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Who Benefits? An Analysis of Academic Growth and Disproportionality in Special
Education

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A Thesis in the Field of Psychology
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

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Abstract

The overrepresentation of historically-underserved racial-ethnic minority groups in special education is a frequently-discussed issue affecting the U.S. education system. At the national level, Black/African American, Native American, and Native Hawaiian/Pacific Islander children have significantly higher risks of receiving special education services, compared to their peers. In recent years, accountability data has demonstrated that students with disabilities continue to lag behind their peers at meeting grade level-proficiency standards, despite recent alterations to federal law that refocused the objectives of special education programs on improving students' academic skills. As a result, the overrepresentation of Black/African-American and Native American children in special education has increased the risk of these groups encountering inadequate interventions for academic deficits. The present study examined disproportionality in the state of Massachusetts to determine (a) whether racial-ethnic minority children were at greater risk of receiving special education services and (b) whether the effect of special education services disparately affected students' academic growth. Results from bivariate analyses indicated that Black/African-American and Hispanic/Latino children were significantly overrepresented in high-incidence disability categories and in educational settings where students spent more than 60% of the day outside of the general classroom. Furthermore, the race/ethnicity and academic setting of students with disabilities had a significant effect on their reading and math growth percentiles.

Dedication

for Talia.

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I'd like to thank Dr. Dante Spetter and Dr. Laura Schifter for their advice and feedback. I'd also like to thank my compassionate and truly remarkable doctors at Massachusetts General Hospital, without whom I would have never been able to complete this project. Most of all, I'd like to thank my parents and friends whose support, patience, and guidance helped me push through to the end.

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Chapter I

Introduction

The overrepresentation of racial-ethnic minority children in special education, or disproportionality, is one of the most widely-discussed issues affecting the U.S. public education system. At the national level, Black/African American and Native American students are 1.4 and 1.7 times more likely than their peers to receive special education services, respectively (Annamma et al., 2014; Bal et al., 2017; Hehir et al., 2014; Office of Special Education and Rehabilitative Services [OSERS], 2018; Skiba et al., 2006). What's more, Black/African American students are almost three times more likely than all other students, including their peers *within the same disability category*, to spend less than 40% of the day inside the general classroom (Fierros & Conroy, 2002; OSERS, 2018). Resultantly, Black/African American students spend significantly less time in educational environments where students are the most likely to experience improvements to their academic performance (Hehir et al., 2014; Skiba et al., 2006).

Recent changes to federal law, namely the Every Student Succeeds Act (ESSA; 2015), have placed increased scrutiny on the academic performance of students with disabilities (SWDs). Notably, ESSA reestablished the importance of measuring the academic achievement of SWDs against grade-level standards as a method of identifying educational disparities and closing achievement gaps. To date, states' accountability data shows that children who receive special education services significantly lag behind their

grade-level peers at meeting proficiency standards (OSERS, 2018). In 2016, the percentage of high-school SWDs who reached grade-level proficiency in English-language arts (ELA) and math centered at 15.9% and 8.1%, respectively (OSERS, 2018). What's more, as grade level increased, the median percentage of students who met grade-level proficiency standards *decreased*. Between third-grade and high school, there was a 4.8% (ELA) and 16.7% (math) decrease in the median percentages of SWDs meeting grade-level proficiency.

From this proficiency data, it is unclear how special education directly affects the academic achievement of SWDs over time. What is evident, however, is that special education is not affecting the academic performance of SWDs enough for them to meet basic grade-level standards. Thus, the overrepresentation of racial-ethnic minority students in special education programs, and their disproportionate placement in academic settings that are associated with poor academic development, stand in direct contrast to the goals of ESSA. The efficacy of special education can only be demonstrated if the academic development of SWDs is not subject to systemic inequities. If students from overrepresented racial-ethnic minority groups are disproportionately disadvantaged by their placement in special education, then the given services do not "...provide all children significant opportunity to receive a fair, equitable, and high-quality education" (National Council on Disability [NCD], 2018). Therefore, it is necessary to investigate the academic growth of students receiving special education services, and determine if the disability and demographic characteristics of these students significantly affects their academic achievement over time.

To date, few research studies have examined the academic growth of subpopulations of students within special education (Hurwitz et al., 2019; Sullivan & Field, 2013). Specifically, no study has investigated the efficacy and equity of special education to determine whether special education programs are more efficacious for some students compared to others. Evaluating the efficacy of special education should not only attempt to mitigate achievement disparities between students who receive services and those who do not, but should also focus on minimizing achievement gaps *within* the special education population.

Study Intent and Significance

In the present study, I examine the relationship between racial-ethnic disproportionality in special education and the academic growth of SWDs. Specifically, I aimed to (a) identify students' risk of identification for a specific disability category, and placement in a particular educational setting; and (b) assess whether students' disability or demographic characteristics significantly affected their academic growth. Therefore, in this study I address the following research questions:

1. What is the relationship between students' racial-ethnic affiliation and (a) their risk of being identified for special education services under a particular disability category; and (b) their risk of placement within a particular educational environment?
2. What is the relationship between students' assigned disability category and their risk of placement within a particular educational environment?

3. What is the effect of students' racial-ethnic affiliation, assigned disability category, and educational environment on their academic growth?

Overall, special education serves children ages 3-21 in programs designed to prepare students for "further education, employment, and independent living" (IDEA, 1997/2004). In general, disproportionality is troublesome due to preliminary evidence suggesting that the psychosocial and intellectual development of SWDs is *further impaired* by their placement in special education (Morgan et al., 2010; Sullivan & Field, 2013). In fact, children ages 14-21 are more likely to exit special education by dropping out (11.3%) than by meeting the goals of their individualized education plan (9.3%; OSERS, 2018). Consequently, many SWDs encounter higher rates of adulthood depression, joblessness, and incarceration (Blackorby et al., 2010). Thus, it is important to identify the individual- and school-level variables that contribute to the degradation of SWD's academic growth.

Legal and Historical Context

Over the last six decades, the Individuals with Disabilities Education Act (IDEA; 2004) and Section 504 of the Rehabilitation Act of 1973, have made it possible for historically-underserved populations to gain access to the U.S. public education system. At the advent of compulsory education, many states elected to exclude racial-ethnic minority children and children with disabilities from their community schools. Instead, school administrators institutionalized children with disabilities in state-run hospitals as a means of fulfilling the state's obligation to provide educational services to all children

(*Watson v. City of Cambridge*, 1893; *Dept. of Public Welfare v. Haas*, 1958; *Beattie v. Bd. of Educ.*, 1919; Yell, 2015). Meanwhile, as schools denied children with disabilities access to public education, states' policymakers generally prohibited racial-ethnic minority children from enrolling in schools alongside their White peers.

The history of public education in the U.S. contains many instances of states isolating culturally- and intellectually-diverse children from their peers. Understanding the current state of racial-ethnic disproportionality in special education requires a critical examination of the historical intersections of racial segregation and the exclusion of children with disabilities from public education. To this extent, I briefly examine the legal and historical context of racial-ethnic disproportionality in special education to reveal how the endeavor to obtain equal educational rights for all children became a mechanism of perpetuating historical inequities.

Early Exclusion

During the nineteenth century, schooling policies in the United States reflected attitudes about the educability of certain social groups. As early as 1893, state courts affirmed that SWDs were exempt from compulsory education laws establishing the importance of quality education for all children. At the time, school officials believed that SWDs were “too weak-minded to derive profit from instruction” (*Watson v. City of Cambridge*, 1893). Additionally, school and district officials argued that accommodating a student’s disability would detract from the quality of education for other students in their classroom.

Meanwhile, in some northern states, free Black children were initially allowed to attend schools alongside their White classmates (Bell, 2004). However, by the late nineteenth century, racial animus towards Black/African American children drove them into publicly funded segregated schools (Bell, 2004; Redfield & Kraft, 2012). Nevertheless, it soon became evident that the quality of education and curriculum provided to children in all-Black schools was substantially inferior to the quality of education at all-White schools. As a result, in 1850 Black parents in Boston mounted the earliest recorded legal challenge against school segregation to contest the inequitable education provided to their children (*Roberts v. City of Boston*, 1850).

Subsequent legal challenges on behalf of children with disabilities and racial-ethnic minorities would fail to alter the exclusionary policies that limited their access to the public education system (*Beattie v. Board of Education*, 1919; *Plessy v. Ferguson*, 1896; *Roberts v. City of Boston*, 1850; *Watson v. City of Cambridge*, 1893) . State and federal courts upheld the legal enforcement of separate educational facilities until 1954, when the Supreme Court of the United States issued a historic ruling in *Brown v. Board of Education*, reasoning that school segregation violated the 14th Amendment by restricting equal protection under the law to all citizens. (Bell, 2004; *Brown v. Board of Education*, 1954).

Emerging Inclusion and Disproportionality

Recognizing the eminence of education in American society, the language of *Brown* established the unconstitutionality of exclusionary school policies, particularly if

based on a person's "unalterable characteristics." Notably, *Brown* provided an avenue for both Black/African American children and children with disabilities to challenge states' policies that prevented their unrestricted access to the public education system.

Unfortunately, however, state officials attempted to circumvent the ruling of the Supreme Court by passing laws that prevented SWDs from enrolling in public schools. Additionally, many school districts outright refused to integrate Black/African American students into public schools as ordered (Yell et al., 1998). Although *Brown* guaranteed the right for all children to receive a public education in integrated school settings, it did not specify *how* integrated schools could educate their student populations. As states began to provide children with disabilities educational services in self-contained classrooms, racial-ethnic minority students found themselves battling disability labels in order to remain in newly-integrated classrooms (Skika et al., 2008). Notably, school districts forced to desegregate by additional court-orders showed the highest rates of overrepresentation for Black/African American and Hispanic/Latino students in special education (Eitle, 2002; Harry & Klinger, 2014).

Beginning in the late 1960s, a series of court proceedings addressed the emergence of racial discrimination via disability determination (*Covarrubias v. San Diego Unified*, 1971; *Diana v. Cal. Bd. of Educ*, 1970, 1973; *Guadalupe v. Tempe Elementary School District*, 1972; *Hobson v. Hansen*, 1967; *Larry P v. Riles*, 1972; *Mills v. Board of Education*, 1972; *PARC v. Commonwealth of Pennsylvania*, 1971). In one such case, the US District Court in Washington, DC, ordered the city's school superintendent to cease the utilization of IQ tests to place economically-disadvantaged

and Black/African American students, on lower educational "tracks" (*Hobson v. Hansen*, 1967). The ruling in *Hobson* recognized that city schools intentionally disadvantaged low-income and racial-ethnic minority students by placing them in inferior academic settings that were highly correlated with unfavorable academic outcomes. Notably, the court denounced that the school system had "classified [students] according to their socio-economic or racial status, or—more precisely—according to environmental and psychological factors which ha[d] nothing to do with innate ability" (*Hobson v. Hansen*, 1967).

Echoing the findings of *Hobson*, in 1968 researcher Lloyd Dunn published a seminal article detailing the overrepresentation of students from low-status backgrounds in special education. Dunn contended that the pernicious nature of the special education label (e.g., emotionally disturbed, mentally retarded, minimally brain injured) created self-fulfilling prophecies that placed labeled children at a further disadvantage. The evidence presented at *Hobson*, and later echoed by Dunn (1968) sounded the alarm about the disproportionate identification and placement of racial-ethnic minority students in special education that persists until today.

Efforts to Address Inequality in Special Education

In 1972, Massachusetts became the first state to enact a comprehensive special education law, Chapter 766. Chapter 766 (now, General Law Chapter 71B) cemented the importance of a "free and appropriate public education" (FAPE) in the "least restrictive environment" (LRE; Baron, 2006). The law emphasized mainstreaming or teaching

children with disabilities alongside their non-disabled peers in the general classroom, whenever the child's disability allowed. Three years later, federal lawmakers incorporated the concepts of FAPE and LRE into federal special education legislation (IDEA; 1997, 2004). In 1975, Congress passed the Education for All Handicapped Children Act (EAHCA), or Public Law 94-142 (P.L. 94-142). The hallmark of the EAHCA was the requirement for schools to develop Individualized Education Programs (IEP) for students with disabilities (Yell et al., 1998). An IEP established specific goals and benchmarks for students' progress, in addition to setting standards for evaluation and assessment of academic and behavioral deficits.

Several iterations of P.L. 94-142 have continued to respond to emerging issues within special education. Most recently, the reauthorization of IDEA (P.L. 94-142, today) has taken note of the persistence of racial-ethnic disproportionality in special education and, accordingly, instituted accountability practices to curb the overidentification of racial-ethnic minority students for special education services.

Summary

The history of public education in the United States reveals how disproportionality in special education is a continuation of long-standing inequity and inequality. From the inception of compulsory education, discriminatory practices prevented children with disabilities and racial-ethnic minorities from gaining access to substantive educational opportunities. Legal challenges to these exclusionary policies were largely unsuccessful until the Civil Rights Movement, when in 1954 the Supreme

Court ruled that discrimination based on a person’s “unalterable characteristics” was unconstitutional. This precedence provided ammunition for parental advocates to challenge the remaining state statues that prevented children with disabilities from receiving public education services.

The increased inclusion of SWDs in public education accompanied the decreased integration of racial-ethnic minority students in regular classroom settings. The findings from *Hobson* (1967) and *Dunn* (1968) revealed how children from marginalized social groups were disadvantaged by their overrepresentation in academic settings that produced poor educational outcomes. Subsequent to these findings, federal statues recognized the growing problem of disproportionality within special education, and enacted accountability measures that required states to take action to reduce the disproportionate number of racial-ethnic children in special education programs.

Literature Review

The disproportionality of racial-ethnic minority students in special education stalls efforts to close achievement gaps and ensure that all children have access to fair, equitable educational opportunities (NCD, 2018). While accountability data shows that children who receive special education services lag behind their grade-level peers, few research studies have connected how factors contributing to racial-ethnic disproportionality simultaneously affect the academic achievement and growth of SWDs (Blackorby et al., 2010; Hurwitz et al., 2019; OSERS, 2018; Sullivan & Field, 2013). In this literature review, I examine the patterns of disproportionality that are prevalent

amongst high-incidence and highly-discussed disability categories (i.e., Communication Impairment [CI], Specific Learning Disability [SLD], Other Health Impairment [OHI], Emotional Disturbance [ED], and Intellectual Disability [ID]) to highlight disparities in racial-ethnic representation between these groups. Next, I discuss how students are further disadvantaged by their overrepresentation in special education as a result of racial-ethnic disparities in the rates of placement within isolated educational settings. To follow, I discuss the academic achievement of students in special education, related to their educational environments or assigned disability category. To conclude, I synthesize the available literature that has investigated the efficacy of special education using methodology assessing the causal relationship between special education interventions and student outcomes.

Racial-Ethnic Disproportionality in Identification Rates

National trends of racial-ethnic disproportionality in special education have remained consistent since the early 1960s, following the landmark *Brown* ruling. As early as 1967, studies recorded that Black/African American students were significantly overrepresented in special education, particularly in classes for children with mental retardation¹ (Dunn, 1968; Mercer, 1973). Today, the overrepresentation of Black/African American children in special education programs persists, in addition to the overrepresentation of Native American and Native Hawaiian/Pacific Islander children.

¹ For temporal consistency, I use the outdated term “mental retardation” if it appears as such in the cited source; today it is known as “cognitive impairment” or “intellectual disability.”

Currently, Black/African American, Native American, and Native Hawaiian/Pacific Islander children are 2.2, 1.6, and 1.8 times more likely than all other children to be identified for ID, respectively (OSERS, 2018). Additionally, Black/African American children are twice as likely as all other children to receive special education services for ED, whereas Native American children are 1.6 times as likely as all other children to be identified for ED. Similarly, Black/African American and Native American children are 1.5 and 1.9 times as likely as all other children to be identified for SLD, respectively. For OHI and CI, only slight overrepresentation exist, such that Native American children are 1.3 and 1.4 times as likely as all other children to be identified for OHI and CI, respectively. It should be noted, however, that these national trends are aggregations of state data, and therefore do not capture the between-state and within-state variation in students' risk of receiving special education services (Morrier & Gallagher, 2012; Sullivan & Artiles, 2011).

Different approaches and methodologies of identifying disproportionality in special education can yield varying conclusions regarding the observed over- or underrepresentation of particular racial-ethnic groups within special education. Several researchers contend that controlling for certain student-level variables reduces or eliminates the observed overrepresentation of any particular racial-ethnic group (Shifrer et al., 2011; Hibel et al., 2010). In fact, several studies argue that when students' academic or behavioral deficits are factored into statistical models, racial-ethnic minority children are *underrepresented* in special education (Hibel et al., 2010; Dever et al., 2016). Although these findings run contrary to a large body of evidence that supports that racial-

ethnic minority students are overrepresented in special education, emerging findings now question how students' need of special education services are being addressed within the context of racial-ethnic disproportionality. It is both possible and likely that there are a disproportionate amount of students who are not receiving special education services who may benefit from them, in addition to a disproportionate amount of students being identified for special education services who do not need them — these ideas are not mutually exclusive. What is evident, however, is that the vast majority of studies continue to find that students' race/ethnicity continues to be the strongest and most consistent variable that predicts a child's likelihood of receiving special education services (Cruz & Rodl, 2018).

Patterns Within ID Identification Rates

Students identified as having ID have varying clinical presentations that correspond to students having below average IQ scores, significant academic hardships, and difficulty with adaptive behavior skills (IDEA, 2004; Polloway et al., 2019). The severity and extent of impairment that students identified as having ID are frequently characterized as “mild,” “moderate,” or “severe” (Bouck & Park, 2016). Students with severe ID typically present with IQ scores of less than 40 points, and receive their academic accommodations in standalone special education schools or residential facilities (Bouck & Park, 2016). Students identified with mild or moderate ID typically present with IQ scores between 55-70 and 40-55 points and generally receive their special education services inside regular schools.

It is important to note that most studies investigating the overrepresentation of racial-ethnic minority students with ID are restricted to examining students with mild or moderate intellectual disabilities. Furthermore, few studies have disaggregated students within the ID category to identify whether there are differences in the rates of identification for students with mild ID, compared to moderate ID. For example, Skiba et al. (2006) found that Black/African American students were overrepresented in the mild and moderate mental retardation categories. However, Black/African American students were 3.29 times as likely as all other students to be classified under the mild mental retardation category, compared to 1.91 times as likely as all other students to be classified under the moderate mental retardation category. Similarly, at the secondary level, Jasper and Bouck (2013) determined that Black/African American students were 3.85 times as likely as all other students to receive special education services for mild ID ($p < .001$).

For Native American children, the rates of identification for ID have depended on several factors, including school service provider. Roughly 17% of Native American children who attended U.S. public schools received special education services, compared to 13.03% of Native American children who attended the Bureau of Indian Education (BIE) schools (Hibel et al., 2008). Relatedly, 323 or 0.70% of Native American students in BIE schools received services for ID, whereas 5,186 students or 1.15% of Native American students educated outside of BIE schools received special education services for ID (National Center for Education Statistics [NCES], 2017). These numbers suggest that Native American students in BIE schools are less likely to receive services for ID, relative to their counterparts outside of BIE schools. This may be due to an increased

understanding of cultural values within BIE schools, and a diminished tendency to pathologize cultural behaviors (Gritzmacher & Gritzmacher, 2010; Pewewardy & Fitzpatrick, 2009).

Comparatively, Asian and White students are roughly half as likely as all other students to be identified as having ID. Researchers have attributed these rates to differences in socioeconomic status (SES), however, there are inconsistent findings within the literature regarding the effect of SES on students' likelihood of receiving special education services (Bal et al., 2019; Hibel et al., 2008; Skiba et al., 2006).

Patterns within ED Identification Rates

Racial disparities in the academic and behavioral outcomes of SWDs disproportionately affect Black/African American and Native American students who are significantly more likely than their White peers to be assigned to the ED category (Bal et al., 2019; Fierros & Conroy, 2002; OSERS, 2018). This trend is particularly concerning, given the symptomatology overlap between students who schools assign to the categories of ED, OHI, and SLD (Mandell et al., 2008). For example, compared to White children with ADHD, Black/African American children with ADHD are more likely to be identified for ED, as opposed to SLD or OHI (Mandell et al., 2008). This decision places Black/African American children at a greater disadvantage than their White counterparts, given the poor academic outcomes and stigmatization of children identified for ED services (Bal et al. 2019; Blackorby et al., 2010; Mandell et al., 2008; Skiba et al., 2006).

Moreover, labeling decisions reflect how subjective the identification process is for

special education services: children who share the same clinical features receive drastically different accommodations despite needing access to similar interventions (Harry et al., 2002).

To determine how variables associated with students' demographic and academic characteristics, schools' socioeconomic and racial-ethnic composition, and teachers' level of education affected students' likelihood of receiving the ED label, researchers Bal et al. (2019) performed several logistic regression analyses using data collected from the Wisconsin Department of Public Instruction (WDPI). Results indicated that Black/African American and Native American students were 2.12 and 3.18 times more likely than White students to be identified for ED. The findings from their logistic regression analyses demonstrated that even after accounting for student-level variables, school-level variables, and teachers' characteristics, the disproportionate representation of Black/African American and Native American students among students identified for ED persisted ($p < .001$). Thus, students' racial-ethnic affiliation remained the strongest predictor of ED.

Addressing the disparities in identification associated with students' racial-ethnic affiliation may require incorporating additional clinical, norm-referenced assessment tools in students' evaluations for special education services (Dever et al., 2016). Dever et al. (2016) utilized a clinical screening tool to determine if children who schools identified for ED corresponded to who would be identified using a clinical assessment tool. The study included 4,946 students, ages 8 to 18, who took part in the standardization process for the *Behavior Assessment System for Children, Second Edition* (BASC-2). Forming a

nationally representative sample of the U.S. population, 11.4% of participants in the sample were Black/African American, 18.9% were Latino/a, 64.9% were White, 2.6% were Asian, 1.3% were Native American, and 0.9% were some other race. In addition, 53.2% of the sample were female.

Students completed the *Behavioral and Emotional Screening System* (BESS) portion of the BASC-2. The BESS contained 30 items rated on a 4-point Likert scale that measured students' risk of developing behavioral and emotional problems. Specifically, items measured students' internalizing tendencies (e.g., anxiety and sadness), inattention and distractibility, poor attitudes towards school, and social and interpersonal skills. Results from the BESS initially categorized students' risk as "Normal," "Elevated," or "Extremely Elevated." For simplicity, the researchers collapsed the "Elevated" and "Extremely Elevated" categories into one "at-risk" group. Consequently, the "at-risk" group formed one of two dichotomous response variables, the other being special education status (i.e., receiving or not receiving special education services). Students' demographics, including race/ethnicity, sex, parental education, English language learner status, and age, constituted the predictor variables.

Dever et al. (2016) conducted two separate logistic regression analyses, one for each response variable, holding the predictor variables constant. Results indicated that although there were no statistically significant racial-ethnic differences in the likelihood of being identified as at-risk on the BESS, racial-ethnic groups significantly differed in their likelihoods of receiving special education services. Native American students were 86.4% more likely than White students to receive special education services. Latino,

Asian, and English language learners were less likely than White and English-proficient students to receive special education services.

Contrary to findings within the literature, the researchers did not find that Black/African American students were more likely to receive special education services for ED than their peers. However, there was a critical mismatch between services needed and services provided for Black/African American students. Specifically, Black/African American students were more likely than their peers to receive special education services when not identified as at-risk, and less likely than their peers to receive special education services when determined to be at-risk. Several researchers have found that Black/African American children are underrepresented in special education, when students' need for services is considered (Mandell et al., 2008; Morgan et al., 2017). Although additional research is needed in this area, it should be recognized that just as overrepresentation in special education poses a significant risk to the educational outcomes of racial-ethnic minority students, so too does the underrepresentation of racial-ethnic minority students who could benefit from special education services.

Patterns within SLD and OHI Identification Rates

The disproportionate identification of Black/African-American students and Native American students for specific learning disability follows a historical pattern regarding the stigmatization of certain disability categories. During the 1970s, Black/African American students, compared to White students, were significantly underrepresented in the SLD category (Ong-Dean, 2009; Reid & Knight; 2006).

However, in 1992 lawmakers amended IDEA to include Attention Deficit Hyperactivity Disorder (ADHD) and Attention Deficit Disorder (ADD) on the list of medical diagnosis satisfying the criteria of OHI. Between the 1987-1988 school year and the 1996-1997 school year, there was a 249.2% increase in the number of students receiving special education services classified under OHI. Comparatively, there was a 51.1% increase in the number of students classified under SLD (OSERS, 1998). Subsequently, *relative to the number of White students* in the SLD category, Black/African American children became overrepresented in SLD and underrepresented in OHI as the stigma of a disability label (compared to a medical diagnosis) became intensified for students classified for SLD (Ong-Dean, 2009; Reid & Knight, 2006).

Recently, Sullivan and Bal (2013) found that students receiving services for SLD were more likely than White students to be Black/African American (Odds Ratio [OR] = 3.09) and Hispanic/Latino (OR = 1.44), $p < .001$. Accounting for students' socioeconomic status reduced the extent of risk, however race/ethnicity still remained a significant predictor of students' risk of identification for SLD ($p < .001$). Notably, the researchers did not find that Black/African American students or Hispanic/Latino students were overrepresented in OHI, relative to the representation of White students.

Patterns of Disproportionality by Educational Environment

The overrepresentation of historically-underserved racial-ethnic minority groups in special education, particularly in educational environments isolated from the general classroom, is an issue that continues to stymie efforts by education researchers and

policymakers to address the disparate outcomes of SWD. In general, students who receive special education services in the general classroom for 80% or more of the day show more improvements in their academic and behavioral functioning, compared to children in other academic settings (Bouck & Park, 2016). Yet, on average schools place half of students identified as having ID in educational settings where they receive their special education services inside the general classroom for less than 40% of the day (OSERS, 2018). Similarly, roughly one-fifth of students identified as having ED receive their special education accommodations in isolated placement settings (OSERS, 2018). Studies suggest that amongst students with the same disabilities, there are significant racial-ethnic disparities in the amount of time students spend inside the general classroom that is not associated with students' severity of impairment (Skiba et al., 2006).

To understand the overrepresentation of Black/African American students in restrictive environments, Skiba et al. (2006) investigated the effects of students' disability categories on their likelihood of receiving special education services in restrictive educational environments. Their study included 295 public school districts in Indiana, representing roughly 1,064,240 students. Eleven percent of the total student population was Black/African American, 81.19% White, 4.18% Hispanic/Latino, 2.08% Multiracial, 1.07% Asian, and 0.26% American Indian.

The researchers focused on two educational environments and five disability categories, including learning disabled (LD), speech and language disorder (SL), mild mental retardation (MIMR), moderate mental retardation (MOMR), and emotional disturbance (ED). Examined educational settings included the general classroom and

restrictive educational environments — defined as students spending more than 80%, or less than 40% of the day in the general classroom, respectively. Subsequently, calculations of disproportionality examined three relationships: (a) Black/African American identification rates for each disability category, (b) Black/African American placement rates in the general classroom or isolated special education settings, and (c) the rates of placement in the general classroom or restrictive environments by disability category.

Results from bivariate analyses indicated that Black/African American children were significantly underrepresented in the general classroom ($RRR = 0.71$), and significantly overrepresented in more restrictive educational environments ($RRR = 2.94$), $p < .001$. The overrepresentation of Black/African American students in restrictive academic settings did not carry over to other racial-ethnic groups within the same disability categories. The findings revealed that Black/African American children with ED were approximately 50% less likely than their classmates with ED to receive their special education services in the general classroom. Likewise, Black/African American students with MIMR and LD were 20% and 30% less likely than all other students to spend 80% or more of their day in the general classroom. Moreover, but to a lesser extent, Black/African American students with SL were 7.7 times less likely than their peers with SL to remain in the general classroom for their special education provisions.

The findings from Skiba et al. (2006) highlight several important issues related to the disproportionality of Black/African American students in special education. First, the overrepresentation of Black/African American students in restrictive environments is

neither due to their overall overrepresentation within special education, nor their overrepresentation within specific disability categories. The findings demonstrated that Black/African American students were significantly more likely than other students within the same disability category to receive their special education accommodations outside the general classroom. Second, the disproportionate representation of Black/African American students in restrictive environments followed a negative dose-response relationship: as disability impairment increased, the intensity of educational intervention decreased. In this instance, Black/African American students with moderate mental retardation received fewer placements in intensive educational settings than students with mild mental retardation. The authors noted that this finding followed a pattern of increasing subjectivity during disability determination. As the criteria for identification for a particular disability category became less specific, disproportionality in the category became more pronounced. Lastly, these results demonstrate a need to investigate how systemic factors (e.g., classroom management, cultural illiteracy, eligibility bias) influence racial-ethnic disproportionality in special education. Although researchers are limited in the types of empirical studies that can establish causal relationships, education research must begin to identify antecedents to racial-ethnic disproportionality in restrictive educational environments.

Academic Achievement of Students with Disabilities

The importance of conducting research on racial-ethnic disproportionality and academic growth is paramount in light of the number of racial-ethnic minority children

who schools siphon off from the general classroom into potentially ineffective special education classrooms. On average children with disabilities struggle to meet grade-level proficiency standards, and accordingly, have difficulty achieving self-sufficiency in adulthood (Blackorby, 2010; Gilmour et al., 2019; Morgan et al., 2010; Sullivan & Field, 2013). However, in thinking about the purpose of special education, policymakers have communicated their intentions for SWDs to demonstrate the efficacy of special education through their academic performance.

In general, studies that have examined the efficacy of special education by measuring the academic progress of SWDs have produced conflicting results. For example, Hurwitz et al. (2019) used longitudinal data to investigate the efficacy of special education services by examining the reading and math achievement of 575 students in grades K-12, enrolled in an urban public school district in Kentucky. To be included in the study, students had to enter or exit special education during the investigated timeframe. Consistent with previous studies students in the sample were predominately male (70%), and qualified for the free or reduced lunch program (67%).

Demographically, 53% of students were White, 35% were Black, 1% was Asian, and 8% were Hispanic/Latino students. Results indicated that students' math achievement significantly improved by an average of 0.07 standard deviations while they were receiving special education services, and continued to improve by an average of 0.12 standard deviations after students exited special education ($p < .001$). Similarly, the average growth in students reading scores was significantly higher during the semesters

after students received special education services (0.08 SDs), compared to the semesters before students received special education services (0.06 SDs; $p < .001$).

However, these findings are not universal and achievement gaps continue to exist in the academic performance of students who receive special education services (OSERS, 2018; ESSA, 2015). The results of the meta-analysis performed by Gilmour et al. (2019) revealed that the reading growth of SWDs fell behind their peers without disabilities by an average of 3.3 years. Additionally, students' disability categories appeared to moderate this relationship. Students identified as having SLD and low-incidence categories (ID, autism, traumatic brain injury [TBI]), on average were 4 and 4.3 years behind their peers without disabilities, respectively. These findings echo the results of Morgan et al. (2010) who used propensity scoring and OLS regression to investigate the efficacy of special education programs. The researchers found that amongst children who had the same propensity for requiring special education services, those that ultimately received special education accommodations achieved significantly lower than their propensity-matched peers ($p < .01$). Receipt of special education services was associated with a negative (worsening) or nonsignificant growth of SWDs' reading and math scores. Additionally, the researchers discovered that SWDs did not benefit from behavioral interventions, and continued to experience problematic internalizing and externalizing behaviors.

Relatedly, Siperstein et al. (2011) discovered that even after accounting for school income and type of special education services provided, students with ED had little or no improvement in their behavioral functioning or academic achievement after two academic years. The researchers' investigated the effect of schools' income-level on the

academic growth and behavioral progress of students with ED, utilizing two samples of students from elementary schools in the greater Boston area. The first sample included 61 students from 8 low-income ($n = 35$) and 12 high-income ($n = 26$) schools, receiving special education services for ED. In this sample, 70%—95% of students within low-income schools qualified for free or reduced lunch (FRL). The sample of students from low-income schools was 43% White, 26% African American, 26% Hispanic, and 5% other racial-ethnic groups. Only one-fifth of the sample was female.

Comparatively, between 2%—15% of students in high-income schools were eligible for FRL. The sample of students identified as having ED from high-income schools did not contain any African American students. Eighty-eight percent of students were White, 4% were Hispanic, and 8% identified as some other racial-ethnic group. Similar to low-income schools, only 19% of students were female.

The second sample of students contained students from low-income schools who exhibited risk factors for emotional or behavioral difficulties but did not receive special education services. This sample allowed researchers to contextualize the performance and progress of students assigned to the ED category, who, if appropriately identified for special education services, would demonstrate similar patterns of growth as students identified as being at-risk. Thirty-five percent of students in the "at-risk" sample were White, 16% were African American, 36% were Hispanic, and 16% were some other race/ethnicity.

The researchers assessed students' academic achievement using the math and reading subtests of the *Woodcock Johnson III* (WJ III), and provided teachers with

the *Social Skills Rating System–Teacher Version* (SSRS-T) and *Critical Events Index* (CEI) rating scale to measure students' behavioral problems. The assessments took place during the spring of two back-to-back years. To measure the effect of time, school income level, and ED disability categorization on students' academic achievement and behavior, the researchers performed a 3x2 MANOVA. Independent variables included Time, a dichotomous (T1 or T2) within-subject factor variable, and Group, a between-subject factor variable with three levels: students with ED in high-income schools, students with ED in low-income schools, and at-risk students in low-income schools.

Results indicated that students with ED from high-income schools and students at-risk of developing ED from low-income schools performed significantly better than students with ED from low-income schools ($p < .001$) on the reading and math subtests of the WJ III. However, no difference in achievement occurred between T1 and T2 for students with ED. Similarly, students with ED from low-income schools experienced more behavioral problems than both students with ED from high-income schools and students who were at risk of developing ED. Furthermore, there were no discernible improvements in the number of problem behaviors exhibited by students with ED in either high- or low-income schools between T1 and T2. Students who were at risk of developing ED showed significant decreases in the occurrences of internalizing problem behaviors.

The findings of Siperstein et al. (2011) highlight a vital issue within special education, and that is its inability to affect the academic trajectory and problem behaviors of students within certain high-incidence categories. Furthermore, the findings reveal

why the ineffectiveness of special education disadvantages low-income (predominantly racial-ethnic minority) schools more: students' academic and behavioral baselines are often much worse than students in high-income schools. Although neither improves, the lack of improvement in below-average achievement places students in low-income schools at-risk of encountering low teacher expectations and stigmatization.

Factors Affecting Achievement and Growth

In an attempt to understand the observed racial-ethnic disproportionality, achievement disparities, and growth trends of SWD, education researchers have focused on in-school variables that predispose certain groups of children to experience academic or behavioral difficulties more than others. Primarily, these variables, or risk factors, center on teachers' interactions with students. Beginning in the early 1960s, a wave of empirical research suggested that children were susceptible to behavioral cues from their teachers that would affect children's academic performance. Resultantly, changes in the child's performance usually confirmed the teacher's unspoken expectations, biases, or stereotypical assumptions about the child (Brophy & Good, 1970; Jussim, 1989; Rosenthal & Jacobsen, 1968). In 1966, researchers Rosenthal and Jacobson published a groundbreaking study (later published as a book entitled *Pygmalion and the Classroom*) detailing the effects of teachers' expectations of students' academic performance. Due to methodological issues, the findings of Rosenthal & Jacobsen did not receive additional attention until researchers Brophy and Good (1970) and Lee Jussim (1989) replicated their findings in studies that established that teachers' expectations and behaviors had a

significant effect on not only students' academic performance, but also students' self-concept.

The findings from these early studies resembled experiments that have investigated the effects of teachers' implicit attitudes towards academically-stigmatized groups (e.g., girls, racial-ethnic minority students, recent immigrants, etc) and the resulting performance of students from these groups. Teachers' expectations of racial-ethnic minority students and SWD may reflect their implicit attitudes, even when the teacher does not explicitly express prejudicial beliefs (Glock et al., 2013; Jacoby-Senghor et al., 2015; Kumar et al., 2015; Peterson et al., 2016). Teachers who hold stereotypical implicit attitudes towards racial-ethnic groups that are not their own are more likely to misinterpret the cultural behaviors of these students, instead attributing these behaviors to defiance. Studies show that teachers are more likely to misinterpret the joking behaviors of Black/African American children as disrespectful, while interpreting cultural mannerisms as threatening gestures (Downey & Pribesh, 2004; McKown & Weinstein, 2002; Neal et al., 2003). This cultural illiteracy results in teachers, administrators, and even psychologists making grave errors in pathologizing the cultural behaviors of racial-ethnic minority students that are dissimilar to normed middle-class White behaviors. In effect, disability becomes construed with students' cultural incongruence with the dominant culture's values (*Hobson, 1967*). This misunderstanding and persistent correction of students' cultural behaviors may contribute to poor self-esteem and externalizing behaviors, negatively affecting students' academic achievement and potential for growth.

Teacher Expectancy Effects. In 1970, researchers Brophy and Good replicated Rosenthal's and Jacobsen's findings about how children's susceptibility to teacher-expectancy effects affected their academic achievement and growth. In particular, the researchers' investigation revealed how teachers' expectations influenced their own behaviors with students, thereby communicating to students their judgement regarding the child's academic potential. Their findings strongly supported what Rosenthal and Jacobsen had theorized: teachers' behaviors played a significant role in producing the behaviors and academic achievement they expected to see. Furthermore, Brophy and Good found that teachers exhibited preferential treatment towards students they expected to be high-achieving, giving them more positive and less negative feedback than children they expected to be at low-achieving ($p = .001$). Conversely, teachers limited their interactions with students who they believed would be low-achieving, providing these students with less feedback, positive or negative, than high-achieving students ($p = .001$). Academically, high-ranked students obtained higher SAT test scores ($p = .001$) than students who teachers believed had low potential.

Since the publication of Brophy's and Good's study, additional studies have examined how teacher-expectancy effects factor into student achievement (Gershenson & Papageorge, 2018; Klehm, 2014; Peterson et al., 2014). McKown and Weinstein (2002), observed how teachers' expectations, specifically teachers' over- and underestimates of students' ability, predicted students' year-end achievement. Their study showed that in third and fifth grades, Black/African American children, compared to all other children, were 2.53 and 10.40 times more likely to confirm their teacher's underestimates of their

ability, respectively. Despite observing improvements in the abilities of students from non-stigmatized group in response to teachers' overestimates, when teachers overestimated the abilities of Black/African American students, the researchers did not observe any additional benefit to the students' performance.

Similarly, Klehm (2014) examined how within special education, teachers' attitudes about SWD predicted their students' performance. The study employed the High-stakes Testing and Students with Disabilities: A Teacher Attitude Survey (HST-SWD) to measure the attitudes, expectations, classroom practices, and demographics of 218 middle school teachers. Klehm's findings indicated that more positive teacher attitudes towards students with disabilities significantly predicted higher achievement scores on the New England Common Assessment Program. Specifically, teachers who believed that students in special education could perform higher level thinking and formulate big ideas using problem-solving saw significantly higher achievement scores for their students. Despite the multitude of studies demonstrating the benefit of teachers' positive expectations on students' academic performance, Hurwitz et al. (2007) noted that teachers had low expectations of their disabled students and consistently devalued their abilities.

Implicit Bias. Teachers' devaluation of students' abilities may be a result of their implicit attitudes towards certain academically stigmatized groups. Researchers van den Bergh et al. (2010) examined the relationship between teachers' prejudiced attitudes and expectations, and students' performance, discovering that students' race/ethnicity significantly moderated the effect of implicit attitudes on teachers' expectations and

students' achievement. As teachers' implicit attitudes became more negative towards racial-ethnic minority students, their expectations for these students decreased, while their expectations for non-racial-ethnic minority students increased ($b = -1.23$, $z = -3.15$, $p = .002$). Not surprisingly, more negative implicit attitudes was a significant predictor of students' achievement and when compared to their classmates, racial-ethnic minority students had significantly lower scores on their academic assessments (math: $b = -0.97$, $z = -2.54$, $p = .011$; reading: $b = -0.94$, $z = -2.27$, $p = .023$). Self-reported prejudicial attitudes, however, did not significantly predict students' performance or teachers' expectations.

Similar studies performed in different countries have found that teachers tend to hold more favorable attitudes towards racial-ethnic majority children, as compared to racial-ethnic minority children. This tendency aligns with the findings from Project Implicit, a non-profit research group investigating implicit social cognition and bias. Researchers at this group have found that within the United States, between 75 - 80% of individuals who identify as White or Asian have substantially more favorable attitudes towards Whites, the racial-ethnic majority group.

To examine the effect of teachers' implicit and explicit attitudes, and teachers' expectations on the achievement of racial-ethnic minority groups in New Zealand (the Māori and Pasifika indigenous groups), Peterson et al. (2016) examined the relationship between students' prior achievement and teachers' implicit attitudes, explicit attitudes and expectations. The study included 38 teachers encompassing grades 3-7 who identified as European (60%), Pasifika (17%), Other (14%), Māori (6%), or Asian (3%). Twenty-seven

teachers were female, and 11 were male. In addition, the study utilized student-level data from 1,060 students ranging in age from 6 to 13 years, in the classes of the 38 teachers. Students self-identified as European (49%), Māori or Pasifika (19% each), Asian (11%), and Other (2%).

Peterson et al. measured the teachers' explicit expectations using a 7-point Likert scale (from "very much below average" to "very much above average") indicating the level they predicted each student in their class would reach by the year's end. Subsequently, the researchers measured teachers' implicit attitudes using a modified version of the Implicit Association Task (IAT), called the Teacher Implicit Academic Achievement Association Task (TIAAAT). The TIAAAT determined the strength of a teachers' bias by measuring the speed at which they paired images of assignments that received "A+" or "F" with either European, Māori, or Asian surnames (for more information on the structure of the IAT, see Greenwald and Farnham, 2000).

Results from an Analysis of Covariance indicated that there was no significant effect of students' race/ethnicity on their year's end achievement, after controlling for students' prior achievement. Additionally, although teachers' explicit expectations were higher for European and Asian students than for Māori and Pasifika students, no significant correlation between teachers' expectations and students' year end achievement emerged, once researchers controlled for prior achievement. However, teachers' implicit attitudes consistently demonstrated unfavorable attitudes towards Māori students, and favorable attitudes towards White students. This bias was associated with a 28-point difference in students' year's end mathematics achievement score, where

implicitly favored European students outperformed Māori students, receiving almost a full year's academic advantage related to this favoritism.

Although the researchers conclude that teachers' expectations and implicit attitudes do not significantly contribute to the observed ethnic achievement gap, this deduction cannot logically be derived from the study's findings. Although students' prior achievement demonstrates that Māori and Pasifika students had low achievement prior to encountering their teachers' implicit and explicit prejudice, the researchers do not demonstrate that Māori and Pasifika students had low potential for achievement, *prior to encountering an education system filled with implicitly prejudiced teachers*. Students' prior achievement is simply their year's end achievement from the year before, when they had roughly an 80% chance of encountering a teacher who held unfavorable implicit attitudes towards them. Therefore, additional research is needed in this area to identify the cumulative effect of teachers' implicit attitudes and explicit expectations on students' achievement and growth, beginning at the onset of a student's educational journey.

Summary of Chapter I

The overrepresentation of racial-ethnic minority students, in particular Black/African American, Native American and Native Hawaiian/Pacific Islander students in special education continues a historical trend of excluding intellectually-, culturally-, and linguistically-diverse students from receiving a quality education. The history of public education in the United States shows how through legal maneuvering and perseverance, many groups fought and won the right for all children to have equal access to a free and

appropriate, quality education. However, as schools permitted the enrollment of SWD in their regular local public schools, the number of racial-ethnic minority children, particularly Black/African American and Chicano/a students, labeled as “disabled” rose at astronomical rates (Bell, 2004; Skiba et al., 2008).

The disproportionality of Black/African American and Chicano/a students in special education classes for children with “educable mental retardation” reignited legal challenges to combat the efforts of schools districts to isolate these students from their White counterparts. By the 2000s, the U.S. Congress recognized the growing issue of disproportionality within special education and tasked local state educational agencies with monitoring its progress and devising interventions, when necessary (ESSA, 2015). Today, the overrepresentation of certain racial-ethnic minority groups in special education persists, within particular disability categories and in educational settings isolated from the general classroom (OSERS, 2018).

Disproportionality in special education presents an issue if the efficacy of special education has been limited in producing positive outcomes for students who receive services under particular disability categories and in certain educational settings. If schools regularly identify racial-ethnic minority children as having a disability that does not benefit from special education services, such as emotional disturbance, then students' receipt of special education services under these categories obstructs their access to the equitable educational opportunities. Additionally, if schools continue to educate racial-ethnic minority students in academic settings where evidence demonstrates that students

experience diminished educational growth, as compared to other settings, then special education becomes a ploy to restore a segregationist past.

The best available evidence suggests that special education is not fulfilling its obligation under federal law such as ESSA and IDEA, to diminish achievement gaps and disparities in the life outcomes of SWD. Students identified as having emotional disturbance are particularly affected by these negative outcomes, demonstrating resilience to both academic and behavioral interventions (Bal et al., 2019; Siperstein et al., 2011). Additionally, studies suggest that on average, SWD do not benefit from their receipt of special education services and may even be harmed by their placement in special education classrooms (Gilmour et al., 2019; Morgan et al., 2010). However, although results are currently weighted towards special education not benefitting students, several researchers have found that SWD do benefit from services, if efficacy is operationalized as within-student growth (Hurwitz et al., 2019).

Several factors may account for the diminished growth of SWD, particularly racial-ethnic minority students, including their teachers' lowered expectations and implicit bias. However, similar to the results from longitudinal achievement studies, the body of research surrounding the effect of teachers' expectations on students' achievement offers mixed results pertaining to the long-term effects on students' performance (deBoer et al., 2010; Peterson et al., 2016; van den Bergh et al., 2010). Nonetheless, it is important to determine whether special education differentially disadvantages some students relative to others.

Chapter II

Method

The aim of this study was to assess the research questions concerning (a) racial-ethnic disproportionality in special education programs and (b) the academic growth of students with disabilities, as enumerated in Chapter I. To this end, I utilized two separate analytical approaches to test the following hypotheses:

1. Black/African American and Hispanic/Latino students are overrepresented in special education categories requiring more subjective assessment, specifically the emotional impairment and intellectual disability categories.
2. Black/African American students are underrepresented in fully inclusive environments, and overrepresented in substantially separate environments.
3. There will be a significant effect of students' race/ethnicity, disability category, and educational environment on their math and ELA growth percentiles.

Additionally, I hypothesize that there will be significant interaction effect between race/ethnicity and educational environment.

The remainder of the chapter is divided into two main sections detailing the methodology used to measure disproportionality and students' academic growth.

Assessment of Disproportionality

I focused the assessment of disproportionality on the relationship between (a) students' race/ethnicity; (b) students' disability category (e.g., intellectual disability, emotional impairment, etc.); and (c) the educational environment where students' received their special education services. Specifically, I sought to determine how likely identification and placement were for a particular racial-ethnic group in a disability category or in an educational environment. Additionally, I measured the probability of placement for a particular disability group in each educational environment. I performed this supplemental analysis to determine whether certain racial-ethnic groups were more likely to be classified under disabilities that had a high likelihood of receiving special education services outside the general classroom.

Disproportionality Sample

This study included 362,118 students in grades 4–8, enrolled in Massachusetts' schools through public funding during the 2016-2017 school year (Table 1). I obtained the sample from de-identified archival data that was publicly available through the Massachusetts Department of Education website. The analytic sample used to assess disproportionality included the full sample of students in grades 4-8. Approximately one-fifth of the analytic sample were SWD (Table 2).

Table 1*Demographic Features of Full Sample, Grades 4-8*

Descriptive Characteristics	Students	
	<i>n</i>	%
Sex*		
Female	176,524	48.75
Not Female	185,594	51.25
Race/Ethnicity*		
Asian	24,109	6.66
Black/ African-American	31,510	8.70
Hispanic/ Latino	70,169	19.38
Multi-Race, Non-Hispanic	12,394	3.42
Native American	814	0.22
Native Hawaiian/ Pacific Islander	291	0.08
White	222,711	61.50
Special Education Eligibility		
Students in Special Education	73,511	20.30
No Special Education Provisions	288,607	79.70

n* = 362,118Table 2***Demographic Characteristics of Children in Special Education*

Descriptive Characteristic	Students	
	<i>n</i>	%
Sex		
Female	26,519	36.07
Not Female	46,992	63.93
Race/Ethnicity		
Asian	2,213	3.01
Black/ African-American	7,481	10.18
Hispanic/ Latino	16,865	22.94
Multi-Race, Non-Hispanic	2,627	3.57
Native American	210	0.29
Native Hawaiian/ Pacific Islander	50	0.07
White	44,065	59.94

Analysis of Disproportionality

To determine a racial/ethnic groups' likelihood of identification for a particular disability category, I used Equations 1 and 2 to calculate the risk index (RI) and ratio (RR), using the referent group of “all others”.

$$RI = \frac{\text{Number of children from racial/ethnic group in disability category}}{\text{Total number of children enrolled from racial/ethnic group}} \times 100 \quad (1)$$

$$RR = \frac{\text{Risk index for racial/ethnic group in disability category}}{\text{Risk index for all others for disability category}} \quad (2)$$

Similarly, to determine the likelihood of a racial/ethnic groups placement within a specific educational setting, I used equations 3 and 4 to compute the risk indices and ratios for placement.

$$RI = \frac{\text{Number of children from racial/ethnic group in educational setting}}{\text{Total number of children with disabilities in racial/ethnic group}} \times 100 \quad (3)$$

$$RR = \frac{\text{Risk index for racial/ethnic group in educational setting}}{\text{Risk index for all others in educational setting}} \quad (4)$$

Subsequently, I performed a bivariate analysis using a chi-square statistic with one degree of freedom, to determine if the risk ratios of identification and placement were statistically significant.

Assessment of Academic Growth

Academic Growth Sample

For the growth analysis, I focused on students within special education who received services under high-incidence categories and categories traditionally included in disproportionality research, specifically emotional impairment (EI), communication impairment (CI), specific learning disability (SLD), intellectual disability (ID), and health impairment (HI). Additionally, I further narrowed the analysis to educational environments within regular public and charter schools, reducing the analytic sample to 52,053 students.

Due to statistical constraints, I excluded an additional 198 students who belonged to the Native American or Native Hawaiian/Pacific Islander racial-ethnic groups. I performed two separate growth analysis, one for growth percentiles corresponding to English-Language Arts (ELA) performance and another for students' Math performance. Students who were missing values for the dependent variables were automatically removed from the analysis by SPSS. As a result, two final analytic samples emerged, one for the ELA subtest ($n = 46,386$) and another for the Math subtest ($n = 45,979$).

In Table 3, I present the descriptive characteristics of the ELA and Math analytic samples. Each sample contained similar proportions of students belonging to each racial-ethnic group, compared to the full sample of SWD in grades 4-8. Socioeconomically, almost half of the students belonged to economically disadvantaged households (i.e., recipients of public assistance programs; 46%), similar to the findings of Hehir et al. (2014).

Table 3*Descriptive Features of Analytic Growth Samples*

Student Characteristics	ELA Sample		Math Sample	
	<i>n</i>	%	<i>n</i>	%
Sex				
Female	18,020	38.85	17,831	38.78
Male	28,366	61.15	28,148	61.22
Race/Ethnicity				
Asian	1,143	2.46	1,135	2.47
Black/Afr-American	4,903	10.57	4,855	10.56
Hispanic/ Latino	11,098	23.93	10,985	23.89
Multi-Race	1,665	3.59	1,639	3.56
White	27,577	59.45	27,365	59.52
Disability Classification				
ID	1,194	2.57	1,162	2.53
CI	8,369	18.04	8,324	18.10
ED	4,838	10.43	4,742	10.31
Health	10,295	22.19	10,192	22.17
SLD	21,690	46.76	21,559	46.89
Placement Environment				
Full	34,880	75.20	34,668	75.40
Partial	8,115	17.49	7,998	17.39
Substantially Separate	3,391	7.31	3,313	7.21
Total	46,386	-	45,979	-

Excluded Students

The number of excluded students differed slightly by subtest. More students completed the ELA subtest than the Math subtest, however, no single factor accounted for this discrepancy. The majority of excluded students completed the MCAS-Alt, or the alternate standardized test designed for students with severe disabilities and first-year English language learners. The grading scale of the MCAS-Alt does not provide students

with a raw score; as a result, students who completed the MCAS-Alt did not receive growth percentiles. Approximately 42.88% and 41.08% of excluded students completed the MCAS-Alt for the ELA and Math subtests, respectively.

The remaining excluded students did not have student growth percentiles due to English language learner status ($n_{ELA} = 141$; $n_{Math} = 115$), testing absence ($n_{ELA} = 600$; $n_{Math} = 684$), test invalidation ($n_{ELA} = 7$; $n_{Math} = 1$), or transfer status ($n_{ELA} = 67$; $n_{Math} = 76$). The remaining cases of excluded students ($n_{ELA} = 2307$; $n_{Math} = 2586$) did not have reasons for missing values.

Variables and Measures

Massachusetts Comprehensive Assessment System (MCAS)

In the spring of 2017, all students educated using Massachusetts' public funds completed the Next-Gen MCAS or its alternative, the MCAS-Alt. In grades 3-8, students complete three subtests: English language arts and literacy (ELA), mathematics, and science and technology/engineering (grade 5 and 8; Massachusetts Department of Elementary & Secondary Education, 2017).

Each field-tested item was reviewed by the Massachusetts Department of Elementary and Secondary Education (2017), an Assessment Development Committee (ADC), a Bias and Sensitivity Review Committee, and External Content Experts (affiliates of higher education institutions who possessed doctoral degrees in the content or subject area being reviewed). The committee analysis of items included statistical evaluations of difficulty indices (the proportion of students who answered the question

correctly), item-test correlations, differential item functioning (DIF), and dimensionality analyses. Subsequent discrimination analyses confirmed that for each item, those selecting the correct answer were higher scoring students and similarly, those selecting more incorrect responses were students receiving lower total scores.

DIF analyses were performed to ensure that no subgroups of students (e.g., sex, race, first-language, economic disadvantage status, or special education recipient) performed differently on the assessment due to ecological differences outside the tested constructs. No item included on the final examination contained items that had DIF indices in the ranges of -0.10 to -0.05 and 0.05 to 0.10 (low likelihood of differential measurement) or indices outside of the -0.10 to 0.10 range (high likelihood of differential measurement) between students receiving special education services and those who were not. However, in grades 4-8, a total of seven ELA items and four math items were included that had high DIF indices. The affected subgroups were LEP, Hispanic/Latino and Black/African American children when measured against Non-LEP and White children, respectively.

ELA. The English language arts section of the exam measured students' reading (e.g., key ideas and details, craft and, and integration of knowledge and ideas), language (e.g., conventions of standard English, knowledge of language, and vocabulary acquisition and use), and writing skills (e.g., text types and purposes; production and distribution of writing). Item types included selected-response (one- or two-part multiple choice), technology-enhanced response, short response, and narrative- and text-based essay. In grades 4-8, reliability estimates ranged from 0.88 to 0.91.

Mathematics. Concepts analyzed on the mathematics subtest were grouped by grade level. Students in third, fourth and fifth grades completed items assessing mathematical concepts such as algebraic thinking, fractions, data analysis and geometry. Students in sixth- and seventh-grade received items related to ratios and proportions, equations, statistics and probability, in addition to concepts learned in prior years, such as geometry. The eighth-grade examination assessed students' ability to apply skills developed in grades 3-7 in solving mathematical functions.

Difficulty indices for the mathematical examinations administered in grades 4-8 were noticeable lower than ELA difficulty indices, and therefore created the expectation that the growth percentiles for the math assessment would be significantly lower than those for the ELA subtest. Reliability estimates ranged from 0.90 to 0.93.

Independent Variables

Sex. The initial data set contained four levels for sex, including 45 students with no sex indicated. An indicator variable "Female" was created to assess the effect of sex on placement, using "1" as female and "0" as not female. "Not female" combined the observations of male and gender non-binary students. After exclusion criteria, only female and male students remained in the sample. Sex was included in the analysis due to evidence indicating that schools identify females at significantly lower rates than males (Coutinho & Oswald, 2005; Shifrer, Muller & Callahan, 2011).

Race/Ethnicity. The analysis included the student's identified race or ethnicity and compared seven different racial-ethnic groups. Due to sample size constraints, Native

American and Native Hawaiian/Pacific Islander students were omitted from the ANOVA and subsequent *post-hoc* analyses.

Nature of Disability. Students in special education received services under one of thirteen categories. The variable itself contained fourteen levels, one level dedicated to students not receiving special education services. The original dataset coded the disability categories as the following numbers : (“1”) intellectual disability, (“2”) hard of hearing/deaf, (“3”) communication impairment, (“4”) vision impairment/blind, (“5”) emotional impairment, (“6”) physical impairment, (“7”) health, (“8”) specific learning disabilities, (“9”) deaf-blindness, (“10”) multiple disabilities, (“11”) autism, (“12”) neurological, and (“13”) developmental delay — ages 3–9 only. See Appendix A for formal definitions of each disability category.

I focused the analysis of variance on high-incidence categories within Massachusetts, specifically, intellectual disability (ID), communication impairment (CI), emotional impairment (EI), specific learning disorder (SLD), and health impairment (HI).

Educational Environment. The primary analysis included a factor variable for educational environments within schools serving students with and without disabilities (i.e., the analysis did not include students served in specialized schools for students with disabilities). These environments included fully-inclusive, partially-inclusive and substantially separate environments meaning that students spent 80% or more, between 79-40%, or less than 40% of their time, respectively, *inside* the general classroom receiving special education services.

Response Variable - Student Growth Percentile

Student growth is a measure of a student's academic achievement over time. In the present study, I utilize a measure of growth that utilizes percentiles to describe how well each student has "grown" in comparison to other students with similar MCAS achievement scores in prior testing years. In other words, the SGP is the percentage of students with similar scores who performed as well as or worse than the student issued the percentile ranking. For example, if a student receives an SGP of 90, the student performed *as well as or better than* 90% of their comparison group. Stated another way, only 10 percent of their comparison group received higher scores.

Consider the following two examples where from one year to the next, a child receives the same raw score:

1. Student A obtains the same raw score from one year to the next. If schools were to interpret growth as the difference in raw score between two consecutive years, then the student exhibits zero growth. However, to determine how normal or average the zero-growth is, in comparison to other children, it is necessary to compare Student A's *absolute* growth to others who have similar achievement levels in prior years (i.e., their academic peers). Upon examination, it may be observed that in year two, Student A's academic peers, on average, received *lower* scores than Student A. Thus, Student A's academic peers show *negative* absolute growth compared to Student A's zero-growth. In essence, if Student A's absolute growth of zero is higher than 90%

of their academic peers, then the student would be in the 90th SGP.

Conversely,

2. Student A's absolute growth of zero is compared to their academic peers, among whom 40% obtained positive absolute growth. Now, Student A would be in the 60th SGP. For this reason, absolute growth alone cannot be used to establish normative growth. Growth, in this instance, is not solely a measure of magnitude, but rather a normed comparison of absolute growth to similarly achieving students.

The calculation of student growth percentiles involves complex modeling using quantile regression. The obtained dataset contained pre-calculated growth percentiles based on the model developed by Betebenner (2009).

Analysis of Academic Growth

To determine if there were statistically significant differences between students' mean growth percentiles related to their demographic or special education characteristics (such as educational setting or assigned disability category), I conducted a multilevel four-way factorial ANOVA. I performed the statistical analyses using IBM® SPSS 25 for Mac, using a general linear model command, additionally selecting options for descriptive statistics and parameter estimates with robust standard errors. *Post-hoc* analyses included Gabriel and Hochberg's GT2, in order to account for the differences in group sizes between multiple comparisons.

Chapter III

Results

The present study included an investigation of students' risk and relative risk of identification for special education services, and placement in certain educational environments, related to students' racial/ethnic affiliation. Additionally, the analysis investigates the efficacy of such placements and attempts to ascertain whether student race/ethnicity, sex, disability category, and/or special education environments significantly predict academic growth. This chapter details the results of the analytical methods outlined in Chapter II that addressed each of the three research questions, and is organized into three corresponding sections.

Racial-Ethnic Disproportionality in Disability Categories

Research Question 1: What is the relationship between students' racial-ethnic affiliation and (a) their risk of being identified for special education services under a particular disability category; and (b) their risk of placement within a particular educational environment?

Disability Classifications

Risk indices and risk ratios for all disability categories by racial-ethnic group are presented in Tables 4 and 5. Results indicate that Black/African American, Hispanic/

Latino, and Native American students were overrepresented in at least two out of five high-incidence disability categories. Conversely, Asian students were significantly underrepresented in four out of five high-incidence categories.

Table 4

Risk Indices and Risk Ratios for Disability Classifications by Race/Ethnicity

Disability Classification	Race/Ethnicity							
	Asian		Black/ Afr American		Hispanic/ Latino		Multiple Races	
	Risk	RR	Risk	RR	Risk	RR	Risk	RR
Autism	1.71	0.85	1.76	0.88	1.48	0.70	2.05	1.03
Communication	2.81	0.94	3.64	1.24	4.19	1.55	2.68	0.89
Deaf-blind	0.01	0.93	0.02	1.22	0.02	1.39	0.02	1.23
Developmental Delay	0.05	0.45	0.10	0.88	0.12	1.10	0.14	1.21
Emotional	0.41	0.19	2.92	1.52	2.66	1.43	2.85	1.44
Hard of Hearing or Deaf	0.13	1.01	0.16	1.25	0.14	1.08	0.07	0.56
Health	0.78	0.22	2.88	0.86	3.33	1.01	3.52	1.07
Intellectual	0.39	0.40	1.85	2.15	1.67	2.18	0.72	0.75
Multiple Disabilities	0.19	0.51	0.40	1.11	0.42	1.21	0.33	0.91
Neurological	0.65	0.47	1.46	1.11	1.20	0.88	1.48	1.12
Physical	0.06	0.43	0.16	1.26	0.13	0.98	0.08	0.62
Specific Learning Disabilities	1.94	0.27	8.33	1.23	8.64	1.33	7.18	1.04
Vision Impairment or Blind	0.05	0.68	0.08	1.12	0.05	0.67	0.08	1.13

Note: RR = Risk Ratio. Statistical significance, $p < .05$, is denoted by **bold** font — risk ratios above one indicate overrepresentation, while risk ratios below one indicate underrepresentation.

Communication Impairment. Children with CI, the third-largest disability category, were significantly more likely to be Black/African American (RR = 1.24; χ^2 (1) = 49.77) and Hispanic/Latino (RR = 1.55; χ^2 (1) = 428.76), compared to all others ($p < .001$). Multi-racial (χ^2 (1) = 4.29, $p = .038$) and White students (χ^2 (1) = 374.79, $p < .001$) were significantly less likely than all others to be in this category.

Table 5*Risk Indices and Risk Ratios for Disability Classifications by Race/Ethnicity, cont.*

Disability Classification	Race/Ethnicity					
	Native American		Pacific Islander		White	
	Risk	RR	Risk	RR	Risk	RR
Autism	1.11	0.55	1.37	0.69	2.22	1.36
Communication	4.18	1.40	2.75	0.92	2.56	0.69
Deaf-blind	-	-	-	-	0.01	0.74
Developmental Delay	0.12	1.07	0.34	3.00	0.12	1.09
Emotional	3.32	1.65	1.37	0.68	1.80	0.77
Hard of Hearing or Deaf	0.37	2.91	-	-	0.12	0.92
Health	3.19	0.97	2.06	0.62	3.62	1.29
Intellectual	1.23	1.30	2.06	2.18	0.66	0.47
Multiple Disabilities	-	-	-	-	0.36	0.99
Neurological	2.46	1.86	1.03	0.78	1.41	1.18
Physical	0.12	0.95	-	-	0.14	1.15
Specific Learning Disabilities	9.71	1.40	6.19	0.89	6.70	0.92
Vision Impairment or Blind	-	-	-	-	0.08	1.33

Note: RR = Risk Ratio. Statistical significance, $p < .05$, is denoted by **bold** font — risk ratios above one indicate overrepresentation, while risk ratios below one indicate underrepresentation.

Emotional Impairment. Similarly, Black/African American (RR = 1.52; $\chi^2(1) = 143.96, p < .001$), Hispanic/Latino (RR = 1.43; $\chi^2(1) = 186.21, p < .001$), Multi-racial (RR = 1.44; $\chi^2(1) = 45.76, p < .001$), and Native American (RR = 1.65; $\chi^2(1) = 7.07, p = .012$) students faced substantially higher risks of receiving special education services for EI, compared to all other students. Conversely, Asian ($\chi^2(1) = 337.22$) and White ($\chi^2(1) = 127.90$) students were significantly less likely than all others to receive services for EI ($p < .001$).

Health Impairment. Consistent with the hypothesis that racial-ethnic minority children are significantly less likely than all others to receive special education services for medicalized disability categories, Asian (RR = 0.22; $\chi^2(1) = 513.95, p < .001$) and Black/African American (RR = 0.86; $\chi^2(1) = 19.46, p < .001$) children had the lowest risks of receiving services for HI. Noticeably, White students had the highest risk of being identified for HI (RR = 1.29; $\chi^2(1) = 181.02, p < .001$).

Intellectual Disability. In contrast to patterns of representation for HI, Black/African American ($\chi^2(1) = 300.00, p < .001$) and Hispanic/Latino ($\chi^2(1) = 494.85, p < .001$) students were 2.15 and 2.18 times *more* likely than all other students to receive special education services for ID, respectively. Conversely, Asian and Multi-racial students were 0.40 and 0.75 times *less* likely as all other students to receive services for ID, corresponding to a significant underrepresentation in this category ($p < .001$, Fisher's exact test). Although the risk ratio for Native American students suggested a slight overrepresentation in ID, this did not reach significance using Fisher's exact test ($p = .362$).

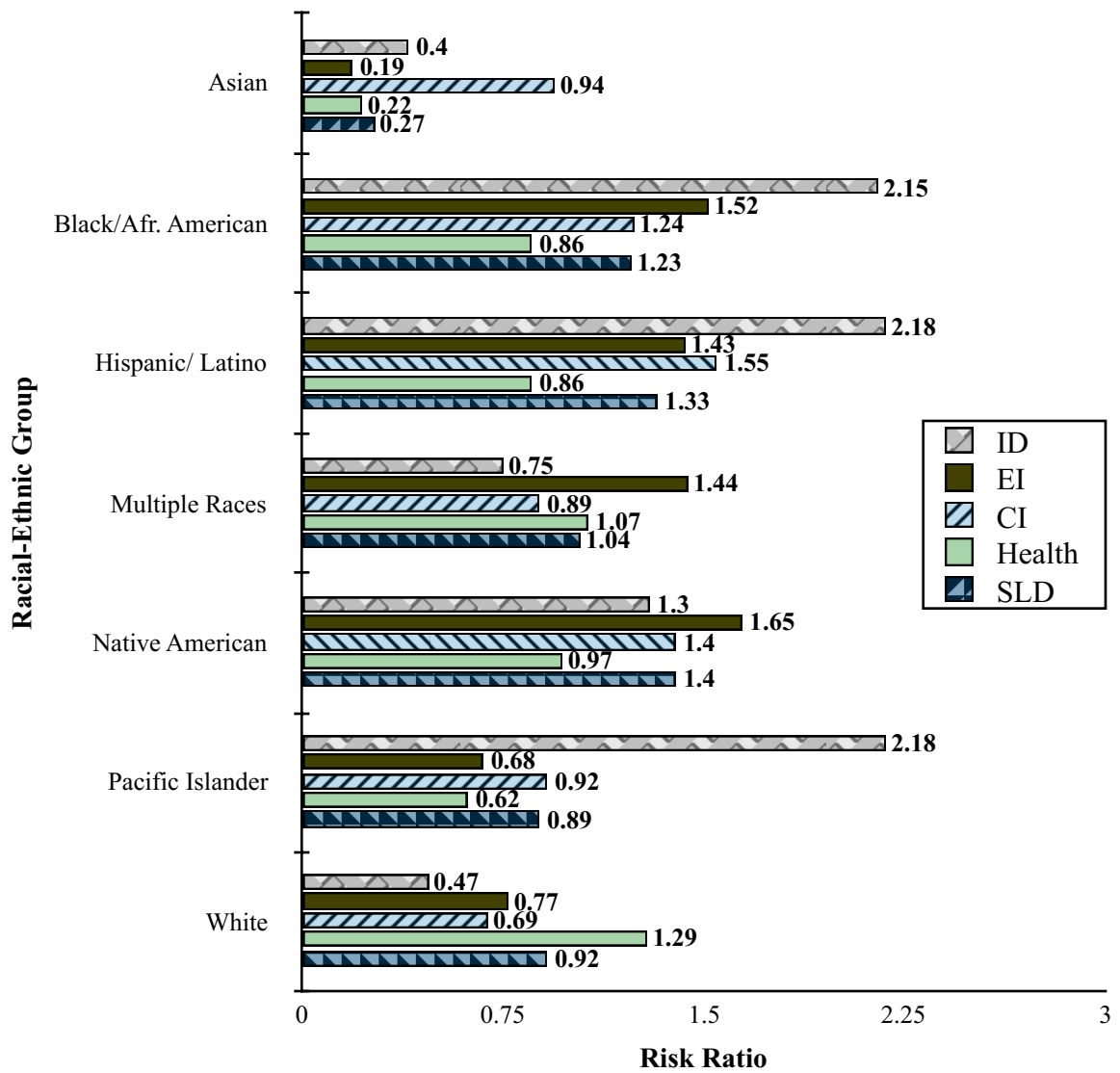
Specific Learning Disability. Amongst students receiving special education services for SLD, Black/African American (RR = 1.23; $\chi^2(1) = 107.00, p < .001$), Hispanic/Latino (RR = 1.33; $\chi^2(1) = 433.17, p < .001$) and Native American (RR = 1.40; $\chi^2(1) = 10.40, p = .001$) students faced significantly higher risks of receiving special

education services for SLD. Similar to other high-incidence categories, Asian students were overwhelmingly underrepresented in SLD (RR = 0.27; $\chi^2(1) = 898.22, p < .001$).

Figure 1

Bar Graph Depicting the Risk Ratios of Racial-Ethnic Groups in High-Incidence

Disability Categories



Note: As illustrated, racial-ethnic minority children, specifically Black/African American, Hispanic/Latino and Native Hawaiian/Pacific Islander children

Educational Environment

Results indicated that compared to all other students, Black/African American (RR = 0.92; $\chi^2(1) = 18.44, p < .001$) and Hispanic/Latino (RR = 0.88; $\chi^2(1) = 207.54, p < .001$) students were significantly underrepresented within fully inclusive environments (Figure 2). Overrepresentation in substantially separate educational settings was notable for Asian (RR = 1.20; $\chi^2(1) = 10.98, p = .001$), Black/African American (RR = 1.73; $\chi^2(1) = 255.68, p < .001$), and Hispanic/Latino (RR = 1.59; $\chi^2(1) = 372.87, p < .001$) students. Similarly, Hispanic/Latino students were also overrepresented in partially inclusive environments (RR = 1.25; $\chi^2(1) = 163.70, p < .001$), however, this was not observed for any other ethnic group in this placement environment, as shown in Table 6.

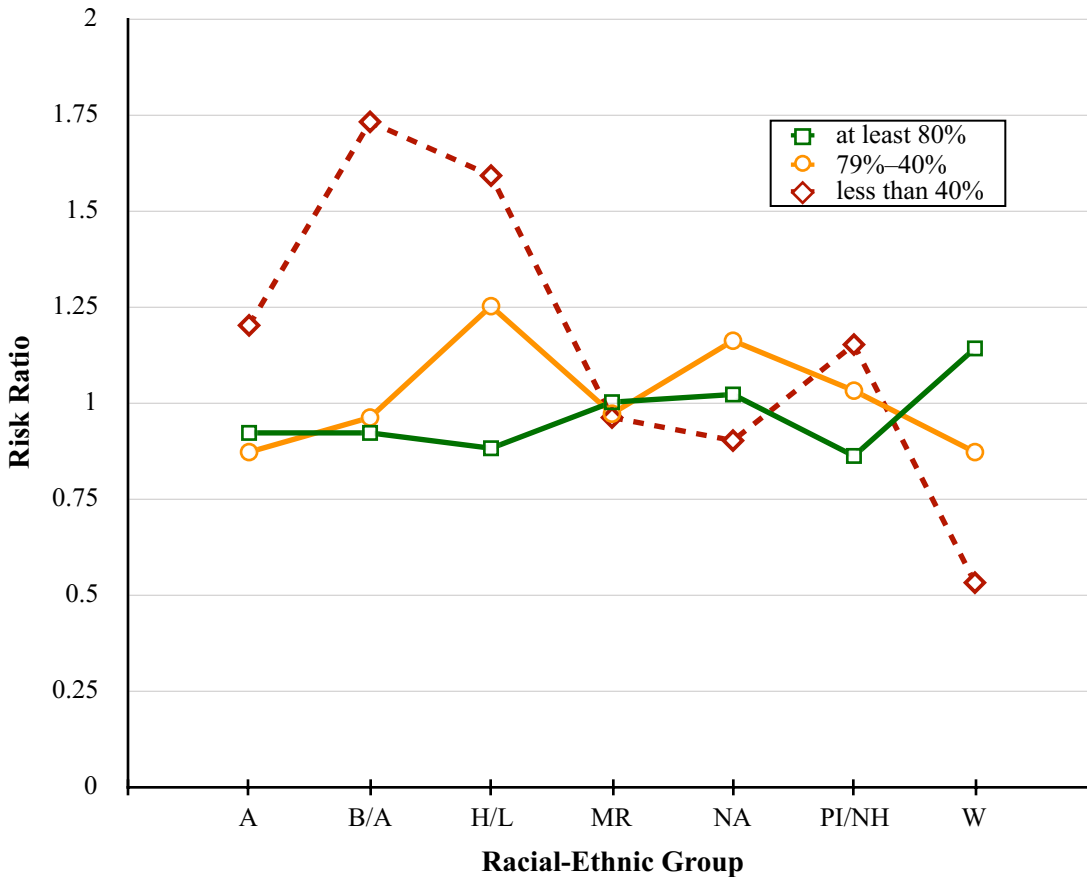
Disproportionality in Educational Settings

Research Question 2: What is the relationship between students' assigned disability category and their risk of placement within a particular educational environment?

To investigate the second research question, the analysis examined the number of students in each educational environment to determine if the assigned disability categories of racial-ethnic minority students spent more time receiving their special education services outside the general classroom (i.e., disability category by educational environment cross tabulations).

Figure 2

Line Graph Illustrating the Risk Ratios of Placement in an Educational Environment, by Racial-Ethnic Group



Note: A = Asian, B/A = Black/African American, H/L = Hispanic/Latino, MR = Multiple Races, NA = Native American, PI/NH = Pacific Islander/Native Hawaiian, W = White. Percentages refer to time spent in the general classroom receiving special education services. As depicted, racial-ethnic minority children have significantly higher risks of receiving their special education services in substantially separate educational environments (less than 40% of time spent in the general classroom).

For high-incidence categories, there was a marked overrepresentation of students with intellectual disabilities and emotional impairments in educational environments where students spent less than 40% of their day in the general classroom (Figure 3). As shown in Table 7, more than half of students with ID were placed in substantially

separate environments, corresponding to these students being 5.85 times as likely as all other students to receive their special education provisions in these isolated environments ($\chi^2 (1) = 1.1 \times 10^3, p < .001$).

Table 6

Risk Indices and Ratios of Environment by Race/Ethnicity

Race/Ethnicity	Special Education Environment					
	Full-Inclusion		Partial Inclusion		Substantially Separate	
	Risk	RR	Risk	RR	Risk	RR
Asian	60.33	0.92	15.62	0.87	12.09	1.20
Black/African American	60.68	0.92	15.63	0.96	11.33	1.73
Hispanic/ Latino	61.87	0.88	14.72	1.25	10.71	1.59
Multiple Races	60.19	1.00	15.58	0.97	12.18	0.96
Native American	60.18	1.02	15.56	1.16	12.17	0.90
Native Hawaiian/Pacific Islander	60.19	0.86	15.56	1.03	12.17	1.15
White	55.44	1.14	16.86	0.87	16.98	0.53

Note: RR = Risk Ratio

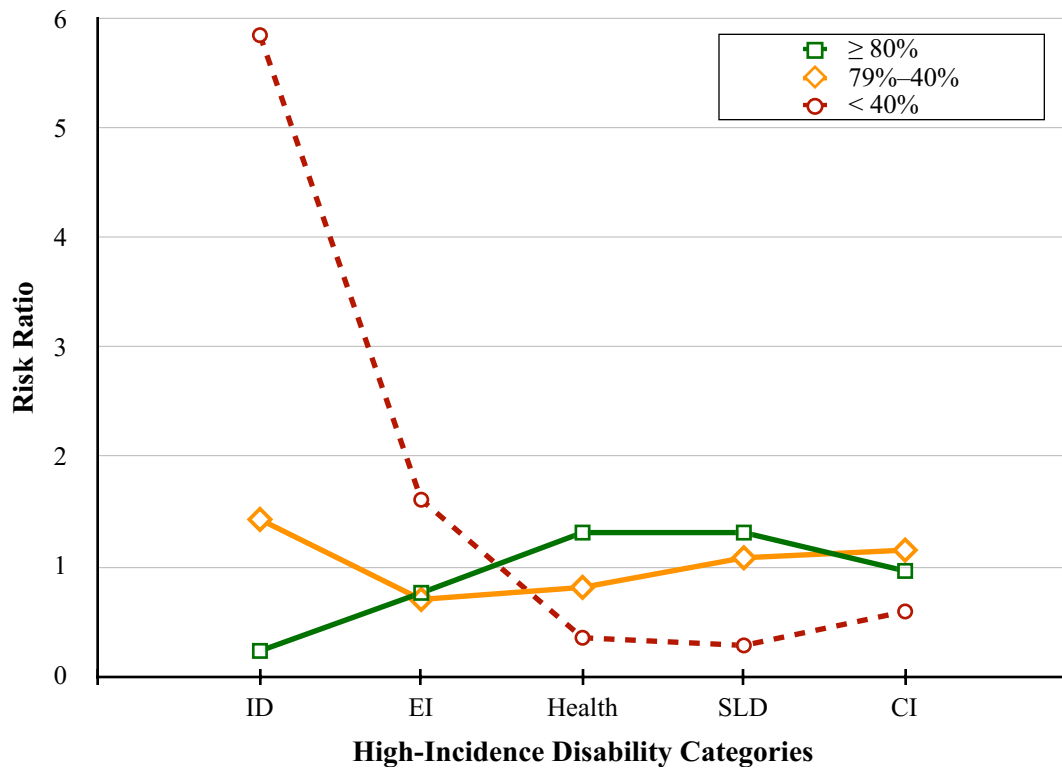
This risk of placement for students with ID in substantially separate environments was the highest risk of placement across all placement environments and disability categories.

Students with ID were also overrepresented in partially inclusive environments (RR = 1.43; $\chi^2 (1) = 336.92, p < .001$) and underrepresented in fully inclusive placements (RR = 0.23; $\chi^2 (1) = 735.13, p < .001$).

Students with EI were 1.61 times as likely to be placed in substantially separate environments ($\chi^2 (1) = 1.2 \times 10^3, p < .001$) as all other students.

Figure 3

Line Graph Showing Risk Ratios of High-Incidence Disability Categories by Educational Environment



Note: Percentages refer to time spent in the general classroom receiving special education services. As depicted, racial-ethnic minority children are overrepresented in disability categories that have high risks of placement within substantially separate educational environments ($\leq 40\%$ of time spent in the general classroom).

Additionally, these students were also underrepresented in placements spending the most time in the general classroom ($p < .001$). No concerning patterns of representation emerged for children with SLD, health, or communication impairment; these students were more likely to receive their services in fully inclusive environments and less likely to receive services in substantially separate environments ($p < .001$).

Table 7*Risk Indices and Ratios of Environment by Assigned Disability Category*

Disability Classification	Special Education Environment					
	Full-Inclusion		Partial Inclusion		Substantially Separate	
	Risk	RR	Risk	RR	Risk	RR
Intellectual	14.20	0.23	21.86	1.43	58.09	5.85
Hard of Hearing or Deaf	47.07	0.78	11.50	0.74	7.38	0.60
Communication	58.26	0.96	17.52	1.15	7.61	0.59
Vision Impairment or Blind	71.43	1.19	10.04	0.64	5.41	0.44
Emotional	46.96	0.76	11.18	0.70	18.48	1.61
Physical	62.23	1.03	3.86	0.25	6.01	0.49
Health	75.12	1.31	13.03	0.81	4.80	0.35
Specific Learning Disabilities	71.42	1.31	16.39	1.08	4.45	0.28
Deaf-blind	45.83	0.76	6.25	0.40	18.75	1.54
Multiple Disabilities	32.75	0.54	14.89	0.96	30.31	2.56
Autism	41.58	0.67	15.39	0.99	27.96	2.68
Neurological	61.34	1.02	18.74	1.22	12.03	0.99
Developmental Delay	16.14	0.27	2.89	0.18	5.78	0.47

Note: RR = Risk Ratio

Academic Growth

Research Question 3: What is the effect of students' racial-ethnic affiliation, assigned disability category, and educational environment on their academic growth?

To determine if students' academic growth was affected by their demographic characteristics (e.g., race/ethnicity or sex) or special education provisions (e.g., educational environment or assigned disability category), students' growth percentiles were included as the dependent variable in a four-way factorial ANOVA. Separate analyses were conducted for ELA and Math growth percentiles. *Post-hoc* analyses

included Gabriel and Hochberg's GT2, in order to account for the differences in group sizes for multiple comparisons.

English-Language Arts Growth

There was a significant main effect of race/ethnicity, $F(4, 46237) = 4.79, p < .001$ and educational environment, $F(2,46237) = 8.67, p < .001$, on the ELA growth of SWD in high-incidence categories (Table 8). However, both significant main effects were qualified by significant interactions with students' sex. Specifically, the effect of race/ethnicity and educational environment on students' ELA growth percentiles differed depending on a student's sex.

Main Effects. The effect for students' race/ethnicity, indicated that the average ELA growth percentile was higher for Asian ($M = 47.33, SD = 27.56$) and White ($M = 44.24, SD = 28.60$) students than for Black/African American ($M = 40.96, SD = 28.21$) and Hispanic/Latino students ($M = 41.66, SD = 28.89$).

Additionally, SWD who received special education services in the general classroom for more than 79% of their school-day ($M = 44.48, SD = 28.59$) and between 40% to 79% of their day ($M = 41.27, SD = 28.46$), obtained significantly higher ELA growth percentiles than students who spent less than 40% of their day in the general classroom ($M = 36.50, SD = 28.57$). Table 9 provides the means, standard deviations, and 95% confidence intervals for students' ELA growth percentiles.

Table 8*ELA Model Summary*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	595443.228 ^a	148	4023.265	4.962	0.000
Intercept	2523545.406	1	2523545.406	3112.09	0.000
Race (R)	15520.377	4	3880.094	4.785	0.001
Sex (S)	418.076	1	418.076	0.516	0.473
Environment (E)	14063.067	2	7031.533	8.671	0.000
Disability Category (D)	3852.629	4	963.157	1.188	0.314
R * S	7677.936	4	1919.484	2.367	0.050
R * E	8317.786	8	1039.723	1.282	0.247
R * D	6876.085	16	429.755	0.530	0.933
S * E	5179.116	2	2589.558	3.194	0.041
S * D	5197.676	4	1299.419	1.602	0.171
E * D	4144.702	8	518.088	0.639	0.746
R * S * E	7388.921	8	923.615	1.139	0.333
R * S * D	18944.500	16	1184.031	1.460	0.104
R * E * D	16947.168	32	529.599	0.653	0.934
S * E * D	4464.086	8	558.011	0.688	0.702
R * S * E * D	16595.194	31	535.329	0.660	0.925
Error	3.75E+07	462	810.883		
Total	1.25E+08	463			
Corrected Total	3.81E+07	463			

a. R Squared = .016 (Adjusted R Squared = .012)

Interaction effects. A simple effects analysis revealed that there was a significant two-way interaction between sex and race/ethnicity, such that the effect of race/ethnicity was greater for male students, $F(4, 28292) = 6.01, p < .001$, than for female students, $F(4, 17945) = 2.03, p = .086$. Gabriel post hoc analysis revealed that amongst male SWD, Black/African American ($M = 37.49$) and Hispanic/Latino ($M = 37.21$) students had

significantly lower ELA growth percentiles than White ($M = 40.02$) and Asian ($M = 45.08$) students ($p = .006$).

Table 9

Mean ELA Growth Percentiles for Students in High-Incidence Placements

Student Characteristics	ELA Growth Percentile			
	<i>M</i>	<i>SD</i>	95% <i>CI</i>	
			Lower	Upper
Sex				
Female	45.44	28.71	45.02	45.86
Male	42.01	28.54	41.67	42.34
Race/Ethnicity				
Asian	47.33	27.56	45.73	48.92
Black/Afr-American	40.96	28.21	40.17	41.75
Hispanic/ Latino	41.66	28.89	41.12	42.20
Multi-Race	43.80	29.04	42.40	45.19
White	44.24	28.60	43.91	44.58
Disability Classification				
ID	35.81	26.74	34.30	37.33
CI	43.26	28.16	42.65	43.86
ED	41.26	29.30	40.43	42.08
Health	42.71	28.59	42.16	43.26
SLD	44.55	28.74	44.17	44.93
Placement Environment				
Full	44.48	28.59	44.18	44.78
Partial	41.27	28.46	40.65	41.89
Substantially Separate	36.50	28.57	35.54	37.46
Total	43.34	0.13	43.08	43.60

Note: n = 46,386

Comparatively, among female students there were significant differences between (a) Black/African American ($M = 39.62$) and White ($M = 42.20$) students ($p < .001$); (b) Hispanic/Latina ($M = 40.51$) and Multiracial ($M = 42.69$) students ($p = .027$); and (c)

Hispanic/Latina and White students ($p < .001$; Figure 4). The mean ELA growth percentiles of female Asian students ($M = 33.30$) did not significantly differ from the mean ELA growth percentiles of female students from other racial-ethnic groups.

In addition to the two-way interaction between race/ethnicity and sex, an additional significant two-way interaction effect involving sex and educational environment, $F(2, 46237) = 3.19, p = .041$, indicating that the effect of educational environment was greater for female students, $F(2, 17945) = 9.54, p < .001$, compared to male students, $F(2, 28292) = 1.43, p = .239$.

Mathematics' Growth

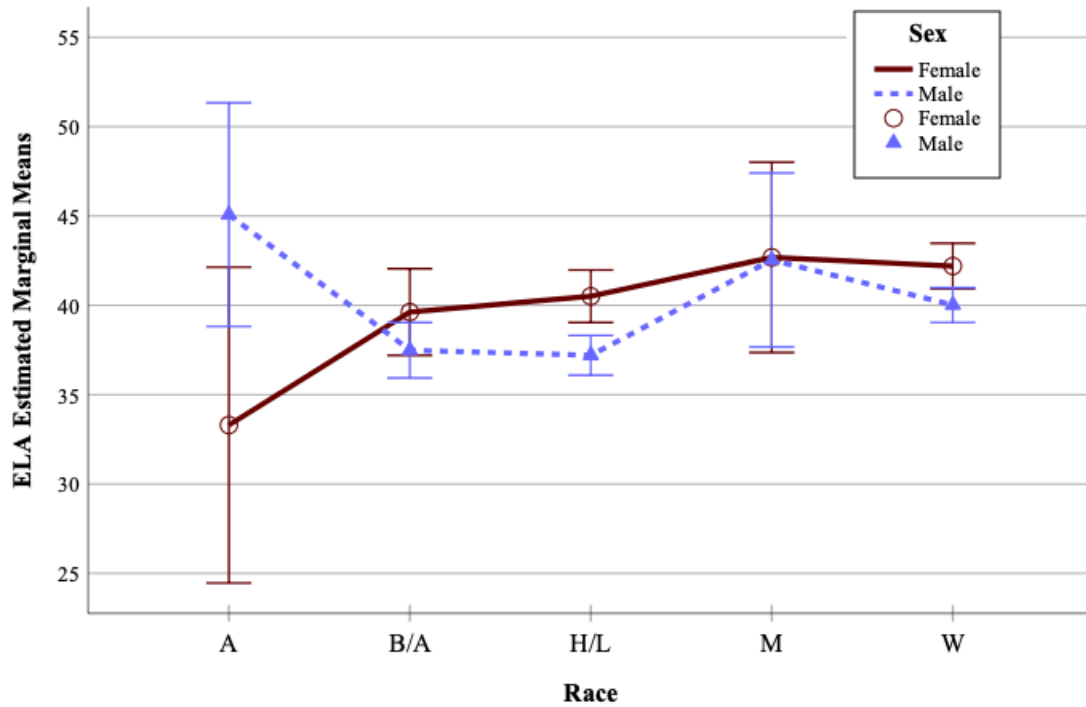
As shown in Table 10, there was a significant main effect of race/ethnicity, $F(4, 45830) = 16.40, p < .001$, and educational environment, $F(2, 45830) = 9.48, p < .001$, on the mathematics growth percentiles of SWD.

Main Effects

Gabriel and Hochberg's GT2 *post hoc* test indicated that student growth was significantly higher in Asian students ($M = 50.42, SD = 29.98$) compared to all other ethnicities ($p = .035$; Table 11). Black/African American ($M = 40.09, SD = 28.50$) students and Hispanic/Latino ($M = 41.15, SD = 29.32$) students experienced significantly less growth than all other ethnicities, except for each other ($p < .05$). Students who spent less than 21% of the day outside of the general classroom ($M = 45.47, SD = 29.10$) experienced significantly more growth than those who did not ($p = .035$).

Figure 4

Profile Plot Depicting Race/Ethnicity x Sex Interaction



Note: Error bars represent 95% CI. A = Asian, B/A = Black/African American, H/L = Hispanic/Latino, M = Multi-race, W = White

Conversely, students within substantially separate environments ($M = 38.48$, $SD = 30.08$) experienced the least amount of growth, compared to all other educational environments ($p = .035$).

Table 10*Math Model Summary*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	645681.821 ^a	148	4362.715	5.159	0.000
Intercept	2617175.75	1	2617175.750	3094.59	0.000
Race (R)	55481.471	4	13870.368	16.401	0.000
Sex (S)	578.812	1	578.812	0.684	0.408
Environment (E)	16033.677	2	8016.839	9.479	0.000
Disability Category (D)	5769.187	4	1442.297	1.705	0.146
R * S	274.695	4	68.674	0.081	0.988
R * E	5255.656	8	656.957	0.777	0.623
R * D	11957.751	16	747.359	0.884	0.588
S * E	3603.156	2	1801.578	2.130	0.119
S * D	2073.152	4	518.288	0.613	0.653
E * D	3363.024	8	420.378	0.497	0.859
R * S * E	7364.443	8	920.555	1.088	0.368
R * S * D	12770.345	16	798.147	0.944	0.517
R * E * D	28929.483	32	904.046	1.069	0.362
S * E * D	7403.223	8	925.403	1.094	0.364
R * S * E * D	19494.747	31	628.863	0.744	0.847
Error	3.88E+07	45830	845.724		
Total	1.30E+08	45979			
Corrected Total	3.94E+07	45978			

a. R Squared = .016 (Adjusted R Squared = .013)

Table 11*Mean Math Growth Percentiles of Students in High-Incidence Placements*

Student Characteristics	Math Growth Percentile			
	<i>M</i>	<i>SD</i>	95% <i>CI</i>	
			Lower	Upper
Sex				
Female	43.91	28.80	43.49	44.34
Male	44.57	29.57	44.22	44.92
Race/Ethnicity				
Asian	50.42	29.98	48.67	52.16
Black/Afr-American	40.09	28.50	39.29	40.89
Hispanic/ Latino	41.15	29.32	40.60	41.70
Multi-Race	43.73	29.56	42.30	45.16
White	46.12	29.14	45.77	46.46
Disability Classification				
ID	36.93	27.72	35.33	38.52
CI	44.54	29.22	43.92	45.17
ED	42.86	30.31	42.00	43.72
Health	44.49	29.38	43.92	45.07
SLD	44.86	29.03	44.47	45.25
Placement Environment				
Full	45.47	29.10	45.16	45.77
Partial	41.73	29.16	41.09	42.38
Substantially Separate	38.48	30.08	37.46	39.51
Total	44.32	29.28	44.05	44.58

Note: n = 45,979

Summary

This chapter addressed each of the three research questions posed in chapter II of whether racial-ethnic minorities are overrepresented in special education, encounter higher risks of assignment to high-incident disability categories and less-inclusive educational settings, or experience diminished academic growth despite receiving special education services. The analyses indicated that Black/African American and Hispanic/

Latino students were twice as likely as all others to receive special education services for ID and approximately 1.5 times more likely than all others to receive services for EI. Students with ID were 5.85 times more likely than all others to be separated from the general classroom for more than 60% of the day.

As the analysis show, the lowest rates of academic growth were seen consistently in students who were isolated from the general classroom. In addition, students' race/ethnicity had a significant effect on students' ELA and Math growth percentiles; however for ELA growth percentiles, this effect presented differently in male, compared to female students.

In sum, racial-ethnic minorities were, (a) overrepresented in special education, (b) had higher risks of identification for highly subjective categories and placement in isolated academic settings, and (c) experienced significantly less academic growth than their peers with disabilities.

Chapter IV

Discussion

Results from the present study confirm nationwide trends and reveal a dismaying pattern of over- and underrepresentation of racial-ethnic minority students in special education. The present findings indicate that Black/African American and Hispanic/Latino students are overrepresented as recipients of special education services and receive those services at significantly higher rates than all other ethnicities, affirming the initial hypothesis. Furthermore, the prevalence of racial-ethnic minority students, specifically Black/African American and Hispanic/Latino students, in substantially separate environments corresponds to their overrepresentation in disability categories that have higher rates of placement in restrictive environments.

Within special education programs in Massachusetts, there was a consistent pattern of diminished academic growth within the population of SWD. Consistent with the longitudinal findings of Siperstein, Wiley, and Forness (2011), the results of the present analysis suggest that despite receiving special education services, the academic growth of SWD remains incommensurate to the growth of students without disabilities, $t(99493.7) = -61.395, p < 0.001$.

The subdued growth of SWD highlights two issues affecting racial-ethnic minority children, with respect to their disproportionate placement in special education. First, Black/African American and Hispanic/Latino children, who receive services at substantially higher rates than all others, do not demonstrate sufficient benefit from these

placements. Recall that student growth percentiles only compare students to their *academic equivalents*. Therefore, at a minimum, it should be evidenced that students receiving special education services are performing as well as their similarly achieving peers, given the objective of special education as defined by ESSA.

Second, in reality, Black/African American and Hispanic/Latino students in Massachusetts are removed from the general classroom at higher rates than their peers to their continued detriment. The findings of the present study mirrors the current literature in underscoring the injurious nature of removing children from the general classroom for a substantial portion of the day. The persistent overrepresentation of Black/African American and Hispanic/Latino students within isolated educational environments not only stagnates the social-emotional development of these children, but also seals their academic fate by failing to address their academic deficits.

Study Limitations and Implications for Research

The present study takes place in Massachusetts' and therefore cannot be generalized to the performance of students in other states. Furthermore, the sample of students investigated within the ANOVA was significantly reduced by exclusion criteria, and therefore may not be representative of all students within the state. Additionally, the exclusion of students from Native American and Native Hawaiian/Pacific Islander backgrounds continues a trend of neglect towards these groups during discussions concerning the disproportionality and outcomes of racial-ethnic minority students in special education. Given the scant, yet significant findings in the literature concerning the

achievement gaps and disproportionate identification of Native American and Native Hawaiian/Pacific Islander children for special education services, it is imperative that future studies use the appropriate statistical methods to offset the sample size limitations that currently deter investigations with this population. Additionally, it is increasingly important that policymakers hold the BIE and U.S. Department of the Interior accountable to the same standards as all other public schools in the United States, and provide researchers with publicly available datasets to investigate the educational outcomes of Native American children with disabilities.

In the future, it will be more beneficial to use growth models when discussing the outcomes and efficacy of special education, particularly concerning the year-to-year performance of students. Although raw achievement and growth are interconnected, the growth model proposed by Betebenner (2009) provides a more accurate description of children's educational progress because it allows schools to make comparisons across all children while setting reasonable expectations for their academic growth. By norming growth expectations on the year-to-year performance of similarly achieving students, schools can determine whether academic or behavioral interventions are successful at producing the desired benefit to the child's educational performance. Consequently, if students' academic growth percentiles are persistently below the mean, then the child's individualized education program is not sufficient at helping them to catch-up to their peers. Additionally, if there are a disproportionate number of students from academically stigmatized groups who fail to meet growth standards, then the issue is not the students'

achievement, but that they are not receiving the appropriate interventions to resolve their hampered growth.

Conclusions

The present study emphasizes the need to address the historical inequities that have plagued the U.S. education system. With the passage of ESSA, schools have received renewed instructions to rigorously pursue the closure of achievement gaps amongst academically stigmatized groups. However, this task can only be completed if the uncomfortable sources of these inequities are addressed, such as the lingering prejudice, negative attitudes, and low expectations of racial-ethnic minority students. Noticeably, efforts to address the achievement gaps of these groups do not sufficiently acknowledge the active participation of certain elements within the U.S. education system at producing these outcomes (Artiles et al., 2010; Ferri & Connor, 2005; Harry & Klinger, 2014; Ysseldyke & Algozzine, 1983).

However, there is sufficient evidence that these active processes can be counteracted with the appropriate methods, such as relying on rigorous empiricism and clinical measures to establish the extent of a child's impairment and need for intervention (Dever et al., 2016; Skiba et al., 2006). Schools can begin to combat the achievement gaps of these groups by employing evidence-based special education services that have demonstrated their efficacy on a diverse sample of students, while monitoring students' growth (Betebenner, 2009) and making the appropriate changes.

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Appendix A

Definitions of Disabilities

- (1) **Intellectual Disability:** Significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance. The term "intellectual disability" was formerly "mental retardation."
- (2) **Hard of Hearing/ Deaf:** The capacity to hear, with assistance, is limited, impaired, or absent and results in one or more of the following: reduced performance in hearing acuity tasks; difficulty with oral communication; and/or difficulty in comprehending auditory information in the education environment. The term includes students who are deaf and students who are hard-of -hearing.
- (3) **Communication Impairment (Speech or Language Impairment):** The capacity to use expressive and/or receptive language is significantly limited, impaired, or delayed and is exhibited by difficulties in one or more of the following areas: speech, such as articulation and/or voice; conveying, understanding, or using spoken, written, or symbolic language. The term may include a student with impaired articulation, stuttering, language impairment, or voice impairment if such impairment adversely affects the student's educational performance.
- (4) **Vision Impairment/ Blind:** The capacity to see, after correction, is limited, impaired, or absent and results in one or more of the following: reduced performance in visual acuity tasks; difficulty with written communication; and/or difficulty with understanding information presented visually in the education environment. The term includes students who are blind and students with limited vision.
- (5) **Emotional Impairment:** The student exhibits one or more of the following characteristics over a long period of time and to a degree that adversely affects their educational performance: an inability to learn that cannot be explained by intellectual, sensory, or health factors; an inability to build or maintain positive interpersonal relationships with peers and teachers; inappropriate types of behavior or feelings under normal circumstances; a general pervasive mood of unhappiness or depression; or a tendency to develop physical symptoms or fears associated with personal or school problems.
- (6) **Physical Impairment (Orthopedic):** The physical capacity to move, coordinate actions, or perform physical activities is significantly limited, impaired, or delayed and is exhibited by difficulties in one or more of the following areas: physical and motor tasks; independent movement; performing basic life functions. The term

includes severe orthopedic impairments or impairments caused by congenital anomaly, cerebral palsy, amputations, and fractures if such impairment adversely affects a student's educational performance.

- (7) **Health:** A chronic or acute health problem such that the physiological capacity to function is significantly limited or impaired and results in one or more of the following: limited strength, vitality or alertness including a heightened alertness to environmental stimuli resulting in limited alertness with respect to the educational environment. The term includes health impairments due to asthma, attention deficit disorder or attention deficit with hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, and sickle anemia.
- (8) **Specific Learning Disabilities:** a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest as the imperfect ability to listen, think speak, read, write, spell, or to do mathematical calculations. The term does not include learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage.
- (9) **Deaf-blindness:** Concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational needs that they cannot be accommodated in special education programs solely for children with deafness or children with blindness.
- (10) **Multiple Disabilities:** Comorbid impairments (such as intellectual disability-blindness or intellectual disability-orthopedic impairment), the combination of which causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments.
- (11) **Autism:** A developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.
- (12) **Neurological:** The capacity of the nervous system is limited or impaired with difficulties in one or more of the following areas: the use of memory, the control and use of cognitive functioning, sensory and motor skills, speech, language, organizational skills, information processing, affect, social skills, or basic life functions, including children who have received a traumatic brain injury.

(13) **Developmental Delay (ages 3-9):** The learning capacity of a young child (3-9 years old) is significantly limited, impaired, or delayed and is exhibited by difficulties in one or more of the following areas: receptive and/or expressive language; cognitive abilities; physical functioning; social, emotional, or adaptive functioning; and/or self-help skills.

Adapted from the Massachusetts Department of Education Website: <http://www.doe.mass.edu/sped/links/defintions28.02.html>