. Descriptive statistics and HGLM analysis were used in this study to address each of the research questions.

Results of descriptive analyses indicate that among third graders, minority students were overrepresented in special education programs, were from lower SES backgrounds, had lower reading and mathematics scores, and had lower approaches to learning scores and higher externalizing behavior scores compared to White students. Likewise, a higher percentage of minority students attended poorer schools and schools with lower average academic achievement scores. Further, findings from the HGLM analysis indicate that SES and mathematics achievement measured in the third grade were key predictors to receipt of special education services in the fifth grade. HGLM results suggest that race/ethnicity is not a significant predictor of receipt of special education services in the fifth grade. Results of this study illuminate the need for additional studies that focus on analysis at the individual student- and school-level and the importance of disaggregating data not only by race/ethnicity and disability type but also for SES but also when services were received.

EXAMINING THE IMPACT OF STUDENT-LEVEL AND SCHOOL-LEVEL  
VARIABLES ON THE DISPROPORTIONATE REPRESENTATION OF MINORITY  
STUDENTS IN SPECIAL EDUCATION USING DATA FROM THE EARLY  
CHILDHOOD LONGITUDINAL STUDY – KINDERGARTEN COHORT

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## CHAPTER 1

### Introduction

The disproportionate representation of minority students in special education programs has been a problem that policy makers, administrators, advocates, and researchers have grappled with for more than forty years (Arnold & Lassmann, 2003; Artiles, Rueda, Salazar, & Higareda, 2005; Artiles, Trent, & Palmer, 2004; Chinn & Hughes, 1987; Dunn, 1968; Hibel, Farkas, & Morgan, 2006; Hosp & Reschly, 2004; Skiba, Poloni-Staudinger, Simmons, Feggins-Azziz, & Chung, 2005; Skiba, et al., 2008; Zhang & Katsiyannis, 2002). It is not a phenomenon unique to the United States; for example, it has also been observed and documented in England (Dyson & Kozleski, 2008).

Disproportionality is generally defined in terms of the proportional representation of students from a specific racial/ethnic group in special education as either higher or lower than the proportional representation of students from the same racial/ethnic group in the general population. For example, if Black/African-American students represent 16% of the total school population then proportional representation would suggest that Black/African-American students should also comprise 16% of students identified as needing special education services. Black/African-American students would be considered overrepresented if the percentage of Black/African-American students in the school was higher than 16% and underrepresented if the percentage of Black/African-American students in the school was less than 16%.

The problem of disproportionality has been identified as a top priority by a number of organizations and agencies: the Office of Civil Rights (OCR), the U.S. Department of Education (USDE), the Office of Special Education Programs (OSEP), the Council for Exceptional Children (CEC), the National Association of Colored People (NAACP) and the Urban League. Numerous position papers have been published about the problem of disproportionate representation and a relatively modest body of research has explored the extent of disproportionate representation and its contributing factors. The majority of the research studies have utilized extant datasets including national-, state-, or district-level data. Findings from these studies have consistently shown a disproportionate representation of certain minority students in special education when compared to the general school population (Hosp & Reschly, 2002; Osher, Woodruff, & Sims, 2002; Oswald, Coutinho & Best, 2002; Oswald, Coutinho, Best & Singh, 1999; Parrish, 2000; Skiba, et al., 2008; Zhang & Katsivannis, 2002). Despite the fact that research has consistently documented disproportionate representation, persistent questions remain. These questions include how to define disproportionality; the conditions under which disproportionality is a problem; the influence of various demographic, economic, cultural, and educational variables; and the appropriate policy and practice interventions needed to reduce disproportionality (Donovan & Cross, 2002; Heller, Holtzman, & Messick, 1982; Losen & Orfield, 2002; MacMillan & Reschly, 1998; Oswald, et al., 1999; Reschly, 1997).

## Why is Disproportionality a Problem?

Overall, children with disabilities have received tremendous benefits since the passage of the Education of All Handicapped Children Act (PL 94-142) in 1975. For the past 33 years, students eligible to receive special education services have been provided additional educational opportunities, supports, services, and accommodations to meet their individual needs and help them realize their potential. According to the most recent Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act (IDEA), 2,759,522 children ages 6 to 11, 2,904,282 children ages 12 to 17, and 295,478 children ages 18 to 21 received special education and related services under the IDEA in 2004 (26th Annual Report to Congress, 2006). Between 1996 and 2005, the percentage of students with disabilities who have received a diploma or certificate has slowly increased while the percentage of student with disabilities who have dropped out of school has decreased (see Figure 1). According to the 26<sup>th</sup> Annual Report to Congress (2006), the percentage of students with disabilities graduating with a regular higher school diploma has increased from 43.5% in 1993-1994 to 51.1% in 2001-2002 and the number of students with disabilities that go on to college has almost tripled since 1978 (Losen & Orfield, 2002).

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INSERT FIGURE 1 ABOUT HERE

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Despite the improvements in the educational opportunities provided to students with disabilities, the outcomes for some eligible children are not always positive. In fact, there can be negative consequences associated with the label (Mitylene & Lassman,

2003). Negative consequences can include being tracked into special education classes that fail to provide full access to challenging curriculum, lowered teacher and parental expectations, alienation from peers, and the stigmatization of children which can result in a diminished sense of competence and self-esteem (Cromwell, Blashfield, & Strauss, 1975; Hibel, Farkas, & Morgan, 2006; Keogh & MacMillan, 1996; Skiba, et al., 2008; Sutherland, Lewis-Palmer, Stichter, & Morgan, 2008). When students are more likely to be exposed to these types of negative consequences as a result of belonging to a certain racial/ethnic group or a socio-economic group (overrepresentation), the system-level problem of disproportionality needs to be addressed. For example, if the system for identifying children with disabilities identifies some groups of students, such as Black/African Americans, at a higher proportion than the proportion of Black/African American students in the general population yet a proportionate percent of White students are classified as needing to receive special education services, then the system is not working the same across groups and is potentially discriminatory (Dyson & Kozleski, 2008).

#### Federal Response to Disproportionality

In the past, the federal government relied on the OCR within the USDE to monitor the classification rates of students of different races and ethnicities within school districts and to cite the districts that exhibited both the overrepresentation and underrepresentation of students with disabilities. Until 1998, the IDEA and the OSEP within the USDE had not exercised enforcement of disproportionate classification.

### *OCR Involvement*

The Office of Civil Rights was created after the passing of Title VI of the Civil Rights Act of 1964 and was charged with the overall goal of enforcing federal laws to ensure that educational institutions receiving federal financial assistance do not engage in discriminatory conduct. In order to examine the issue of disproportionality, the OCR has administered a biennial survey to approximately one-third of the nation's school districts since 1968. The OCR collected data on special education students by race/ethnicity in the categories where a disproportionate representation of minority students has been historically observed including Mental Retardation (MR), Emotional Disturbance (ED), Specific Learning Disabilities (SLD), and Speech and Language Impaired (SLI). The data are published as part of the Elementary and Secondary School Civil Rights Compliance report and are used extensively by researchers to examine the issue of disproportionate representation. If disproportionality is observed at the district- or state-level, OCR creates a cooperative agreement with state or local education personnel to develop and implement appropriate prereferral strategies; provide in-service training, standardized prereferral, referral, and evaluation procedures; and track implementation of these procedures (Glennon, 2002).

### *IDEA and Disproportionality*

The 1975 PL 94-142 and accompanying regulations attempted to address the issues of disproportionate representation. The basic requirements of the provision include a comprehensive and individualized assessment to determine disability as well as the child's educational needs, a team decision-making process that includes the parents,

assessments that lead directly to interventions, and the monitoring of student progress toward Individualized Education Program (IEP) goals (Hueffner, 2007; Yell, 2006). These procedures were intended to place the focus on each student's unique difficulties in the classroom. During the passage of PL94-142, Congress heard testimony regarding how Intelligence Quotient (IQ) and achievement tests dominated special education eligibility and placement decisions and that these decisions were often based on a single test (i.e., the IQ test). Furthermore, many school districts used tests that were considered discriminatory and not normed for use with students with disabilities (Yell, 2006). As a result, OSEP developed the Protection in Evaluation Procedures (PEP) regulations, to address abuses in the assessment process and implemented these regulations in 1977 (Donovan & Cross, 2002; Losen & Welner, 2002). OSEP designed these regulations to ensure that (a) all students with genuine disabilities were considered for special education and (b) students with learning patterns and behaviors that appear to be disabilities but were due to cultural differences were not determined to be eligible for special education. Researchers derived specific features of these regulations, often verbatim, from the results of class action court cases such as *Diana v. State Board of Education*, 1970; *Guadalupe Organization v. Tempe Elementary School District No. 3*, 1972; *Mills v. Board of Education*, 1972; and *Pennsylvania Association for Retarded Children v. Commonwealth of Pennsylvania*, 1972 (Donovan & Cross).

The PEP regulations changed in 1999 when the regulations for IDEA 1997 were published as the Procedures for Evaluation and Determination of Eligibility (34 CRF 300.530 to 34 CFR 300.543). Policymakers, researchers and administrators viewed the reauthorization of IDEA in 1997 as an opportunity to give increased attention to racial,

ethnic, and linguistic diversity to prevent inappropriate identification and mislabeling. The 1997 amendments state “a child shall not be determined to be a child with a disability if the determinant factor for such determination is lack of instruction in reading or math or limited English proficiency” [Section 614(b)(4)].

The 1997 statute and regulations maintained all of the basic requirements in PEP (34 CFR 300.532) but expanded the focus to include gathering functional and developmental information on the student from a variety of sources, including parents. This requirement emphasized the importance of gathering information about the problem behavior in the natural setting and aimed at reducing the likelihood of disproportionate representation of minority students in special education. To fulfill this requirement, three new regulations 532(h), (i), and (j) were developed to focus on assessment procedures and the importance of aligning the assessment process with the development of a special education program. The regulations emphasized curriculum-based measures, as opposed to standardized tests (Donovan & Cross, 2002).

Additional new requirements in the 1997 and 2004 amendments required that states (a) collect and review data on racial disproportionality in identification and placement, (b) intervene when significant disproportionality exists, and (c) have policies and procedures designed to prevent inappropriate over-identification of children with disabilities by race. The new requirements 2004 mandated that states define “significant disproportionality” and analyze district-level data to determine the extent to which disproportionality is a result of inappropriate identification and report the results of these analyses in their biennial State Performance Plan.



### *Early Intervening Services (EIS)*

A final provision in the 2004 amendments requires Local Education Agencies with significant disproportionality in identification, LRE, and suspensions and expulsions to reserve 15% of the funds received under Part B of IDEA for the implementation of comprehensive, coordinated EIS. These funds target students who are not currently identified as receiving special education or related services but who need additional academic and behavioral supports to succeed in the general education environment and emphasize service to significantly over-identified groups. EIS encouraged schools to place the emphasis on students in kindergarten through third grade but may extend up to grade 12 [34 CFR 300.646(b)(2)] [20 U.S.C. 1418(d)(2)(B)].

### Investigations of Disproportionality

A number of studies and two National Academy of Sciences panels investigated the issues surrounding over-representation of certain students in special education. In both 1982 (Heller, et al., 1982) and 2002 (Donovan & Cross), the National Research Council (NRC) of the National Academy of Sciences convened panels of nationally recognized researchers who reviewed the data in special education and issued a set of findings that are remarkably similar. Both reports acknowledge that minority students, particularly Black/African-American students, are over-represented in certain categories within special education, notably MR and ED. Both reports also acknowledge the interaction between ethnicity and poverty citing the lack of opportunities to learn in classrooms in high poverty schools where teachers are ill prepared to teach, where

expectations of student learning are low, and where overcrowded classrooms lack instructional resources.

The Panel on Selection and Placement of Students in Programs for the Mentally Retarded focused on examining the overrepresentation of students identified as MR, and in 1982, Heller, Holtzman, and Messick published the results. In 2002, Donovan and Cross published results from the second study, *Minority Students in Special and Gifted Education*. The expanded focus of the 2002 study included examination of (a) minority under representation in gifted and talented programs and (b) minority overrepresentation in the categories of MR, ED, and SLD. Findings from both studies indicate that disproportionate representation results from a complex interaction of biological, economic, cultural/social, and educational factors that differ by race/ethnicity and contribute to a higher incidence of special needs in some disability categories among some racial/ethnic groups.

It is important to note that while the race/ethnicity variable is a social construction and cannot adequately reflect the unique characteristics of any one child or the variance within any one racial/ethnic group, general trends in school success by race/ethnicity have been consistently observed. Examining the impact of race/ethnicity on school achievement is not unique to special education and disproportionality literature; the influence of this variable has been widely observed throughout general education literature as well (Chubb & Loveless, 2002; Jencks & Phillips, 1995; Lee & Burkham, 2002; Losen & Orfield, 2005). For example, the achievement gap between Black/African-American and White students is well documented throughout general education literature and numerous theories have been suggested for why minority

students do not academically achieve at the same level as White students (Chubb & Loveless, 2002; Jencks & Loveless, 1995; Nettles, 2006).

### *Empirical Research*

A number of studies utilizing national-, state-, and district-level data document evidence of disproportionality (Hosp & Reschly, 2002; Mercer, 1973; Osher, et al., 2002; Oswald et al., 1999; Oswald, et al., 2002; Parrish, 2000; Zhang & Katsiyannis, 2002). Research studies primarily used nationally representative datasets from the OCR, OSEP, and the Common Core of Data (Chinn & Hughes, 1987; Coutinho, et al., 2002; Finn, 1982; Hibel, et al., 2006; Oswald, et al., 1999; Oswald, et al., 2001; Zhang & Katsiyannis, 2002). State- and district-level datasets also examine disproportionality (Artiles, et al., 2005; Hosp & Reschly, 2002; Simmone, et al., 2005),

Findings consistently indicate that Black/African-American students are more likely to be overrepresented in the categories of MR and ED; American Indian students are more likely than Whites to be represented in the category of SLD; Hispanic students are slightly underrepresented in the categories of MR, ED, and SLD at the national level; and Asian/Pacific Islander students are underrepresented in all 13 of the federal disability categories and overrepresented in programs for Talented and Gifted students (Chinn & Hughes, 1987; Coutinho, et al., 2002; Finn, 1982; Hosp & Reschly, 2002; Hosp & Reschly, 2004; Wagner, Newman, Cameto & Levine, 2006).

### *Contributing Variables*

The literature on disproportionate representation repeatedly emphasizes the importance of examining the influence of demographic, economic, sociocultural, and educational variables that contribute to disproportionate representation (Artiles, et al., 2005; Coutinho, et al., 2002; Donovan & Cross, 2002; Finn, 1982; Heller, et al., 1982; Hosp & Reschly, 2002; Oswald, et al., 2002; Reschly, 1998). Several studies examined variables such as race, socioeconomic status, poverty, district size, and the percentage of minority students enrolled in the school in an attempt to better understand the causes of disproportionate representation and inform policy and practice to address the problem (Coutinho & Oswald, 1998; Coutinho, Donovan & Cross, 2002; Finn, 1982; Hibel, et al., 2006; Oswald, & Best, 2002; Oswald, et al., 1999; Zhang & Katsiyannis, 2002). Overall, findings from this body of research are inconsistent. For example, the majority of studies examining the influence of poverty on disproportionality suggests that socio-economic level (SES) is a key factor contributing to the overrepresentation of some racial/ethnic groups in special education but does not account for all the racial/ethnic group differences (Oswald et al., 1999; Salend, Garrick, Duhaney & Montgomery, 2002; U.S. Department of Education, 1998). However, the influence of SES appears to vary by district size (Finn, 1982) as well as gender, racial/ethnic group, and disability category (Hosp & Reschly, 2004; Oswald et al., 1999; Oswald et al., 2001). Similarly, the influence of factors such as percent minority student enrollment in the district, percent of students in the school who are at risk or have Limited English Proficiency, district size, student-to-teacher ratio, teacher race, and academic achievement are inconsistent across studies. It has been suggested that these inconsistencies could be attributed in part to the

different ways of defining and measuring each of these variables (Coutinho & Oswald, 1998; Oswald, et al., 1999). Additional limitations of the current research base result from the fact that the majority of the studies have analyzed district-level data aggregated to the national level and have had to merge datasets in order to examine all of the variables. It is possible that aggregated data obscures the effects of the variables at the district-level and that the need to merge datasets impacts the true influence of these variables (Reschly, 1997).

A recent study conducted by Hibel, Farkas and Morgan (2006) overcame some of these limitations. Hibel, et al. used the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K) dataset to examine the influence of student- and school-level predictors on the disproportionate representation of minority students in receipt of special education services. The ECLS-K study, funded by the U.S. Department of Education’s National Center for Education Statistics (NCES), used a nationally representative sample of children who were in kindergarten in 1998-99, their teachers, parents, and schools. The ECLS-K provides descriptive information on children’s cognitive, social, emotional, and physical development as they entered school and progressed through middle school. Researchers gathered information about children with a disability through the parent interview, special education teacher survey, and school records. These researchers used the ECLS-K data “to estimate which variables, measured in the fall of kindergarten, predict special education placement by the spring of third grade” (Hibel, et al., 2006, p. 13). To analyze the data, researchers conducted descriptive statistics and used a multilevel modeling analysis approach, Hierarchical Generalized Linear Modeling (HGLM) (Raudenbush & Bryk, 2002). The HGLM allowed for the

appropriate estimation of student-level effects within separate schools as well as examination of the unique influences of the school environment (between-school effects).

The findings of this study indicate that when examining the issue of disproportionate representation at the individual student-level (as compared to the district- or national-level), minority students are underrepresented in special education programs as compared to White students. Further, the strongest predictor of placement in special education programs is not race, poverty, or any other sociodemographic variable; rather, it is academic achievement (Hibel, et al., 2006). Academic achievement, measured by the average of the student's reading and mathematics test scores taken in the fall of kindergarten, was significant at both the student- and the school-level. These findings are inconsistent with earlier research and strongly suggest further examination. For instance, it is possible that these findings are accurate for children in early elementary but that as students progress through elementary school and schools identify more students in the categories of MR, SLD, and ED, the relative influence of race or other sociodemographic variables may have a greater influence on special education classification.

The categories MR, SLD, ED, and SLI are sometimes referred to as "judgmental", "social system", high incidence or high inference categories because these students are usually not diagnosed by a medical professional, do not exhibit readily observable distinguishing features, and are often not diagnosed until after school entrance (Donovan & Cross, 2002). Since it is generally the responsibility of the classroom teacher to determine when to refer a student to be evaluated for special education, researchers have

observed a wide variation in placement rates in judgmental categories across states and districts.

In contrast, disabilities such as deafness/hearing impairment, deaf-blindness, blindness/visual impairment, multiple disabilities, orthopedic disability, traumatic brain injury, autism, and other health impairment are typically diagnosed by medical personnel prior to school entrance as there are clear, identifiable disorders of the central nervous system, sensory status or neuromotor capabilities (Donovan & Cross, 2002). These disabilities are generally referred to as medical, low incidence or low inference disabilities. Although these broad categories do not sufficiently account for the unique attributes of each student (e.g. a student categorized with a judgmental or high incidence disability might also exhibit a biological disorder) or the nuances within each disability type (e.g. while mild MR is generally viewed as a judgmental or high incidence category, more severe cases of MR would be classified as medical or low incidence), it is typically within the judgmental or high incidence categories that researchers have observed a disproportionate representation of minority students in special education and not within the medical or low incidence categories. For the purposes of this study, I will refer to students who have been classified as MR, ED, or SLD as having judgmental disabilities.

Because it is the responsibility of the teacher to identify students who are not achieving within the classroom and to refer the child for disability assessment, many students classified as having a judgmental disability are not diagnosed until the later elementary grades. As can be seen in Table 1, there is a steady increase in the percent of students identified in the categories of SLD, MR, and ED as students get older and a steady decrease of students identified with a Speech or Language impairment. In

contrast, the percentage of students identified in the medical categories remains relatively stable across age.

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Considering that teachers often do not identify students in the judgmental categories until the later elementary grades and the subjective nature of the teacher referral process for judgmental disabilities, it is plausible that sociodemographic variables such as race and poverty may be more significant predictors in later elementary but not in the early years of schooling.

#### Purpose of Study & Research Questions

The purpose of this study was two-fold: (a) to extend the study conducted by Hibel, et al. (2006) by examining the influence of student- and school-level demographic, economic, academic, and behavioral variables measured in the third grade on a student's probability of special education placement in the fifth grade and (b) to describe the characteristics of students who never received special education services and students who received services at distinct points in time throughout the study. This information could help researchers, policymakers and school administrators to better understand the unique characteristics of students in receipt of services at individual grade levels as well as those who received services in multiple grades.

There is a dearth of studies that examine the disproportionate representation of minority students at different times of service (e.g. the differences between students who



received services only in kindergarten as compared to students who received services in kindergarten and also in fifth grade but not in third grade). Research question two was designed to describe the characteristics of students at various points of special education service in order see if there were any key differences among students receiving services at different points in time. The results of analyses provide a foundation for understanding the characteristics of each sub-group and a starting point for conducting future longitudinal research to determine factors that may result in a student's movement in and out of special education service.

It was important to extend the analyses techniques used in the Hibel et al. study to assess the proportion of minority students receiving special education services in the later elementary grades and to determine if academic achievement remains the most predictive variable for receipt of special education services when examining student-level data in the upper elementary grades. Considering changes in the student special education population from kindergarten to 5<sup>th</sup> grade and the increase in number of students identified as MR, ED, and SLD in the upper elementary grades, variables that were and were not significant in the early elementary grades needed to be reassessed to determine their influence in upper elementary grades.

### *Research Questions*

The research was guided by the following questions:

Research Question 1: What are the characteristics of the student population by race/ethnicity, who received special education services in third grade, as compared to students who did not receive special education services in third grade. The following

characteristics were examined: (a) gender, (b) SES, (c) academic achievement (reading and mathematics), (d) student behavior measures (Approaches to Learning and Externalizing Problem Behaviors), and (e) school level variables (school-average SES, academic achievement, Approaches to Learning, Externalizing Problem Behaviors, and percent minority enrollment in the school)?

Research Question 2: What are the characteristics of the population of students who (a) never received special education services, (b) received special education services only in kindergarten or third grade or fifth grade, (c) received special education services in kindergarten and third grade but not in fifth grade, (d) received special education services in kindergarten and fifth grade but not in third grade, (e) received services in third and fifth grade but not in kindergarten, and (f) received special education services in kindergarten, third grade and fifth grade? The following characteristics were examined: (a) race/ethnicity, (b) gender, (c) SES, (d) academic achievement, (e) student behavior measures (Externalizing Problem Behaviors and Approaches to Learning), and (f) school-level variables (percent minority enrollment, school average SES, school average academic achievement in reading and mathematics).

Research Question 3: Which variables, as measured in third grade, were the strongest predictors of whether or not a student received special education services in the fifth grade? Variables that were examined included: race/ethnicity, gender, SES, student-level academic achievement (reading and mathematics), student-level behavior measures (externalizing problem behaviors and approaches to learning), school average SES, school average academic achievement (reading and mathematics), school mean behavior

scores (approaches to learning and externalizing problem behaviors), and percent minority enrollment in the school.

### *ECLS-K Dataset*

The ECLS-K dataset was used to conduct this study. Student-level and school-level measures collected in third grade (2001-2002 school year) were examined to predict the likelihood that a student did not receive special education services in the fifth grade. The dependent variable in these analyses was a dichotomous indicator of the receipt of special education services during the fifth grade (Yes/No). Student-level (level 1) variables included: gender, race/ethnic group, SES, test score in reading, test score in mathematics, approaches to learning score, and externalizing problem behavior score. School-level (level 2) variables included the average SES for the school, school average test scores in reading and mathematics, school mean behavior measures (approaches to learning and externalizing problem behaviors), and percent minority enrollment in the school. A detailed description of each variable is in Chapter 3: Methodology.

### Limitations

There were limitations of the data and analyses used in this study. One limitation of this study was that not all racial/ethnic groups were included in the analytic sample in the study and subgroups (e.g., the differences among Puerto Ricans, Mexicans, and Brazilians) and mixed race categories (e.g. bi-racial children who are African-American and Asian, African-American and White, Hispanic and White, etc.) were not examined separately. Also, Native American and Asian students were not included because of the

relatively low numbers of these children in the sample. Children from subgroups such as Puerto Ricans, Cubans, or Mexican Americans were not individually assessed because these subgroups were aggregated into a single Hispanic category.

A second limitation of the study was that the sample of students in the ECLS-K longitudinal study was not consistent over time. Although the sample remained nationally representative, the sample was refreshed in the 1999-2000 school year (at first grade) and altered the initial cluster structure of the study. Also, if a sampled child moved during the course of the study, the design of the study was to follow the child through the waves of data collection as opposed to selecting a new student from the school initially included in the sample, which further impacts the initial cluster structure of the study. These alterations to the initial cluster structure can potentially impact school-level analyses.

Further, students with disabilities were not over-sampled in the ECLS-K study. Over-sampling is a sampling procedure designed to give a particular subgroups (e.g. students with learning disabilities or students identified as mentally retarded) a larger proportion of representation in the sample than the population's proportion of representation in the overall population. Over-sampling is generally used to increase the sample size of subgroups that have a smaller proportion of representation in the population in order to ensure that sample sizes are large enough to conduct statistical analyses. Because students with disabilities were not over-sampled in the ECLS-K study, detailed analyses by disability type was not possible. It is also possible that variability in the sample of students with disabilities and students in receipt of special education

services in the ECLS-K is not fully captured. However, considering the size of the sample, the expected impact was minimal.

A final limitation of this study is that data were not disaggregated by disability category because no attempts were made by the ECLS-K staff to quantify the reliability and validity of variables used to measure whether or not a student received special education services (as measured by the field officer) and the disability type of the student as indicated by a special education teacher. Therefore, results include all students who were recorded as receiving services regardless of disability category.

#### Definition of Terms

Student-level factors: characteristics of students (e.g. gender, race/ethnic group, child's primary disability, family SES, average of reading and math test scores, average student-level approaches to learning, average externalizing problem behaviors) and student mobility.

Cluster sampling: a sampling technique used when "natural" groupings are evident in the population (e.g., schools). The total population is divided into these groups (or clusters), and a sample of the groups is selected.

Disability: a "child with a disability" is a child identified with mental retardation, hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance, orthopedic impairments, autism, traumatic brain injury, other health impairment or specific learning disabilities.

Disproportionality/Disproportionate Representation: For the purposes of this study,

disproportionality/disproportionate representation was defined as the presence of students from a specific group (e.g. Black/African-American students) in receipt of special education services being higher or lower than one would expect based on their representation in the general population of students.

ECLS-K: The Early Childhood Longitudinal Study – Kindergarten Cohort.

Kindergarten, first, third, and fifth grade have been collected.

IDEA: The Individuals with Disabilities Education Act now referred to as the Individuals with Disabilities Education Improvement Act (2004).

IEP: Individualized Education Program as defined by the IDEA 2004.

Longitudinal approach: a research method that follows and measures the same students over time.

Judgmental Disabilities: Students identified in the categories of MR, ED or SLD.

NCES: The National Center for Education Statistics. The primary federal entity for collecting and analyzing data related to education.

No Child Left Behind Act of 2001: The No Child Left Behind Act of 2001 (P.L. 107-110) was signed into law by President Bush on Jan. 8, 2002, and is the reauthorization of the Elementary and Secondary Education Act originally enacted in 1965. The NCLBA is the main pre-collegiate education law and implemented a series of accountability measures for public and charter schools in the US.

Race/Ethnicity: One of five racial groups of students including (a) White, (b) Black/African-American, (c) Hispanic, (d) American Indian/Alaskan, (e) Asian/Pacific Islander.

School-level factors: Characteristics of schools (e.g. school average reading achievement test score, school average mathematics test score, school average externalizing problem behaviors, school average SES, percent minority enrollment in the school).

## CHAPTER II

### Overview of Policy Changes and Review of Literature

The disproportionate representation of minority students has been a persistent and complex problem that policymakers; educators; administrators; and disability, research and development groups have been struggling with for more than four decades (Arnold & Lassmann, 2003; Artiles, et al., 2005; Artiles, et al., 2004; Chinn & Hughes, 1987; Hosp & Reschly, 2002; Hosp & Reschly, 2004; Losen & Orfield, 2002; Skiba, et al., 2005; Skiba, 2008; Zhang & Katsiyannis, 2002). Sufficient and objective evidence of disproportionate minority representation is no longer debatable (Oswald, et al., 2001). Prevailing research acknowledges a disproportionate representation of minority students in special education as compared to the general school population (Hosp & Reschly, 2002; Oswald, et al., 1999; Oswald, et al., 2002; Osher, Woo, et al., 2002; Parrish, 2000; Zhang & Katsiyannis, 2002) and researchers observe a persistent overrepresentation of Black/African-American students in special education nearly every state (Parrish, 2002). Researchers observe evidence of disproportionality at the state- and district-level (Artiles, et al., 2005; Hosp & Reschly, 2002; Skiba, et al., 2005) as well as at the national-level through nationally representative datasets such as the OCR dataset and the U.S. Department of Education, OSEP dataset (Chinn & Hughes, 1987; Coutinho, et al., 2002; Hosp & Reschly, 2004; Finn, 1982; Oswald, et al., 2001; Oswald, et al., 1999; Zhang & Katsiyannis, 2002). The following are general trends researchers observed: Black/African-American students are more likely to be overrepresented in the categories of MR and ED; American Indian/Alaska Native students are more likely than Whites to



be represented in the category of SLD; Hispanic students are slightly underrepresented in the categories of MR, ED, and SLD at the national level; and Asian/Pacific Islander students are underrepresented in all 13 of the federal disability categories and overrepresented in programs for Gifted and Talented (G/T) students (Artiles & Trent, 1994; Donovan & Cross, 2002; Heller, et al., 1982; Losen & Orfield, 2002; Mitylene & Lassmann, 2003; Reschly, 1997).

National data suggest that the risk ratio for receiving special education and related services is greatest for Black/African-American students. The risk ratio allows for the comparison of the proportion of a particular racial/ethnic group receiving special education and related services to the proportion of all other racial/ethnic groups combined. The risk ratio is computed by dividing the risk index for a racial/ethnic group by the combined risk index for all other racial/ethnic groups. The resulting risk ratio is the difference among the racial/ethnic groups receiving special education and related services. For example, the risk ratio for Black/African-American students in 2005 in the category of MR is 2.18 indicating that Black/African-American students are 2.18 times more likely to receive special education and related services than all other racial/ethnic groups combined. A risk ratio greater than 1.0 suggests that students have an increased likelihood of receiving services (overrepresentation), less than 1.0 suggests that students have a decreased likelihood (underrepresentation) and 1.0 indicates no difference between the racial/ethnic groups.

Table 2 illustrates the risk ratios for students with disabilities ages 6 through 22 by race/ethnicity and disability category for the 2005-2006 school year. Disability categories typically considered to be medical categories (e.g. hearing impairments, visual

impairments, deaf-blindness, multiple disabilities, and physically or otherwise health impairments) are not represented in Table 2 because, in general, marked disproportion by racial/ethnic group has not been observed in these categories.

Across all disability categories, Black/African-American students were more likely and Hispanic students were less likely to be served under Part B than White students. Overrepresentation of Black/African-American students was most pronounced in the categories of MR and ED. In contrast, White students were underrepresented among students identified as MR and Hispanic students were underrepresented in the category of ED.

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INSERT TABLE 2 ABOUT HERE

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While national data suggest that Hispanic students are underrepresented in the categories of MR, and ED, analyses of district-level data suggest that Hispanic representation is actually comprised of numerous cases of under- and overrepresentation (Artiles, et al., 2005) demonstrating the importance of disaggregating data. In order to better understand the causes of disproportionality, it is important to examine the extent of disproportionate representation not only at the national-level but also at the state-, district-, and child-level. Although trends have been consistently observed across national-, state-, and district-level datasets, the extent and causes of the apparent disproportionality, the way disproportionality is defined and measured, the influence of variables (e.g. SES, school district size, percent of minority students enrolled in the district, race/ethnicity of teachers, academic achievement), and the policy and practice

interventions that effectively reduce disproportionality are still being debated and explored (Oswald et al., 1999).

Although the issue of disproportionate representation includes both the overrepresentation and underrepresentation of students from culturally and linguistically diverse backgrounds, the majority of research, litigation, and statutes and regulations has focused on the problem of overrepresentation in the categories that are referred to as the judgmental categories which include MR, ED, and SLD (Coutinho, et al., 2002; Hosp & Reschly, 2002; MacMillan & Reschly, 1998; Donovan & Cross, 2002). These categories are frequently referred to as the judgmental categories of disability because the diagnosis of disability is not a biological disorder that is diagnosed by a medical professional. Rather, students are typically not identified until after they begin school and are determined to need special education services through a referral, evaluation, and placement process which is often viewed as subjective and varies widely from state-to-state, district-to-district, and even school-to-school (Donovan & Cross, 2002). Further, the majority of the research focuses on the judgmental categories of MR and ED; much less attention is paid to the category of SLD since the overall national identification rates of SLD are similar for Black/African-Americans, Whites, and Hispanics. The NRC recently recognized underrepresentation of minority students in G/T programs as a problem in a 2002 study. However, relatively little attention has been given to the problem of underrepresentation as compared to the problem of overrepresentation (Artiles & Zamora-Duran, 1997; Donovan & Cross, 2002; Salend, et al., 2002).

This chapter draws on existing literature and policy to examine the extent of disproportionate representation and key factors that appear to contribute to the problem.

The chapter is divided into the following main sections: (a) search procedures, (b) why and when is disproportionality a problem, (c) definition of disproportionate representation, (d) history prior to 1975, (e) legal policy and litigation, (f) studies conducted by the NRC, and (g) critical review of quantitative large-scale research studies.

### Search Procedures

Articles, reports, federal policy and related amendments, and litigation on disproportionality reviewed in this chapter were identified in a number of ways. First, I conducted electronic searches through use of the following databases: the Educational Resources Information Center (ERIC), PsychINFO, Education Abstracts, and Exceptional Child Education Resources. Keywords used included various combinations of the following: “disproportionality”, “disproportionate representation”, “overrepresentation”, “minority”, “race”, “ethnicity”, “disability”, “special education”, “mental retardation”, “emotional disturbance”, and “specific learning disabilities”.

I reviewed the article abstracts identified through the electronic searches and selected articles that focused on reporting the disproportionate prevalence rates of minority students as well as examination of demographic, economic, school-related, and academic factors that potentially influence identification. Articles on the disproportionate representation of minority students, particularly Black/African-American students, in more restrictive placements, and articles on the underrepresentation of Black/African-American, American Indian/Alaska Native, and Hispanic students in classes for the Gifted and Talented (G/T) were not included in this review because examination of these topics and variables were not included in this study.

Further, I examined the reference lists of all selected articles and conducted an ancestral search of current special education and education journals. Journals were chosen based on the frequency of published articles on disproportionality as observed through the electronic searchers and reference lists. Finally, I conducted a search of relevant websites including: the National Center for Culturally Responsive Educational Systems, the USDE, the OSEP, the CEC, IDEA data, the Library of Congress (THOMAS), and Wrightslaw.

Research articles that are critically reviewed in the final section of this chapter were primarily limited to research studies that met the following criteria: (a) published in a peer-refereed journal and (b) used quantitative methods to analyze data (national-, state-, or district-level). I selected a total of 11 quantitative studies for review in this chapter's critique of the research literature section.

In addition to selected quantitative research studies, I identified position papers about disproportionality. These papers provided a historical overview of the problem, discussed issues related to disproportionate representation, and offered recommendations for appropriate interventions to address the problem of disproportionality. These articles contribute to understanding the problems that education officials, scholars, and policymakers face. Information from these articles is cited throughout the chapter. However, inclusion of discussion articles in the critical review of this chapter's research literature section was not appropriate because no new empirical findings are presented in these articles.

## Why and When is Disproportionality a Problem?

Special education can provide many benefits to students including low student/teacher ratio, legislative mandates protecting students' rights, guaranteed funding for needed services, and educational programs that are individualized to meet the students' specific needs. Given these benefits, it is important to evaluate why the overrepresentation of minority students, particularly Black/African-American students, is considered problematic. In part, the answer lies in the perceived ineffectiveness of special education programs (Heller, 1982; Hosp & Reschly, 2003; MacMillan & Reschly, 1998). According to Heller, Holtzman, and Messick (1982), the disproportionate representation of minority students in special education is problematic if the program is not effective or is stigmatizing. Despite the positive outcomes experienced by some students with disabilities, the outcomes for many students who have received special education are not always positive (Wagner, Newman, Cameto & Levine, 2006). Special education programs have often been perceived as programs that offer limited educational services and track students into low level achievement that impede a student's return to the regular education setting. Assessing the effectiveness of special education programs is not an easy or straightforward process, and studies have resulted in inconclusive and contradictory findings. In general, individuals with significant disabilities have enjoyed the most positive outcomes of special education programming, and the majority of negative comments and outcomes typically relate to students with mild disabilities classified in the judgmental categories of MR, ED, and SLD (Arnold & Lassman, 2003; MacMillan & Reschly, 1998). Specifically, overrepresentation in the area of MR has been viewed as problematic, at least in part, because the educational treatment provided

has been perceived ineffective (Artiles & Trent, 1994; MacMillan & Reschly, 1998; Patton, 1998).

In addition to the perceived ineffectiveness of special education programs, the stigma of a disability label such as MR or ED can have a deleterious effect on the life of the student due to teacher, school, and societal perceptions about the disability type (Artiles & Trent, 1994; Dunn, 1968; Patton, 1998). For example, teachers generally have lower expectations for students identified as having MR (Donovan & Cross, 2002; Heller, et al., 1982) and will focus on the negative behaviors of students identified as ED even when the behaviors are not significantly different from students without an ED label. Researchers, policymakers and administrators consider disproportionate representation to be a problem if (a) assessment procedures are used that may lead to inappropriate placement and services for certain groups of children (i.e. Black/African-American children), (b) the process of identification (e.g. the referral process and assessment practices) and placement is not applied equally to different groups of students (Heller et al., 1982), or (c) it results in racial segregation because students with disabilities are being removed from the general education classroom (U.S. Department of Education, 1997; Zhang & Katsiyannis, 2002). For example, Black/African-American students who receive special education are frequently placed in more segregated settings (Reschly, 1988; Serwatka, Deering & Grant, 1995).

During the 2005-2006 school year, about 20% of the students in receipt of services across all educational environments were Black/African-American, nearly 59% were White approximately 18% were Hispanic (Table 3). In comparison, a smaller percentage of Black/African-American students received services within the regular class

at least 80% of the day (16.72%) and a higher percentage of White students received services primarily in the regular class (63.07%). Among students who spent less than 40% of the day in a regular class, Black/African-American and Hispanic students were overrepresented (28.46% and 20.96% respectively) and White students were underrepresented (46.66%). Further, although Black/African-American students comprised only 20% of the total population of students in receipt of services in 2005-2006 across educational environments, Black/African-American students represented 50.07% of the students in receipt of services in correctional facilities.

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Similarly, a higher percentage of Black/African-American students in receipt of services during the 2005-2006 school year were also suspended and expelled more often than White or Hispanic students. Data taken from Table 5-4 on the [www.ideadata.org](http://www.ideadata.org) website indicates that 2.78 percent of Black/African-American students in receipt of services were either suspended more than 10 days during the school year or were expelled. In contrast, less than 1 percent of White (0.67%) and Hispanic (0.87%) students were suspended or expelled as often.

In order for policymakers, researchers, and school-professionals to be able to effectively address the issue of disproportionate representation of minority students in special education, it is essential to not only identify when and why disproportionate representation is a problem, but also to clearly define disproportionate representation.



The next section discusses the inconsistencies in definitions of disproportionate representation and presents the most commonly used definitions.

The extent and significance of possible causes of disproportionate representation vary (Oswald, et al., 2001; Reschly, 1997). Possible identified causes of disproportionality have ranged from individual, student-level characteristics such as race/ethnicity, behavior, socioeconomic status, family culture, and child-rearing styles to characteristics of the instructional setting, methods of instruction, possible biases in assessments, and characteristics of the legal and administrative systems in which special education programs operate (Heller, et al., 1982; Klingner, et al, 2005). Further, for children who are diagnosed with a judgmental disability, researchers identify the referral and assessment processes as potential causes that impact the disproportionate representation of minority students (Donovan & Cross, 2001). For this group of students, the decision to refer a child for evaluation and assessment is usually determined by the teacher, and therefore, is highly subjective. Subjective decisions regarding referral for special education evaluation and assessment can lead to false-negative cases in which a child who should be referred is not. Subjective decisions can also lead to an overrepresentation of some children as a result of inadequate instruction or a mismatch in the behavioral expectations of a student and the student's culture. Once the referral to special education evaluation and assessment has been made, the assessment process has been identified as underestimating the skills of minority children resulting in an overrepresentation of minority students in judgmental categories.

The IDEA legislation provides no specific definition for disproportionality or regulations because of the numerous factors at the state-level including population size,

composition of the state's population, and size of the school-district that could impact how a state defines significant disproportionality. However, OSEP does require that the definition be based on numerical analysis of state- and district-level data collected. Numerous definitions of disproportionate representation and methods for analyzing the data have been used by researchers throughout the professional literature. All of the definitions reviewed share the common assumption that some racial/ethnic group(s) is/are inappropriately overidentified for special education (Coutinho & Oswald, 2002). Researchers and policymakers use the following definitions to examine the issue of disproportionality:

- a. Disproportionate representation is the presence of students from a specific group their representation in the general population of students (Yates, 1988).
- b. Disproportionate representation is the extent to which membership in a given racial/ethnic group affects the probability of being placed in a specific special education disability category. The degree to which disproportionate representation exists is calculated as an odds ratio which is the number of students of X ethnicity in Y disability category/placement divided by the number of students of X ethnicity in the student population (Coutinho & Oswald, 1998; Oswald, Coutinho, Best & Singh, 1999).
- c. Disproportionate representation is the “percent of category or program by group” (Reschly, 1997). The numerator under this definition is the number of children in X ethnicity having Y disability type and the denominator is the total number of children classified with Y disability type (Reschly, 1997).
- d. Disproportionate representation is the “percent of group in category or program.” In this definition, the numerator would be the number of children from X

racial/eth compared to the percent of comparison group in category or program.” This calculation is referred to as the risk ratio and is increasingly becoming the preferred method by researchers and OSEP for assessing minority disproportionality (Burdett, 2007; Coutinho & Oswald, 2004). In a review of State definitions conducted by Burdett (2007), 18 of 28 states used a risk ratio formula to examine disproportionate representation of minority students.

### History Prior to 1975

Long before the federal government developed specific policies to protect the rights of children with disabilities, state and local school district officials created programs to meet the needs of children with disabilities and those at risk of school failure. School officials faced a disproportionate representation of not only minority students, but also students from low SES in these programs. Concerns about the appropriate classification and assessment of students for special education classes date back to the early 1900’s as schools struggled to meet the increasing diversity of their students that resulted from implementation of compulsory education laws. For example, Hendrick and MacMillan (1987; 1989) researched and documented the early efforts of school officials in Los Angeles (LA) and New York City (NYC) between 1900 and 1930. In both cities, the authors found that in order to cope with the increasing diversity of the student population and best meet the needs of all students in the school, a range of ability grouping and grading practices were used by school officials which included the development of ungraded, special classes for children that were identified as MR. These ungraded classes became the first organized form of special education for students

performing poorly in regular classrooms and formed in the larger cities of America such as NYC, Philadelphia, Baltimore, and LA where district officials observed the greatest amount of racial/ethnic and economic diversity. For example, district officials developed a special class for students classified as “misfits” in LA as early as 1902. By 1915 the number of these special classes had increased to 90. Simultaneously, City Superintendent of Schools, William Henry Maxwell, developed ungraded classes for students suspected of being MR in NYC. The number of ungraded classes in NYC grew from 61 classes in 1908 to 103 in 1910 to 189 in 1914 to 258 in 1920. This growth in the number of students in ungraded classrooms in NYC was about five to seven times faster than the increase in student enrollment in normal classes at the elementary school level (Hendrick & MacMillan, 1989).

A large percentage of students from “foreign” and recently immigrated families and students from low SES families were placed in these early, ungraded classes. For example, in LA, 22 of 111 first through third grade students who were enrolled in ungraded classes were “reported by their teachers and principals as being retarded on account of language alone” (Hendrick & MacMillan, 1987). According to Hendrick and MacMillan, LA school officials were not only aware that a large percentage of Mexican students were placed in ungraded classes, but also, that the academic achievement problems experienced by these students were primarily due to language problems and not a result of a disability.

Maxwell was interested in implementing a classification process that could properly identify students with a disability while preventing “normal” children who were not academically achieving as a result of (a) language problems, (b) a cultural mismatch

between the school/teacher and the student, or (c) SES (Hendrick & MacMillan, 1989). As a result, Maxwell worked to distinguish between students considered “incorrigible and truant children” and those that were “defective in mental ability.”(Hendrick & MacMillan, 1989, p. 400). To protect against individuals being misclassified and inappropriately placed in a special class, a process of teacher referral, documentation of a physical examination by a medical doctor, and ability test data such as the IQ test identified students in both NYC and LA for ungraded classes . The introduction and standardization of the Stanford-Binet intelligence test in 1916 resulted in a drastic expansion of these early special education programs. In 1914, 10,890 children were counted as enrolled in special classes for the MR; in 1922, this figure had increased to 23,252, and 10 years later, the count was 75,099 (Heller, et al., 1982).

After World War II, the number of programs for students classified as MR, as well as the prevalence of minority students served in these programs, increased drastically (Hendrick & MacMillan, 1987), but identification and placement was haphazard and inconsistent (Rothstein, 1990). Since that time, the disproportionate representation of minority students in special education has been a consistent and well-documented problem (Artiles, et al., 2004).

Dunn (1968) was first to address the issue in professional literature in his seminal article, “Special Education for the Mildly Retarded – Is Much of it Justifiable?” In this article, he called attention to the disproportionate representation of Black/African-Americans, American Indians, Mexicans, and Puerto Rican Americans in classes for students with mild mental retardation (MMR). He also noted that about one-third of all special education teachers in the nation were teachers of students with MR and guessed

that about 60-80% of students classified as MR were minority children from low SES backgrounds. Dunn observed that with the development of compulsory education laws, schools/teachers were forced to provide educational opportunities to students who had historically been excluded, such as low performing students from poverty, single parent homes, and low status minority groups. To meet the needs of these students, special education was created, and these groups of children were segregated into programs for students with MR like the ungraded special classes in LA and NYC discussed above (Artiles & Trent, 1994).

Dunn was not the only researcher concerned about the policies and procedures used to classify children in these early years. In 1972, the director of the Office of Child Development in the U.S. Department of Health Education and Welfare instituted a major government initiative with the support of Elliott Richardson, Secretary of Health, Education, and Welfare, and 10 federal agencies, all of whom had an interest in the topic of classification systems, the categorization of students, and the overrepresentation of minority students and students living in poverty. Secretary Richardson noted that research had been conducted on the use of appropriate diagnostic procedures for classifying children but the results of these studies had not been widely disseminated. He also noted that appropriate diagnostic procedures still needed to be standardized. Thus, a government initiative was developed to conduct a systematic review of the policies and procedures used to classify and label children with disabilities and to identify the consequences of classification.

What evolved from this initiative was the *Project on Classification of Exceptional Children*. The classification project had three objectives: (a) to increase public

understanding of problems associated with classification systems and categorizing children who are handicapped, disadvantaged, or delinquent; (b) to provide a rationale for public administrative regulations and guidelines bearing on classification systems and its consequences; and (c) to improve professional practice of educators, psychologists, physicians, lawyers, social workers, and others responsible for the well being of exceptional children (Hobbs, 1975). Once underway, the project narrowed its focus somewhat and concentrated on four issues: (a) the technical adequacy of diagnostic and classification systems; (b) the effects of labeling on individual children; (c) the consequences (such as special class placement or institutionalization) that may ensue when a student is assigned a disability label; and (d) the social, legal, and ethical implications of categorizing and labeling children, with a view toward achieving a sensible balance between individual rights and the common good (Hobbs, 1975). To meet the objectives of the project, a task force of 93 experts representing educators, psychologists, psychiatrists, pediatricians, sociologists, public administrators, lawyers, and parents of children with disabilities was convened. The task force summarized the existing knowledge base on classification systems and selected topical areas such as the overrepresentation of minority students and students living in poverty in special education programs. The work of the task force resulted in two publications: *Issues in the Classification of Children* edited by Nicolas Hobbs (1975) and *The Futures of Children* (1975). The task force wrote *Issues in the Classification of Children* to provide a foundation for public policy; the book presents a systematic review and summary about the classification of children and related problems.

Mercer, in her 1973 book *Labeling the Mentally Retarded*, documented the disproportionate representation of minority students in special education. In this book, Mercer explored the question, “Who is identified as mentally retarded?” through a social system and clinical epidemiology perspective. Mercer reported results of analyses on data collected in Riverside, California from 241 public and private organizations that served individuals with MR. Survey respondents identified a total of 813 persons under the age of 50 years as having MR in the 241 surveys collected. Among the 813 individuals, 32% were Mexican-Americans, but Mexican Americans represented only 9.5% of the total population in Riverside. Whites comprised 82 % of the total Riverside population, but only 54% of Whites were identified as having MR. Black/African-Americans represented 11% of persons identified as having MR, yet Blacks/African-Americans only represented 7 % of the total population in Riverside. Disproportionality was not observed in all 241 organizations. For instance, religious organizations, mental hygiene facilities, and private organizations serving individuals with MR demonstrated no disproportionality while marked disproportionality was observed in the public schools, law enforcement agencies, and public welfare-vocational rehabilitation centers.

In order to better understand why disproportionality was observed in some organizations and not in others, Mercer examined the methods for determining who was labeled as MR by organization. Results suggested that organizations depending largely on a statistical model which defines abnormality in terms of deviation from a mean and evaluates and describes persons in terms of an IQ score had higher rates of disproportionate representation than organizations that defined MR through a medical-pathological model which defines abnormality in terms of symptoms that are diagnosed



and classified by medical syndromes. For example, law enforcement agencies and public schools were the two organizations with the greatest overrepresentations of minorities and persons from low SES and relied almost exclusively on the statistical model for defining persons as MR.

Mercer also examined the process in which students are referred, evaluated, and labeled as MR within the schools. At the time of the study, Riverside Unified School District was comprised of 22 elementary schools, 6 junior high schools, and 3 senior high schools and served approximately 25,300 students. She collected data on: (a) the characteristics of the 1,234 students referred to the Pupil Personnel Department, (b) written teacher evaluations of students who were referred as possible MR during the year of the referral study, (c) the characteristics of all students who had ever been labeled as MR by the schools who were still living in Riverside, and 4) information obtained through a household survey. Mercer found Mexican-Americans to be overrepresented in the category of MR four times greater than what would be expected based on their proportion in the total student population. Further, Black/African-American students were three times more likely to receive special education services for MR than would be expected based on the population. Despite the overrepresentation of these two racial/ethnic groups identified as MR and receiving special education services in programs for the MR, neither group of students had been disproportionately referred for evaluation. In fact, students of “all ethnic groups were referred in their approximate and expected proportions” (p. 111). Further, Mercer found that not only did a higher percentage of Mexican-American and Black/African-American students and students from low SES score lower on IQ tests than White children, but Whites from higher SES

homes were less likely to be labeled as MR regardless of their score on the IQ test. Mercer noted that “20% of those [White students] not recommended for placement had IQs below 64” (p. 115). As a result, Mercer concluded that the bias in identifying a student in the category of MR occurred during the intervening step between referral and eligibility determination.

### *The Office of Civil Rights and Disproportionality*

The OCR within the USDE has the responsibility for collecting data on special education classification by race/ethnicity. The USDE created the OCR after the passage of Title VI of the Civil Rights Act of 1964 and charged the office with the overall goal of enforcing federal laws to ensure that educational institutions receiving federal financial assistance do not engage in discriminatory conduct. To fulfill its charge, OCR has worked with state and local education personnel on issues such as the failure of some school districts to provide equal educational opportunity for students who have limited proficiency in English, the overrepresentation of minority students in the categories of MR, ED, SLD, and SLI, and discriminatory assignment of minority students in segregated classes for students who are MR. The OCR monitors the actions of the nation’s approximately 15,000 school districts<sup>1</sup> through: (a) the administration of a biennial survey to approximately one-third of the nation’s school districts, (b) compliance reviews, and (c) response to complaints of discrimination received.

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<sup>1</sup> According to the Digest of Education Statistics, 2005 produced by the National Center on Education Statistics (NCES), the number of public school districts in the 2003-2004 school year was 14,383. Retrieved May 27, 2007 from [http://nces.ed.gov/programs/digest/d05/tables/dt05\\_084.asp](http://nces.ed.gov/programs/digest/d05/tables/dt05_084.asp)

### *Biennial survey*

The OCR has administered a biennial survey to approximately one-third of the nation's school districts since 1968. This survey is an efficient tool for documenting the practices of a nationally representative sample of school districts. The OCR designed the survey to collect and evaluate data related to discriminatory practices in school districts including examination of the overrepresentation of minority students in special education. The OCR uses a stratified random sampling scheme to collect the data so that state and national figures may be projected from the survey data (Oswald, et al., 2001). The OCR collects data on special education students by race/ethnicity in the categories where a disproportionate representation of minority students has been historically observed including MR, ED, SLD, and SLI. Prior to 1994, data on students identified as MR were collected in two categories: (a) educable MR and (b) trainable MR. In 1994, OCR collapsed the two categories of "educable MR" and "trainable MR" into one broader category of MR, discontinued monitoring of SLI, and began monitoring student enrollment in G/T programs (Donovan & Cross, 2002). The OCR publishes these data as part of the Elementary and Secondary School Civil Rights Compliance Report. Researchers have used these data extensively to examine the issue of disproportionate representation and to inform policy decisions. Although the OCR data provides useful longitudinal data on disproportionality, there are some limitations to using these data. Limitations of the OCR dataset as well as results from analyzing the dataset are presented in the critical review of this chapter's literature section.

The Assistant Secretary of the OCR established a task force, Minorities in Special education (MINSPEd), in 1994, to study the issue of minority overrepresentation in

special education (Glennon, 2002). Upon forming MINSPEd, the assistant secretary issued a memorandum describing the ways in which inappropriate placement in special education was detrimental to minority students. Limited access to the core curriculum, stigmatization, and racial segregation were cited as key reasons. At the same time that MINSPEd was being formed, the OCR was in the process of changing some of their practices and procedures to increase effectiveness in fulfilling their charge. Due to the large number of complaints received, the time required processing each complaint or compliance review, and the limited number of staff, the OCR began to use a partnership approach in complaint resolution and compliance review activities. Through this approach, the OCR encouraged states and local school districts to enter into cooperative agreements to implement measures to reduce the disproportionate placement of minority students in special education. Between 1993 and 2001, the OCR conducted 168 compliance reviews and entered into 147 cooperative agreements with individual school districts and five cooperative agreements with state departments of education. The majority of these cooperative agreements included: “1) development and implementation of prereferral strategies for all students experiencing learning or behavior problems prior to referral for special education evaluations; 2) in-service training for all staff members concerning teacher expectations and effective education for a diverse student population; 3) standardization of prereferral, referral, and evaluation procedures including the use of validated testing and assurances that identification is based on a wide range of factors, not just performance on IQ tests; and 4) tracking and reporting to the OCR on prereferral interventions, evaluations for need for special education, identification as disabled, and restrictiveness of placement of all special education students by race” (Glennon, 2002, p.

200). These cooperative agreements have not only helped states and local school districts address the issue of disproportionate representation of minority students in special education programs but also have been instrumental in informing changes in IDEA legislation and corresponding regulations.

### Legal Policy and Litigation

The Education of All Handicapped Children Act (P.L. 94-142) was passed in 1975 and became effective in 1977. The Act, whose name was changed in the 1990 reauthorization to IDEA, is the primary federal law defining which students are eligible for special education and related services and the rights and protections afforded to these students. Before and after the passage of P.L. 94-142, Congress acknowledged the problem of disproportionate representation of minority students in special education. The original statute and regulations as well as subsequent revisions to the law include a number of provisions designed to ensure nondiscriminatory testing and the use of evaluation materials and procedures designed to address this issue (Rothstein, 1990). The statutory and regulatory policies are discussed in the following section along with key court cases relating to disproportionate representation.

#### *IDEA and Eligibility*

One of the basic rights included in the IDEA is the right to nondiscriminatory testing, evaluation, and placement procedures. The basic requirements of the provision include a comprehensive and individualized assessment to determine disability as well the child's educational needs, a team decision-making process that includes the parents,

assessments that lead directly to interventions, and the monitoring of student progress toward IEP goals (Hueffner, 2007; Yell, 2006). These procedures were intended to place the focus on each individual student's unique difficulties in learning in the classroom. During the passage of P.L. 94-142, Congress heard testimony regarding how IQ and achievement tests dominated special education eligibility and placement decisions and that these decisions were often based on a single test (i.e., the IQ test). Furthermore, many school districts were using tests that were considered discriminatory or were not normed for use with students with disabilities (Yell, 2002). As a result, the PEP regulations were developed by OSEP to address abuses in the assessment process and were implemented in 1977 (Donovan & Cross, 2002; Losen & Welner, 2002). These regulations were designed to ensure that (a) all students with genuine disabilities were considered for special education and (b) students with learning patterns and behaviors that appear to be disabilities but were, in fact, due to cultural differences were not determined to be eligible for special education. Specific features of these regulations were derived, often verbatim, from the results of class action court cases such as *Diana v. State Board of Education* (1970); *Guadalupe Organization v. Tempe Elementary School District No. 3*, (1972); *Mills v. Board of Education* (1972); and *Pennsylvania Association for Retarded Children v. Commonwealth of Pennsylvania* (1972) (Donovan & Cross).

The purpose of these regulations was to ensure that evaluations were individualized for each student and that school districts did not simply employ a standard battery of tests, which often included an IQ test, a test of visual-motor perception, and a brief screening test of achievement. Thus, no single assessment test (e.g., IQ test) could be used as the sole criterion for determining eligibility or placement of a student in

special education. Rather, the PEP regulations stipulated that a student be assessed in all areas related to the suspected disabilities and that tests used to assess the student be (a) validated for their intended use, (b) given in a child's native language, and (c) administered by trained personnel (Hueffner, 2007; Yell, 2006). The regulations guaranteed parents the right to review educational records, obtain an independent evaluation of the student, receive written notice prior to initiation of the placement process, and demand a hearing before an impartial officer if the placement is challenged.

The PEP regulations were not changed from 1977 until 1999, when the regulations for IDEA 1997 were published as the Procedures for Evaluation and Determination of Eligibility (34 CFR 300.530 to 34 CFR 300.543). The reauthorization of IDEA in 1997 was viewed as an opportunity to give increased attention to racial, ethnic, and linguistic diversity to prevent inappropriate identification and mislabeling. The 1997 amendments state “a child shall not be determined to be a child with a disability if the determinant factor for such determination is lack of instruction in reading or math or limited English proficiency” [Section 614(b)(4)]. The 1997 statute and regulations maintained all of the basic requirements in PEP (34 CFR 300.532) but were expanded to focus on gathering functional and developmental information on the student from a variety of sources, including parents. This requirement emphasized the importance of gathering information about the problem behavior in the natural setting and was aimed at reducing the likelihood of disproportionate representation of minority students in special education. To fulfill this requirement, three new regulations 532(h), (i), and (j) were developed that focus on assessment procedures and the importance of aligning the assessment process with the development of a special education program.

Curriculum-based measures as opposed to standardized tests were emphasized (Donovan & Cross, 2002). Additional new requirements in the 1997 amendments required states: (a) to collect and review data on racial disproportionality in identification and placement, (b) to intervene when disproportionality is considered to be significant, and (c) to have policies and procedures designed to prevent inappropriate over-identification of children with disabilities by race.

### *IDEA and Assessing Disproportionality*

According to the 2004 amendments to IDEA, states are required to collect and examine data to 1) assess disproportionality resulting from inappropriate identification [20 U.S.C. 1416(a)(3)(C); 34 CFR §§300.173 and 300.600(d)(3)] and the placement, by setting, of such children [34 CFR 300.646(a)] [20 U.S.C. 1418(d)(1)] and 2) determine if significant disproportionality is occurring at the state or local level [20 U.S.C. 1418(d) and 34 CFR §300.646]. These data must be collected and analyzed annually and States are required to publicly report data and findings.

Each State has the responsibility of defining significant disproportionality based on numerical information; a difference of 20% points or greater has developed as a common convention used by many states and researchers (Coutinho & Oswald, 2004). States who find a significant disproportionate representation of students in special education by race/ethnicity need to review, and when appropriate, revise or develop new policies, procedures and practices used to refer, identify, place, and discipline students with disabilities (Posny, 2007). Further, States who find significant minority disproportionality must require that the local education agency utilizes the maximum



amount of the flow-through funds received under Part B of IDEA to provide early intervening services (EIS). The purpose of EIS is to target students who have not yet been identified for special education yet, are at risk [34 CFR §300.646(b)(2)].

### *Early Intervening Services*

A new provision in the 2004 IDEA amendments is EIS [20 U.S. C. 1432(4)]. This provision permits local school districts to use up to 15 % of their federal special education funds for any fiscal year to provide “early intervening services” to students who have not been identified as needing special education or related services but who need additional academic and behavioral support to succeed in a general education environment. These services may be provided to students in K-12 but should emphasize grades K-3 and target students who are not currently identified as receiving special education or related services but who need additional academic and behavioral supports to succeed in the general education environment. EIS may include professional development and providing educational and behavioral evaluations, supports and services. The funds may be used to carry out activities coordinated with the No Child Left Behind Act as long as they supplement those services. In cases where a local district has been identified as having significant disproportionality in either the identification or placement of students with disabilities, the district must implement EIS and emphasize service to those groups that were significantly over identified [34 CFR 300.646(b)(2)] [20 U.S.C. 1418(d)(2)(B)]. Districts are also required to report on the number of children served through the EIS as well as the number of children that were initially served

through EIS and subsequently were identified as eligible for special education and related services under Part B of the act [34 CFR 300.226(d)] [20 U.S.C. 1413(f)(4)].

### *Key Litigation*

As noted above, several court decisions played a key role in the recognition of students' rights to an education and their protection against biased placement (Coutinho & Oswald, 2004). Although disproportionate representation includes both the overrepresentation of minority students in the categories of MR, ED, and SLD and the underrepresentation of minority students in programs for the G/T, the majority of lawsuits have focused on the issue of overrepresentation and specifically on the use of IQ testing as a means of classification. Significant court cases include *Hobson v. Hansen* (1969), *Diana v. State Board of Education* (1970), *Larry P. v. Riles* (1979), *PASE v. Hannon* (1980), *Marshall et al. v. Georgia* (1984), and *Crawford et al. v. Honig* (1998). Prior to 1975, court cases tended to focus on assessment procedures and instructional quality whereas cases heard after the passing of the Education of All Handicapped Children Act focused more on the definition of MR and the cultural appropriateness of IQ tests (Coutinho & Oswald, 2004).

#### *Hobson v. Hansen*

*Hobson v. Hansen*, 269 F.Supp.401 (D.C. Cir. 1967, 1969) was the first major case to challenge the use of standardized tests and pupil tracking in DC public schools (Reschly, 1997). Due to concerns regarding poor standardized test scores of students in the tenth grade and reports about the educational retardation of some students, the DC Board of Education for the elementary, junior, and senior high school levels developed

and passed an ability group tracking system that was implemented in the late 1950's. Researchers based the tracking procedures on multiple sources of information including grades, teacher recommendations, and standardized tests of achievement and ability. This tracking system was the foundation for the *Hobson v. Hansen* court suit. Because a disproportionate number of minority students were assigned to the lower ability groups, the school district had the burden to prove that their ability grouping practices did not contribute to the differences in performance found between minority students and white students and that the lower ability groups were not only receiving quality instruction but also instruction that was superior to what they would otherwise achieve without ability grouping. The plaintiffs argued that the lower ability track had limited curriculum and course offerings, instruction that was inferior to the higher ability tracks, and poorer facilities (Reschly, 1997). Judge Wright determined that ability grouping was unconstitutional, resulted in a disproportionate number of minority students placed in lower track courses, and denied equal opportunity for economically disadvantaged and minority students, particularly Black/African-American students. Ultimately, Judge Wright determined the ability grouping system inequitable because the process for determining what ability group a student would be assigned was based on a generic score which led to an overall placement decision into an ability group and no compensatory provisions were provided within the lower tracks to improve student performance. As a result, the tracking system was terminated.

*Diana v. State Board of Education*

*Diana v. State Board of Education* (1970) was the first court case that directly disputed the disproportionate minority representation in special education, the use of individually

administered IQ tests, and the placement of minority students from Latino and Native American groups on the grounds of inadequate assessment practices. Diana was a Spanish-speaking student in Monterey County, California who had been placed in a class for students with MR because of her low score on the standardized IQ test administered in English. The court case was a class action suit filed on behalf of Diana and eight other Mexican-American children from Monterey County Schools. In this school district, Mexican-American students comprised 33% of the MR population while only comprising 18.5% of the total student enrollment. Plaintiffs claimed that classification and placement decisions that were made on the basis of verbally loaded IQ tests were unfair to English Language Learners (ELLs) and that psychologists were inadequately trained to evaluate ELLs. Plaintiffs also argued that often parents were not informed that their child was referred or given the opportunity to participate in the decision-making regarding diagnosis and placement. Further, the plaintiffs viewed the educational programs for students identified for special education as inferior and inadequately funded.

The Diana case was resolved through a consent decree whereby the court ruled that Spanish-speaking children should be tested in their native language to avoid errors in placement and avoid inappropriate categorization (Artiles & Trent, 1994; Reschly, 1987). The court also mandated the use of non-verbal tests and the collection of extensive support data necessary to justify special education placement. Although the court ruled in favor of the plaintiff, it is important to note that the court did not reject the notion of IQ or achievement testing – rather, it was the type of test used that was modified. As a result of these changes in the assessment process, virtually all overrepresentation of Hispanic students in IQ ranges below 70 was eliminated (Reschly, 1997).

*Larry P. v. Riles*

*Larry P. v. Riles* (1979) was also concerned with tests that do not discriminate on the basis of race/ethnicity. In this case, Black/African-American students in California were overrepresented in programs for students with MR; although Black/African-American students constituted only 10% of the total California student enrollment, Black/African-American students represented 25% of the enrollment in these programs. The plaintiff claimed that this overrepresentation of Black/African-American students in MR programs was due to the use of culturally inappropriate standardized IQ testing to evaluate Black/African-American students for MR resulting in misclassification of some students. In this case, the courts expanded the ruling in the Diana case and ruled that the use of standardized IQ testing to evaluate Black/African-American students for MR was culturally inappropriate and therefore banned.

*Marshall et al. v. Georgia*

In the case of *Marshall et al. v. Georgia* (1984, 1985), the use of ability grouping was challenged again on behalf of Black/African-American students in Georgia who were overrepresented in lower general education tracks, and as a result of placement in this lower track, were misclassified as mild MR. In contrast to the court ruling in *Hobson v. Hansen* (1969), the court ruled in favor of ability grouping in *Marshall et al. v. Georgia* (1984, 1985). To build the case for ability tracking, the defendants pointed out that formal grouping was used primarily in the elementary grades and rarely at the high school level, argued that a combination of objective and judgmental criteria were used to constitute classroom groups, demonstrated the flexibility of their ability tracking through block grouping which allowed students to be placed in different tracks depending on the

subject, established that the grouping procedures allowed for greater individualization of instruction, and provided evidence of beneficial outcomes and improved performance for students in the lowest ability tracks. In this case, the level of achievement within a basal curricula was emphasized as having the most important influence on ability grouping decisions, and students were not assigned to one ability group for all content areas – rather, a student’s assignment to an ability group varied by subject depending on their achievement within that subject. Further, in the Marshall case, the school district provided evidence that 37% of the students in the district changed levels over the course of two academic years and demonstrated that since placement in the ability groups was based on achievement, teachers were able to individualize the instruction provided to meet the needs of the students in the classroom. In this case, the courts supported the school district in their implementation of ability grouping and found that it was preferable to mixed-ability groups because the ability grouping provided for improved educational opportunities for Black/African-American students. In 1984, the plaintiffs appealed the trial opinion to the U.S. Court of Appeals for the 11<sup>th</sup> Circuit where the initial court findings and ruling were upheld.

*Crawford et al. v. Honig*

In 1998, the Larry P. ban on IQ testing for purposes of placing Black/African-American students in special education classes was questioned in *Crawford et al. v. Honig* (1998). The original ruling to ban the use of IQ tests when evaluating Black/African-American students for the category of MR had been expanded in 1986 to prohibit the use of standardized IQ tests with Black/African-American students for all special education placements. In the *Crawford et al. v. Honig* (1998), Black/African-

American students argued for the administration of standardized IQ tests in special education evaluations of Black/African-American students so they could qualify for special education. The court ruled that the 1986 expansion of the original ruling was not supported by factual findings and determined that the use of standardized IQ tests could be used when evaluating students for the category of Specific Learning Disabilities (SLD). However, the court continued to support the original ruling which banned the use of standardized IQ tests with Black/African-American students when evaluating a student for the category of MR. The results of this case aligned with the position of the Office of Special Education and Rehabilitative Services which stated that standardized IQ tests can be a valuable part of the evaluation process if they are not used as the sole criterion for placement and that the appropriate use of IQ tests should not be prohibited.

#### The National Research Council Reports

The U.S. Congress twice has asked the NRC of the National Academy of Sciences to examine the disproportionate representation of minority students in special education. The first study (the Panel on Selection and Placement of Students in Programs for the Mentally Retarded) began in 1979, The panel produced and results were published in 1982 (Heller, et al., 1982). The second NRC study (Donovan & Cross, 2002) not only examined the regulations and guidelines surrounding special education identification and placement but also examined issues of school-level capacity, supports for achievement, and environmental influences on the development of children that could potentially make children more vulnerable to school failure. Further, while the first study focused on disproportionate representation within the category of MR, the charge of the

second study was to examine the extent and causes of overrepresentation of minority students in classes for MR, ED, and SLD as well as the underrepresentation of Black/African-Americans, American Indians, and Hispanics in G/T classes. An overview of the research questions, key findings, and recommendations from each of these studies is discussed below.

### *1982 NRC Report*

The 1982 NRC Committee was comprised of 15 individuals representing fields such as law, psychiatry, statistics, clinical psychology, and both general and special education. The committee was convened in 1979 under the auspices of the Committee on Child Development Research and Public Policy of the NRC. The panel commissioned several preliminary studies as well as a series of background papers and analyzed the data gathered by OCR to document the nature and extent of disproportionality in special education. The OCR data were disaggregated at the district-level for analysis due to the wide variation in identification and placement procedures within each district and a log-odds index of disproportion was calculated for each special education category in order to examine the correlation between the extent of disproportion and school-related characteristics. Results suggested large regional variation in minority representation with the greatest disproportion in the southern states, relatively low disproportion in the West, and virtually no observable disproportion in the Northeast and Midwest. In addition to regional variation, the extent of racial/ethnic disproportion varied by district size with the greatest degree of disproportion observed in large districts with more than 30,000 students. The smallest amount of disproportion was observed in districts with 1,000-



3,000 students, and a slightly higher degree of disproportion was observed in districts with fewer than 1,000 students and districts with 3,000-10,000 students.

The panel also examined the impact of district minority enrollments and found: (a) an increase from small to moderate disproportion as minority enrollment increased from zero to 50% in all district sizes, (b) a decrease in disproportion in medium and large school districts when minority enrollment was between 50 and 90%, and (c) significant disproportion in small school districts with more than 50% minority student enrollment. Thus, the impact of percent minority in the school district varies depending on the size of the school district. Further, the committee found that although nationwide summary statistics suggest an underrepresentation of Hispanic students in the category of MR, the “small Hispanic-White difference for the nation as a whole is an average of many sizable positive and negative disproportions” (p. 13). These analyses led the committee to conclude that disproportion is determined by multiple interacting factors including legal and administrative requirements, characteristics of the students, quality of instruction, potential bias in the referral and assessment process, characteristics of community-level factors, and broader historical and cultural contexts.

In an effort to identify feasible and effective policies and practices to reduce overrepresentation, the committee turned its focus to addressing the causes of disproportion representation and examining the underlying assumptions and reasons for this problem. A wide range of factors was examined in the study including the role of IQ testing, appropriateness of educational setting, definition and measurement of MR, racial discrimination in educational practices, and effectiveness of instruction. Analysis of these factors helped the committee define an improved set of rules for assessing and

placing a student who needs special education services, determine whether placement in special education would be beneficial, and decide when and how students would exit special education programs. As a result of their work, the committee developed six key recommendations that were designed to improve the referral, assessment, and placement procedures as well as the quality of instruction within the general education and special education classroom. The committee offered the following recommendations:

a. Teachers in the general education classroom should be responsible for implementing multiple educational interventions and monitoring the impact of the intervention on a student experiencing academic problems prior to referring the student for special education assessment.

b. Assessment specialists are responsible for documenting that the evaluation measures are valid and assess the functional needs of the individual student

The IEP placement team is responsible for ensuring that any label given to a student or placement in an educational program result in improved student outcomes that cannot be achieved in the general education classroom

Special education teachers and related service personnel are responsible for implementing high-quality, effective individualized instruction that adhere to the goals of that students' IEP

c. Special education teachers and related service personnel are also responsible for reevaluating the student on an annual basis to determine whether or not the student should continue to receive special education services

Administrators at the district, state, and national level are responsible for monitoring special education placements and types of services provided to ensure

that appropriate procedures are employed and that there are no inequities within the system. (Heller, et al., 1982, p. 94-95)

In addition to the recommendations for school personnel, the committee provided recommendations to improve the OCR's data collection and monitoring of disproportionality. The committee recommended the following changes to the OCR survey instruments, administration, and data analyses: (a) alternative ways to collect data on the amount of time students spend in special education classes in order to clarify instructional placement and gather additional information; (b) analyses of OCR survey data should be based on placement rates that are calculated uniquely for each racial/ethnic group in order to highlight patterns of disproportion for all minority groups, and (c) development of a system for data validation to include recounts of students enrolled in schools and school programs in a sub-sample of the schools.

### *2002 NRC Report*

Twenty years after the release of the first NRC report, the NRC convened a second committee to once again examine the problem of disproportionality. Whereas the first study focused on the overrepresentation of minority students in special education programs, specifically in the category of MR, the second study was expanded to include examination of minority underrepresentation in G/T programs and minority overrepresentation in the categories of MR, ED, and SLD. The committee grounded its work in the assumption that student achievement and behavior is determined through the interaction of the child, the teacher, and the classroom environment including effectiveness of instruction (Donovan & Cross, 2002). Similar to the 1982 report, the

2002 report considered disproportionality to be problematic when it stigmatizes a student, results in lowered expectations, or leads to poor educational outcomes. The committee did not view the end goal as one in which no minority group was represented in disproportionate numbers, rather the end goal should be one in which the children who receive special education or gifted program services are those who truly require them and who benefit from them (Donovan & Cross, 2002).

The 2002 NRC report addressed the following four questions: (a) “Is there reason to believe that there is currently a higher incidence of special needs or giftedness among some racial/ethnic groups? Specifically, are there biological and social or contextual contributors to early development that differ by race/ethnicity? (b) Does schooling independently contribute to the incidence of special needs or giftedness among students in different racial/ethnic group through the opportunities that it provides? (c) Does the current referral and assessment process reliably identify students with special needs and gifts? In particular, is there reason to believe that the current process is biased in terms of race/ethnicity? and (d) Is placement in special education a benefit or a risk? Does the outcome differ by race or ethnic group?” (Donovan & Cross, 2002, pg. 21).

In response to the first question, the committee determined that because minority students are disproportionately poor and poverty is associated with a number of environmental and health conditions that have negative effects on early cognitive and emotional development, minority students are at a greater risk of being identified as needing special education services (Donovan & Cross, 2002). With regards to the second question, the committee found that schools with higher concentrations of low-income and minority students are also less likely to have experienced teachers thereby influencing the

quality of instruction provided. Question three, which addressed the bias in the referral process, was more complex and difficult to answer. It has been well documented that eligibility determination is subjective (Reschly, 1987), and both NRC reports concluded that eligibility determination for special education is extremely judgmental. Although teachers could be biased in evaluating student performance and behavior, the referral is only the first step in determining eligibility and placement in special education. Once a student is referred, the student is then evaluated and determined to be eligible or ineligible for services. Although the assessment process is designed to ensure that students are evaluated objectively, there is controversy surrounding the cultural bias in assessments used. The committee concluded that the “right” students were not being identified for special education. According to the committee, some students with learning problems were overlooked for referral, and procedures for the assessment process were conducted later in the education process than is most effective or efficient. Finally, the committee did not believe that appropriate data had been collected in order to address question four.

### Critical Review of Research Studies

In the following section, 11 research studies on the disproportionate representation of minority students in special education are reviewed and key findings from the articles are discussed. Articles included in this section were selected based on the following criteria: (a) publication in a peer-refereed journal; (b) empirical examination of disproportionality through analyses of a national-, state-, or district-level dataset; (c) focus on reporting the extent of disproportionate representation as well as

examination of potential demographic, economic, school-related, and academic factors; and (d) use of quantitative methodologies for analyses. All studies met these criteria with the exception of one article (Hibel, et al., 2006) that was not published in a peer-refereed journal. This study was published in a report of the Population Research Institute and was included in the review because of its direct relevance to the proposed study.

Guidelines provided by Issac and Michael (1997) were used to develop the framework for evaluating each article. The following aspects of each article were assessed: (a) clear statement of the problem, research questions, and hypotheses; (b) description of dataset used and sample; (c) adequacy of variable descriptions; (d) appropriate data analyses methods, and (e) clear description of findings. Each of these areas is discussed below.

#### *Rationale, Research Questions, and Hypotheses*

All of the reviewed studies included a well-described and clear purpose (Table 4). The authors of each study established the significance of the problem through providing a strong rationale for their research and a review of the related literature. All authors discussed the long-standing history of disproportionality in the judgmental categories of MR, ED, and SLD. Some authors also discussed key court cases and changes in IDEA as it relates to addressing disproportionality. Although the purpose of the research is provided in each of the articles reviewed, authors of only two of the studies (Oswald, et al., 1999; Skiba, et al., 2005) explicitly stated the research questions that guided their investigations (see Table 4). Inclusion of clearly stated research questions and

hypotheses help the reader to understand the researcher's line of inquiry, methodological approach, and interpretation of findings.

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Considering the variety of definitions used throughout the literature for disproportionate representation, it would seem that researchers would clearly define disproportionate representation as used in their study in order for the reader to accurately interpret the findings of the study. The authors of only 2 (Artiles, et al., 2005; Oswald, et al., 1999) of the 11 studies included a definition of disproportionate representation that guided their investigation.

#### *Description of Dataset and Sample*

All 11 studies included in this review used extant datasets to examine the disproportionate representation of minority students in special education. Seven of the authors used one or more nationally representative dataset(s) (Chinn & Hughes, 1987; Coutinho, et al., 2002; Finn, 1982; Hibel, et al., 2006; Oswald, et al., 1999; Oswald, et al., 2001; Zhang & Katsiyannis, 2002), one of the authors used state-level datasets (Simmone, et al., 2005), two of the authors used district-level datasets (Artiles, et al., 2005; Hosp & Reschly, 2002), and one of the authors used a combination of nationally representative datasets and district-level datasets (Hosp & Reschly, 2004) (Table 5). Nationally representative datasets included the OCR dataset, the Common Core of Data dataset, the ECLS-K, data from the 22<sup>nd</sup> Annual Report to Congress on the

Implementation of the Individuals with Disabilities Education Act (2000), and the National Center for Education Statistics: Statistics in Brief and the Census Bureau. The OCR dataset and the Common Core of Data dataset were merged in 4 of the 11 studies.

Detailed descriptions of the overall study design, sample, variables of interest, instruments used in data collection, and data collection process are important elements of a research study. Eight of the authors (Artiles, et al., 2005; Chinn & Hughes, 1987; Coutinho, et al., 2002; Finn, 1982; Hibel, et al., 2006; Hosp & Reschly, 2004; Oswald, et al., 2001; Oswald, et al., 1999) provided an adequate description of the datasets analyzed. Authors of the three remaining studies (Hosp & Reschly, 2002; Skiba, et al., 2005; Zhang & Katsiyannis, 2002) provided insufficient information about the dataset used.

In order to facilitate interpretability of the findings for the reader, researchers using extant data should also provide a description of the analytic sample used throughout their analyses (see Table 5). Eight of the authors provided information on the number of school districts and schools in the analytic sample (Artiles, et al., 2005; Coutinho, et al., 2002; Finn, 1982; Hosp & Reschly, 2002; Hibel, et al., 2006; Hosp & Reschly, 2004; Oswald, et al. 2001; Oswald, et al., 1999). However, the majority of these studies failed to report relevant information about the analytic sample such as size of school districts or racial/ethnic composition of the sample. It is possible that this information was not included because the majority of the studies applied weights in order to generalize the population. However, in this case, the authors should provide a detailed description of the population. It is also possible that additional information about the analytic sample was not provided because it was unavailable to the authors or because the information is publicly available to the reader. For example, although Artiles et al.



(2005) do not provide detailed information about the sample in their article, they provide the website where readers can access additional information about the sample. Among the 11 studies, Hosp and Reschly (2004) provided the most detailed explanation of the sample in their dataset. They included information such as the number and percent of race/ethnic group in the population, grade levels, and educational setting.

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*Limitations of using extant datasets*

There are several limitations to using extant datasets when examining disproportionality. Depending on the dataset, key limitations could include: (a) how race/ethnicity is determined; (b) the criteria for determining disability categories; (c) the sampling framework, and (d) the need to merge multiple datasets in order to address research questions for the current study (Coutinho & Oswald, 2000; Oswald, et al., 2001; Oswald, et al., 1999). Although the OCR and OSEP datasets provide invaluable longitudinal data on the disproportionate representation of minority students in special education, there are limitations to using these data. A key limitation for both datasets is how studies measured race/ethnicity and disability (MacMillan & Reschly, 1998, Donovan & Cross, 2002). In both datasets, the data on race/ethnicity are aggregated from the school building level to the district, state, and national levels. As a result, any variation in practices for determining race/ethnicity or disability at the school building or

district level is obscured when considering state and national figures (MacMillan & Reschly, 1998). Further, these datasets do not account for biracial children and fail to consider the impact of socioeconomic status (MacMillan & Reschly, 1998).

The disability status of a child is reported in both the OSEP and OCR datasets. However, as was discussed previously in this chapter, there is great variation from school to school and district to district in how disability criteria are operationalized in the judgmental categories of MR, ED, and SLD. As a result of these differences, a child who has been identified as MR in one district could be identified as SLD in another district. Thus, comparing the prevalence rates at the regional-, state-, or district-level is difficult and the true prevalence of these categories cannot be determined (Donovan & Cross, 2002). Finally, since researchers generally analyze the OSEP and OCR datasets at the national-level, significant state and district variation is ignored, and the findings do not accurately portray the reality of disproportionate representation.

MacMillan and Reschly (1998) raised an additional concern regarding the use of the OCR dataset revolving around the sampling framework. Although the OCR samples one-third of the nation's school districts, the sampling framework is such that the dataset includes the 50 largest school districts (the majority of which are located in urban inner cities) in the nation and only a sample of smaller districts. This sampling framework could result in an over-sampling of Black/African-American students since there is a greater percentage of Black/African-American students attending the 50 largest school districts. Also, since small and rural school districts are not oversampled, there is concern that the sample does not fully represent the population attending these types of schools. The concern about the sampling framework is often cited by researchers as a

potential limitation to using the OCR dataset, however, the data are still analyzed and interpreted with the assumption that they can be generalized to the population and are nationally representative.

### *Adequacy of Variable Descriptions*

Researchers should explicitly define the variables used in the study and describe how variables are measured. The quality and degree to which dependent and independent variables were described varied greatly across the studies. The independent variables used in the 11 studies fall into four main categories: (a) demographic variables, (b) economic variables, (c) school-related variables, and (d) academic and behavior variables. The variables included in each study are presented in Table 6. Although adequate descriptions were provided in each study on the majority of the variables, inadequate information was provided for some of the variables; none of the studies provided descriptions of the instrumentation used to collect the data for each variable. For example, at risk was not defined in the variable “percent of students enrolled who were considered at risk” in the studies by Coutinho, et al. (2002), Oswald, et al. (1999) and Oswald, et al. (2001). Similarly, how the economic variable SES was measured is not provided in the study by Artiles, et al. (2005). SES is a composite variable that combines responses from a series of questions such as household income, housing value, educational attainment, and occupational status of the parent. Since the variables included in the SES composite vary across studies, it is important for researchers to describe how the SES variable was calculated in their research. The variables “individual teacher help”, “project life”, “peer helper”, “counseling” and “initial peer relations” in the

article by Hosp and Reschly (2002) were also not clearly defined. The lack of clear definitions and descriptions of instrumentation and variables seriously impacts the interpretability of the findings. The reader does not know who has provided the information being reported, does not have a clear definition of all variables, and is unable to effectively evaluate the interpretation of results provided by the authors.

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### *Data Analysis*

Three common methods for measuring and reporting on the extent of disproportionality within a sample include calculation of the Odds Ratio (OR), the Risk Index (RI), and the Composition Index (CI). OR (Finn, 1982) is used to calculate the odds of a student of a certain group (i.e. Black/African-American) being identified in a certain category (i.e. MR) by dividing the number of students in the group of interest in that category by the number of students in that group not in that category (Donovan & Cross, 2002). This number is then divided by the odds of students of all other groups identified in the same category (i.e. MR) to create the OR. In other words, to calculate the OR of Black/African-American students identified as MR, the number of Black/African-American students classified as MR would be divided by the total number of Black/African-American students not identified as MR. This number would then be divided by the odds of White, Hispanic, Asian, and American Indian/Alaska Native students being identified as MR. Finn (1982) argued that this analysis technique resulted

in an accurate picture of the disproportionality problem since disproportions could appear larger or smaller if based on absolute number and differences of percentages or ratios.

The OR provides a consistent measure of the likelihood of a certain event. However, it does not include a measure of the RI nor does it provide for a direct comparison of groups. Researchers using the OR or RI (discussed below) need to determine the reference group that will be used as the denominator. There are three methods for calculating the denominator: (a) use the OR or RI for all students not in the target group, (b) use the OR or RI for all students in the population of interest, or (c) use a consistent group as a comparison (e.g., White). Typically, researchers have used White as the comparison group when calculating the RI. A limitation to using Whites as the comparison group is that the RI and associated risk ratio cannot then be calculated for White students (Coutinho & Oswald, 2004).

The RI is calculated by dividing the number of students in a given racial/ethnic group placed in a particular disability category by the total enrollment for that racial/ethnic group in the school population (Klinger, et al., 2005; Donovan & Cross, 2002). The risk ratio can then be calculated by comparing the RI of one group to the RI of another group (or the total population) (Klinger, et. al., 2005; Skiba et al., 2005). Risk ratios are generally a more stable indicator in districts with large numbers of students in each group being compared and may not be appropriate for use with smaller districts because the smaller a group's representation is in a district, the more individuals influence the relative risk ratio for that district (Hosp & Reschly, 2004). One additional problem with risk ratios is that they do not adjust for differences in the overall special education identification rates (Coutinho & Oswald, 2004).

The CI compares the proportion of students in special education from a given racial/ethnic group with the proportion of that group in the population or in school enrollment (Donovan & Cross, 2002; Skiba, et al., 2005). The CI is calculated by dividing the number of students in a given racial/ethnic group placed in a particular disability category by the total number of students enrolled in that disability category (Klinger, et al., 2005; Donovan & Cross, 2002). Interpretation of the CI is tied to the base rate in the population for the racial/ethnic group in question, which complicates use of the CI to compare statistics across schools, districts, and states (Coutinho & Oswald, 2004). Generally, researchers using the CI consider a group to be overrepresented if its representation in special education is equal to or greater than 10 percent of the percentage expected on the basis of the school population. For example, if 15% of the school population is Black/African-American, then Black/African-American enrollment in a disability category should fall between 13.5 and 16.5% (i.e. 15 plus or minus 1.5). Thus, Black/African-American students are considered underrepresented if fewer than 13.5% were enrolled in a disability category, and Black/African-American students are considered overrepresented if more than 16.5% were enrolled. OSEP adopted the CI in their initial implementation of the IDEA 1997 mandate to monitor disproportionality. In their Annual Performance Reports, states are asked to calculate disproportionality baseline/trend data using the CI. The OSEP Annual Performance Reports also adopted the conventional 20% point difference as the cut-point for what constituted disproportionality. Latest guidelines for measuring disproportionate representation recommend calculating multiple indicators for disproportionality (Artiles & Rueda, 2002; Donovan & Cross, 2002.). Although the overall results of analyses are similar for all

three methods of measurement, slight differences are observed depending on the method used. The interpretation of data leads readers to different perceptions about the extent of the problem. These differences in how disproportionality is determined not only limit interpretation of the data from study to study but may also account for some of the inconsistencies found throughout the professional literature with respect to the data on disproportionate representation of minority students in special education programs (Coutinho & Oswald, 1998; Coutinho, et al., 1999; MacMillan & Reschly, 1998). According to Reschly (1997), a major problem resulting from multiple definitions and ways of measuring disproportionality revolves around the use of percentages when presenting enrollment statistics. Most researchers do not distinguish between the percent of program by group and the percent of group in program or inappropriately use the percentages interchangeably. As a result, incorrect conclusions can be drawn about the extent of the problem.

Six of the studies reviewed calculated the OR as a part of their analyses (Artiles, et al., 2005; Coutinho, et al., 2002; Finn, 1982; Oswald, et al., 1999; Oswald, et al., 2001; Zhang & Katsiyannis, 2002), three of the studies calculated the RI (Artiles, et al., 2005; Hosp & Reschly, 2004; Skiba, et al., 2005), and four studies calculated the CI as part of their analyses (Artiles, et al., 2005; Chinn & Hughes, 1987; Skiba, et al., 2005; Zhang & Katsiyannis, 2002). One of the studies calculated all three measures (Artiles, et al., 2005), one study calculated both the OR and CI (Zhang & Katsiyannis, 2002), and one study calculated both the RRI and CI (Skiba, et al., 2005). Two of the studies did not use any of these three measurement approaches in their analyses (Hibel, et al., 2006; Hosp & Reschly, 2002).

### *Descriptive Statistics*

Quantitative research analyses begin with examining descriptive statistics of the sample in order to ensure that the data meet the statistical assumptions necessary for conducting additional analyses including normality of the variables and analysis of missing data. The authors of 8 of the 11 studies that were reviewed conducted limited descriptive statistics of the sample including the mean and standard deviation of the variables in the study. Authors of only two of the studies mentioned using the descriptive information to identify variables with markedly skewed distributions, which were then normalized. The failure to conduct and report descriptive statistics in three of the studies inhibits interpretability of the results.

Simple correlation analyses among variables in the study were also calculated for 3 of the 11 studies. Finn (1982) calculated the correlation of disproportion in Educable MR placements with overall placement rates, socioeconomic status, suspension rates, amount of time spent in Educable MR classes, average special education identification by state, size of the district, percent minority enrollment in the school district, and average suspension rates by district size and minority enrollment. Similarly, Skiba et al. (2005) analyzed and reported simple correlations among race, poverty, achievement, and special education placement for school districts in this sample. Oswald et al. (2001) conducted and reported the spearman rank correlations among all variables included in their study.

Only 3 of the 11 studies reviewed addressed the issue of missing data among the variables selected. Hibel et al. (2006) used multiple imputation techniques to address



missing data, Oswald, et al. (1999) eliminated districts if race/ethnicity data were missing, and Hosp and Reschly (2002) chose to conduct Analysis of Variance (ANOVAs) rather than regression analyses due to the large amounts of missing data. As Hosp and Reschly explain, because most of the cases were missing data for one or more variables, a regression model would have resulted in the elimination of too many cases.

### *Statistical Analysis*

Although the descriptions of statistical procedures varied across the studies, authors of all studies reviewed included adequate information on the data analyses procedures used and provided sufficient support from the research for utilizing the chosen procedure. Methods used by researchers in the studies reviewed included ANOVAs, Ordinary least squares (OLS) logistic regression models, Hierarchical Linear Models and Ideal Type Analyses.

Hosp and Reschly (2002) and Zhang and Katsiyannis (2002) conducted ANOVAs in their analysis of the data. Hosp and Reschly (2002) constructed a series of two-way ANOVAs to examine the main effect for each variable as well as its interaction with race. The dependent variable in these analyses was minutes per week spent outside the general education classroom. Variables collected on a continuous scale were dichotomized in order to make factorial comparisons. The authors provided a detailed description of why ANOVAs were chosen including issues related to missing data, problems related to dummy coding categorical variables with three or more categories, and the negative impact of categorization of continuous variables in regression models that is not problematic in ANOVAs. Zhang and Katsiyannis (2002) also conducted ANOVAs. The purpose of using this statistical approach was to examine the regional variations in racial

representation; state poverty rates were used as a covariate. When a significant difference was identified through the univariate analyses, a one-way ANOVA was conducted to further explore where the difference existed.

Regression analyses were conducted by five of the authors (Coutinho, et al., 2004; Oswald, et al., 2001; Oswald, et al., 1999; Skiba, et al., 2005). Hosp and Reschly (2004) conducted a series of 12 multiple weighted ordinary least squares regression models using the RRI as the response variables. The predictors were entered into the regression models as part of one of three blocks: (a) academic, (b) demographic, and (c) economic. In general, the correlations among predictors within each of the three blocks were greater than the correlations between the blocks. The proportion of variance was calculated for each block both independently and incrementally.

Skiba et al. (2005) also constructed an OLS regression model in their study. The dependent variable in this study was the estimate of district-level disproportionality as expressed by the z-score. The purpose of the model was to predict disproportionality in specific disability categories. In addition to the OLS model, the authors constructed a logistic regression model to assess the independent effects of race, poverty, and district-level resources on the odds of special education identification. The authors used the ORs from the logistic regression equations to conduct a four-step follow-up analysis that examined: (a) the odds of identification considering only race, (b) the odds of identification considering only poverty, (c) the odds of identification considering race and poverty, and (d) the odds of identification considering the full model. Finally, the authors conducted ideal type analyses to examine the likelihood of Black/African-American

students being identified at three distinct income levels. This type of analysis is an effective way to summarize the influence of predictors on the rate of identification. Oswald et al. (1999) constructed a two-step logistic regression model to examine the relationship between the selected predictors and the rate of identification as ED or Educable MR. In the first step of their model, the authors examined the impact of the predictors without including student race or the ethnicity base rate in the school. Racial/ethnic information was then entered into the model as either Black/African-American or non-Black in the second step of their model along with all predictors. The authors created plots of the ED and MR identification rates in relation to each of the predictors in order to assist in interpretation of the results.

Coutinho et al. (2002) also constructed a logistic regression model in their analyses. The purpose of the model was to examine the relationship between a child being classified as having a SLD and the variables of gender, ethnicity, and nine selected predictors. The authors applied appropriate sample weights and weighted the districts by the number of students in order to simulate the student as the unit of analyses. In a subsequent study by Oswald et al. (2001), a logistic regression model was constructed to examine the relationship between the rate of identification as MR and nine selected predictors, gender, race, and all possible interactions of the covariates with gender and race. The authors then used the results of the logistic regression model to plot the predicted MR identification rate for each gender/ethnic group across the variables “poverty” and “non-white”. Next, the authors computed the tenth and ninetieth percentile for each of the predictors as well as the adjusted OR for each of the gender/ethnic groups to examine the variation across the distribution of each of the predictor variables.

Hibel, et al. (2006) used a hierarchical generalized linear model (HGLM) in their analyses of the ECLS-K data. Due to the cluster-sampling technique used in the ECLS-K study, basic logistic regression models are inappropriate. However, a multilevel modeling approach allows for the appropriate estimation of student-level effects within separate schools and the estimation of unique influences of the school environment (between-school effects). Further, the HGLM two-level model adjusts for standard errors to reflect data clustering and accounts for the effects of individual and school characteristics on students' likelihood of special education placement.

#### *Findings on the Extent of Disproportionate Representation*

Table 7 provides a summary of findings from each of the 11 studies reviewed. Collectively, the data from the 11 studies suggest that Black/African-American students (particularly males) are overrepresented in the categories of MR, ED, and SLD; Hispanic students are underrepresented in MR and ED at the national level; and Asian students are underrepresented in all disability categories. Finn (1982) was the first researcher to analyze OCR data to explore questions related to the disproportionate representation of minority students in special education. He used data from the 1978 OCR dataset. Results from analyses suggested that disproportion of minority students varies by race/ethnicity, region of the country, size of the district, percent minority within a district, and the SES of families within a district. Overall, his findings suggested that Black /African-American students were overrepresented in both MR and ED; American Indian/Alaska Native students were overrepresented in the category of SLD; Hispanic and White students were classified at similar rates when examined at the national level; and Asian American students were underrepresented in all 13 categories of IDEA.

Black/African-American students constituted 38% of the students in classes for students identified as Educable MR while constituting only 16% of all elementary and secondary students (Finn, 1982). Nationwide, the proportion of minority students identified in the category of Trainable MR exceeded the proportion of White students in 34 states, and the proportion of minority students identified in the category of ED exceeded the proportion of White students in 28 states and in DC. Despite these general trends, Finn (1982) highlighted significant differences in the extent and degree of disproportion when examining the disaggregated data. For example, while Black/African-Americans were overrepresented on a nationwide basis and in the majority of states, Black/African-Americans were enrolled in programs for the MR at a lower rate than whites in Alaska, Rhode Island, and Wisconsin. Similarly, although the proportionate representation of Hispanic students at the national level is comparable to White students, Hispanic students were overrepresented in 26 of 31 individual states, and great variation was observed by region and among districts. In order to better understand Hispanic representation in special education, Finn (1982) selected a sub-sample of districts in which Hispanic students comprised at least 5% of the district's enrollment and the number of Hispanic students was at least 50. The sub-sample consisted of 854 districts, and 765 of these districts had Educable MR programs. In these districts, Finn found positive and negative disproportions of Hispanic students. Thus, the slight underrepresentation of Hispanic students as compared to White students observed at the national-level is actually comprised of a combination of both over- and underrepresentation of Hispanic students. When analyzing the difference of Hispanic disproportion by size of the district, findings suggest that overrepresentation of Hispanic students in programs for Educable MR

students is significant ( $p < 0.01$ ) and most pronounced in the smallest districts (fewer than 1,000 students). Further, results indicate that the mean Educable MR disproportion for Hispanic students decreases as the percent of Black/African-American student enrollment increases among large districts; this difference is significant at the  $p < 0.01$  level.

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In the analyses conducted by Chinn and Hughes, (1987), Black/African-American students constituted 45.3% of the students in classes for Educable MR in 1980, 54% in 1982, 48% in 1984, and constituted only 20, 25.8 and 24.5% of all elementary and secondary students respectively. Black/African-American students were also overrepresented in programs for students identified as Trainable MR. Black/African-American students represented 27.2, 30.6, 27.1 and 33.2% of students identified as ED and only 15.7, 20, 25.8 and 24.5% of total enrollment. Over this same time period, results of analyses suggest that Black/African-American students are also overrepresented in the ED category. In 1978, Black/African-American students represented 24.4% of the ED population but only 15.7% of the total school enrollment. Black/African-American students represented 28.56% (1980), 32.35% (1982), and 30.8% (1982) of the ED population and only 20, 25.8, and 24.5% of total school enrollment (Chinn & Hughes, 1987).

Results of analyses conducted by Chinn and Hughes (1987) suggest that Hispanic students are slightly underrepresented in programs for students identified as Educable MR, Trainable MR, and SLD. Prevalence rates for Hispanic students suggest slight

underrepresentation in all disability categories examined (Educable MR, Trainable MR, ED, SLD, SLI, and G/T). Hispanic students were only observed as slightly overrepresented in the category of SLD in 1978 (7.54% v. 6.75% of the total school enrollment), 1982 (8.81% v. 8.64% of the total school enrollment), and 1984 (13.38% v. 13.22% of the total school enrollment) and in the category of Trainable MR in 1978 (6.95% v. 6.75% of the total school enrollment). Further, Asian/Pacific Islander students were consistently overrepresented (nearly twice as many as would be expected based on the population) in G/T classes and were underrepresented in all other categories. As for American Indians/Alaska Natives, they were proportionately represented in Educable MR classes in 1984 and overrepresented in 1978, 1980, and 1982.

The same trends are observed in the Oswald et al. (1999) study and the Oswald et al. (2001) study in which the 1992 and 1994 datasets were analyzed respectively. In the analyses of the 1992 OCR dataset, the authors found Black/African-American students were nearly two and one-half times as likely as non-Black/African-American students to be identified as Educable MR, and Black/African-American students were one and one-half times as likely to be identified in the category of ED as compared to their non-Black peers. In the 2001 study, the authors disaggregated the data by race/ethnic group and gender and calculated both the odds ratio and an adjusted OR of being identified as MR. The adjusted OR takes into account the influence of the nine independent variables examined in the study by calculating the OR at the median value for each of the predictors. Results of the adjusted OR suggest that Black/African-American males were four times as likely as White females to be identified as MR, and Black/African-American females were 2.58 times as likely as White females to be identified as MR.

Although less marked, overrepresentation was also observed in the following groups when compared to White females: American Indian males (adjusted OR=1.60), American Indian females (adjusted OR=1.18), Hispanic males (adjusted OR=1.35), and White males (adjusted OR=1.32). These results support previous findings by Finn (1982) that males are overrepresented and demonstrate the importance of disaggregating the data not only by race/ethnic group but also by gender. For example, although Chinn and Hughes (1987) reported that Hispanics were slightly underrepresented in their analyses, after disaggregating the 1994 OCR data, these results suggest that Hispanic males are slightly overrepresented while Hispanic females are proportionality represented. The 2002 study by Coutinho et al. also used the 1994 OCR dataset to examine disproportionality and focused specifically on the identification of students in the category of SLD. As in the Oswald et al. (2001) study, the authors disaggregated the data by both race/ethnic group and gender and found that SLD identification rates vary by race/ethnic group and gender. Their analyses suggest that in the category of SLD, American Indian males display the largest overrepresentation with an OR of 2.9.

Results from the remaining studies reviewed support the findings discussed above. For example, in the study conducted Zhang and Katsiyannis (2002), Black/African-American and American Indian/Alaska Native students are overrepresented in all disability categories, as well as the specific disability categories of MR and ED. Black/African-American students also have the highest level of representation in the disability category of SLD in their analyses. Throughout their analyses, Asian/Pacific Islander students and Hispanic students are underrepresented as compared to White students. Further, in both the Hosp and Reschly (2004) analyses of



1998 OCR data and Skiba et al. (2005) analyses of state-level data, the same trends are observed. Skiba et al. (2005) conducted a four-step analysis of odds ratios resulting from the logistic regression coefficients. When considering only race, Black/African-American students were more than three times as likely as other students to be identified as MR, nearly two times as likely as other students to be identified as moderate MR, and more than two times as likely as other students to be identified as ED. Finally, the study of ELLs in 11 California school districts conducted by Artiles et al. (2005) also illustrates the importance of disaggregating the subgroups within race/ethnic groups. In this study, the authors examined the differences in identification rates among students at various levels of English acquisition. ELLs with the most limited language skills showed the highest rates of identification in the special education categories examined.

#### *Influence of economic variables*

Some consider SES to be a critical factor impacting the disproportionate representation of minority students in special education (National Organization on Disability, 2004; Parrish, 2000; Seelman & Sweeney, 1995; Zhang & Katsiyannis, 2002), yet the extent of its influence continues to be debated. Some have posited that poverty is a proxy for race and that poverty alone accounts for the disproportionate representation of minority students in special education. However, the majority of research examining the influence of poverty on disproportionality suggests that although poverty is a key factor contributing to the overrepresentation of some racial/ethnic groups in special education, poverty alone does not account for all these differences (Oswald et al., 1999; Salend, et al., 2002; U.S. Department of Education, 1998). Eight of the studies (Artiles, et al., 2005; Coutinho, et al., 2002; Finn, 1982; Hibbel, et al., 2006; Hosp & Reschly, 2004; Oswald, et

al., 1999; Oswald, et al., 2001; Skiba, et al., 2005) reviewed included economic variables in their analyses. Key findings from these studies are presented below.

Finn's (1982) examination of the impact of SES on minority representation in special education programs suggests a general tendency for Educable MR disproportions to occur in lower SES districts. The correlations between SES and Educable MR disproportions by race are significantly negative for all districts, however, the strength of this relationship and direction changes depending on district size. For example, in medium-sized districts (up to 29,999 students), the correlation is negative but not significant. For districts with 30,000 or more students, the correlation is positive and significant. In large districts, the correlation between SES is significant and positive indicating that as school SES increases, more minority students are categorized as Educable MR.

Results from studies by Oswald et al. (1999), Oswald et al. (2001), Hosp and Reschly (2004) and Skiba et al. (2005) support and extend Finn's findings by examining the influence of poverty on student identification rates in MR, ED, and SLD and the differential impact of economic variables. As was observed by Finn, the results of these four studies suggest that the impact and direction of economic variables is not consistent. For example, as was observed in the 1999 study by Oswald et al, only a slight difference in the identification rate of ED for Black/African-American and non-Black students was observed in high-poverty communities. In contrast, a Black/African-American student had more than a 1.7% chance of being identified as ED whereas a non-Black student had less than a 0.9% chance of being identified in communities with virtually no poverty. The relationship between poverty and identification rate for MR was more consistent; the

identification rate for MR increased for all students as poverty increased. Further, the absolute identification rate for MR was higher among Black/African-American students across levels of poverty. Therefore, although the identification rate for students of all race/ethnic groups increased as poverty increased, Black/African-American students continued to be the group that was most overrepresented at all levels of poverty. Oswald, et al. (1999) found that even without considering the effects of race/ethnicity, the economic environmental predictors accounted for 11.7% of the variance in the identification of ED students and 35.6% of the variability in identification of MR students. Findings indicate that there is a greater increase in the percent of variability explained for Black/African-American students when considering both economic environmental predictors and race. These results suggest that race influences the identification rates of Black/African-American students in the categories of MR and ED more directly than non-Black/African-American students. For example, for non-Black students identified as ED and MR, the change in variance increased from 8.9 and 26.7% when just considering the predictor variables to 10.4 and 30.3% respectively when considering the economic environmental predictor variables and the race variables. The increase was larger for Black/African-American students (from 12 to 18.5% in the category of ED and from 26.9 to 36.1% in the category of MR).

In the 2001 study by Oswald et al., the authors disaggregated the data by gender as well as race/ethnic group and examined the impact of poverty by gender and race/ethnicity group. Results suggest that poverty had a weak-to-moderate positive association with the identification rate of MR for all of the gender/racial groups except female Asian students where the relationship is essentially nonexistent. However, this

simple bivariate relationship is misleading; the authors found that these relationships change once the predictor effects and their interactions are also considered. For example, for Black/African-American and American Indian/Alaska Native students, the rate of identification in MR decreases as poverty increases, but for White students, the rate of identification in MR increases as poverty increases. Hosp and Reschly (2004) also examined the influence of SES by entering a set of economic variables as a block into their regression models. The economic block of variables used in this study is similar to the environmental block of variables used in the Oswald et al. (1999) study. Results support previous findings; economic variables account for a significant portion of variance in the overrepresentation patterns of Black/African-American students in the disability categories of MR and ED. The economic block was the strongest independent block for 3 of the 12 models, and it accounted for a significant amount of the variance for 5 of the remaining 9 models. Skiba et al. (2005) also examined the influence of poverty independent of race/ethnicity and found that students living in high-poverty school districts were more than twice as likely as students in high-SES school districts to be identified as mildly MR, nearly twice as likely to be identified as moderately MR, and twice as likely as students in wealthier school districts to be identified as ED. When both race/ethnicity and poverty were added to the regression model, results suggest that both race/ethnicity and poverty have an independent effect on the odds of special education identification. The authors concluded that although poverty does contribute to some of the variation in special education identification, it is a weak and inconsistent predictor of disproportionality. The influence of poverty does not account for all the differences

observed, and race/ethnicity continues to be a significant predictor of both MR and ED identification.

The impact of poverty and SES is not limited to the disability categories of MR and ED. Coutinho, et al. (2002) examined the influence of poverty in relation to the rate of identification in SLD. Results suggest that increased poverty is associated with increased SLD identification rates among Black/African-American, Hispanic, and male Asian students. As was observed in the disability categories of MR and ED, the influence of poverty is not consistent across race/ethnic group. Results indicate that increased poverty is associated with decreased SLD identification rates among White and American Indian/Alaska Native students. Further, results from the study conducted by Artiles et al. (2005) suggest a greater percentage of low-SES ELLs are identified as SLD. Finally, Hibel, et al.(2006) examined the influence of poverty and SES in the ECLS-K dataset. The economic variables were added to the model following the race/ethnicity variables. Results of analyses indicate that economic variables (e.g. SES) explain a significant amount of the variation in special education placement. However, after the authors added the academic predictors to the model, nearly all of the effects of economic variables were explained.

#### *Influence of school-related variables*

Nine of the studies reviewed (Artiles, et al., 2005; Coutinho, et al., 2002; Finn, 1982; Hibel, et al., 2006; Hosp & Reschly, 2002; Hosp & Reschly, 2004, Oswald, et al., 1999; Oswald, et al., 2001; Skiba, et al., 2005) included at least one school-related variable. School-related variables ranged from “type of special education program”, “type of language program”, “student-teacher ratio”, and “suspension/expulsion rates” to

demographic school variables such as “percent of children in school district at risk”, “percent of minority schools in the school district”, “teacher race”, “district size”, and “total number of interventions employed prior to referral to special education” (a list of variables included in each study is provided in Table 6). The majority of the studies reviewed did not examine school-related variables as a unique block of variables; rather, these variables were included within one of the demographic, economic, and academic blocks or as part of an environmental or socio-demographic block.

In Finn’s (1982) analyses of school-related variables, he examined the variation in special education placement rates and school district size, percent of minority students enrolled, and suspension rates within the school district. Findings from analyses on school-district size suggest that on average, disproportion increases with district size. Thus, average disproportion was highest in school districts with 30,000 or more students. Finn also observed that the standard deviation decreases as district size becomes larger indicating an absence of extreme disproportions in either direction in the larger districts. In contrast, districts with very small enrollments were found to have extreme disproportions in both directions.

Finn examined the influence of the variable “percent of students enrolled in the district that are minority” by first classifying districts as having 0-10%, 10-30%, 30-50%, 50-70%, 70-90%, or 90-100% minority enrollment. He then conducted a two-way fixed effects analysis of variance model with percentage of minority enrollment and geographic region as factors of classification. Results show distinct relationships between percent of minority students in the school district and Educable MR disproportion dependent on the size of the district. For example, in medium and large districts, higher percentages of

minority students in the school district were not associated with increased disproportion in Educable MR classes. In fact, as the percentage of minority students in medium and large school districts increased, the minority Educable MR placement rate decreased and the difference between the rate at which White and minority students were identified approached zero. The impact of percent minority enrollment was more influential in smaller districts with very high disproportion observed in small districts as the minority enrollment approached 90-100%.

Oswald et al. (2001) also examined the influence of minority enrollment in a school district. The authors reported a positive association between the percent of minority enrollment and the MR identification rate. Findings indicate that the MR identification rate decreases among Black/African-American students as the percent of non-White students in the school increases. Therefore, Black/African-American students who are attending a predominantly White school have a greater chance of being identified as MR. These findings support the results from Finn (1982) which indicated higher percentages of minority students in the school district were not associated with increased disproportion in Educable MR classes, and higher percentages of minority student enrollment led to a decrease in minority disproportion. Coutinho et al. (2002) also examined the influence of percent minority student enrollment and disproportion specifically in relation to the rate of SLD identification. In this study, the percent of minority student enrollment was weakly to moderately associated with SLD identification for all racial/ethnic groups. Findings suggest that the rate of SLD identification decreases for all gender/ethnic groups (except American Indian/Alaska Native students for which identification increases slightly) as the proportion of non-White students in the

district increases. These findings are consistent with the findings of the Finn et al. and Oswald et al. studies.

In addition to exploring the impact of percent minority enrollment, studies reviewed examined the influence of percent students who were limited English proficient. Oswald et al. (1999) examined the impact of this variable on the probability of being in an ED or MR program. The authors entered the percent of ELL student enrollment as part of the block of nine environmental variables that also included SES variables (see Table 6 for a list of all variables included). Overall, the block of variables accounted for a significant amount of the variability in the ED rate ( $R^2=11.7\%$ ) and in the MR rate ( $R^2=35.6\%$ ). Coutinho et al. (2002) also examined the influence of this variable on the rate of SLD identification. The authors concluded that, overall, there was only a weak relationship between the SLD identification rate and the percent of students who were limited English proficient.

With regard to suspension rates within the school district, Finn (1982) found that in medium and large school districts, there was a positive association of racial disproportion with suspension rates. Nationwide, 3.3% of all students and 4.1% of minority students were suspended at least once in the 1977-78 school year. The suspension rate increased with district size to 5.4% of all students and 7.3% of minority students in large school districts, and a positive association between suspension rate and Educable MR disproportion was observed. Thus, it appears that medium-sized districts tend to suspend greater numbers of minority students as well as assign these students to Educable MR classes in greater numbers. Overall, findings suggest that the proportion of suspensions was lowest in all White or all minority school districts and highest in



school districts with 30-70% minority students enrolled. No association between disproportion in Educable MR and suspensions was observed in the smallest school districts. Skiba et al. (2005) also examined the rate of school suspensions and expulsions and found this variable to be a robust predictor of special education disproportionality and the only consistent and significant predictor across disability categories. Finally, suspension/expulsion rates were significant and positively related to disproportionality in ED ( $p < 0.002$ ), Moderate MR ( $p < 0.002$ ), Mild MR ( $p < 0.05$ ), and SLD ( $p < 0.002$ ).

Coutinho et al. (2002) and Oswald et al. (2001) examined the impact of district level per pupil expenditure. Coutinho et al. found that per pupil expenditure was weakly, positively associated with MR rate of identification for all racial/ethnic grounds except with American Indian/Alaska Native and Black/African-American students. Findings from the Oswald et al. study were varied; on average, results suggested that districts with higher per pupil expenditure had lower rates of MR identification for Black/African-American students and higher rates of identification for Hispanic students.

Hibel, et al. (2006) examined the influence of student mobility, teacher race/ethnicity, and interactions between teacher race/ethnicity and student race/ethnicity. The authors also computed school averages for student test scores, the two behavior variables (approaches to learning and externalizing problem behaviors), and SES by aggregating individual student scores by school ID. The schools' mean percent of minority student enrollment was entered into the regression model first followed by the schools' mean test score, school average approaches to learning score, and school average externalizing problem behaviors score. The purpose of entering the school variables step-wise in two blocks was due to concerns about multi-collinearity among the

variables; entering the variables as two separate blocks allowed for comparison of the impact of school demographic versus school academic and behavioral variables. Results suggest that the only school-level variable that achieved significance was the school mean test score and this variable had a positive impact. In other words, if two somewhat low-performing students were enrolled in different schools, the student enrolled in the higher-performing school would have an increased chance of special education placement.

Finally, Hosp and Reschly (2002) examined the relationship between race/ethnicity and a student receiving individual help from a classroom teacher such as a pre-referral intervention. The authors report a significant interaction between these variables and found a significant difference in the amount of time spent outside the general education classroom for Black/African-American and White students. Findings suggest that among students who do not receive an intervention, Black/African-American students spend more time outside the general education classroom than Whites.

#### *Influence of Academic and Behavioral Variables*

There is a call in the literature to examine the impact of academic and behavioral variables on the disproportionate representation of minority students in special education. Only four of the studies (Hibel et al., 2006; Hosp & Reschly, 2002; Hosp & Reschly, 2004; Skiba et al., 2005) reviewed included academic and behavioral variables in their analyses.

Hibel, et al. (2006) examined the influence of average student reading and math test scores (measured through direct assessments developed and administered by ECLS-K) at the time of kindergarten entry on the identification rate in third grade. Findings

suggest that higher scores of student mean test scores were the most powerful predictor of special education placement and significantly reduced the odds of special education identification in the third grade. The authors also state that the variability in placement due to SES could be explained through academic variables. Placement decisions were found to be influenced by the student's actual academic performance. The authors concluded that after taking into account the influence of academic achievement, there appears to be no social class bias in the decision to place a student into special education. To examine the influence of test scores at the school level, Hibel, et al. (2006) averaged individual student test scores by school ID. According to the authors, when the average of student test scores is controlled, Black/African-American, Hispanic, and Asian students are significantly underrepresented in special education. Further, after controlling for student test scores, male students are significantly more likely than females to be placed in special education. This finding suggests that Black/African-American, Hispanic, and Asian students are much less likely than White students with similar academic performance levels to be placed into special education. In addition to academic achievement, the authors examined the influence of two variables: (a) approaches to learning (including attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization) and (b) externalizing problem behaviors (including arguing, fighting, acting impulsively, getting angry, and disrupting class activities). Teacher surveys collected data for both behavior measures. The Approaches to Learning variable was found to have a significant negative effect on whether or not a student is receiving special education services by race. The Externalizing Behavior Problem variable was also measured through a scale on which teachers rated students'

propensity to display externalizing behavior problems (arguing, fighting, acting impulsively, getting angry, and disrupting class activities). Higher scores represent more problem behaviors and more negative teacher ratings of behavior. The Approaches to Learning variable was also found to strongly affect achievement test scores even after controlling for prior test scores. Although the Externalizing Problem Behaviors variable has a positive effect on placement, the effect was small and significant only at the 0.10 level.

Skiba et al. (2005), Hosp and Reschly (2004) and Hosp and Reschly (2002) also examined the influence of academic and behavior predictors in their studies. Skiba et al. used mean third grade test scores on the state-mandated criterion referenced test to reflect early academic achievement, and they used average SAT scores as a measure of later academic achievement. The authors found academic achievement to be a significant predictor in two of the equations constructed. To control for the fact that average test scores decline as more students within the population of interest take the test, the authors included the percentage of students taking the SAT as a variable in the model. Average SAT score within the school was positively and significantly related to MR disproportionality. Findings also suggest that the school-level SES (measured as the rate of students receiving free lunch in a school district) is a moderately high predictor of both early and late school achievement. Both academic and behavioral variables were significant in these analyses but less consistent than poverty and race; Black/African-American students continued to have greater odds than their peers of being diagnosed with Mild MR (2.57), Moderate MR (1.24), and ED (1.31).

Hosp and Reschly (2004) reported that academic predictors are important to consider in discussions of disproportionate representation because academic achievement is a strong predictor of referral and eventual placement in special education. Independent variables were entered into one of three blocks: (a) academic (percent of White students proficient in reading, percent of White students proficient in math, percent of the racial/ethnic group being compared proficient in reading, and percent of the racial/ethnic group being compared proficient in math); (b) demographic (base rate of White students, base rate of the racial/ethnic group being compared, percent of students with limited English proficiency, and base rate of students with disabilities); and (c) economic (median housing value, median income, percentage of adults with twelfth grade education or less, and percent of students at risk). Correlations between variables within each block were generally greater than those between blocks. Proportion of variance was calculated for each block independently and incrementally. Findings from their analyses suggest that academic predictors do influence special education identification and account for a significant portion of the variance by race. The authors constructed an academic block of variables that were found to be significant in 8 of the 12 models they constructed. This academic block of predictors differed in the relative strength of predictor depending on race/ethnic group and was found to be a stronger predictor for Black and Asian students than for Hispanic and American Indian/Alaska Native students. Although this block of predictors was significant in 8 of the 12 models, it was weaker than the demographic and economic blocks that were also entered into the regression models. Hosp and Reschly suggested the influence of the block of academic predictors could be impacted by the correlation among the variables within the block. For example,

since the variables in the academic block were more strongly correlated than the variables in the other blocks, the amount of overall variance explained would be reduced.

Finally, Hosp and Reschly (2002) examined the impact of academic and behavior predictors in relation to the amount of time special education students spent outside the general education classroom. Results from analyses support the results presented above that both academic and behavior predictors are significant and that the impact of these predictors varies according to race/ethnic group. There was a significant interaction between the discrepancy in classroom instruction level (i.e. reading ability group) and grade level by race. Black/African-American students with a larger discrepancy between these two variables were more likely to spend less time outside the general education classroom than White students. In relation to the behavior variables (dependency and anger control), Black/African-American students were found to spend more time than White students outside the general education classroom when rated as “not dependent”, but when rated as “excessively dependent”, Black/African-American students spent less time than White students outside the general education classroom. Black/African-American students identified as having poor control of anger were also found more likely to be placed outside the general education classroom than White students.

### Conclusion

Disproportionate representation is a complex issue and despite significant policy development, litigation, and research, it remains problematic today. In order to design effective policy and practice responses, it is important to understand how to define disproportionate representation as well as why disproportionate representation occurs.

This requires a coherent conceptual framework and meticulous empirical investigation (Utley & Obikow, 2000). Results of the studies reviewed suggest that the predictors of disproportionality are not uniform across disability or gender category, size of school district, or region. Although a great deal has been learned from the current body of literature, only one of the studies reviewed examined the issue of disproportionality at the student-level (Hibel et al., 2006).

According to Artiles et al. (2005), studies that clearly define disproportionality are needed in order to more effectively measure contributing factors and assess their impact. Findings from the reviewed studies remind us that analysis of disproportionality must include not only demographic and economic child-level factors but also academic and behavioral factors both at the child- and school-level. Analyses of the influence of academic and behavior variables, including their interactions with demographic and economic variables, are essential in order to develop effective interventions (Coutinho, et al., 2002).

## CHAPTER III

### Methodology

Findings from the body of research reviewed in Chapter 2 have consistently shown a disproportionate representation of certain minority students in special education when compared to the general school population. However, the extent of disproportionality and the influence of contributing demographic, economic, school-related and academic factors vary and are not yet fully understood. Implications of these studies emphasize the importance of continuing to examine the effects of contributing factors of disproportionality at both the student- and school- level through analyses of a nationally representative dataset. Thus, the purpose of this study was two-fold: (a) to examine the influence of student- and school-level demographic, economic, academic, and behavioral variables measured in the third grade on a student's probability of special education placement in the fifth grade and (b) to explore and describe the differences in the characteristics of students who never received special education services and those that were receiving special education services in kindergarten, third grade, and fifth grade; kindergarten and fifth grade but not in third grade; and kindergarten but not in third or fifth grade.

This study utilized the restricted version of the extant ECLS-K dataset. The restricted version was used because the public version suppresses information on students in receipt of special education services and students identified with disabilities to protect the confidentiality of the student due to the relatively small numbers of students in these subgroups. This chapter describes the data set and the methodology for this study. The



first section provides an overview of the ECLS-K including purpose of the study, study design, sampling procedures, instrumentation, response rates, and ways to identify children with disabilities within the ECLS-K dataset. The second section describes the variables used in this study and provides a rationale for variable selection. Finally, the third section outlines the methodology used to address each of the research questions including a description of how missing data will be handled, an explanation of the hierarchical generalized linear model, and a description of the software programs used to conduct the analyses.

### Dataset

ECLS-K is a nationally representative sample of kindergarteners and their teachers, parents, and schools. ECLS-K focuses on children's early school experiences from kindergarten to middle school (eighth grade). Children included in the sample came from diverse socioeconomic and racial/ethnic backgrounds, represented both public and private schools, and attended both full-day and part-day kindergarten programs. ECLS-K was designed to provide descriptive information on children's cognitive, social, emotional, and physical development as they enter school, transition to kindergarten, and progress through school. Some key areas of interest include school readiness, the relationship between the kindergarten experience and later school performance, and growth in cognitive and non-cognitive domains. Also included in the dataset is information on the child's home environment, home educational activities, school and classroom environment, and teacher qualifications. In the base year, the ECLS-K dataset included information on 21,000 children attending more than 1,200 public and private

schools. Data was collected through direct and indirect assessments of children, student questionnaires, parent interviews, teacher questionnaires (including special education), school administrator questionnaires, school records abstracts, and a school facilities checklist. ECLS-K gathered information on children with a disability through the parent interview, special education teacher survey, and school record abstracts including whether or not a child (a) has an IEP and (b) is receiving special education services.

### *Research Design and Sampling Strategy*

The ECLS-K dataset is a nationally representative sample of public and private kindergartens, children attending kindergarten in 1998, and kindergarten teachers. In 1999, the sample was freshened to create a nationally representative sample of first graders, first grade classrooms, and first grade teachers. As a result, the data collected on the children in kindergarten (1998) and first grade (1999) can be generalized to the entire U.S. population of children attending kindergarten in 1998 and children attending first grade in 1999. The data were not freshened prior to the 2002 or 2004 data collection. Thus, the data are not nationally representative of all children in third grade or fifth grade. Rather, the data represent children who were in kindergarten in 1998 and are now in third or fifth grade.

ECLS-K used a clustered, primary sampling unit multi-stage design for sample selection; schools were selected and then students within each of the selected schools were randomly selected. Private schools, private school children, and Asian and Pacific Islander children were all over-sampled. Children with disabilities were not over-sampled in the ECLS-K. As a result, sample sizes may not be large enough to conduct

robust statistical analyses and detailed analyses within each of the 13 federally defined disability categories. Also, many of the children with disabilities in the sample have been identified as needing special education services and began receiving services over the life of the study. Thus, the sample of children receiving special education services increases, in size and proportion, between kindergarten and fifth grade.

### *Instrumentation*

Data for the ECLS-K were collected from students, parents, teachers, and school administrators at several points throughout the study (see Table 8 for information regarding when each of the ECLS-K instruments were administered). Instruments administered include: direct and indirect assessments of children, the self-description questionnaire, parent interviews, teacher questionnaires, school administrator questionnaires, school records abstracts, and a school facilities checklist. In addition to the instruments listed above, which are administered every year data are collected, the following instruments have been developed and administered for special studies: Head Start verification, the Salary and Benefits Survey, and the Food Consumption Survey. None of the variables examined in this study came from instruments administered for special studies. For more information about these instruments, go to the ECLS-K website at <http://nces.ed.gov/ecls/Kindergarten.asp>.

Instruments were administered by an ECLS-K data collection team consisting of one field supervisor and three assessors. The team was responsible for all data collection activities in their assigned work areas including conducting the direct child assessments and parent interviews, distributing and collecting school administrator and teacher questionnaires,

collecting school records abstracts, and completing a school facilities checklist. While no specific attempts were made within the ECLS-K study to quantify the reliability and validity of measures such as special education services received as recorded by the field management supervisor, several in-person training sessions were conducted to promote accurate collection of variables collected by field supervisors and assessors. First, field supervisors were required to participate in a 3 day training which included topics such as reviewing materials, role plays to practice contacting school coordinators, identifying and locating children who moved, identifying the regular and special education teachers of ECLS-K children, distributing and following up on teacher questionnaires and school administrator questionnaires, completing the facilities checklist, and conducting quality control observations. Next, field supervisor and assessors participated in a 5 day assessor training workshop. Assessors were responsible for conducting the direct-child assessments and the five day assessor training focused on practice direct child assessments using role-play scripts, direct child assessment precertification exercises, strategies for building rapport with children and standardized procedures for administering all assessment items. Finally, all field staff who participated in the training workshops were required to complete certification exercises included both written exercises and observation of each trainee in administering the assessment to students recruited for the training sessions. 74 percent of the trainees passed the certification exercises on the first attempt. Trainees who did not pass were required to participate in additional training and retake the certification exercises. One additional training was provided, and all trainees passed on the second attempt.

A brief description of these instruments and data collection is provided below.

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### *Direct Cognitive Assessments of Students*

Information about a child's reading and mathematics skills, general knowledge (grades K-1), and science knowledge (grades 3, 5) were collected through un-timed, one-on-one direct assessments. Some items on each of the assessments were borrowed from other tests, and some of the items used were created by ECLS-K staff based on a broad review of curricula and standards in the subject area by grade level. All assessments were piloted and psychometric properties were evaluated. For the kindergarten tests first administered in 1998-99, over 200 items in each domain area were tested on 1800 students. In order to examine content validity, a panel of experts was convened to review the appropriateness of the items in each domain. Direct assessments were typically conducted in a school classroom or library using a computer-assisted interviewing methodology. All assessment items were read to the student and answered by pointing or verbal response. None of the items required students to write or explain their reasoning. On average, the direct child assessment took approximately 50 to 70 minutes per child. Prior to administering the assessments, field supervisors checked the school records to determine a student's home language. If this information was not available through school records, the ECLS-K field staff requested this information directly from the student's teacher. The Oral Language Development Scale (OLDS) was given to those children whose primary language spoken at home was not English to determine if student understood English well enough to receive the direct child assessment in English. Students who passed the OLDS received the full ECLS-K direct assessment battery in English. Spanish speaking students who did not pass an established cut score received a reduced Spanish version of the ECLS-K assessments including the mathematics

assessment, the Spanish version of the OLDS<sup>2</sup>, and a psychomotor assessment. Students who did not pass the established cut score on the OLDS and whose native language was not Spanish were excluded from the assessment, and only data on the student's height and weight were collected. Overall, 15% of the sampled students were screened using the OLDS in the fall of kindergarten. Of the students whose home language was Spanish, 42% were at or above the cut score, and of the students whose home language was a language other than English or Spanish, 61% were at or above the cut score. The direct cognitive assessment began with a short routing test for each of the three subject areas. The routing test consisted of 12 to 20 items and was administered to determine the most appropriate level assessment form to be administered next. Administering assessment items that are too hard for a particular child not only causes frustration and distress but also provides very little information on the precise level of the child's ability (NCES, 2001). Assessment items that provide the best information are those that are slightly too easy or slightly too hard for an individual. The pattern of right and wrong responses on such items makes it possible to estimate ability within a narrow range. The assessments included both multiple choice and open-ended items, and questions of similar format were grouped together in order of increasing difficulty.

The reading assessment included questions designed to measure basic skills (print familiarity, letter recognition, beginning and ending sounds, rhyming sounds, and word recognition), vocabulary (receptive vocabulary), and comprehension (listening comprehension and words in context). Comprehension items were targeted to measure

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<sup>2</sup> The Spanish OLDS was similar in content to the English OLDS and measured the same constructs. All comparative analyses between the English and the Spanish OLDS support the conclusion that the language of administration had little or no impact on the scores obtained (User's Manual for the ECLS-K Base Year Public-Use Data files and electronic codebook, NCES, 2001-029 (revised)).

skills in initial understanding, interpretation, personal reflection, and critical stance demonstration. In the kindergarten and first grade reading assessment, students were also questioned on their familiarity with conventions of print (i.e., indicating that reading goes from left to right, going to the beginning of the next line at the end of the previous line, and finding the end of the story). These items were not included in the third- and fifth-grade reading forms because nearly all children had mastered them by the spring of first grade. The reading assessment contains the following five proficiency levels that reflect a progression of skills and knowledge: (a) identifying upper- and lower-case letters of the alphabet by name, (b) associating letters with sounds at the beginning of words, (c) associating letters with sounds at the end of words, (d) recognizing common words by sight, and (e) reading words in context.

The mathematics assessments were designed to measure skills in conceptual knowledge, procedural knowledge, and problem solving through questions on number sense, number properties, operations, measurement, geometry, spatial sense, data analysis, statistics, probability patterns, algebra, and functions. Manipulatives were available for student use in order to aid students in solving addition facts. As with the reading assessment, the items on the mathematics assessment were grouped into five proficiency levels reflecting progression of skills and knowledge. These levels included (a) identifying some one-digit numerals, recognizing geometric shapes, and one-to-one counting up to 10 objects; (b) reading all one-digit numerals, counting beyond 10, recognizing a sequence of patterns, and using nonstandard units of length to compare objects; (c) reading two-digit numerals, recognizing the next number in a sequence, identifying the ordinal position of an object, and solving a simple word problem; (d)

solving simple addition and subtraction problems; and (e) solving simple multiplication and division problems and recognizing more complex number patterns.

Researchers administered the general knowledge assessment, which consisted of both science and social studies items, in kindergarten and first grade. The science items were designed to measure understanding of scientific facts and a student's ability to construct questions about the world, attempt to answer their questions based on evidence, recognize the process used to reach their conclusions, and communicate their answers. For example, students could be shown four pictures and asked to point to all of the foods that grow in a garden. Social studies items included questions about history, government, culture, geography, and economics. Researchers used student's responses to calculate an overall general assessment score to represent the student's understanding of the world around them. ECLS-K researchers replaced the general knowledge assessment with separate science and social studies assessments in order to collect more specific information in each of these domains.

#### *Other Direct Assessments of Students*

In addition to direct cognitive assessments, students were administered physical and motor assessments (kindergarten) and socioemotional assessments in third and fifth grade. To measure physical growth and development, the student's height and weight were measured and recorded. Assessed motor skills included both fine and gross motor skills. Materials used for measuring fine motor skills included 10 wood blocks, a pencil, and two pieces of plain white paper. Fine motor skills were assessed by having each child use building blocks to replicate a model, copy forms (e.g., an asterisk, a square) on paper, and draw a person. Researchers measured gross motor skills through activities such as



skipping, hopping on one foot, walking backward, and standing on one foot. To assess physical growth and development, children's height and weight were measured. In third and fifth grade, sampled students also completed a self-description questionnaire designed to measure socioemotional aspects such as peer relations, externalizing and internalizing problem behaviors, feelings about school, reading, and mathematics.

### *Indirect Assessments of Students*

ECLS-K researchers assessed students indirectly through the academic rating scale, completed by the student's teacher, and the social rating scale, completed by both the student's teacher and parent. The academic rating scale is a rating form that allows teachers to report on students' cognitive knowledge and skills and program placements (e.g. reading level group). Researchers designed the academic rating scale to overlap and augment the direct student assessment measures by collecting data on student learning in skills areas that could not be directly assessed due to time and cost constraints such as use of computers, spelling, oral expression, and writing skills. Teachers evaluated each student in comparison to their peers in reading, math, and general knowledge (Kindergarten and first grade), science (third and fifth grade) and social studies (third and fifth grade).

ECLS-K researchers used the social rating scale to measure the social/emotional development of children and was completed by both the student's teacher and parent. Researchers adapted the *Social Skills Rating Scale Elementary Scale A* by Gresham and Elliott (1990) to create the social rating scale used in ECLS-K. The purpose of collecting these data from both the teacher and the parent is to examine whether or not the same behaviors are observed in both the school and home/family environment. Items

on the social rating scale measure a student's approaches to learning, self-control, interpersonal skills, externalizing and internalizing problem behaviors, and peer relations. The items were rated on a scale of one (Never) to four (Very often). Reliability data on each of the scales included in the social rating scale are presented in Table 9 below.

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The Approaches to Learning scale measures behaviors that affect the ease with which children can benefit from the learning environment. It includes six items that rate the child's attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization. The Self-Control Scale included four items that measure a student's ability to control behavior. These items include: (a) respecting the property rights of others, (b) controlling temper, (c) accepting peer ideas for group activities, and (d) responding appropriately to pressure from peers. Five items assessing a student's interpersonal skills include the ability to form and maintain friendships; to get along with people who are different; to comfort or help other children; to express feelings, ideas, and opinions in positive ways; and to show sensitivity to the feelings of others. Researchers evaluated students on externalizing and internalizing problem behaviors. The five items to measure externalizing problem behaviors include the frequency with which a child argues, fights, gets angry, acts impulsively, and disturbs ongoing activities; and the four items to measure internalizing problem behaviors include the apparent presence of anxiety, loneliness, low self-esteem, and sadness.

### *Parent Interviews*

Data collected from the parents/guardians of sampled students include parent and child demographics, child and family health, family characteristics, and parent behavior including student-parent interactions, activities conducted with the child, and interactions with the child's teacher. Parents/guardians were also questioned about family structure, childcare use, household income, and child rearing practices. Researchers collected parent/guardian data through phone interviews by trained interviewers and were recorded using computer-assisted telephone/personal interviewing methods (CATI/CAPI). For families that did not have a phone, ECLS-K field staff conducted the parent/guardian interview in person. The respondent had to be knowledgeable about the student's care and education, be 18 years of age or older, and be living in the household with the child. The respondent was typically the mother of the child, however, the respondent could be a father, stepparent, adoptive parent, foster parent, grandparent, another relative, or non-relative guardian. Although the majority of parent interviews were conducted in English, the parent/guardian questionnaire was translated into Spanish, Chinese, Lakota, and Hmong to accommodate parents/guardians who spoke other languages.

#### *Teacher questionnaires*

Teachers in both general and special education completed a self-administered survey about the classroom environment, the school climate, classroom instruction, teacher background, and student profiles. The general education questionnaire included three distinct parts. Part A asked the teacher to provide information about the classroom environment and classroom characteristics such as the demographics of the students in the class. Part B included more detailed items on class organization, class activities, evaluation methods, views about school readiness, school environment, overall school

climate, and teacher background questions. Finally, Part C of the questionnaire consisted of academic rating scale and social rating scale rating forms previously discussed in indirect student assessments. Parts A, B, and C of the teacher survey(s) were replaced in the fifth grade (2003-04 school year) by a general teacher-level survey and distinct surveys for reading, mathematics, and science teachers.

In addition to the general education teacher questionnaire, a special education survey was administered to the student's primary special education teacher. ECLS-K defined a student's primary special education teacher as either (a) the teacher who managed the child's Individual Educational Program (IEP), or (b) the teacher who spent the most amount of time providing special education services to the child, or (c) the teacher who was most knowledgeable about the child's special needs and equipment. The survey consisted of two parts. Part A collected teacher background data including the following information: teacher's gender, teacher's age, teacher's race/ethnicity, teaching experience, educational background, and special education teacher background. The second section of the questionnaire (Part B) included items about the sampled ECLS-K student who was receiving special education services. These items included: disability category, IEP goals, extent of services, types of services provided for the year, primary placement, teaching practices, methods, and materials and assistive technologies used by the student. Part B also collected data on general education goals, expectations and assessments, collaboration between the special education teacher and the student's general education teacher, frequency of communicating with the student's parents, and receipt of formal evaluations in the past year.

#### *Adaptive Behavior Scale*

Primary special education teachers also completed the Adaptive Behavior Scale for all sampled students excluded from the direct child assessment due to a disability. A child was excluded from the direct assessment if he/she needed the assessment administered in Braille, enlarged print, or sign language, or if the child's IEP specifically prohibited the child from taking standardized assessments. The adaptive Behavior Scale collected data on these students in the areas of independent functioning, language development, and numbers and time.

#### *School Administrator Questionnaires*

The school principal, administrator, or headmaster completed the school administrator questionnaire. The purpose of this questionnaire was to gather information about the school, student body, teachers, school policies, and administrator characteristics. The questionnaire was divided into nine sections. The first seven sections requested factual information about the school (e.g. number of school days, average daily attendance, funding, percent of children attending the school by racial/ethnic group, percent of children receiving a free or reduced price lunch, number of classes by grade level, parental involvement, etc.) and the programs offered at the school (e.g. English as a second Language (ESL) and bilingual education, special education programs, classes for children identified as gifted and talented, etc.). The school principal was expected to complete the final two sections of the questionnaire. In these two sections, the school principal reported information on their background and evaluated the school climate.

### *School Records Abstract*

ECLS-K field researchers collected the student's attendance, report card, and IEP through the use of a school records abstract. The school records abstract also included information about the type of language or English proficiency screening that the school used and whether the child participated in Head Start prior to kindergarten.

### *School Facilities Checklist*

ECLS-K field supervisors completed the facilities checklist. The facilities checklist collected information about the (a) availability and condition of the selected schools, (b) presence and adequacy of security measures, (c) presence of environmental factors that may affect the learning environment, and (d) overall learning climate of the school.

### *Identifying Children with Disabilities in ECLS-K*

There are multiple sources for identifying children with disabilities in the ECLS-K dataset including parent interview data, school record data, and special education teacher survey data. Depending on the source of the data, prevalence rates of children with disabilities in the ECLS-K dataset vary. Table 10 presents a comparison of the data collected through the school via (a) the ECLS-K field data manager, (b) school abstracts, and (c) special education teacher survey. Data from the school records on whether or not a student has an IEP are much higher in both absolute numbers and weighted percentages than data obtained from the field management supervisor and the special education teacher survey. It is possible that more students have an IEP in school records because school records are not updated every year, or it could be that a portion of students that

have an IEP in the school records are not receiving special education services during the current school year. Data from the school abstracts variable were not used in this study. Rather, the dependent variable is the dichotomous variable of whether or not a student was in receipt of special education services (FxSPECS). Although there is slight variation in the prevalence rates of whether or not a child is in receipt of special education services as recorded by the field management supervisor and whether or not the student has data from a special education teacher, these differences are minimal after the data have been weighted. The exception is in the spring of third grade when only seven percent of the weighted sample had special education data from a teacher survey, but nine percent were identified by the school as receiving special education services.

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INSERT TABLE 10 ABOUT HERE

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### Variables

Findings from the literature reviewed in Chapter 2 informed variable selection for this study. Table 11 provides a brief description of selected variables used in analyses. A more detailed description of each variable is then provided. Independent variables include both student-level and school-level variables.

### *Dependent Variable*

The dependent variable in this study was dichotomous and indicated 1 = a child did not receive special education services and 0 = a child received special education

services. As noted above, the field management supervisor collected this information upon visiting the school. This information then was entered into the ECLS-K dataset as variable FxSPECS.

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INSERT TABLE 11 ABOUT HERE

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### *Independent Student Level Variables*

#### *Gender*

The gender composite created by ECLS-K was used in this study. ECLS-K researchers derived this composite by using the gender indicated in the parent interview, and, if it was missing, the gender indicated in the automated field management system. Field data collectors used the field management system throughout the data collection period to enter information about sampled children, parents, teachers, and schools. Each child was coded as 0 = Male and 1 = Female.

#### *Racial/ethnic Group*

The data on race/ethnicity is presented in the ECLS-K files as race and as ethnicity. ECLS-K created a race/ethnicity variable that was used in this study. Since a respondent was allowed to indicate that they belonged to more than one of the five race categories (White, Black or African American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander), ECLS-K researchers created a series of dichotomous race variables that indicated separately whether the respondent belonged to any of the five specified race groups. In addition one more dichotomous variable was



created for those who had simply indicated that they were multiracial without specifying the race (e.g., biracial). Data were collected on ethnicity as well. Respondents indicated if they were Hispanic or not. Using the dichotomous race variables and the Hispanic ethnicity variable, ECLS-K researchers created a race-ethnicity composite variable. The categories include: White (non-Hispanic); Black/African-American (non-Hispanic); Hispanic (race specified); Hispanic (no race specified); Asian; Native Hawaiian or other Pacific Islander; American Indian or Alaskan Native; and more than one race specified (non-Hispanic).

For the purposes of this study, only the categories of Black/African-American, White, and Hispanic were used. These students comprised approximately 88% of the total sample. Therefore, about 12% of the total population was not used in the analyses for this study. For the purpose of research question one and two, students were coded as either 0 = White, 1 = Black/African-American and 2 = Hispanic. For the purpose of research question three, two dummy-coded race/ethnicity variables were created: 0 = White and 1 = Black/African-American and 0 = White and 1 = Hispanic.

### *Primary Disability Type*

The variable “primary disability type” was constructed to assess the percentage of students in receipt of services who were identified with judgmental disability compared to those who were identified with medical disabilities. Students in receipt of special education services who were identified as having a primary disability type of MR, ED or SLD were categorized as having a judgmental disability (= 0); students with a primary disability type of Speech and Language, Blind/Visually Impaired, Deaf/Hard of Hearing, Health Impairment, Physical Impairment, Deaf/Blind, Multiple Disabilities, Autism,

Traumatic Brain Injury, and Developmental Delays were categorized as having a medical disability (= 1); and students in receipt of special education services who were not identified as having a disability were categorized as “Not Classified” (= 2).

### *SES*

SES is considered a critical factor influencing disproportionality, yet findings from previous studies on the influence of SES remain varied and inconsistent. Previous studies have examined the influence of SES at the district, state, and national levels. Inclusion of SES at the student-level in this study permitted examination of how SES influences disability identification at the individual student- and school-level. The categorical, standardized composite measure supplied by NCES reflecting parents’ income, educational attainment, and occupational status at the time of children’s entry into kindergarten was used in this study. Rather than using SES at third grade, SES at kindergarten was used because the dataset demonstrates that more data were missing in subsequent years. For instance, 4,970 more parents reported information needed to calculate SES when their child was in Kindergarten than when their child reached third grade. Considering SES is a composite measure reflecting not only parental income but also occupational status and educational attainment, it is unlikely that the SES of a student would change drastically between kindergarten and third grade.

ECLS-K researchers computed the SES composite variable at the household level for the sets of parents who completed the parent interview. The components used for the creation of the SES were: Father/male guardian’s education, Mother/female guardian’s education, Father/male guardian’s occupation, Mother/female guardian’s occupation, and household income. Because not all the parents responded to all the questions, there were

missing values for some of the components of the SES indicator. Researchers imputed missing values of all components of the SES through a hot deck imputation methodology. In hot deck imputation, the value reported by a respondent for a particular item is given or “donated” to a “similar” person who failed to respond to that question. Ideally, donors and non-respondents have similar characteristics in the cell. The SES component variables were highly correlated so a multivariate analysis was more appropriate for examining the relationship of the characteristics of donors and non-respondents. A categorical search algorithm called Chi-squared Automatic Interaction Detector (CHAID) was used to divide the data into cells based on the distribution of the variable to be imputed. The analysis used the records with no missing values for the variable being imputed. CHAID not only analyzed and determined the best predictors but also created the cells that were used for hot deck imputation. Researchers imputed the variables in a sequential order and separately by type of household (female single parent, male single parent, and both parents present). For households with both parents present, the mother’s and father’s variables were imputed separately. The new imputed values were used in the creation of the imputation cells if these values had been already imputed. If this was not the case, an “unknown” or missing category was created as an additional level for the CHAID analysis. As a rule, no imputed value was used as a donor. In addition, the same donor was not used more than two times.

The ECLS-K dataset includes both categorical and continuous SES composite variables. For the purpose of addressing research questions one and two, the categorical SES composite was used. In this variable, SES was divided into five quintiles with the 1<sup>st</sup> quintile representing families from the lowest SES backgrounds and the 5<sup>th</sup> quintile

representing families from the highest SES backgrounds. ECLS-K also created a continuous SES composite which was used in the HGLM analyses for research question three. This variable was standardized through a z-transformation to facilitate interpretation of results from the HGLM analyses.

### *Academic Achievement*

Academic predictors are important to consider in discussions of disproportionality because academic achievement is a strong predictor of referral and eventual placement in special education (Hosp & Reschly, 2004). Inclusion of test score variables in this study is important in order to determine whether the influence of these variables differs in the later elementary grades (3-5). Both reading and mathematics test scores were obtained through direct measurement of students using assessments designed by ECLS-K staff. As discussed earlier, some items on the assessments were borrowed from other tests and other items were created by ECLS-K staff; all assessments were piloted and psychometric properties were evaluated. The third grade scores were used in this study. Scores based on the full set of test items were calculated using Item Response Theory (IRT) procedures. IRT made it possible to calculate scores that could be compared regardless of the second-stage form a child took. IRT uses the pattern of right, wrong, and omitted responses and the difficulty, discriminating ability, and “guess-ability” of each item to place each child on a continuous ability scale. The items in the routing test, plus a core set of items shared among the different second-stage forms, made it possible to establish a common scale. It is then possible to estimate the score the child would have achieved if all of the items in all of the test forms had been administered. In this study, I recoded the continuous IRT scores for reading and mathematics into categorical variables to aide in

interpretability of results for research question one and two. Table 12 shows the continuous IRT scores in each of the four categories for the recoded variables. Although the recoded categorical variables were used in research questions one and two, the continuous variable was used for the HGLM analyses conducted for research question three.

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INSERT TABLE 12 about here

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#### *Behavior Measures in ECLS-K*

The impact of behavior measures, as reported by the classroom teacher, on disproportionality is largely unexplored. Hibell et al. (2006) found that these behavior measures had a significant effect on special education placement. Inclusion of behavior variables measured at the student-level facilitates a better understanding of how student behavior contributes to the problem of disproportionate representation. As mentioned above, ECLS-K adapted the Social Skills Rating Scale developed by Gresham (1990) to assess social skills. Several social skill areas were assessed including approaches to learning, self-control, interpersonal skills, externalizing and internalizing problem behaviors, and peer relations. Each area was measured through a series of items resulting in a composite score ranging from 1=never to 4=very often for each area. For the purposes of this study, the approaches to learning and externalizing problem behaviors composite scores were used to examine the influence of behavior on the disproportionate representation of minority students. The approaches to learning variable has been recommended by ECLS-K staff as the behavior variable with the most variance and best

variable to use in terms of significance (ECLS-K training session, 2004). The externalizing problem behaviors variable was chosen because it reflects behaviors that are often associated with the category of ED and have been suggested throughout the literature on disproportionality as influential.

### *Approaches to Learning*

Teachers provided student behavior data on the following approaches to learning task behaviors: attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization. Students received scores on a 4-point Likert-scale: 1 = never, 2 = sometimes, 3 = often and 4 = very often. Thus, higher scores reflected higher student engagement with learning. For research question three, this categorical variable was standardized using a z transformation resulting in a continuous representation of standard scores with a standard deviation of 1.

### *Externalizing Problem Behaviors*

Teachers also provided data on student externalizing problem behaviors. Teachers reported a student's propensity to display an externalizing behavior program including arguing, fighting, acting impulsively, getting angry, and disrupting class activities. As with the approaches to learning variable, students received scores of 1= never, 2 = sometimes, 3 = often and 4 = very often. Therefore, for this variable, higher scores represented more problem behaviors. As with the approaches to learning variable, this variable was also transformed into a continuous variable for HGLM analysis.

### *Independent School-Level Variables*

This study examined the influence of school-level variables related to minority disproportionality. All variables represent the mean of student scores and were calculated by aggregating student scores by school ID with the aggregation method in SPSS.

#### *Average SES*

As discussed in Chapter 2, previous findings suggest that school SES differentially impacts a student's likelihood of being identified for special education and the influence of living in a high-poverty school district varies by race/ethnicity and disability type. Using the categorical SES variable, a school-level mean SES was calculated for the purposes of this study.

#### *Academic Achievement*

To measure the school-level effect of academic achievement, individual student test scores in reading and in mathematics were aggregated by school ID.

#### *Average Approaches to Learning*

Individual student scores on this variable were aggregated by school ID for this study. Higher scores reflect higher student engagement with learning at the school level.

#### *Average Externalizing Problem Behaviors*

Individual student scores on this variable were aggregated by school ID for this study. Higher scores represent more problem behaviors and, therefore, more negative teacher ratings of behavior.

### *Percent Minority Enrollment*

Results from the Hibel et al. (2006) study suggest that the percent of minorities in the school is not a significant predictor of disproportionality. However, findings from other studies reviewed in Chapter 2 suggest that the percentage of minority students does influence disproportionality and influences students differentially by race.

Using data from the school administrator questionnaire, ECLS-K researchers created a percent minority student enrollment composite by determining the percentage of children who were either of Hispanic origins, American Indian or Alaskan Native, Asian, Black/African-American, or Native Hawaiian or Other Pacific Islander. In the questionnaire design, it was assumed that the school administrator would allow for overlap between the ethnicity and race. For example, 20% of the children could be listed as Hispanic, and these same children's races could be indicated in the next question, such that the percentages for different races in the school would add up to 100%. However, this is not how all school administrators answered the items on the questionnaires; therefore, ECLS-K researchers established rules to accommodate different answer patterns. Based on these patterns, researchers compared the range of possible percent minority values to the school sample frame value. If the school sample frame value was within range of the possible values, then the school sample frame value was used as the percent minority composite. If the school sample frame value was outside of the range of possible values, then school sample frame values were not used because the range of values in the school administrator questionnaire offered at least some improvement for an estimate over the school sample frame alone. If the school sample frame value was lower than the range of values, the lowest possible percent minority was used as the composite



estimate. If the school sample frame value was higher than the range of values, the highest possible percent minority was used as the composite estimate.

Students were coded as attending a school with 1 = less than 10% minority students, 2 = 10% to less than 25% minority students, 3 = 25% to less than 50% minority students, 4 = 50% to less than 75% minority students, and 5 = 75% or more minority students. In this study, categories 2, 3, and 4 were aggregated for research questions one and two resulting in three categories: 1 = super-majority schools (less than 10% minority students), 2 = integrated schools (10% to less than 75% minority students), and 3 = super-minority schools (75% or more minority students).

## Methodology

The goal of this study was to empirically estimate the effects of demographic, economic, academic, behavior, and school-related variables on whether or not a student receives special education services. Descriptive statistics documented the basic characteristics of children receiving special education services in the third grade and children receiving special education services at specific points in time throughout the study including (a) kindergarten, (b) third grade, (c) fifth grade, (d) kindergarten and third grade, (e) kindergarten and fifth grade, (f) third and fifth grade, and (g) kindergarten, third, and fifth grade as compared to students not in receipt of special education services. A multilevel statistical model was used to examine the effects of the independent variables, measured in the third grade, on whether or not a student was in receipt of special education services in the fifth grade as well as the impact of school characteristics such as the percent of minority student enrollment on independent variables. The

purpose of the following section is to describe the methodology used in this study. The remainder of this chapter provides information about sampling weights, missing data, exploratory data analyses, regression analysis using a hierarchical generalized linear model, and statistical software used to conduct all analyses.

### *Sampling Weights*

Sampling weights estimate the characteristics of the population in nationally representative studies. Weights compensate for not collecting data from the entire population and for over-sampling of sub-groups by adjusting for differential selection probabilities. The use of weights also reduces bias associated with non-response by adjusting for differential non-response. In contrast to using unweighted data where each case is counted equally and the data only represent those in the sample that have provided data, weighted data assigns a value to each case that is relative to its representation in the population and allows for analyses that represent the target population. Therefore, sampling weights are primarily used for the following reasons: (a) to make inferences of the population being studied, (b) to adjust for differential sampling rates (e.g. certain groups of children sampled at a higher rate), and (c) to adjust for differential non-response. ECLS-K researchers created sampling weights based on (a) level of analysis (student, teacher, or school); (b) rounds of data use in the analyses (cross-sectional versus longitudinal); and (c) sources of data (student assessment, parent interview, teacher questionnaires, etc.). I used the cross-sectional weight for third grade for research question one and three and the longitudinal panel weight (kindergarten through fifth grade) for research question two.

## *Missing Data*

Survey data and longitudinal studies are notoriously prone to non-response and missing data. Data are missing throughout the ECLS-K dataset for a number of reasons; therefore, missing values in the ECLS-K dataset were coded as follows: a) not applicable (-1), b) data suppressed (-2), c) refused to answer (-7), d) don't know (-8), e) not ascertained (-9), and system missing (blank). The "not applicable" code (-1) indicates that the respondent did not answer the question due to skipping instructions within the instrument or because of external reasons that led the respondent to not participate. A "not applicable" was also coded for items that were not asked of the respondent because of a previous answer given. For example, an item about a sibling's age is not asked when the respondent has indicated that the child has no siblings. A "not applicable" code was used in the direct child assessment if a child did not participate in any section due to language or a disability. For the teacher and school files where the instruments are self-administered, a "not applicable" was coded for items that the respondent left blank because the written directions instructed them to skip the item due to a response on a previous item. The "data suppressed" code (-2) indicates that the data for that variable are suppressed in order to protect the identity of the respondent or child. When the data for a variable are suppressed, all the cases have a value of -2 for that variable. The comment, "This data is suppressed for respondent confidentiality," is displayed in the comment field in the electronic code book. The "refused" code (-7) indicates that the respondent specifically told the interviewer that he or she would not answer the question. This, along with the "don't know" code and the "not ascertained" code, indicates item non-response. The "don't know" code (-8) indicates that the respondent specifically told the interviewer

that he or she does not know the answer to the question (or in rare cases on the self-administered questionnaires, “I don’t know” was written in for the item). The “don’t know” code was also used in the direct child assessment when children did not answer a particular question after procedures had been followed to repeat the question and try it again. The “not ascertained” code (-9) indicates that the respondent left the item he or she should have answered blank. For the school and teacher self-administered questionnaires, this is the primary code for item non-response. System missing codes (blanks) indicate that an entire instrument or assessment is missing due to unit non-response.

To run HLM software there cannot be any missing data at the school level. Therefore, it is critical to determine how missing data will be addressed for this study. There are a number of ways to address missing data due to item non-response and unit non-response. A few ways researchers can address missing data is to ignore the problem and simply report all data available, delete cases with missing data, or impute values calculated from the data for the missing values. In general, case deletion leads to valid inferences only when missing data are missing completely at random (MCAR) which is generally implausible in social science research and impossible to verify (Allison, 2002). Data are assumed to be MCAR if the probability of missing data is completely random and not related at any other variables in the dataset. For example, if parents with lower incomes are also more likely to have missing SES data, then missing SES cannot be considered MCAR because the missing SES data are related to level of income. In this example, more missing data would be expected from parents of low SES and therefore, not MCAR. It is not reasonable to assume that the missing data in the ECLS-K dataset are unrelated to other student-level or school-level variables.

If case deletion were used for this study, nearly 2847 (18.6%) of the students who remained in the study through the end of fifth grade would be deleted. Considering the sample size of the dataset, the loss of these students may not appear problematic at first. However, since students with disabilities have not been over-sampled in this dataset, the sample sizes for various subgroups of students with disabilities are relatively small and all cases must be retained. Case deletion of all cases with missing data from the analytic sample would inevitably result in the loss of some students with disabilities thereby reducing the already small sample size and further limiting analyses.

An alternative to listwise deletion is the process of imputation in which missing data cells are filled with a reasonable guess for the missing value. The analyses are then conducted as if there were no missing data. Several imputation methods currently exist (e.g. mean substitution, simple regression, regression with an error term, the expectation maximization [EM] algorithm) with the most basic method being that of imputing a single value. The most basic method of single imputation is a mean imputation process; the mean is calculated using all cases with data and then imputed for all cases missing data. A key problem with mean imputation is that this process assumes that the data are MCAR and produces biased estimates of variances and covariances (Allison, 2002). Single-imputation techniques also reduce the standard deviation (SD) of a variable and produce invalid standard errors (SE) (Schafer, 2002). Thus, not only is the variance of the variable in a set of values (i.e. the SD) impacted but also, the SE which is a measure of the standard deviation of the sampling distribution of a statistic. The Missing Value Analysis in SPSS 16.0 showed that 18.7% of the values for reading scores in third grade were missing. While the original data and the data with single imputation have the same

mean score, the standard deviation (SD) and standard errors (SE) are smaller, indicating less variance between scores and an increase in a type-one error. In contrast, the SE and SD of the data with multiple imputation (MI) are more closely aligned to that of the original data.

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MI is a technique whereby missing values are replaced by  $m > 1$  simulated versions resulting in several complete datasets. These datasets are then analyzed and results merged to produce estimates and confidence intervals of regression coefficients that account for the variability in estimating the coefficient and uncertainty in the imputation process . A fundamental problem of all imputation methods is that analyzing imputed data as complete data produces SE that are underestimated and test statistics that are overestimated (Allison, 2002) leading to inflated Type II error. However, as the sample size increases, the problems associated with imputation are minimized. As can be seen in Table 13, problems with underestimation of SES and overestimation of the test statistic are virtually non-existent.

MI has the advantage over single imputation of incorporating uncertainty into the SE of imputed values by accounting for variance between imputed solutions (Hibel, et al., 2006; Schafer, 1999). Instead of filling in a single value for each missing value, a MI procedure replaces each missing value with a set of plausible values that represent the uncertainty regarding the right value to impute (Rubin, 1987).

The Missing Value Analysis procedure in SPSS 16.0 was used to impute missing values on the independent variable of whether or not a child received special education services as recorded by the field manager as well as the dependent achievement variables (reading and mathematics) and behavior measures (externalizing problem behaviors and approaches to learning). This multiple imputation procedure creates multiple imputed data sets for incomplete  $p$ -dimensional multivariate data. It uses methods that incorporate appropriate variability across  $m$  imputations. As can be seen in Table 14 below, the test statistic and SE for the sample with and without missing values imputed are consistent which indicates minimal introduction of bias as a result of the imputed values.

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### *Analyses*

The analyses were split into two major parts. First, research questions one and two were addressed with descriptive exploratory data analysis (EDA). The second part of analysis included development and implementation of a Hierarchical Generalized Linear Model (HGLM) designed to examine the influence of student-level variables in level-1 of the model and school-level variables in level-2 of the model. A description of each part of analysis is provided below.

#### *Exploratory Descriptive Analysis*

The appropriate analytic sample for each research question was selected, values for missing data on the independent variable were imputed, and the data were weighted.

Then, the frequency and percentage of students on each of the dependent variables were calculated.

To address research question one, the analytic sample was restricted to students in the third grade and the third grade child-level cross-sectional weight was used. Students that received special education services were compared to students that were not receiving special education services in the third grade on each of the independent variables. For research question two, the analytic sample included students who were sampled in kindergarten, third grade, and fifth grade. The child-level panel weight was used in these descriptive analyses. Descriptive statistics were calculated for each group of students, and observed differences in each of the independent variables are discussed in Chapter 4.

#### *Hierarchical Generalized Linear Modeling (HGLM)*

HGLM was used to address research question three. Historically, a fundamental challenge to conducting research in the field of education had been a unit of analysis problem, which limits the full investigation of nested data (e.g. students nested within schools). Analyzing nested data using single-level analyses requires the researcher to select a single unit of analysis (i.e. either the student- or school-level) thereby ignoring the nested structure of the data. Critical problems associated with ignoring hierarchical structures and conducting single-level analyses with nested data include aggregation bias, miscalculation of standard errors, underestimation of sampling variance, and confounding of effects across levels and conceptual impoverishment of models (Raudenbush & Bryk, 2002). Traditional statistical techniques used in the studies reviewed in Chapter 2 such as logistic regression and ANOVAs examined prevalence rates of students with disabilities



by race and the influence of variables on special education identification. These techniques are not appropriate for the proposed study because they do not account for the effects of student-level variables that vary by school-level variables (Raudenbush & Bryk, 2002).

Fortunately, due to advances in estimation theory, convergence in work across disciplines, and development of interesting models within the HGLM framework, researchers are now able to analyze nested data more effectively through the use of hierarchical linear modeling (Raudenbush & Bryk, 2002). Using hierarchical linear modeling (HLM), a researcher is able to examine the relationships among variables within a given level as well as the influence of variables at one level on the relationships at another level. For example, the influence of a student's race as well as the influence of a student's race within a particular type of school (e.g. a school with a high percentage of minority students) can be examined. In other words, hierarchical models allow the researcher to investigate relationships within and across levels simultaneously. Key benefits to using HLM include: (a) analysis of predictors at multiple levels (i.e. student- and school-level), (b) calculation of complex error terms involving variance both within and across levels, and (c) estimation of coefficients based on an average (fixed) effect and its variance (a possible random effect).

The standard HLM is appropriate for two- and three-level nested data where the expected outcome at each level can be represented as a continuous, linear function of the regression coefficients. However, it is not an appropriate model when the outcome variable is binary. In situations where the expected outcome variable is dichotomously scored, researchers should use the more appropriate HGLM (Raudenbush & Bryk, 2002).

Hierarchical models offer a coherent modeling framework for multilevel data with nonlinear structural models and non-normally distributed errors. Since the dependent variable is dichotomously scored ( $y_{ij} = 1$  if student was not the recipient of special education services or  $y_{ij} = 0$  if a student received special education services), a logistic HGLM was an appropriate analytic model.

The Bernoulli distribution was used to model the dichotomous response variable as a function of student-level (level-1) and school-level (levels-2) variables measured in third grade to predict the likelihood of not receiving special education services in the fifth grade. Aligning with conventional uses of hierarchical models, the HGLM can be specified as either (a) a unit-specific model or (b) a population-average model. The unit-specific model is appropriate for addressing research questions that are designed to describe how differences in level-2 explanatory variables relate to differences in level-1 predictors in each level-1 unit. The population-average model is appropriate for addressing research questions that are examining the mean effect of level-2 explanatory variables across all level-2 units. Results from unit-specific and population-average models are generally similar with the directions of findings and statistical significant nearly identical. Determination of which model to use is guided by the nature of the research question. In this study, the unit-specific model was used because the question was geared toward examining how differences in predictors at level-2 relate to differences in level-1 predictors for each student.

Comparison between HLM and HGLM parallels a comparison in “single-level” models between a standard linear regression model and a logistic regression model. The statistical output of the HGLM analysis is on the log-odds scale. Thus, level-1

coefficients provide estimates on the influence of the student-level variables on the log-odds that a student is not receiving special education services in the fifth grade. Level-2 coefficients provide estimates on the influence of the school-level variables on the log-odds that a student is not in receipt of special education services in the fifth grade. The results from the models (in predicted log-odds) were then transformed to an odds ratio by exponentiating the log-odds coefficient [ $\exp(\beta_p)$ ]. The resulting odds ratio is the predicted change in odds for a one unit increase in the independent variable. Odds ratios less than 1 indicate a decrease in the odds while odds ratios of more than 1 indicate an increase in the odds. The odds ratio and corresponding confidence interval are presented for each coefficient. The purpose of transforming the results from log-odds to an odds ratio was to facilitate interpretation and discussion of results.

*Unconditional model*

Typically in HLM analyses, investigators begin by fitting an unconditional model (also known as a random intercept model with no level-1 or level-2 predictors) to ascertain how much variation in the response can be explained by variation of the level-2 units. The unconditional model for a continuous, normally-distributed outcome can be specified at level-1 as:

$$\eta_{ij} = \beta_{0j} \tag{4.1a}$$

while the level-2 model is

$$\beta_{0j} = \gamma_{00} + u_{0j} \tag{4.1b}$$

The distributional assumptions at level-1 and level-2, respectively are

$$r_{ij} \square N(0, \sigma^2) \quad u_{0j} \square N(0, \tau_{00}) \tag{4.1c}$$

The proportion of variance in  $y$  that can be explained by variation at level-2 can be expressed as

$$\rho = \frac{\tau_{00}}{\tau_{00} + \sigma^2} \quad (4.1d)$$

If  $\tau_{00}$  is small relative to  $\sigma^2$ , then  $\rho$  will be small indicating that fitting a two-level conditional model would be moot as there would be little reliable variation at level-2 to explain. In contrast to normal-theory HLM, the level-1 variance for HGLMs has a predetermined form corresponding to the chosen distribution of the response. For the Bernoulli distribution used in the current analysis, the variance at level-1 is a function of the mean and is potentially different for each individual. Consequently, conventional use of an unconditional model in HGLM analyses is not feasible. Conceding this pre-analysis limitation, I proceeded with the analysis using a conditional means-as-outcomes model described below to answer research question 3.

Using the Bernoulli sampling model and a logit link function, the level-1 conditional model used in the analysis has the following form:

$$\eta_{ij} = \log \left[ \varphi_{ij} / (1 - \varphi_{ij}) \right] = \beta_{0j} + \sum_{q=1}^Q \beta_{qj} x_{qij} \quad (4.2a)$$

where  $\eta_{ij}$  represents the log-odds of the  $i^{\text{th}}$  student not receiving special education services in the  $j^{\text{th}}$  school,  $\varphi_{ij}$  is the probability of the  $i^{\text{th}}$  student in the  $j^{\text{th}}$  school not receiving special education services,  $\beta_{0j}$  is the level-1 intercept, and the  $\beta_{qj}$  are the coefficients of the level-1 (student) variables.

The level-2 model has the general form

$$\beta_{qj} = \gamma_{q0} + \sum_{s=1}^{S_q} \gamma_{qs} w_{sj} + u_{qj} \quad \text{where } q = 0, \dots, Q \quad (4.2b)$$

where  $\gamma_{q0}$  is the mean coefficient averaged across schools,  $\gamma_{qs}$  are the level-2 regression coefficients,  $w_{sj}$  the  $s$ th level-2 predictor for the  $j$ th school, and  $u_{qj}$  are the random effects associated with school  $j$ .

The level-1 and level-2 coefficients characterize the extent to which student-level and school-level attributes impact receipt of special education services in fifth-grade. Specifically, the level-1 coefficients describe the influence of each student-level variable on the log-odds of not receiving special education services, while school-level predictors provide information on the degree to which school characteristics impact the log-odds of receiving services.

In this study, I hypothesized that not receiving services in the fifth grade would be associated at level-1 (student-level) with being a White male from a family with an average SES, having reading and mathematics scores at the mean, and having a mean approaches to learning score and externalizing behavior score. I also hypothesized a contextual effect at level-2 such that attending schools with fewer minority students and with a higher school-mean SES would predict higher rates of not receiving services among students. Finally, I expected that students attending schools with higher average reading and mathematics scores, higher approaches to learning scores and lower externalizing problem behavior scores would be more likely to not receive services.

The particular HGLM used in the analysis can be specified at level-1 as:

$$\eta_{ij} = \beta_{0j} + \beta_{1j}(Black)_{ij} + \beta_{2j}(Hisp)_{ij} + \beta_{3j}(Gender)_{ij} + \beta_{4j}(SES)_{ij} + \beta_{5j}(Rdg)_{ij} + \beta_{6j}(Mth)_{ij} \\ + \beta_{7j}(ATL)_{ij} + \beta_{8j}(ExpB)_{ij} \quad (4.3)$$

while the level-2 model is:

$$\begin{aligned}
 \beta_{0j} &= \gamma_{00} + \gamma_{01}(\% \text{ Minor}) + \gamma_{02}(MSES) + \gamma_{03}(MRdg) + \gamma_{04}(MMth) + \gamma_{05}(MATL) \\
 &\quad + \gamma_{06}(MExpB) + u_{0j} \\
 \beta_{1j} &= \gamma_{10} \\
 &\quad \vdots \\
 \beta_{8j} &= \gamma_{80}
 \end{aligned}
 \tag{4.4}$$

Prior to running the model, the sample was restricted to only include students with a race/ethnicity of White, Black/African-American, and Hispanics. Students with a race/ethnicity of Asian, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander were deleted from the analytic dataset. The reason for restricting the dataset to these students is because the majority of literature on disproportionate representation indicates that the problem of disproportionality is most often experienced by students who are Black/African-American or Hispanic students. A list of all variables and the coding scheme is presented in Table 15.

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INSERT TABLE 15 ABOUT HERE

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To facilitate an understanding of the results in the next section, a general interpretation of some of the regression coefficients is warranted. For instance,  $\beta_{0j}$  is the predicted log-odds of not receiving special education services in the 5<sup>th</sup> grade for a white male from an average SES background with reading, mathematics, approaches to learning and externalizing problem behavior scores at the mean. Each of the  $\beta_{gj}$  coefficients represent the change in predicted log-odds of not receiving special education services in the 5<sup>th</sup> grade for each predictor variable. At level-2 of the model,  $\gamma_{00}$  is the

predicted log-odds of not receiving special education services in 5<sup>th</sup> grade for a white male student from an average SES background with reading, mathematics, approaches to learning and externalizing problem behavior scores at the mean while holding all school-level variables constant. The remaining  $\gamma_{0j}$  coefficients indicate the change in predicted log-odds of not receiving special education services in the 5<sup>th</sup> grade for the school-level predictor variables. For example,  $\gamma_{02}$  is the change in predicted log-odds of not receiving special education services in the 5<sup>th</sup> grade for students who attended schools of varying SES while holding all remaining variables constant.

But what does this mean? Generally speaking, practitioners and policymakers do not talk about the influence of predictors on the log-odds scale. Thus, in order to facilitate meaningful interpretation of the results, the log-odds coefficients were converted to odds ratios by exponentiating the parameter estimate under investigation. The odds ratio,  $\exp\{\beta\}$ , represents the odds<sup>3</sup> of the event occurring in group one divided by the odds of the event occurring in group two. Odds-ratios greater than 1 indicate that the predictor (gender in the previous example) increases the odds of the outcome (receipt of services); an odds-ratio of less than 1 indicate that the predictor decreases the odds of the outcome. For each odds-ratio, a 95% confidence interval was calculated to assess the significance of the odds ratio. Confidence intervals that include the value of 1 are not significant and thereby, suggest no difference in rate of services received between the two groups in question. Confidence intervals that do not include the value of 1 are

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<sup>3</sup> Odds = probability of success / probability of failure. In this study, the odds represented the probability of not receiving services in the fifth grade divided by the probability of receiving services in the fifth grade.

significant. Results from these analyses will be presented in odds ratios and are presented in the following chapter.

### Statistical Software for Conducting Analyses

The SPSS 16.0 software program (SPSS Inc., 2008) was used to store the database, conduct multiple imputation, apply appropriate sampling weights, and conduct the analysis of question one and two. The HLM 6.0 software program (Raudenbush, Bryk, & Congdon, 2005) was used to conduct the analyses required to address research question three.

### Summary

In summary, descriptive exploratory analyses were conducted to address research questions one and two and a hierarchical generalized linear model was constructed to address research question three. The purpose of research question one was to describe the characteristics of third grade students in receipt of services compared to students who did not receive services in the third grade. Research question two was longitudinal in nature and focused on describing differences in the characteristics of students in receipt of services at various points in time compared to students who never received services. In contrast to research questions one and two which were descriptive in nature, research question three was designed to examine the influence of student-level and school-level variables measured in the third grade on whether or not a student would receive special education services in the fifth grade.



Throughout all analyses, specific attention was paid to missing data. In order to maintain the greatest number of cases, a multiple imputation technique was used in this study. Further, appropriate cross-sectional and longitudinal sampling weights were applied to each analytic sample. In the next chapter, results of these analyses are presented.

## CHAPTER IV

### Results

The purpose of this study was two-fold: (a) to examine the influence of student- and school-level demographic, economic, academic, and behavioral variables measured in the third grade on a student's probability of not receiving special education services in the fifth grade and (b) to examine the differences among students who have received special education services and then exit out of special education, students who remain in special education, and students who never received special education services. Variables were selected from kindergarten, third, and fifth grade data from the restricted ECLS-K dataset. This chapter presents findings related to each of the research questions.

As discussed in Chapter 3, the dependent variable is the dichotomous variable of whether or not a student was in receipt of special education services as recorded by the field management supervisor for ECLS-K. Further, missing values were imputed for the following variables: receipt of special education services, reading and mathematics IRT scores, approaches to learning scores and externalizing problem behaviors scores. Prior to conducting the analyses, the appropriate cross-sectional or panel weight was applied. All results are nationally representative of students who began kindergarten in the 1998-1999 school year. Results are presented by research question in the following sections.

#### Research Question 1

Research Question 1: What are the characteristics of the population of students, by race/ethnicity, in ECLS-K identified as receiving special education services, as

compared to students not receiving special education services in third grade in terms of the following: (a) gender, (b) socioeconomic status (SES), (c) academic achievement (reading and mathematics), (d) student behavior measures (Approaches to Learning and Externalizing Problem Behaviors), and (e) school level variables (school average SES, school average academic achievement, school average Approaches to Learning, school average Externalizing Problem Behaviors, and school percent minority)?

The purpose of research question one was to provide a descriptive snapshot of students in the third grade. The analytic sample consisted of a total of 13,431 third grade students who began kindergarten in the fall of the 1998-1999 school year and was restricted to students with a recorded race/ethnicity of White, Black/African- American, or Hispanic. The cross-sectional child-level weight for third grade was applied to the analytic sample. Results are nationally representative of third grade students who began kindergarten in 1998-1999.

### *Student-Level Results*

At the student-level, results are presented by race/ethnicity for students who were and were not in receipt of special education services in the third grade on each of the variables analyzed including disability type (coded as either judgmental or medical), SES, reading achievement, mathematics achievement, and the behavior measures “Approaches to Learning” and “Externalizing Problem Behaviors” (Table 16).

Based on the literature, disproportionate representation of minority students in special education has been typically observed in the judgmental disability categories of MR, ED, and SLD. In order to examine the percent of students in the third grade with

judgmental disabilities as compared to the percent of students in third grade with other disabilities, a new variable was created. Students in receipt of special education services identified as having a primary disability type of MR, ED or SLD were categorized as having a judgmental disability. Otherwise, students were either coded as having a medical disability of “not classified.” The number and percent of third grade students in receipt of special education services within the categories of judgmental, medical or not classified are presented in Table 16.

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INSERT TABLE 16 ABOUT HERE

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Among Black/African-American and White students who were in receipt of special education services in the third grade, the vast majority were identified as having a judgmental disability (83.04% and 66.27% respectively). In contrast, only 16.73% of third grade Hispanic students in receipt of special education services were identified as having a judgmental disability. Although all White and Black/African-American students in receipt of special education services were identified as having either a judgmental or medical disability (Other = 0), 14.68% of Hispanic male students did not have a disability category recorded.

A higher percentage of third-grade Black/African-American and White female students, as compared to male students, were identified as having a judgmental disability. Specifically, 75.00% of White female students and all Black/African-American female students (100.00%) who were in receipt of special education services in the third grade were identified as having a judgmental disability.

*SES*

Due to missing data on the SES variable in third and fifth grades, the SES variable collected at kindergarten was used for the analyses in the present study. In the overall sample, a higher percentage of Black/African American and Hispanic students were from poor families when compared to White students. For instance, Black/African American and Hispanic students constituted 67.98% of the students in the lowest SES quintile but only 13% of the students in the highest SES quintile (Table 17).

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INSERT TABLE 17 ABOUT HERE

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Among White students who were not in receipt of special education services, only 8.79% were in the lowest SES quintile as compared to 32.87% of Black/African American students and 35.98% of Hispanic students (Table 18). Similarly, 10.57% of White students who were in receipt of services were in the lowest SES quintile as compared to 32.04% of the Black/African American students and 51.72% of Hispanic students. A higher percentage of White students who received services were in the highest SES quintile (30.20%) compared to Black/African-American (15.08%) and Hispanic students (6.19%).

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INSERT TABLE 18 ABOUT HERE

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### *Academic Achievement*

On average, a greater percentage of Black/African-American and Hispanic third grade students who received and did not receive special education services had test scores in the lowest quartile in both reading and mathematics. For example, among students who received services in the third grade, 45.33% of Black/African American students and 44.59% of Hispanic students scored in the lowest quartile in reading compared to 21.31% of White students. Over one-third (35.70%) of third grade White students in receipt of special education services scored in the top quartile on the reading assessment, compared to 4.55% and 14.18% of their Black/African American and Hispanic counterparts. On the mathematics achievement test, only 8.24% of Black/African American students and 12.78% of Hispanic students who received special education services scored in the uppermost quartile compared to 30.27% of their White counterparts.

### *Behavior Measures*

A higher percentage of White students were rated as exhibiting behaviors that positively impact learning compared to Black/African-American and Hispanic students. Approximately 30% of White students (31.49% receiving services: 31.02% not receiving services) were rated as exhibiting positive approaches to learning “very often” whereas only 14.82% and 18.97% of Black/African American students received these ratings. Among Black/African-American students, 44.32% of those who received services and 37.77% of those who did not were rated as “never” or “sometimes” demonstrating positive

approaches to learning compared to 23.61% and 23.47% of White students, respectively.

In the total sample, the majority of students were rated as “never” or “sometimes” exhibiting externalizing problem behaviors. Compared to Black/African-American students, a greater percentage of White and Hispanic students were reported as “never” exhibiting problem behaviors. About 25% of Black/African-American students were rated as “never” exhibiting problem behaviors whereas about 40% of White students and slightly more than 40% of Hispanic students were reported similarly. Relatively few Black/African-American students received ratings of “very often” demonstrating externalizing problem behaviors (5.37% of students receiving special education services and 5.15% of students not receiving special education services). An even smaller percentage of White and Hispanic students were reported in this category (1.34% of White students and 1.89% of Hispanic students).

#### *Within Race/ethnic Group Comparison*

Across student-level variables, minimal differences were observed within racial/ethnic group between students receiving services and those not receiving services. For example, among Black/African American students, 32.87% of students not receiving services were in the lowest SES quintile compared to 32.04% of students receiving services. Further, among White students, the percentage of students who received services (10.57%) who were in the lowest quintile was only slightly greater than the percentage of to students who did not receive services (8.79%).

A few exceptions to this general trend were noted among Black/African-American and Hispanic students. For instance, there were more than twice as many Black/African American students from families in the highest SES quintile who received services (15.08%) compared to Black/African-American students not receiving services (7.78%). Also, the percentage of Hispanic students from families in the lowest SES quintile who received special education was much greater (51.72%) than Hispanic students not receiving services (35.98%). Finally, fewer Black/African-American and Hispanic students who received services were rated as “often” and “very often” displaying positive approaches to learning. For example, 39.48% of Hispanic students and 40.87% of Black/African-American students who received services were rated as “often” demonstrating positive behaviors, compared to 45.81% of Hispanic students and 43.26% Black/African-American students who did not receive services.

### *Summary*

Student-level characteristics of students who began kindergarten in 1998-1999 and who received special education services in the third grade tended to support previous findings in disproportionality. The following key observations can be made. A higher percentage of Black/African American and Hispanic students were from poor families and had lower test scores in both reading and mathematics compared to White students. The majority of Black/African-American and White students who received services in the third grade were identified in one of the judgmental categories of SLD, MR or ED. In contrast, less than 20% of Hispanic students who received services were identified in one of these three categories. A smaller percentage of Black/African-American and Hispanic



students exhibited positive approaches to learning compared to White students. Across all race/ethnicity groups, the majority of students who received services were rated as never or sometimes exhibiting externalizing problem behaviors.

### *School-Level Results*

As discussed in the review of literature, there are several school-level variables that are important to consider when analyzing the issue of disproportionate representation of minority students. In this study, the following school-level variables were examined: percent of minority enrollment in the school, average SES, mean reading achievement scores, mean mathematics scores, mean approaches to learning scores, and mean externalizing behavior scores. Results are presented in Table 19 on each of the school-level variables analyzed.

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INSERT TABLE 19 ABOUT HERE

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#### *SES*

The majority of students in the sample attended schools with student populations that were at or above the mean in terms of SES. None of the White or Black/African-American students in the sample attended schools with a mean SES in the lowest quintile, and only 1.52% of Hispanic students who received special education services attended schools with this proportion of low income students. Among students who received services in the third grade, 52.15% of White students, 74.56% of Black/African-

American students, and 69.67% of Hispanic students attended schools where the average student SES was in the third quintile.

A higher percentage of White students compared to Black/African-American or Hispanic students attended economically advantaged schools. About 40% of third grade White students who received services attended schools with a mean SES of the 4<sup>th</sup> quintile; 14.30% of Black/African-American students and 8.96% of Hispanic students attended these types of schools.

#### *Percent Minority Enrollment*

Across all three race/ethnicity groups, about 45% of the students in the sample attended schools where the percent of minority student enrollment ranged from 10% to 74%. The one observed exception was among the Hispanic students who received services in the third grade of which only 34.16% attended such schools. A higher percentage of third grade Hispanic students receiving special education services (43.03%) attended super-majority schools (less than 10% minority students enrolled) compared to White (31.98%) and Black/African-American (25.15%) students. Similarly, a higher percentage of Hispanic students who did not receive services in the third grade attended super-majority schools as compared to White and Black/African-American students (38.21%, 31.28%, and 26.51% respectively).

In terms of super-minority schools (75% or more minority students enrolled), a higher percentage of Black/African-American students (30% receiving services; 28.09% not receiving services) were enrolled compared to White students. Fewer than one-quarter (24.34% receiving services; 24.37% not receiving services) of White students attended super-minority schools and only 22.80% of Hispanic students who received

services and 19.70% of Hispanic students who did not receive services attended such schools.

### *Academic Achievement*

A greater percentage of White students attended schools with a higher mean reading and mathematics achievement score compared to Black/African-American and Hispanic students. For example, 60.23% of White students who received services and 64.85% of White students who did not receive services attended schools with a mean reading achievement score in the top two quartiles. Similarly, 54.81% of White students who received services and 58.10% of White students who did not receive services attended schools with mean mathematics achievement scores in the top two quartiles. In contrast, only 38.87% of Black/African-American students and 35.23% of Hispanic students who received services attended schools with this level of reading achievement.

As shown in Table 19, the majority of White students attended schools with a mean reading achievement in the third quartile. In contrast, the majority of Black/African-American students and Hispanic students attended schools with mean reading and mathematics achievement scores in the second quartile. Few students in the sample attended schools with mean reading and mathematics achievement scores in the uppermost quartile. A higher percent (5.91%) of White students receiving services attended these schools compared to less than 0.1% of their Black/African-American or Hispanic counterparts.

### *Behavior Measures*

A higher percentage of White students, compared to Black/African-American and Hispanic students, attended schools with a mean approaches to learning score of “very often”. For instance, more than a quarter of White students attended this type of school while less than 15% of Black/African-American students attended similar schools. A greater percentage of Black/African-American and Hispanic students attended schools with a mean approaches to learning score of “never” or “sometimes”. About 25% of Black/African-American and Hispanic students who received services attended schools with mean approaches to learning scores of “sometimes”, compared to 19.05% of their White counterparts.

When examining the externalizing problem behavior variable, results were similar. Less than 8% of White students receiving services attended schools with a mean externalizing problem behaviors score of “often”; 23.03% of Black/African-American students and 10.86% of Hispanic students attended such schools. A smaller percent of Black/African-Americans (25.9%), as compared to White (40%) and Hispanic (46.02%) students, attended schools in which the mean score for exhibiting an externalizing problem behavior was “never”.

### *Within Race/ethnic Group Comparison*

As at the student-level, school-level findings indicate that in general, there were small differences on these variables among students from different racial/ethnic groups who were receiving and those not receiving services. Two notable exceptions follow. One, about twice as many Black/African-American students who did not receive services attended schools with mean reading and mathematics achievement scores in the

bottommost quartile compared to Black/African-American students who received services. Two, a higher percentage of Black/African-American students (3.33%) who received services attended schools with a higher approaches to learning score compared to 0.27% of students who did not receive services.

### *Summary*

In conclusion, a greater percentage of Black/African-American and Hispanic third grade students were attending schools with a lower mean SES than their White counterparts. In addition, a higher percentage of Black/African-American students were enrolled in super-minority schools compared to White students while Hispanic students were primarily attending super-majority schools. Similar to results at the student-level, more Black/African-American and Hispanic students were attending schools with lower average reading and mathematics achievement scores and lower approaches to learning scores as compared to White students.

### Research Question 2

Research Question 2: What are the characteristics of the population of students who (a) never received special education services, (b) received special education services only in kindergarten or third grade or fifth grade, (c) received special education services in kindergarten and third grade but not in fifth grade, (d) received special education services in kindergarten and fifth grade but not in third grade, e) received services in third and fifth grade but not in kindergarten, and f) received special education services in kindergarten, third grade, and fifth grade? The following characteristics will be examined: (a) race/ethnicity, (b) gender, (c) socioeconomic status (SES), (d) academic

achievement, and (e) student behavior measures (Externalizing Problem Behaviors and Approaches to Learning).

The purpose of research question two was to explore the characteristics of students in receipt of special education services at various points in time in the ECLS-K sample. Results are presented for the following categories: (a) no services received, (b) services received in kindergarten only, (c) services received in third grade only, (d) services received in fifth grade only, (e) services received in kindergarten and third grade, (f) services received in kindergarten and fifth grade but not in fifth grade, and 7) services received in third grade and fifth grade but not in kindergarten. Results include information on gender, race/ethnicity, SES, and academic achievement (reading and mathematics) (see Table 20).

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INSERT TABLE 20 ABOUT HERE

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Among students who did not receive special education services at any grade level, 62.43% were White, 17.46% were Black/African-American, and 20.01% were Hispanic. Figure 1 illustrates the percentage of students by race/ethnicity in each of the sub-groups examined. A slightly larger percent of Black/African-American students received services in kindergarten (20.24%), third grade (20.20%) and fifth grade (18.78%) compared to students who did not receive services (17.46%). However, Black/African-American students were underrepresented among sub-groups of students who received services at multiple grade levels (i.e. a) kindergarten and third grade, b) kindergarten and fifth grade, and c) kindergarten, third and fifth grade). Further, Hispanic students were

underrepresented in kindergarten (12.82%) and kindergarten and fifth grade (5.56%) compared to their counterparts (20.01%). Finally, a higher percentage of White students were observed in the kindergarten and fifth grade sub-group (90.83%) compared to the percentage of White students among students who never received services (62.43%).

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INSERT FIGURE 2 ABOUT HERE

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### *Gender*

On average, males comprised approximately 50% of the sample among students who never received services and those who received services in at one point in time (i.e. kindergarten, third grade or fifth grade). As can be seen in Figure 2, the percentage of male and female students who received services in multiple grade levels was not equally distributed. In these sub-groups, a higher percentage of females were represented in kindergarten and third grade; otherwise, a higher percentage of male students received services compared to female students.

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INSERT FIGURE 3 ABOUT HERE

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### *SES*

Students who had never received special education services were almost equally represented across the five SES quintiles. The percentage of students in the first and fifth SES quintile by sub-group is provided in figure 3. A higher percentage of the students who received services in kindergarten and third grade

were poor (from the 1<sup>st</sup> quintile) compared to all other sub-groups. Further, compared to all other sub-groups, a greater percentage of students who received services just in kindergarten and those who received services in third and fifth grade were from the highest SES quintile.

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INSERT FIGURE 4 ABOUT HERE

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*Academic Achievement*

Figure 4 shows the percentage of students for each sub-group who had reading and mathematics scores in the highest (4<sup>th</sup>) and lowest (1<sup>st</sup>) quartile. Across most sub-groups, a larger percentage of students who received services had reading and mathematics scores in the lowest quartile compared to the highest quartile. Compared to students who did not receive services, a greater percent of students who received services in the third grade (38.68%) and in kindergarten and third grade (52.73%) had test scores in the 1<sup>st</sup> quartile. Finally, findings indicate that among students who received services in both third and fifth grade, a smaller percentage had reading or mathematics test scores in the 1<sup>st</sup> quartile and a greater percentage had reading and mathematics scores in the 4<sup>th</sup> quartile.

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INSERT FIGURE 5 ABOUT HERE

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### *Behavior Measures*

Across all sub-groups, a very low percentage of students (less than 2%) were rated as “never” expressing learning behaviors that positively impact a students’ learning. The majority of students across sub-groups were rated as “often” or “very often” demonstrating positive approaches to learning. However, as can be seen in figure 5, a smaller percentage of students who received services in both kindergarten and fifth grade had positive approaches to learning scores.

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INSERT FIGURE 6 ABOUT HERE

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With respect to externalizing problem behaviors, the majority of students across sub-groups “never” or “sometimes” displayed these behaviors (see figure 6). Results show that students who received services in kindergarten and those who received services in kindergarten and third grade were least likely to display externalizing problem behavior “often” or “very often.”

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INSERT FIGURE 7 ABOUT HERE

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### *Summary*

The purpose of research question two was to explore the characteristics of students who never received services and those that received services at various times between kindergarten and fifth grade. Findings indicate that the characteristics explored vary depending on when services were received; that is, the characteristics for students who

received services in kindergarten differs from those who received services in fifth grade or those who received services in both kindergarten and fifth grade.

The following general observations can be made from these exploratory findings. Black/African-American and Hispanic students were underrepresented among sub-groups of students who received services in a) kindergarten and third grade, b) kindergarten and fifth grade, and c) kindergarten, third and fifth grade. About 90% of the students who received services in both kindergarten and fifth grade were White students. A higher percentage of males compared to females received services in many sub-groups: that is among students who received services in third grade, in kindergarten and fifth grade, in third and fifth grade and also in kindergarten, third and fifth grade. A higher percentage of students who received services in a) kindergarten and b) third and fifth grade were from wealthy families as compared to all other sub-groups. Students who received services were more likely to have reading and mathematics scores in the lowest quartile compared to the highest quartile.

### Research Question 3

Research Question 3: Which variables, as measured in third grade, are the strongest predictors of whether a student is receiving special education services in the fifth grade? Student level predictor variables were race/ethnicity, gender, SES, student-level academic achievement measures, and student-level behavior measures (Externalizing Problem Behaviors and Approaches to Learning. School level predictor variables include: average school SES, average school academic achievement scores (Reading and Mathematics), average school approaches to learning, average school

externalizing problem behaviors, and percent minorities in schools.

HGLM was used to examine the importance of student-level (level-1) and school-level (levels-2) variables measured in third grade in predicting whether or not a student received special education services in the fifth grade. Level-1 variables included two dummy-coded race/ethnicity variables (Black/African-American vs. White and Hispanic vs. White), SES, reading achievement, mathematics achievement, approaches to learning and externalizing behaviors (Table 21). Continuous versions of SES, reading achievement and mathematics achievement were used in the HGLM analysis to prevent loss of information and facilitate parameter interpretation. Further, a z-score transformation was applied to both continuous and categorical student-level predictors to further facilitate interpretation of the results. A z-score transformation is especially useful when comparing the relative standings of items from distributions with different means and/or different standard deviations. For instance, the z-score transformation in this study permits for comparison of the achievement scores in reading and mathematics as well as comparison of the behavior measures approaches to learning and externalizing problem behaviors. The transformed scores have a mean of zero and standard deviation of one. The magnitude of the regression coefficient corresponding to the z-score scaled variable provides information on the expected change in  $y$  in standard deviational units for a one standard deviation increase in  $z_x$ . The sign of the regression coefficient indicates whether this expected change in  $y$  will increase or decrease.

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INSERT TABLE 21 ABOUT HERE

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As discussed in Chapter 3, a two-level HGLM model with level-1 student predictors and level-2 school predictors produced results needed to address research question three. The hypothesis at level-1 was that the probability of not receiving special education services in the 5<sup>th</sup> grade would be associated with the following student characteristics: White, higher SES, higher reading and mathematics scores, higher approaches to learning score and a lower externalizing problem behavior score. The hypothesis at level-2 was that certain school characteristics would predict lower rates of services received in the fifth grade. Specifically, students would be less likely to receive services in the fifth grade if attending a school with a lower percentage of minority students, higher SES, higher reading and mathematics achievement scores, higher approaches to learning scores, and lower externalizing behavior problem scores.

In general, the regression coefficients from a HGLM can be interpreted in the same manner they are in HLM analyses – that is based on their corresponding variable’s scale of measurement. For continuous predictors (e.g., mathematics achievement), coefficients can be interpreted as the expected change in the log-odds of success for each unit change in the predictor. For dichotomous predictors the previous interpretation is modified to account for the discrete nature of the variables. Each regression coefficient represents the expected log-odds ratio of the group described by the corresponding predictor variable and a referent group. The interpretation can be further simplified by exponentiating each estimated parameter, which results in the odds-ratio. The odds ratio,  $\exp\{\beta\}$ , for a given predictor variable represents the factor by which the odds(event) change for a one-unit change in the predictor. Odds-ratios greater than 1 would indicate

that the predictor increases the odds of the outcome; an odds-ratio less than 1 would indicate that the predictor decreases the odds of the outcome.

Table 22 shows the results for the conditional two-level model. The intercept represents the expected log-odds of not receiving special education when controlling for all predictor variables. The unstandardized coefficient was  $\gamma_{00} = 4.02$  (OR =  $\exp(4.02) = 55.95$ , CI = 6.80, 460.14). The odds of a White, male student, of average SES background, with average reading and mathematics achievement scores, and average approaches to learning and externalizing problem behavior scores not receiving services was  $\approx 56$  times a student with those same individual characteristics receiving special education services.

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INSERT TABLE 22 ABOUT HERE

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*Student-level effects*

Surprisingly, results from the model suggest that Black/African-American students were not significantly more likely than White students to be in receipt of services in the fifth grade when controlling for all other predictor variables. Being Black/African-American was associated with an unstandardized coefficient of  $\gamma_{10} = -1.08$  (OR =  $\exp(-1.08) = 0.34$ , CI = 0.11, 1.05). Although, the log-odds coefficient approached significance, when examining the confidence interval for the odds ratio, the confidence interval includes one (0.11, 1.05) suggesting no significant difference in the

likelihood of Black/African-American students receiving services at a greater rate than White students.

Further, findings indicated that, when holding all other predictor variables constant, students from a lower-SES background were more likely than students from a higher-SES background to receive services in the fifth grade. The unstandardized coefficient for SES was  $\gamma_{40} = 0.20$  (OR =  $\exp(0.20) = 1.22$ , CI = 1.03, 1.45). Thus, comparing two students who were similar in other ways but differ by one unit in SES, the odds of not receiving services of the higher-SES student was 1.22 times the odds of not receiving services of the lower-SES student. Adding an additional unit increase in SES further increased the odds of not receiving services from 1.22 to ( $\exp(0.40) = 1.49$ ).

Reading and mathematics student achievement scores were examined as well. Findings suggest when controlling for all other predictors, there was no significant difference between students with higher reading achievement scores and those with lower reading achievement scores ( $\gamma_{50} = -0.09$ ; OR =  $\exp(-0.09) = 0.91$ , CI = 0.73, 1.13). On the contrary, students with higher mathematics scores were less likely to receive services than students with lower mathematics scores given they have the same characteristics ( $\gamma_{60} = 0.49$ ; OR =  $\exp(0.49) = 1.64$ , CI = 1.09, 2.47). Hence, given students were identical on all other predictors, the odds of a student with a mathematics score one unit higher not receiving services was 1.64 times the odds of a student with the lower mathematics score. The odds of not receiving services continued to increase with each additional unit increase: the odds of a student with a mathematics score two units higher not receiving services was ( $\exp(0.98) = 2.66$ ) the odds of the student with the lower mathematics score.

Finally, results of the model suggest that the approaches to learning variable comes close to significance and was associated with higher rates of services received. In other words, it appears that there is a tendency for students with higher approaches to learning scores in the third grade were less likely to not receive services in the fifth grade ( $\gamma_{80} = -0.27$ ; OR =  $\exp(-0.27) = 0.76$ , CI = 0.56, 1.04).

### *Summary*

Findings from the HGLM analyses at the student-level support previous research findings in disproportionate representation on the importance of SES. Students from a lower-SES background were more likely than students from a higher-SES background to receive services in the fifth grade. Results suggest that there was not a significant difference between students of different race/ethnicities nor among students with higher and lower reading achievement scores however, students with higher mathematics scores were found to be less likely to receive services than students with lower mathematics scores. Finally, when considering the two behavior measures examined, approaches to learning was associated with higher rates of services received.

### *School-Level Effects*

Level-two of the model allowed for analysis of the effect of school-level predictors. The following predictors were analyzed at the school-level: percent minority students attending the school, school average SES, mean reading and mathematics scores, approaches to learning score and externalizing problem behaviors score in the school. Results from level-two of the model provided information about the impact of each of the

school-level variables on whether a student would be likely to receive services in the fifth grade.

None of the school-level variables were statistically significant in the HGLM analyses. Even though the results were not statistically significant, variation was observed at the school level. For example, students attending schools with a higher percentage of minority students were less likely to be in receipt of special education services in the fifth grade than students who were attending schools with a lower percentage of minority students ( $\gamma_{01} = 0.17$ ;  $OR = \exp(0.17) = 1.18$ ,  $CI = 0.94, 1.49$ ). Thus, after controlling for all other predictors, the odds of not receiving services among students attending schools with a higher percentage of minorities approached significance and was 1.18 times the odds of a student attending a school with a lower percentage of minorities. Findings also suggest that students attending more economically advantaged schools were less likely not to receive services than students attending schools with a lower mean SES. The unstandardized coefficient was ( $\gamma_{01} = 0.17$ ;  $OR = \exp(0.17) = 1.18$ ,  $CI = 0.43, 1.40$ ). In other words, the odds of not receiving services of a student who was attending a school that was one standard deviation higher in SES was 1.18 times the odds of a student attending the lower SES school given that the student were identical on all other predictor variables.

With respect to achievement scores, findings indicate that students attending schools with higher mean reading achievement scores are more likely not to receive services ( $\gamma_{03} = 0.68$ ;  $OR = \exp(0.68) = 1.98$ ,  $CI = 0.70, 5.63$ ). These findings suggest that the odds of not receiving services for a student who was attending a school with a



higher mean reading achievement score is 1.98 times the odds of a similar student who was attending a schools with a lower mean reading achievement score. Quite the opposite, students attending schools with higher average mathematics achievement scores were less likely not to receive services in the fifth grade ( $\gamma_{04} = -0.54$ ; OR =  $\exp(-0.54) = 0.58$ , CI = 0.18, 1.87).

Finally, the influence of the two behavior measures (approaches to learning and externalizing problem behaviors) at the school-level was not only not statistically significant but also, the odds ratios for both variables were small. For instance, the odds of not receiving services for a student who was attending a school with a higher mean approaches to learning score was only 1.09 times the odds of a similar student who was attending a school with a lower mean approaches to learning score.

### *Summary*

At the school-level, findings indicate that students who attended schools with fewer minority students were more likely to receive services in the fifth grade compared to students who attended schools with more minority students. Further, results suggest that students who attended schools that were economically disadvantaged were less likely to receive services than students who attended wealthier schools. Given that students were the same on all other predictors, students who attended schools with lower mean reading achievement scores were more likely to receive services whereas students who attended schools with lower mean mathematics achievement scores were less likely to receive services. With respect to the behavior measures examined, the influence of these variables at the school level was insignificant.

## CHAPTER V

### Discussion

The primary aim of this study was to extend the research conducted by Hibel, et al (2006) who used the ECLS-K dataset to examine the influence of student- and school-level variables as measured in kindergarten on a student's probability of receiving special education services in the third grade. Results from the Hibel, et al. study suggest that minority students were underrepresented in special education programs when controlling for other predictors as compared to White students and academic achievement was the strongest predictor of receipt of special education services as opposed to race/ethnicity, poverty, or any other socio-demographic variable. Extending the analyses techniques used in the Hibel et al. study assists in determining if academic achievement remains the most predictive variable for receipt of special education services in fifth grade when examining student-level data measured in the third grade. Considering the percentage of students identified in the judgmental categories of MR, SLD and ED tend to increase steadily between kindergarten and fifth grade (Table 1), a reexamination of the influence of various predictors was warranted. Therefore, this study utilized data from the ECLS-K database to examine the influence of student- and school-level variables collected in the third grade (2001-2002) to predict the likelihood that a student received special education services in the fifth grade (2003-2004).

A secondary goal of this study was to describe the student-level demographic, academic, and behavior characteristics as well as school-level characteristics of students who did and did not receive services at various points in time between kindergarten and

fifth grade. Previous research on disproportionate representation lacks focus regarding the differences among grade levels in terms of the characteristics of students who receive special education. However, what is known from state reported data ([www.ideadata.org](http://www.ideadata.org)) is that the number of students identified for special education varies by age and by disability category. Expanding the information about the differences in terms of race/ethnicity, SES and other characteristics of students who are receiving services at various grades could help researchers, policymakers and school administrators better understand the possible causes of disproportionate representation and the interaction among student characteristics, school factors, and eligibility requirements in determining which students become identified for special education. In this study, students in the ECLS-K sample were divided into eight categories – students who received services in a) kindergarten, b) third grade, c) fifth grade, d) kindergarten and third grade, e) kindergarten and fifth grade, f) third and fifth grade, and g) kindergarten, third and fifth grade. This question attempts to begin exploring any differences in the characteristics of students in each of these eight categories.

The purpose of this chapter is to discuss overall findings as well as the implications of these findings for policy. Recommendations for future research will also be discussed. The chapter is divided into the following sections: a) discussion of primary findings, b) characteristics of students at various grade levels, and c) implications for policy and future research.

### Discussion of Primary Findings

An underlying assumption in this study is that the proportion of different racial/ethnic groups in receipt of special education services should be equal to the

proportion of that group among students who did not receive special education services. Based on this interpretation, descriptive statistics from this study suggest that Black/African-American students were overrepresented among groups of students in receipt of special education services in kindergarten, or in third grade or in fifth grade. Meanwhile, descriptive results suggest that Hispanic students were underrepresented among students who received services in kindergarten but were overrepresented among students who received services in third grade and fifth grades.

Despite these findings, results from the HGLM analyses indicate that race/ethnicity was not a significant predictor of receipt of special education services. Rather, the results of these analyses point to the SES of a student's family as more influential than race/ethnicity in whether a child was identified to receive special education services in kindergarten, third and fifth grades. Specifically, students from poorer families are more likely to be in receipt of special education services in the fifth grade.

### *SES*

Throughout the literature on disproportionate representation, SES has been considered to be a key factor contributing to the overrepresentation of some minority racial/ethnic groups in special education (National Organization on Disability, 2004; Oswald et al., 1999; Parrish, 2000; Salend, et al., 2002; Seelman & Sweeney, 1995; U.S. Department of Education, 1998; Zhang & Katsiyannis, 2002). Findings from the two National Academy of Sciences panels (Heller, et al., 1982; Donovan & Cross, 2002) acknowledge the interaction between ethnicity and poverty citing the lack of opportunities to learn in classrooms in high poverty schools where teachers are ill

prepared to teach, where expectations of student learning are low, and where overcrowded classrooms lack instructional resources.

Some studies have suggested that although SES is a significant variable impacting minority disproportionality, it does not negate the influence of race/ethnicity (Hosp and Reschly, 2004; Oswald et al., 2001; Skiba, Poloni-Staudinger, Simmons, Feggins-Azziz, Chung, 2005). For instance, in a multivariate analyses conducted by Hosp and Reschly, when both race/ethnicity and poverty were added to the regression model, both race/ethnicity and poverty had independent effects on the odds of special education identification. Other researchers have posited that race/ethnicity actually serves as a proxy variable for poverty (Halloran, 2006; Hebbeler & Wagner, 1998; MacMillan & Reschly, 1998). For example, Hebbeler and Wagner (1998) suggested that the overrepresentation of Black/African-American students in special education is because Black/African-American students are disproportionately poor and poor children are more likely to have a disability.

In this study, the influence of SES is evident throughout all results. For example, three times as many minority students who were in special education in third grade were in the lowest SES quintile compared to White students; the percentage of minority students in the highest SES quintile was less than half of that of White students; and minority students (both those that were and those that were not receiving special education services in the third grade) were more likely to attend poorer schools than White students. Further, HGLM results suggest that the SES of a student's family is more influential than race/ethnicity in considering which students are identified for special education in fifth grade. SES was a significant predictor ( $p < 0.05$ ) of receiving

special education services in fifth grade when controlling for all other variables however, findings suggest only a weak to moderate effect.

The results of my study are supported by Hibel et al. who found that underprivileged kindergarten students were more likely to have received services in the third grade than privileged kindergarten students. The results are also consistent with previous findings regarding the influence of SES on the identification of minority students as requiring special education. Findings suggest that although there are observed differences between minority and White students in the rate of services received, these differences are influenced by a student's SES background and academic achievement as opposed to the race/ethnicity of a student. This study examined the influence of race/ethnicity and SES at the student-level; this difference in the unit of measurement may partially explain why race/ethnicity does not appear as influential as SES in this study.

Unpacking how SES impacts student learning and the interplay between SES, race/ethnicity and academic achievement is not straightforward. Over the years, researchers have suggested several theories on why students from lower SES families are more likely to have lower academic test scores and be disproportionately referred and identified for special education services. For example, students from lower SES backgrounds are exposed to more risk factors even prior to school entry such as malnutrition or exposure to lead and parents from low SES backgrounds may place less importance on education as compared to parents from higher SES backgrounds which influences the students' attitude toward school and learning. Differences between children from lower SES backgrounds compared to those from higher SES backgrounds

are not only present in the home environment but also at the school level. For example, students from lower SES backgrounds are more likely to attend schools with fewer resources and more unqualified teachers (Nettles, 2006). While prior research has established a link between SES background and academic achievement, more work is needed to disentangle the underlying causes and potential areas for policy and practice to ameliorate the problem.

### *Academic Achievement*

Identification for special education is a two-pronged decision. First, the student must be found to have a disability and then the disability must have an adverse impact on a student's ability to learn or benefit from education. Thus, low academic achievement is a major factor to be considered in disproportionate representation. Academic predictors are important to consider in discussions of disproportionate representation because academic achievement is a strong predictor of referral and eventual placement in special education (Hosp & Reschly, 2004). Skiba et al. (2005), Hosp and Reschly (2004, 2002) all examined the influence of academic predictors in their studies. Previous findings suggest that academic variables are significantly and positively related to disproportionality.

Descriptive analyses from the present study highlight the differences in reading and mathematics test scores among third graders of different race/ethnicity. In general, minority students tended to have lower reading and mathematics test scores in the third grade compared to White students.

In the Hibel, et al. (2006) study, average reading and mathematics test scores at the time of entry to kindergarten were the strongest predictors of receipt of special

education services in third grade when holding all other variables constant. In the present study, third grade reading and mathematics test scores were examined independently in order to assess the relative influence of each variable on receipt of special education services in the fifth grade. Results from the HGLM analysis indicate that students with higher mathematics scores in the third grade were less likely to receive services in the fifth grade than students with lower mathematics scores. However, third grade reading achievement scores did not predict receipt of special education services in fifth grade. It is possible that these findings can be attributed to the way in which reading was measured in the ECLS-K dataset or that there was an interaction effect between SES and reading achievement that masked the significance of reading achievement in the HGLM analyses. It is also possible that teachers have more tolerance of low reading scores throughout the elementary school years because difficulties in the various areas of reading are so common among young children. Further exploration of the unique contribution of reading and mathematics achievement is needed to parcel out the reasons that mathematics achievement would be seemingly more influential than reading achievement in determining receipt of special education services.

#### *Behavior Measures*

One explanation offered throughout the literature for the observed disproportionate representation of minority students in special education is that there is a cultural mismatch between minority students and schools. Schools and classrooms throughout the U.S. generally reflect the culture of the dominant majority – i.e. white, middle-class culture. However, the familial and neighborhood culture of minority students does not always align with the expectations of the white, middle-class culture.



As a result, minority students are often perceived as deficient and deviant (Klingner, et al., 2005). One way to assess the presence of a cultural mismatch is to examine behavior ratings that teachers give students in their classroom.

In this study, two behavior variables were analyzed; teacher ratings of students' approaches to learning and externalizing problem behaviors. On average, White students in the third grade received higher approaches to learning scores than minority students in the third grade. Despite the observed differences between White and minority students in the third grade, HGLM results suggest that having a low rating for approaches to learning score in the third grade did not increase the likelihood that a student would receive services in the fifth grade.

With respect to externalizing problem behaviors, the majority of students were rated as "never" or "sometimes" exhibiting these behaviors. However, a greater percentage of Black/African-Americans were rated as "often" and "very often" demonstrating negative externalizing behaviors. Despite these differences in ratings, results of the HGLM analyses indicate that externalizing problem behaviors was not a significant predictor of receiving services in the fifth grade.

In summary, findings indicate that neither approaches to learning nor externalizing problem behaviors variables were predictive of services received in the fifth grade. However, Black/African-American students did have higher ratings for externalizing problem behaviors and lower ratings of positive approaches to learning. A limitation of this study is that teacher ratings on each of the behavior measures were not disaggregated by teacher ethnicity. Thus, results do not account for possible differences in student ratings from Black/African-American teachers compared to White teachers.

Rather, findings only reflect the differences in behavior ratings for students by race/ethnicity irregardless of teacher race/ethnicity. It is possible that the behavior measures included in this study would be more influential if examined by teacher race/ethnicity as well.

### *School-Level Findings*

Prior research has examined the influence of several district-level variables such as district-level SES, percent minority enrollment in the district and size of the district. Results from these studies have generally highlighted that minority disproportionality varies not only on student-level characteristics, but also by district-level variables. For example, Finn (1982) found that the MR overrepresentation is generally observed in districts with a lower mean SES and that the strength of the relationship between SES and MR by race/ethnicity vary in strength and direction depending on the size of the district. Results from a study conducted by Skiba et al. (2005) also suggest that students attending poor school districts were more likely to be identified as MR than students attending wealthier school districts.

The impact of attending a high minority school has also been explored (Coutinho, 2002; Finn, 1982; Oswald et al., 2001). Findings have consistently shown that Black/African-American students are more likely to be identified as MR when attending schools with a higher percent of White students (Finn, 1982; Oswald et al., 2001). Coutinho et al. (2002) extended this research by examining the influence of minority student enrollment on disproportionality in the area of LD identification. Once again, findings suggest that students attending schools with a higher percent of minorities are less likely to be identified as LD.

In this study, percent minority enrollment, mean SES, average reading and mathematics test scores, and average behavior measures (approaches to learning and externalizing problem behaviors) were all explored at the school-level. Cross-sectional descriptive statistics suggest that on average, minority students were more likely to attend schools with lower mean SES, lower average academic achievement scores, and higher externalizing problem behavior scores compared to their White counterparts. Despite these observations, none of the school-level variables were significant in the HGLM analysis. It is possible that the influence of the student-level variables accounted for the majority of the variance thereby masking the influence of the student-level predictors. Analyses that included only school-level variables might help to provide more information about the impact of these variables on receipt of services. Further, a limitation of this study is that data were not disaggregated by disability type due to sample size. School-level variables may appear more influential depending on the type of disability examined.

#### Characteristics of Students at Various Grade Levels

One purpose of the present study was to explore whether the characteristics of students who received services at different grade levels (i.e., between kindergarten and third and fifth grade) differed from those students who never received services. In this study, the analyses focused on describing the differences among students in each of the three grades in terms of their race/ethnicity, SES, reading and mathematics achievement, and behavior measures (approaches to learning and externalizing problem behaviors). Additionally, differences in the school-level variables of percent minority enrollment, mean SES and mean academic achievement were analyzed for each of the three grades.

The analyses were intended to only describe the characteristics of each group of students who were receiving services at each of the three grades and do not account for the interaction among the variables.

Overall, the results indicate that the characteristics of students who received services at more than one grade level differ from those who either received services at only one grade level or never received services. For example, males tended to be overrepresented among groups of students who received services at multiple grade levels. However, gender was relatively balanced among students who received services in only one grade level. Further, African-American students were underrepresented among students who received special education services at multiple grade levels and a higher percentage of students who received services in kindergarten and third grade or in kindergarten and fifth grade were in the lowest SES quintile compared to all other subgroups of students. Findings suggest that about 90% of the students who received services in both kindergarten and fifth grade were White students; more than twice as many students who received services in kindergarten and fifth grade had reading achievement test scores in the lowest quartile compared to students who never received services; and a lower percentage of students who received services in kindergarten and fifth grade were rated as “never” exhibiting externalizing problem behaviors.

The percentage of students reflected in each of these categories was very small; only 1.2% of White and Hispanic students and 0.6% of Black/African-American students received services in kindergarten and third grade but not in fifth grade and an even smaller percentage of students (0.4% of Whites and 0.1% of Blacks/African-Americans and Hispanics) received services in kindergarten and fifth grade but not in third grade. When

examining these results, it is important to consider who the students are that receive services at multiple grade levels, particularly those that receive services in kindergarten and third grade or kindergarten and fifth grade. These two sub-groups appear to have much different characteristics compared to other subgroups of students who were in receipt of services and who never received services. One possibility is that some of the students that received special education services in kindergarten were classified under the category of SLI and may have exited special education by third grade only to be reclassified under a different category (i.e. SLD) by fifth grade. There is a limited research base on late emerging reading disabilities that would support this theory (Catts, Adlof, & Weismer, 2006; Leach, Scarborough, & Rescorla, 2003). An additional possibility is that some students identified as requiring special education services in kindergarten may have their learning or behavioral issues ameliorated by third grade but only to have the problems reemerge once the student is no longer in receipt of services requiring reclassification in the later elementary grades. Further, because students with disabilities were not oversampled in the ECLS-K study and the percentage of students in each of these categories is so small, it is possible that the differences in characteristics of students in these subgroups as compared to other students is a result of incorrect data collection by ECLS-K staff and the results from this study may not accurately reflect the true population of students. Future research is needed to be able to further explore any potential differences in characteristics (e.g. proportion of students by race/ethnicity and SES in receipt of services) between students who received services in multiple grade levels compared to those that either never received services or received services at only one grade level as well as underlying reasons for the observed differences.

## Implications for Policy and Future Research

This study highlights the complexity of understanding disproportionate representation of minority students in special education. The study points to the importance of analyzing data at both the student- and school-level as well as the importance of considering the interaction of race/ethnicity, SES, and achievement. While district- and state-level data provide general trends, individual student- and school-level data can provide administrators with the knowledge needed to address the problem of disproportionate representation in their school setting.

Prior research has suggested that the influence of variables associated with disproportionate representation is not consistent across race/ethnicity, disability type or SES background. For example, the influence of SES appears to vary by district-size (Finn, 1982), gender, race/ethnicity, and disability category (Hosp & Reschly, 2004; Oswald et al., 1999; Oswald et al., 2001). Hosp and Reschly (2004) concluded that it is critical to disaggregate analyses by race/ethnicity and disability category in order to better understand the disproportionality issue. Therefore, research studies are needed that examine the influence of student-level and school-level and assess the interaction effects between the variables in question.

In this study, SES was found to be the strongest predictor of receipt of services in the fifth grade. In order to better understand the scope of influence of variables such as SES compared to the impact of race/ethnicity, academic achievement and behavior measures, data, programs and research studies should focus on within variable comparison (i.e. within race/ethnicity and within SES group) so that programs can be

appropriate targeted to address the unique needs of the students in each of these groups. To date, the literature on disproportionate representation has effectively illuminated the problem of minority disproportionality however; numerous questions remain relating to the causes of the problem. A continued focus on examining the nuances on how variables such as SES can influence identification rates is essential to moving the discussion forward.

The findings from this study call attention to the need for additional research that is longitudinal and examines variables associated with disproportionate representation at the student- and school-level. The majority of prior studies have tended to analyze cross-sectional data and have utilized district-level data aggregated to the national level. As Reschly (1997) points out, the use of aggregated data could possibly obscures the effects of the individual variables. The use of datasets that permit for analysis at the student- and school-level might address this limitation. Further, longitudinal studies would contribute to the field of literature on disproportionality by permitting for a better understanding in how the influence of predictors changes and evolves over time.

Data utilized in this study were collected between the 1998-99 and 2003-2004 school years. Since that time, key Federal policy changes have been implemented through the No Child Left Behind Act of 2001 and the IDEA of 2004; currently, there is a greater focus on academics, provision of prevention services such as early intervening services and new methods of identifying students with disabilities such as response to intervention. As a result of these Federal policy changes, it is possible that the influence of variables such as SES or academic achievement has been affected. It would be

interesting to examine whether or not the findings from this study remain consistent when using data that were collected after the passing of the new Federal statute and regulations.

Finally, the results of this study call attention to the importance of not only examining the differences in the characteristics of students in receipt of services at various grade levels but also, exploring variables contribute to a student exiting out of special education by race/ethnicity. An understanding of the predictors that may lead a student exiting out of special education may shed some new light on the topic of disproportionality and the factors that contribute to the disproportionate representation of minorities. .

#### Summary

Unpacking the potential causes of disproportionate representation is essential to designing policies and providing programs and services that appropriately target the unique needs of students in our schools. The present study provided a) a descriptive, cross-sectional snapshot of students who did and did not receive special education services in the third grade, b) exploratory descriptive statistics on students in receipt of special education services between kindergarten and fifth grade and c) results from HGLM analysis on the predictive influence of student-level and school-level variables associated with the disproportionate representation of minority students. In general, descriptive statistics of third grade students who received special education services mirror previous findings; minority students tended to be overrepresented in special education programs, were from lower SES backgrounds, had lower reading and mathematics scores, and had lower approaches to learning scores and higher externalizing behavior scores compared to White students. Likewise, a higher percentage of minority



students attended poorer schools and schools with lower average academic achievement scores. Findings from the HGLM analysis suggested that SES and mathematics achievement measured in the third grade are key predictors to receipt of special education services in the fifth grade. Further, findings suggest that race/ethnicity is not a significant predictor. Although SES and academic achievement have been considered important elements contributing to the disproportionate representation of minority students in previous research, the finding that race/ethnicity is not a significant predictor warrants further research. Finally, results of this study highlight the importance of disaggregating data collected for the purposes of monitoring disproportionality of minority students not only by race/ethnicity, disability type, and SES but also when services were received.

More than 25 years ago, the panel on selection and placement of students in programs for the Mentally Retarded issued a set of conclusions that continue to be relevant today. This does not mean that no progress has been made toward the aim of better understanding the underlying causes of disproportionality and key predictors. On the contrary, great progress has been made over the years. For example, both the NCLB Act of 2001 and the IDEA amendments of 2004 attempt to address some of the observed problems. While district- and state-level data provide general trends, individual student- and school-level data can provide administrators with the knowledge needed to address the problem of disproportionate representation in their school setting.

## TABLES

Table 1

*Percent of Students Served under IDEA, Part B, in the U.S. by Age and Disability Category: Fall 2007*

Disability category	5 Years old		6 Years old		7 Years old		8 Years old		9 Years old	
	N	%	N	%	N	%	N	%	N	%
Speech or language impairments	166,659	56.06%	219,924	60.69%	219,932	52.53%	195,118	42.37%	159,826	32.22%
Specific learning disabilities	8,111	2.73%	23,911	6.60%	63,081	15.07%	121,049	26.29%	180,485	36.39%
Mental retardation	7,310	2.46%	14,356	3.96%	19,400	4.63%	24,819	5.39%	29,996	6.05%
Emotional disturbance	2,616	0.88%	7,042	1.94%	12,825	3.06%	18,705	4.06%	24,005	4.84%
Multiple disabilities	3,994	1.34%	6,210	1.71%	7,387	1.76%	8,107	1.76%	8,958	1.81%
Hearing impairments	3,210	1.08%	4,188	1.16%	4,909	1.17%	5,397	1.17%	5,784	1.17%
Orthopedic impairments	3,202	1.08%	4,109	1.13%	4,603	1.10%	4,775	1.04%	4,959	1.00%
Other health impairments	9,414	3.17%	17,419	4.81%	27,625	6.60%	38,539	8.37%	50,018	10.08%
Visual impairments	1,366	0.46%	1,708	0.47%	1,892	0.45%	2,099	0.46%	2,162	0.44%
Autism	18,989	6.39%	24,241	6.69%	25,192	6.02%	24,698	5.36%	24,753	4.99%
Deaf-blindness	88	0.03%	83	0.02%	103	0.02%	104	0.02%	86	0.02%
Traumatic brain injury	433	0.15%	693	0.19%	970	0.23%	1,198	0.26%	1,509	0.30%
Developmental delay <sup>a</sup>	71,917	24.19%	38,504	10.63%	30,732	7.34%	15,894	3.45%	3,499	0.71%
All disabilities	297,309	100%	362,388	100%	418,651	100%	460,502	100%	496,040	100%

Source: Modified Table 1-7: Children and students served under IDEA, Part B, in the U.S. and outlying areas, by age and disability category: Fall 2007. Available at the Individuals with Disabilities Education Act Data Web site, <https://www.ideadata.org/>.

<sup>a</sup>Developmental delay is applicable only to children ages 3 through 9.

Table 2

*Risk Ratios for Students Ages 6 through 21 with Disabilities, by Race/Ethnicity*

*and Disability Category: 2005-2006 school years*

	White	Black/African- American	Hispanic
Specific learning disabilities	0.94	1.25	1.01
Mental Retardation	0.67	2.18	0.92
Emotional Disturbance	1.07	2.01	0.57
All Disabilities	1.01	1.26	0.86

Source: Average risk ratio calculated from state risk ratio data provided at [www.nccrest.org](http://www.nccrest.org). All data are for the 50 states and the District of Columbia.

Table 3.

*Students ages 6 through 21 served under IDEA, Part B, in various educational environments by race/ethnicity: Fall 2006*

	White	Black/African-American	Hispanic
All educational environments	58.65	20.06	17.53
Inside a regular class at least 80% of the day	63.07	16.72	16.57
Inside a regular class 40% to 79% of the day	57.51	20.54	18.08
Inside a regular class less than 40% of the day	46.66	28.08	20.96
Separate school for children with disabilities	52.76	28.46	15.23
Correctional Facility	30.42	50.07	17.40

Source: Modified Table 2.8 from [www.nccrest.org](http://www.nccrest.org).

Table 4

*Articles Included in Literature Review: Description of Purpose*

	Description of Purpose
Artiles, Rueda, Salazar, and Higareda (2005)	To examine within-group diversity, assess the magnitude of disproportionate representation for English Language Learners (ELLs) in several California urban districts, and examine the potential impact of various diversity markers on disproportionality.
Chinn and Hughes (1987)	To determine whether any changes have occurred in the extent of the representation of minorities in special education classes since 1978.
Coutinho, Oswald, and Best (2002)	To investigate the extent of gender and race/ethnicity disproportionality among students identified as having Specific Learning Disabilities (SLD), and investigate the relationships between disproportionality and sociodemographic factors.
Finn (1982)	To investigate the differences in placement rates and describe the context in which these differences arise.
Hibel, Farkas and Morgan (2006)	To estimate the cognitive, behavioral, and contextual effects on children's probability of special education placement using children's academic skills and learning-related behaviors at school entry to predict their probability of special education placement by the end of third grade.
Hosp and Reschly (2002)	To identify specific variables and patterns of variables that are related to the restrictiveness of a student's placement and to determine if these variables and patterns differed for Black/African-American and White students.
And Hosp & Reschly (2004)	To extend the research on disproportionate representation of minority students in special education by providing confirmation of previous findings and adding findings in academic achievement.
Oswald, Coutinho, Best, and Singh (1999)	To describe the extent of disproportionate ethnic representation as Emotionally Disturbed (ED) and Mildly Mentally Retarded (MMR) for Black/African-American special education students and to explore the extent to which economic, demographic, and educational variables at the district level were associated with disproportionate identification for an ethnic group.
Oswald, Coutinho, Best, and Nguyen (2001)	To examine the extent of disproportionality among students with MR and to investigate the extent to which a set of sociodemographic variables was related to the disproportionate representation of minority students as having Mental Retardation (MR).
And Skiba, Poloni-Staudinger, Simmone, Feggins-Azziz, Chung (2005)	To explore the impact of a variety of sociodemographic and poverty-related variables on levels of ethnic disproportionality in special education.

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Zhang and Katsiyannis (2002)

To examine minority representation across states and regions for all disabilities, along with high-incidence disabilities (SLD, MR, and ED), and to address such variability in light of minority representation in the total student population and state poverty rates.

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Table 5

*Articles Included in Literature Review: Type of Dataset Used*

	Nationally representative dataset	State-level dataset	District-level dataset
Artiles, Rueda, Salazar, and Higareda (2005)			11 Urban School Districts in California
Chinn and Hughes (1987)	Office of Civil Rights (OCR) (1978; 1980; 1982; 1984)		
Coutinho, Oswald, and Best (2002)	OCR (1994) & Common Core of Data (CCD) (1993)		
Finn (1982)	OCR (1978)		
Hibel, Farkas, and Morgan (2006)	Early Childhood Longitudinal Study – Kindergarten Cohort		
Hosp and Reschly (2002)			4 School Districts in Delaware
Hosp and Reschly (2004)	OCR (1998); CCD (1997-1998);	OCR (1992); CCD (1992)	District-level achievement data
Oswald, Coutinho, Best, and Singh (1999)	OCR (1992); CCD (1992)		
Oswald, Coutinho, Best, and Nguyen (2001)	OCR (1994); CCD (1993)		
and Skiba, Poloni-Staudinger, Simmone, Feggins-Azziz, Chung (2005)		3 separate statewide datasets in a Midwestern state (2000-2001)	
Zhang D. & Katsiyannis, A. (2002)	Office of Special Education, 22nd Annual Report to Congress; National Council of Education Statistics: Statistics in Brief; Poverty in the U.S.		



Table 6

*Articles Included in Literature Review: Variables*

	<i>Demographic Variables</i>	<i>Economic Variables</i>	<i>School-Related variables</i>	<i>Academic and Behavioral Variables</i>
Artiles, Rueda, Salazar, and Higareda (2005)	* Race/Ethnic group * Grade level * Language proficiency	* Socioeconomic Status (SES)	* Type of special education programs * Type of language program	
Chinn & Hughes (1987) and Coutinho, Oswald, & Best (2002)	* Race/Ethnic group * Race/Ethnic group * Gender	* Median housing value * Median income for households with children * % of children in household below poverty level * % of adults in the community who had education of 12 <sup>th</sup> grade or less and no diploma	* Student-teacher ratio * Per-Pupil Expenditure * % of children enrolled considered at risk * % of children enrolled non-White * % of children limited English proficient	
Finn (1982)	* Race/Ethnic group	* SES	* District size * Region * Suspension rates * % minority * Special education placement	
Hibel, Farkas, and Morgan (2006)	* Race/Ethnic group * Gender * Student mobility	* Family SES	* Teacher race/ethnic * Mean minority teacher * School % minority enrollment	* Test score * Approaches to learning * Externalizing problem behaviors

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				<ul style="list-style-type: none"> <li>* School mean SES</li> <li>* School mean test score</li> <li>* School mean approaches to learning</li> <li>* School mean externalizing problems</li> <li>* Chapter 1 help</li> <li>* Individual teacher</li> <li>* Project life</li> <li>* Peer helper</li> <li>* Counseling</li> <li>* Small Group</li> <li>* Total number of interventions</li> </ul>	<ul style="list-style-type: none"> <li>* Reading score</li> <li>* Math score</li> <li>* IQ scores</li> <li>* Reading discrepancy</li> <li>* Math discrepancy</li> <li>* Writing discrepancy</li> <li>* Spelling discrepancy</li> <li>* Instructional difference-math</li> <li>* Instructional difference-reading</li> </ul>
Hosp and Reschly (2002)	<ul style="list-style-type: none"> <li>* Race/Ethnic group</li> <li>* Gender</li> <li>* District</li> <li>* Age</li> <li>* Initial placement</li> <li>* Retained</li> <li>* Absences</li> <li>* Initial peer relations</li> <li>* Initial age</li> <li>* Referral reason</li> </ul>				
Hosp and Reschly (2004)	<ul style="list-style-type: none"> <li>* Base rate of White students</li> <li>* Base rate of the racial/ethnic group being compared</li> <li>* Percentage of students with limited English proficiency</li> <li>* Base rate of students with disabilities</li> </ul>	<ul style="list-style-type: none"> <li>* Median housing value</li> <li>* Median income</li> <li>* % of adults with 12th-grade education or less</li> </ul>	<ul style="list-style-type: none"> <li>* % of students at risk</li> </ul>	<ul style="list-style-type: none"> <li>* % of White students proficient in reading</li> <li>* % of White students proficient in math</li> <li>* % of the racial/ethnic group being compared proficient in reading</li> <li>* % of the racial/ethnic group being compared proficient in math</li> </ul>	
Oswald, Coutinho, Best, and Singh (1999)	<ul style="list-style-type: none"> <li>* % of student enrollment that is Black/African-American</li> </ul>	<ul style="list-style-type: none"> <li>* Median value housing</li> <li>* Median income for households with children</li> </ul>	<ul style="list-style-type: none"> <li>* % of children enrolled in school who are "at risk"</li> <li>* % of children who are limited English</li> </ul>		

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Oswald, Coutinho, Best, and Nguyen (2001)	<ul style="list-style-type: none"> <li>* Gender</li> <li>* Race/ethnic group</li> </ul>	<ul style="list-style-type: none"> <li>* % of children below poverty level</li> <li>* % of adults in the community who have 12th-grade education or less and no diploma</li> <li>* Median housing value for houses</li> <li>* Median income for household with children</li> </ul>	<ul style="list-style-type: none"> <li>proficient</li> <li>* Student-teacher ratio</li> <li>* Per pupil expenditure</li> <li>* % of children enrolled who are at risk</li> <li>* % of enrolled children who are not White</li> <li>* % of enrolled children who are limited English proficient</li> </ul>	<ul style="list-style-type: none"> <li>* Mean 3<sup>rd</sup> grade score on state's accountability measure</li> <li>* Average Scholastic Aptitude Test (SAT) scores</li> <li>* % of students in the district taking the SAT</li> </ul>
Skiba, Poloni-Staudinger, Simmone, Feggins-Azziz, and Chung (2005)	<ul style="list-style-type: none"> <li>* Race/ethnic group</li> </ul>	<ul style="list-style-type: none"> <li>* Poverty level</li> </ul>	<ul style="list-style-type: none"> <li>* Average teacher salary</li> <li>* Student-to-teacher ratio</li> <li>* Expenditures per student</li> <li>* % Black/African-American students at the district level</li> <li>* Size of school district</li> <li>* Overall school district suspension-expulsion rate</li> <li>* School district dropout rate</li> </ul>	<ul style="list-style-type: none"> <li>* Mean 3<sup>rd</sup> grade score on state's accountability measure</li> <li>* Average Scholastic Aptitude Test (SAT) scores</li> <li>* % of students in the district taking the SAT</li> </ul>
Zhang D. and	<ul style="list-style-type: none"> <li>* Race/Ethnic group</li> </ul>		<ul style="list-style-type: none"> <li>* Region</li> </ul>	

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Table 7

*Articles Included in Literature Review: Findings*

	Findings
Artiles, Rueda, Salazar, and Higareda (2005)	English Language Learners (ELLs) with the most limited language skills showed the highest rates of identification in the special education categories examined. A greater percentage of low-socioeconomic status (SES) ELLs are identified with Specific Learning Disabilities (SLD).
Chinn and Hughes (1987)	Black/African-American students were overrepresented in Educable and Trainable Mentally Retarded (MR) programs and Emotional Disturbance (ED) programs..Hispanic students are slightly underrepresented in programs for students identified as Educable MR, Trainable MR, and SLD.
Coutinho, Oswald, and Best (2002)	Increased poverty is associated with increased SLD identification rates among Black/African-American, Hispanic, and male Asian students. Increased poverty is associated with decreased SLD identification rates among White and American Indian/Alaska Native students. The percent of minority student enrollment was weakly to moderately associated with SLD identification for all racial/ethnic groups. Per pupil expenditure was weakly, positively associated with MR rate of identification for all racial/ethnic grounds except with American Indian/Alaska Native and Black/African-American students.
Finn (1982)	The disproportion of minority students varies by race/ethnicity, region of the country, size of the district, percent minority within a district, and SES. Black/African-American students were overrepresented in both MR and ED. American Indian/Alaska Native students were overrepresented in the category of SLD. Hispanic and White students were classified at similar rates. Asian American students were underrepresented in all 13 categories of the Individuals with Disabilities Education Act (IDEA). Educable MR disproportions tend to occur in lower SES districts. On average, disproportion increases with district size. The proportion of suspensions was lowest in all White or all minority school districts and highest in school districts with 30-70 % minority students enrolled.
Hibel, Farkas, and Morgan (2006)	Economic variables (e.g. SES) have little to no effect on the variation in special education placement. Higher scores of student mean test scores were the most powerful predictor of special education placement.

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Hosp and Reschly (2002)	Black/African-American and American Indian/Alaska Native students are overrepresented in all disability categories. Black/African-American students have the highest level of representation in the disability category of SLD.
Hosp and Reschly (2004)	Black/African-American and American Indian/Alaska Native students are overrepresented in all disability categories. Economic variables account for a significant portion of variance in the overrepresentation patterns of Black/African-American students in the disability categories of MR and ED. Among students who do not receive an intervention, Black/African-American students spend more time outside the general education classroom than Whites. Academic predictors account for a significant portion of the variance by race.
Oswald, Coutinho, Best, and Singh (1999)	Black/African-American students were nearly two and one-half times as likely as non-Black students to be identified as Educable MR. Black/African-American students were one and one-half times as likely to be identified in the category of ED as compared to their non-Black peers. Impact and direction of economic variables is not consistent.
Oswald, Coutinho, Best, and Nguyen (2001)	Black/African-American males were four times as likely as White females to be identified as MR, and Black/African-American females were 2.58 times as likely as White females to be identified as MR. Poverty had a weak-to-moderate positive association with the identification rate of MR for all of the gender/racial groups except female Asian students where the relationship is essentially nonexistent. MR identification rates decrease among Black/African-American students as the percent of non-White students in the school increases. Districts with higher per pupil expenditure had lower rates of MR identification for Black/African-American students and higher rates of identification for Hispanic students.
Skiba, Poloni-Staudinger, Simmone, Feggins-Azziz, and Chung (2005)	When considering only race, Black/African-American students were more than three times as likely as other students to be identified as MR and more than two times as likely as other students to be identified as ED. Poverty is a weak and inconsistent predictor of disproportionality. Rate of school suspensions and expulsions is a robust predictor of special education disproportionality. Academic achievement is a significant predictor.
Zhang D. and Katsiyannis, A. (2002)	Black/African-American and American Indian/Alaska Native students are overrepresented in all disability categories. Black/African-American students have the

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highest level of representation in the disability category of SLD. Asian/Pacific Islander students and Hispanic students are underrepresented as compared to White students.

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Table 8

*Data Collection Timeline by Instrument*

	1998-1999		1999-2000		2001-2002	2003-2004
	Fall- Kindergarten	Spring- Kindergarten	Fall- 1 <sup>st</sup> grade	Spring- 1 <sup>st</sup> grade	Spring- 3 <sup>rd</sup> grade	Spring- 5 <sup>rd</sup> grade
Direct and Indirect Child Assessments	X	X	X	X	X	X
Parent Interview	X	X	X	X	X	X
Teacher Survey Part A	X	X	X	X	X	
Teacher Survey Part B	X	X	X	X	X	
Teacher Survey Part C	X	X	X	X	X	
Teacher Survey						X
Reading Teacher Survey						X
Mathematics Teacher Survey						X
Science Teacher Survey						X
Special Education Teacher Survey Part A		X		X	X	X
Special Education Teacher Survey Part B		X		X	X	X
Adaptive Behavior Scale		X		X		
Student Self-description Survey					X	X
Food Consumption Survey						X
Student Record Abstract		X		X	X	X
School Fact Sheet					X	
School Facilities Checklist		X		X	X	X
Salary and Benefits Survey		X				
Head Start Verification		X				



Table 9

*Means, Standard Deviations, Split-Half Reliability for Teacher SRS Scores*

	Weighted Mean	SD	Split-half reliability
Approaches to Learning	3.04 (2.67)	0.68 (0.68)	0.91
Self-Control	3.22 (3.22)	0.61 (0.63)	0.79
Interpersonal	3.06 (2.82)	0.65 (0.69)	0.88
Externalized Problem	1.67 (1.82)	0.59 (0.69)	0.89
Internalized Problem	1.65 (1.82)	0.55 (0.69)	0.77
Peer Relationships	3.13 (2.90)	0.60 (0.63)	0.92

Source: *Pallack, Njararian, Rock, Atkins-Burnett, Hausken, 2005*

Note: Estimates based on C6WO weight. Numbers outside of the parentheses represents fifth graders at the time of assessment. Numbers inside of the parentheses represents third-fourth graders at time of assessment.

Table 10

*Comparison of Data Sources for Identifying Children with Disabilities*

	Field Management System: (FxSPECS)		School Records: (UxRIEP)		Special Education Survey Data: (DxSETQA or ExSETQB)	
	N	Weighted %	N	Weighted %	N	Weighted %
Fall Kindergarten	784	4	1,016	7	742	3.8
Spring first grade	795	5	1,043	10	718	4.7
Spring third grade	1,165	9	1,330	13	978	7.0
Spring fifth grade	1,031	12	1,081	15	992	11.6

Source: U.S. Department of Education, National Center for Education Statistics (NCES), Early Childhood

Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K). Restricted use data files. Data weighted using CxCPTWO for FxSPECS and UxRIEP and using CxCWO for DxSETQA and ExSETQB.

Table 11

*Description of Variables Used in the Current Study*

<i>Variable Name</i>	<i>Description</i>
Dependent Variable	
Receipt of special education services	Dichotomous indicator of the receipt of special education services (no services received=0; services received=1)
Student-level	
Gender	Dichotomous composite variable (male=0; female=1)
Race/Ethnicity	Categorical composite variable; for the purposes of this study, the categories White, Black/African-American and Hispanic were utilized. (For research questions 1 and 2: White=1, Black/African-American=2, Hispanic=3. For research question 3, two dummy race/ethnicity variables were created: Black/African-American=1, White=0 and Hispanic=1, White=0)
Socioeconomic Status (SES)	Categorical composite measure of student socioeconomic status was used for research question one and two (1 <sup>st</sup> quintile=1, 2 <sup>nd</sup> quintile=2, 3 <sup>rd</sup> quintile=3, 4 <sup>th</sup> quintile=4, 5 <sup>th</sup> quintile=5); A continuous composite measure of student socioeconomic status was used for research question three
Reading Achievement	Continuous variable representing students' Item Response Theory (IRT) scores on the reading exams; this variable was recoded into a categorical variable for research questions 1 and 2 (1 <sup>st</sup> quartile=1, 2 <sup>nd</sup> quartile=2, 3 <sup>rd</sup> quartile=3, 4 <sup>th</sup> quartile=4)
Mathematics Achievement	Continuous variable representing students' IRT scores on the mathematics exams; this variable was recoded into a categorical variable for research questions 1 and 2 (1 <sup>st</sup> quartile=1, 2 <sup>nd</sup> quartile=2, 3 <sup>rd</sup> quartile=3, 4 <sup>th</sup> quartile=4)
Approaches to Learning	Categorical variable representing a students' score in display of positive learning behaviors (never=1, sometimes=2, often=3, very often=4)
Externalizing Problem Behaviors	Categorical variable representing a students' score in display of negative behaviors (never=1, sometimes=2, often=3, very often=4)
School-level	
Percent Minority Enrollment	A categorical variable representing the percent of minority students enrolled in the school (less than 10% minority = 1, 10 to less than 25% = 2, 25 to less than 50% = 3, 50 to less than 75% = 4, 75% or more = 5)
SES	The mean of all individual student SES within a school
Reading Achievement	Continuous variable of the mean of all individual student IRT reading achievement scores within each school

Mathematics Achievement	calculated to derive a mean reading achievement score for the school Continuous variable of the mean of all individual student IRT mathematics achievement scores within each school
Approaches to Learning	calculated to derive a mean mathematics achievement score for the school Continuous variable of the mean of all individual students' Approaches to Learning scores within a school
Externalizing Problem Behaviors	Continuous variable of the mean of all individual students' Externalizing Problem Behaviors scores within a school

Table 12

*Categorized IRT Scores in Reading and Mathematics*

	1 <sup>st</sup> Quartile Less than 25 percent correct	2 <sup>nd</sup> Quartile 25 to 49 percent correct	3 <sup>rd</sup> Quartile 50 to 74 percent correct	4 <sup>th</sup> Quartile 75 percent or more correct
IRT Test Score				
<i>Reading</i>	0 to 91.73	91.74 to 107.46	107.47 to 121.96	121.97 and up
<i>Mathematics</i>	0 to 69.95	69.96 to 85.40	85.41 to 97.57	97.58 and up

Table 13

*IRT Reading Scores at Third Grade: Original Data, Data with Multiple Imputation, and Data with Single Imputation*

	N	Mean	SE	SD
Original Data	14,280	107.49	0.17	20.26
Multiple Imputation	15,305	107.38	0.17	20.31
Simple Imputation	15,305	107.49	0.16	19.57

Table 14

*Number and Percent of Students in Receipt of Special Education Services With and Without Missing Values Multiply Imputed*

	Receipt of Special Education Services						
	Yes		No		Mean		
	N	%	N	%	Statistic	SE	SD
Without Multiple Imputation	968	7.8	11490	92.2	1.92	0.002	0.268
With Multiple Imputation	1135	7.4	14170	92.6	1.93	0.002	0.262

Table 15

*Coding Scheme for Student- and School-Level Variables*

<b>Student-Level Variables</b>	
Race: Black/African-American	1 = If student is Black/African-American 0 = White
Race: Hispanic	1 = If student is Hispanic 0 = White
Gender	1 = Female 0 = Male
Socioeconomic status	Continuous variable; z-score transformation
Reading Achievement Score	Continuous variable; z-score transformation
Mathematics Achievement Score	Continuous variable; z-score transformation
Approaches to Learning Score	Categorical variable; z-score transformation
Externalizing Problem Behaviors Score	Categorical variable; z-score transformation
<b>School-Level Variables</b>	
% Minority Enrollment	Categorical variable
SES	Continuous variable
Reading Achievement Score	Continuous variable
Mathematics Achievement Score	Continuous variable
Approaches to Learning Score	Continuous variable
Externalizing Problem Behavior Score	Continuous variable

Table 16

*Weighted Number and Percent of Students in Receipt of Special Education Services in the Third Grade by Race and Disability Type*

	Disability Type in Third Grade					
	Judgment		Other		Not Classified	
	N	%	N	%	N	%
White	8187	66.27	4166	33.72	0	0
<i>Male</i>	4377	60.19	2895	39.81	0	0
<i>Female</i>	3810	75.0	1270	25.0	0	0
Black/African-American	3867	83.04	790	16.96	0	0
<i>Male</i>	2494	75.94	790	24.06	0	0
<i>Female</i>	1373	100	0	0	0	0
Hispanic	587	16.73	2529	72.09	392	11.17
<i>Male</i>	400	14.98	1878	70.34	392	14.68
<i>Female</i>	188	22.43	650	77.57	0	0

Table 17

*Weighted Number and Percent of Students in the Lowest (1<sup>st</sup>) and Highest (5<sup>th</sup>) SES Quintiles by Race/Ethnicity*

	1 <sup>st</sup> Quintile		5 <sup>th</sup> Quintile	
	N	%	N	%
White	181896	32.02%	585282	87.00%
Black/African-American	158634	27.92%	40852	6.07%
Hispanic	227575	40.06%	46613	6.93%
Total	568105	100%	672747	100%

Table 18

*Results from Cross Tabulation of Students in Third Grade by Receipt of Services and Race/ethnicity by Student-Level*

*Variables*

	White		Black/African American				Hispanic					
	Receiving services		Not receiving services		Receiving services		Not receiving services		Receiving services		Not receiving services	
	N	%	N	%	N	%	N	%	N	%	N	%
	SES											
1 <sup>st</sup> Quintile	16372	10.57%	165524	8.79%	14199	32.04%	144435	32.87%	24415	51.72%	203160	35.98%
2 <sup>nd</sup> Quintile	26540	17.13%	331881	17.63%	8000	18.05%	103437	23.54%	9160	19.41%	133512	23.65%
3 <sup>rd</sup> Quintile	32972	21.28%	386385	20.53%	9428	21.28%	87518	19.92%	4550	9.64%	113539	20.11%
4 <sup>th</sup> Quintile	32262	20.82%	460205	24.45%	6001	13.54%	69861	15.90%	6155	13.04%	70728	12.53%
5 <sup>th</sup> Quintile	46791	30.20%	538491	28.61%	6682	15.08%	34170	7.78%	2923	6.19%	43690	7.74%
	Reading Achievement											
1 <sup>st</sup> Quartile	34353	21.31%	33055	16.9%	24129	45.33%	222491	43.29%	21868	44.59%	255992	40.45%
2 <sup>nd</sup> Quartile	27578	17.10%	338365	17.3%	13385	25.15%	115692	22.51%	9845	20.07%	133528	21.10%
3 <sup>rd</sup> Quartile	41748	25.89%	579756	29.7%	13289	24.97%	116297	22.63%	10374	21.15%	151086	23.87%
4 <sup>th</sup> Quartile	57559	35.70%	704180	36.1%	2422	4.55%	59498	11.58%	6956	14.18%	92231	14.57%
	Mathematics Achievement											
1 <sup>st</sup> Quartile	30303	17.84%	315636	15.20%	27194	46.70%	268840	46.63%	19942	37.34%	239486	34.10%

2 <sup>nd</sup> Quartile	35736	21.03%	485468	23.38%	17957	30.84%	155212	26.92%	17661	33.07%	203194	28.93%
3 <sup>rd</sup> Quartile	52433	30.86%	579092	27.89%	8284	14.23%	107212	18.60%	8973	16.80%	153678	21.88%
4 <sup>th</sup> Quartile	51419	30.27%	695805	33.52%	4799	8.24%	45283	7.85%	6827	12.78%	105880	15.08%
Approaches to Learning												
Never	1030	0.61%	20124	0.97%	3936	6.76%	11593	2.01%	1169	2.19%	9402	1.34%
Sometimes	39071	23.00%	467011	22.50%	21870	37.56%	206201	35.76%	16281	30.49%	201303	28.67%
Often	76297	44.91%	944936	45.52%	23800	40.87%	249399	43.26%	21084	39.48%	321680	45.81%
Very Often	53492	31.49%	643931	31.02%	8628	14.82%	109353	18.97%	14870	27.84%	169854	24.19%
Externalizing Problem Behaviors												
Never	66421	39.10%	844313	40.67%	14843	25.49%	152452	26.44%	24577	46.02%	274965	39.16%
Sometimes	87869	51.72%	1018463	49.06%	26855	46.12%	283543	49.18%	22017	41.23%	348423	49.62%
Often	13325	7.84%	181196	8.73%	13410	23.03%	110883	19.23%	5799	10.86%	66941	9.53%
Very Often	2275	1.34%	32029	1.54%	3126	5.37%	29668	5.15%	1011	1.89%	11910	1.70%



Table 19

*Results from Cross Tabulation of Students in Third Grade by Receipt of Services and Race/ethnicity by School-Level*

*Variables*

	White		Black/African American				Hispanic					
	Receiving services		Not receiving services		Receiving services		Not receiving services		Receiving services		Not receiving services	
	N	%	N	%	N	%	N	%	N	%	N	%
School Mean SES												
1 <sup>st</sup> Quintile									814	1.52%	3172	0.45%
2 <sup>nd</sup> Quintile	12283	7.23%	112838	5.44%	6487	11.14%	128701	22.32%	10601	19.85%	157775	22.48%
3 <sup>rd</sup> Quintile	88591	52.15%	1009697	48.64%	43422	74.56%	398015	69.03%	37204	69.67%	495844	70.63%
4 <sup>th</sup> Quintile	66968	39.42%	929171	44.76%	8325	14.30%	49830	8.65%	4784	8.96%	44829	6.39%
5 <sup>th</sup> Quintile	2048	1.21%	24296	1.17%					0	0.0%	382	0.05%
Percent Minority Enrollment												
>10	53787	31.98%	642878	31.28%	14516	25.15%	151512	26.51%	22779	43.03%	266387	38.21%
10 to >75	73451	43.68%	911222	44.34%	25992	45.03%	259511	45.40%	18082	34.16%	293410	42.09%
75 or more	40926	24.34%	500895	24.37%	17212	29.82%	160580	28.09%	12071	22.80%	137377	19.70%
Mean Reading Achievement												
1 <sup>st</sup> Quartile	1332	0.78%	13118	0.63%	1391	2.39%	23793	4.1%	835	1.56%	16553	2.36%

2 <sup>nd</sup> Quartile	66237	38.99%	716616	34.52%	34210	58.75%	35268	61.2%	33756	63.21%	415191	59.13%
3 <sup>rd</sup> Quartile	92286	54.32%	1177685	56.74%	22633	38.87%	199554	34.6%	18812	35.23%	270422	38.51%
4 <sup>th</sup> Quartile	10036	5.91%	168321	8.11%	0	0.0%	571	0.1%	0	0.0%	73	0.0%
Mean Mathematics Achievement												
1 <sup>st</sup> Quartile	4012	2.36%	20749	1.0%	918	1.6%	21168	3.7%	1221	2.3%	21074	3.0%
2 <sup>nd</sup> Quartile	72770	42.83%	848904	40.89%	41580	71.4%	428627	74.3%	40917	76.6%	483460	68.8%
3 <sup>rd</sup> Quartile	87489	51.50%	1135224	54.68%	15736	27.0%	126751	22.0%	11265	21.1%	197705	28.2%
4 <sup>th</sup> Quartile	5620	3.31%	71125	3.42%								
Mean Approaches to Learning												
Never	0	0.0%	2278	0.1%	1938	3.33%	1570	0.27%	100	0.19%	4307	0.61%
Sometimes	32359	19.05%	384051	18.5%	14610	25.09%	166717	28.92%	13578	25.43%	142408	20.31%
Often	94765	55.78%	114385	55.1%	34462	59.18%	329874	57.22%	28230	52.86%	430674	61.42%
Very Often	42767	25.17%	545817	26.3%	7224	12.41%	78386	13.60%	11496	21.53%	123849	17.66%
Mean Externalizing Problem Behaviors												
Never	66421	39.10%	843537	40.63%	14843	25.49%	152452	26.44%	24577	46.02%	274965	39.16%
Sometimes	87869	51.72%	1019239	49.10%	26855	46.11%	282719	49.04%	22017	41.23%	348423	49.62%
Often	13325	7.84%	181196	8.73%	13410	23.03%	111707	19.38%	5799	10.86%	66941	9.53%
Very Often	2275	1.33%	32029	1.54%	3126	5.37%	29668	5.15%	1011	1.89%	11910	1.70%

Table 20

*Weighted Number and Percent of Students in Receipt of Special Education Services at Various Times and Students that Never Received Special Education Services by Student-level and School-Level Characteristics*

	Special Education Services Received by Grade Level															
	None		Only at K		Only at 3 <sup>rd</sup>		Only at 5 <sup>th</sup>		K and 3 <sup>rd</sup>		K and 5 <sup>th</sup>		3 <sup>rd</sup> and 5 <sup>th</sup>		K, 3 <sup>rd</sup> and 5 <sup>th</sup>	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
	Gender															
<i>Male</i>	1547721	51.57%	36488	49.38%	66738	54.15%	79315	49.25%	15679	40.07%	10783	64.58%	57394	60.47%	28678	60.5%
<i>Female</i>	1453680	48.43%	37398	50.62%	56512	45.85%	81739	50.75%	23453	59.93%	5914	35.42%	37520	39.53%	15571	39.5%
	Race/Ethnicity															
<i>White</i>	1867720	62.43%	49460	66.94%	70184	56.99%	95454	59.27%	26696	68.22%	15166	90.83%	55169	58.19%	29722	67.17%
<i>Black/African - American</i>	522219	17.46%	14957	20.24%	24877	20.20%	30248	18.78%	3436	8.78%	602	3.61%	13919	14.68%	3098	7.00%
<i>Hispanic</i>	601746	20.01%	9469	12.82%	28099	22.82%	35352	21.95%	8999	23.00%	929	5.56%	25716	27.12%	11429	25.83%
	SES															
<i>1<sup>st</sup> Quintile</i>	518695	18.71%	10448	15.55%	20343	17.61%	20110	13.14%	11545	30.48%	2848	21.60%	14330	16.03%	6719	17.29%
<i>2<sup>nd</sup> Quintile</i>	542662	19.57%	11726	17.46%	26458	22.91%	32164	21.02%	4516	11.92%	3476	26.37%	11021	12.32%	5891	15.16%
<i>3<sup>rd</sup> Quintile</i>	567711	20.47%	8682	12.93%	20236	17.52%	25418	16.61%	7440	19.64%	2612	19.81%	19113	21.37%	10166	26.17%
<i>4<sup>th</sup> Quintile</i>	572672	20.65%	14000	20.84%	24633	21.33%	39457	25.79%	9359	24.71%	1066	8.09%	16328	18.26%	9592	24.69%
<i>5<sup>th</sup> Quintile</i>	571246	20.60%	22315	33.22%	23817	20.62%	35859	23.44%	5016	13.24%	3181	24.13%	28628	32.02%	6482	16.68%

Reading Achievement																
<i>1<sup>st</sup> Quartile</i>	905841	27.98	19871	24.91%	38066	28.57%	62356	35.61%	14549	36.02%	10387	60.02%	20774	19.25%	10757	22.74%
<i>2<sup>nd</sup> Quartile</i>	828641	25.60%	22283	27.93%	37460	28.11%	31630	18.06%	10481	25.95%	2447	14.14%	30343	28.11%	7927	16.76%
<i>3<sup>rd</sup> Quartile</i>	731979	22.61%	22707	28.46%	32834	24.64%	47879	27.34%	9523	23.58%	1509	8.72%	23358	21.64%	10772	22.77%
<i>4<sup>th</sup> Quartile</i>	770469	23.80%	14912	18.69%	24891	18.68%	33254	18.99%	5838	14.45%	2963	17.12%	33465	31.00%	17842	37.72%
Mathematics Achievement																
<i>1<sup>st</sup> Quartile</i>	947378	29.27%	16250	20.37%	51540	38.68%	52907	30.21%	21297	52.73%	3464	20.02%	16987	15.74%	14460	30.57%
<i>2<sup>nd</sup> Quartile</i>	809466	25.01%	29814	37.37%	27821	20.88%	47996	27.41%	7168	17.75%	7213	41.68%	36086	33.43%	7009	14.82%
<i>3<sup>rd</sup> Quartile</i>	732012	22.61%	14963	18.76%	23267	17.87%	35176	20.09%	4392	10.87%	2902	16.77%	27458	25.44%	10300	21.78%
<i>4<sup>th</sup> Quartile</i>	748074	23.11%	18745	23.50%	30623	22.98%	39039	22.29%	7534	18.65%	3726	21.53%	27408	25.39%	15529	32.83%
Approaches to Learning																
<i>Never</i>	43601	1.45%	174	0.24%	1652	1.34%	781	0.48%	414	1.06%	0	0.0%	1777	1.87%	0	0.0%
<i>Sometimes</i>	783133	26.09%	13478	18.24%	26817	21.76%	36234	22.50%	7308	18.68%	6647	39.81%	24334	25.64%	11831	26.74%
<i>Often</i>	1315818	43.84%	26625	36.03%	58720	47.64%	89268	55.43%	11258	28.77%	6524	39.07%	44710	47.11%	24794	56.03%
<i>Very Often</i>	858849	28.61%	33608	45.49%	36061	29.26%	34771	21.59%	20152	51.50%	3526	21.11%	24093	25.38%	7625	17.23%
Externalizing Problem Behaviors																
<i>Never</i>	1470064	48.99%	35281	47.75%	56647	45.96%	84567	52.51%	20310	51.90%	5921	35.46%	40087	42.23%	20769	46.94%
<i>Sometimes</i>	1200655	40.00%	34635	46.88%	53485	43.40%	58935	36.59%	17110	43.72%	9172	54.93%	47081	49.60%	20741	46.87%
<i>Often</i>	291906	9.73%	3969	5.37%	12645	10.26%	17380	10.79%	1711	4.37%	1604	9.61%	7172	7.56%	1653	3.74%
<i>Very Often</i>	38777	1.29%	0	0.0%	474	0.38%	172	0.11%	0	0.0%	0	0.0%	575	0.61%	1087	2.46%

School Level Percent Minority Students Enrolled																
> 10	926591	31.15%	32126	43.59%	37541	30.50%	44265	27.53%	9345	24.01%	9710	58.15%	18726	20.04%	12031	27.52
10 - >75	1308883	44.00%	30504	41.39%	53439	43.42%	79289	49.31%	14386	36.96%	6537	39.15%	48523	51.93%	13730	31.41
75+	738966	24.84%	11072	15.02%	32100	26.08%	37257	23.17%	15192	39.03%	450	2.70%	26183	28.02%	17948	41.06
School Level Mean SES																
1 <sup>st</sup>	70175	2.34%	2074	2.81%	3882	3.15%	1622	1.01%	4766	12.18%	3186	19.08%	2791	2.94%	1673	3.78%
2 <sup>nd</sup>	672600	22.41%	14091	19.07%	31663	25.69%	29545	18.34%	7707	19.70%	538	3.22%	17200	18.12%	8113	18.33%
3 <sup>rd</sup>	1293602	43.10%	31116	42.11%	55796	45.27%	81977	50.90%	10317	26.37%	4940	29.59%	35271	37.16%	24116	54.50%
4 <sup>th</sup>	833437	27.77%	24761	33.51%	26742	21.70%	46215	28.70%	14347	36.66%	8033	48.11%	24122	25.41%	9965	22.52%
5 <sup>th</sup>	131434	4.38%	1843	2.49%	5167	4.19%	1695	1.05%	1994	5.10%	0	0.0%	15531	16.36%	383	0.87%
School Level Mean Reading Achievement																
1 <sup>st</sup>	65856	2.19%	1126	1.52%	1352	1.10%	1229	0.76%	0	0.0%	0	0.0%	1208	1.27%	0	0.0%
2 <sup>nd</sup>	1441368	48.02%	39005	52.79%	69347	56.26%	82282	51.09%	18568	47.45%	8145	48.78%	40767	42.95%	24839	56.13%
3 <sup>rd</sup>	1463511	48.76%	33559	45.42%	49858	40.45%	77198	47.93%	18499	47.27%	8551	51.22%	52239	55.04%	19411	43.87%
4 <sup>th</sup>	30666	1.02%	196	0.27%	2694	2.19%	346	0.21%	2064	5.27%	0	0.0%	700	0.74%	0	0.0%
School Level Mean Mathematics Achievement																
1 <sup>st</sup>	37185	1.23%	1126	1.52%	857	0.70%	346	0.21%	387	0.99%	0	0.0%	456	0.48%	0	0.0%
2 <sup>nd</sup>	1501415	50.02%	36602	49.54%	64491	52.32%	78704	48.87%	22159	56.63%	8293	49.67%	37292	39.29%	19736	44.60%
3 <sup>rd</sup>	1403090	46.75%	35962	48.67%	54790	44.45%	76305	47.38%	14341	36.65%	8403	50.33%	56693	59.73%	24513	55.40%
4 <sup>th</sup>	59711	1.99%	196	0.27%	3113	2.53%	5700	3.54%	2244	5.73%	0	0.0%	473	0.50%	0	0.0%

Table 21

*Descriptive Statistics of Student-Level and School-Level Variables Used in the HGLM.*

Level-1 Descriptive Statistics					
<i>Variable Names</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Males	11,788	0.48	0.5	0	1
Black/African-American Dummy Variable					
	11,768	0.86	0.35	0	1
Hispanic Dummy Variable	11,768	0.78	0.41	0	1
SES	10,200	0	1	-1.42	1.46
Reading Scores	11,788	0	1	-3.92	2.38
Low Mathematics Scores	11,788	0	1	-3.41	1.42
Low Approaches to Learning	11,788	0	1	-2.59	1.37
Low Externalizing Behaviors	11,788	0	1	-1.07	3.11
Level 2 Descriptive Statistics					
<i>Variable Names</i>	<i>J</i>	<i>Mean</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Percent of Minorities in School	743	2.81	1.6	1	5
Low SES	743	0.02	1.08	-3.77	3.92
Low Reading Scores	743	0.03	1.03	-3.38	2.56
Low Mathematics Scores	743	0.03	1	-2.85	1.68
Low Approaches to Learning	743	0.04	1.09	-3.72	4.04
Low Externalizing Behaviors	743	0.03	1.12	-4.03	3.85

Table 22

*Results of Conditional, Two-Level HGLM: Log-Odds Coefficients, Odds Ratio and Confidence Intervals*

		<i>Fixed Effect</i>	<i>Coefficient</i>	<i>T-test</i>	<i>d.f.</i>	<i>Significance</i>	<i>Odds Ratio</i>	<i>CI</i>	
								<i>Lower</i>	<i>Upper</i>
<b>INTERCEPT, <math>\beta_{0j}</math></b>	INTERCEPT, $Y_{00}$		4.02	3.74	736	0.000	55.95	6.80	460.14
	% of Minorities, $Y_{10}$		0.17	1.41	736	0.16	1.18	0.94	1.49
	SES, $Y_{20}$		-0.25	-0.84	736	0.40	0.78	0.43	1.40
	Reading Scores, $Y_{03}$		0.68	1.28	736	0.20	1.98	0.70	5.63
	Math Scores, $Y_{04}$		-0.54	-0.91	736	0.36	0.58	0.18	1.87
	App. to Learning, $Y_{05}$		0.09	0.29	736	0.77	1.09	0.61	1.96
	Externalizing Behaviors, $Y_{06}$		-0.02	-0.10	736	0.93	0.98	0.58	1.63
<b>Blacks, <math>\beta_1</math></b>	INTERCEPT, $Y_{10}$		-1.08	-1.88	10168	0.06	0.34	0.11	1.05
<b>Hispanics, <math>\beta_2</math></b>	INTERCEPT, $Y_{20}$		-0.14	-0.17	10168	0.86	0.87	0.18	4.21
<b>Gender, <math>\beta_3</math></b>	INTERCEPT, $Y_{30}$		-0.18	-0.77	10168	0.44	0.84	0.54	1.31
<b>SES, <math>\beta_4</math></b>	INTERCEPT, $Y_{40}$		0.20	2.24	10168	0.03	1.22	1.03	1.45
<b>Reading Achievement, <math>\beta_5</math></b>	INTERCEPT, $Y_{50}$		-0.09	-0.82	10168	0.41	0.91	0.73	1.13

<b>Mathematics Achievement, <math>\beta_6</math></b>	INTERCEPT, $\Upsilon_{60}$	0.49	2.36	10168	0.02	1.64	1.09	2.47
		-0.27	-1.71					
<b>Approaches to Learning, <math>\beta_7</math></b>	INTERCEPT, $\Upsilon_{70}$			10168	0.09	0.76	0.56	1.04
<b>Externalizing Problem Behaviors, <math>\beta_8</math></b>	INTERCEPT, $\Upsilon_{80}$	0.08	0.59	10168	0.56	1.08	0.83	1.40

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## FIGURES



Figure 1

*Percent of Students with Disabilities, Age 14 – 21, Served under IDEA, Part B, in the U.S. who Exited School, by Exit Reason and Reporting Year: 1996-97 through 2005-06*

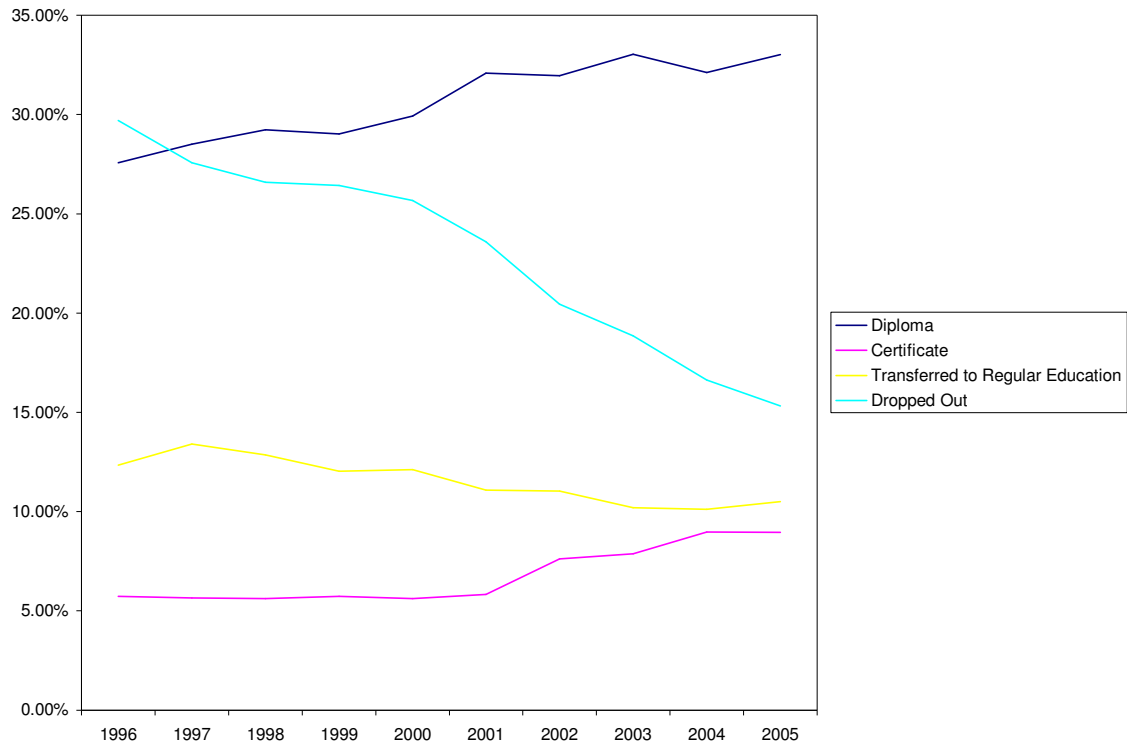


Figure 2

*Percentage of Students in Receipt of Special Education Services by Grade Level and Gender*

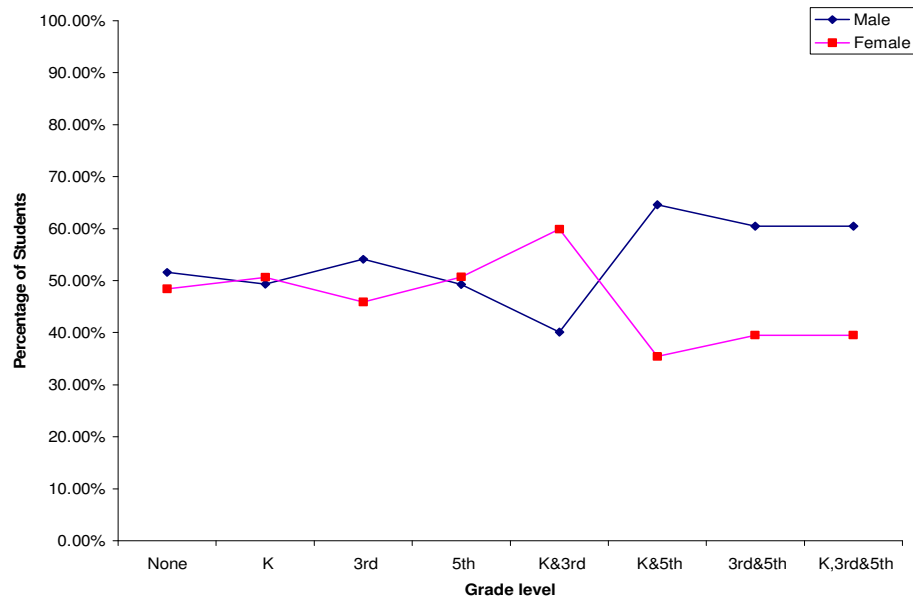


Figure 3

*Percentage of Students in Receipt of Special Education Services by Grade Level and Race/Ethnicity*

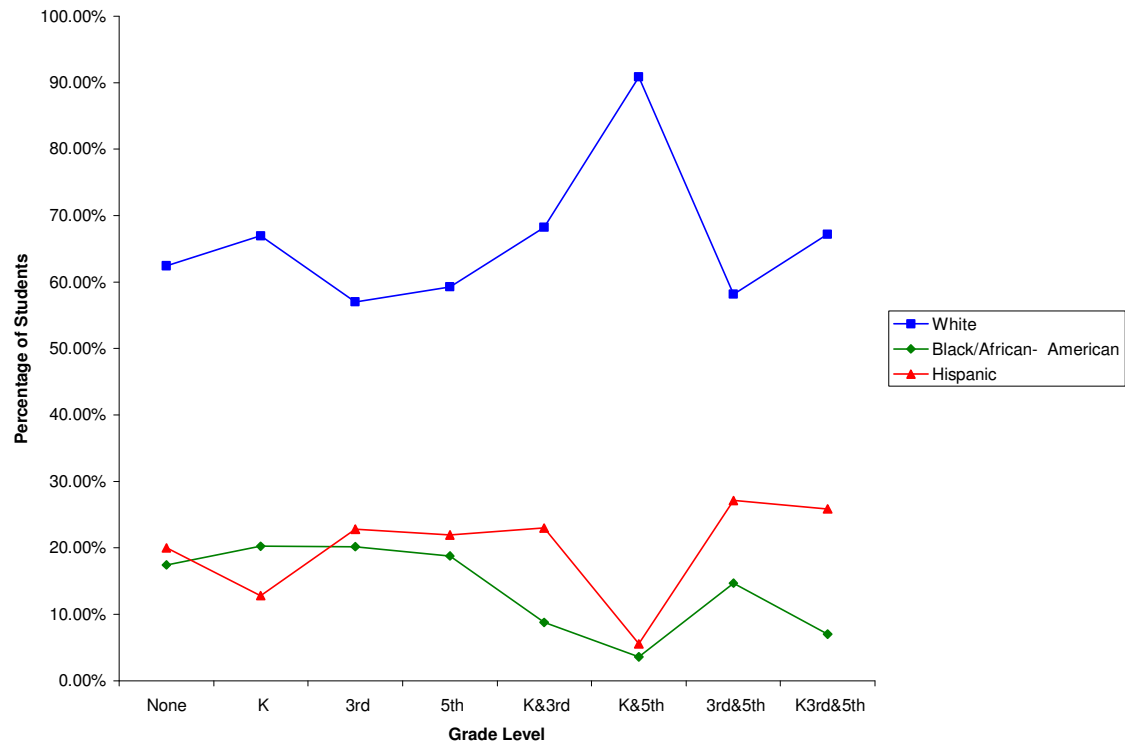


Figure 4

*Percentage of Students in Receipt of Special Education Services by Grade Level in the First and Fifth SES Quintile*

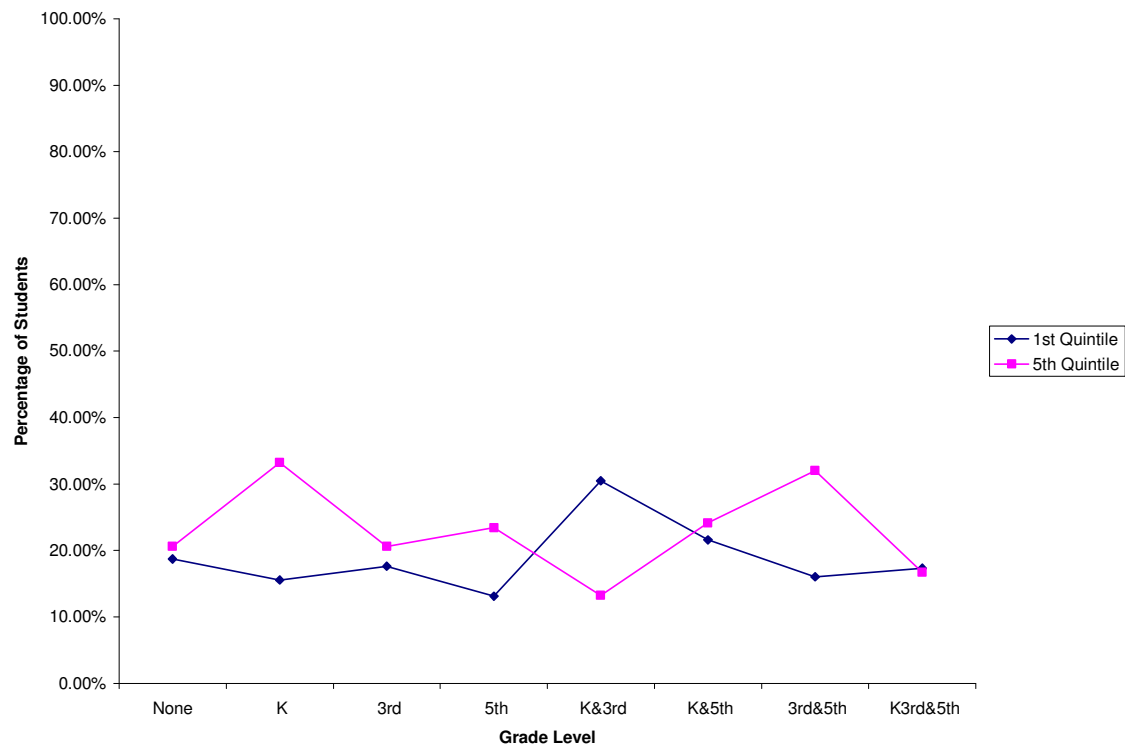


Figure 5

*Percentage of Students in Receipt of Special Education Services by Grade Level and Reading and Mathematics Scores in the 1st and 4th Quartiles*



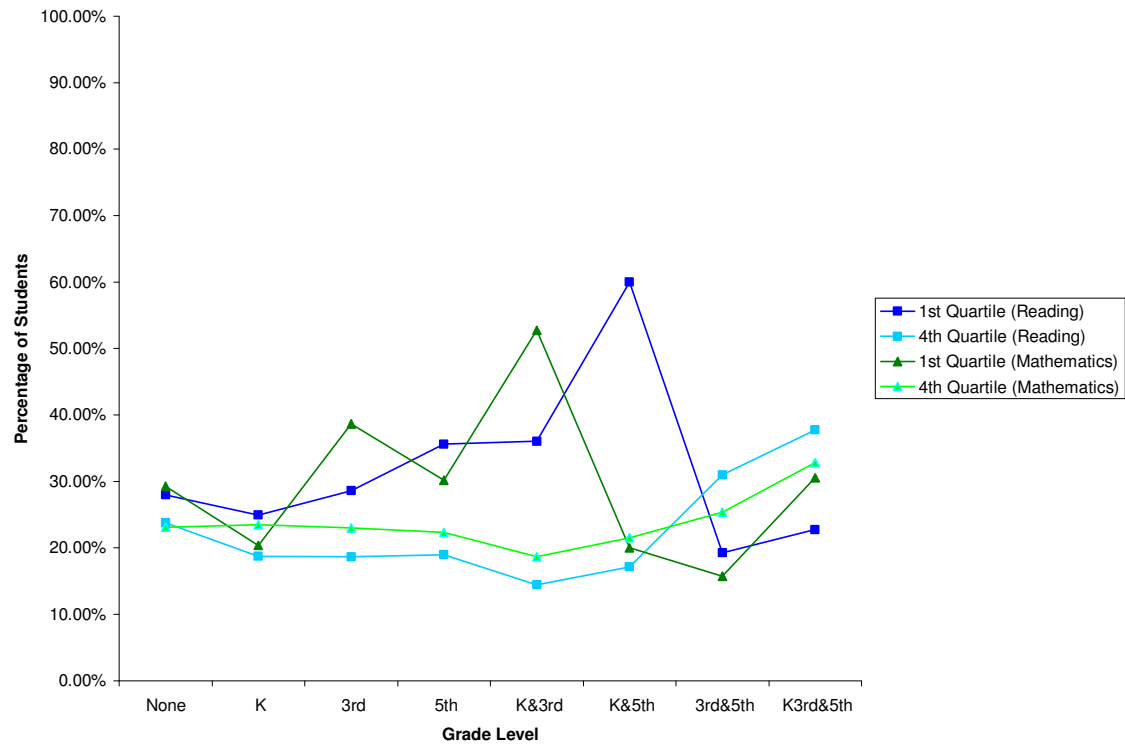


Figure 6

*Percentage of Students in Receipt of Special Education Services by Grade Level and Approaches to Learning Scores*

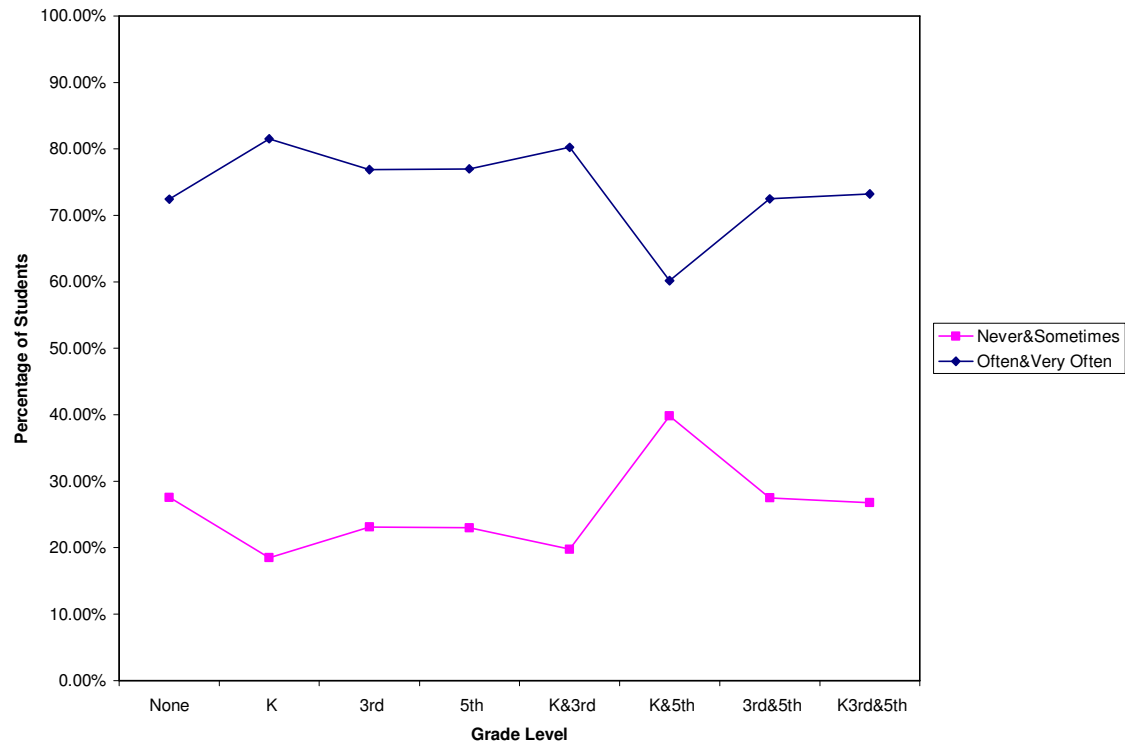
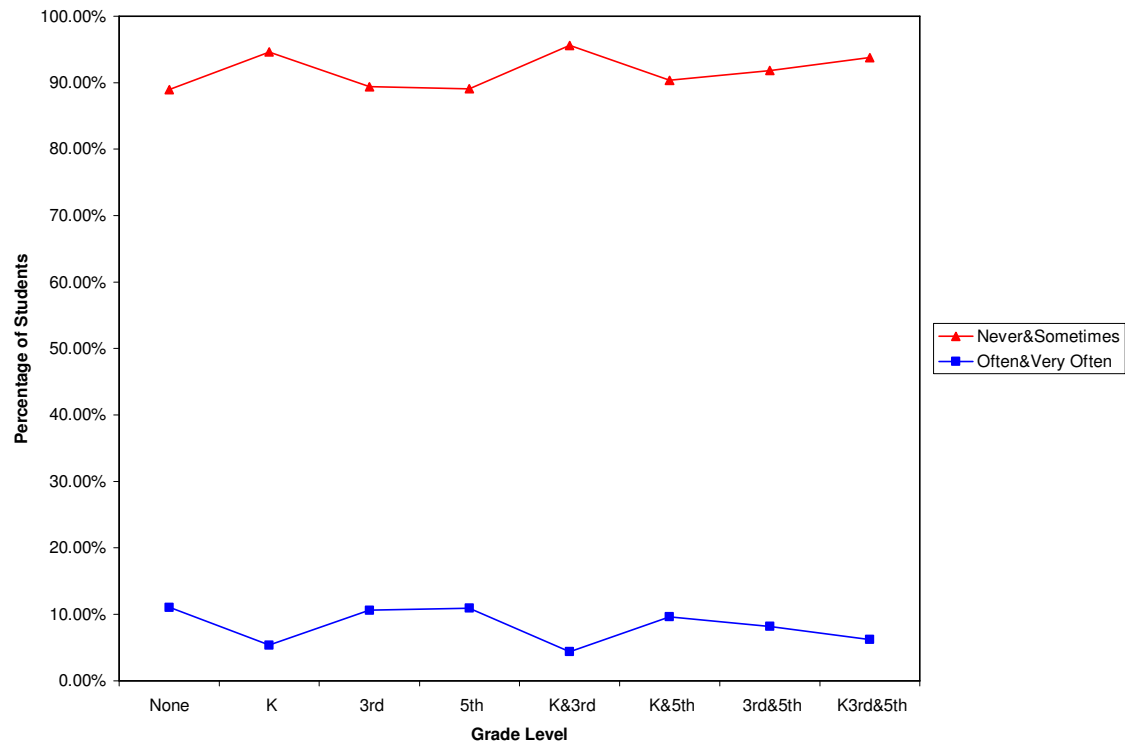


Figure 7

*Percentage of Students in Receipt of Special Education Services by Grade Level and Externalizing Problem Behavior Scores*





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