2008

A Multivariate Study of Disproportionality in Special Education

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A MULTIVARIATE STUDY OF DISPROPORTIONALITY IN SPECIAL
EDUCATION

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April, 2001

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August, 2003

submitted in partial fulfillment of the requirements for the degree
MASTER OF EDUCATION
at the
CLEVELAND STATE UNIVERSITY
December, 2008

This thesis has been approved for

the Department of TEACHER EDUCATION

and the College of Graduate Studies by

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ACKNOWLEDGEMENTS

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ABSTRACT

The disproportionate representation of ethnically and culturally diverse students in special education has been the topic of significant research and policy debate for the last forty years. Disproportionality occurs when the proportion of students of a specific ethnic group in a disability category is greater or less than the proportion of Caucasian students in the same disability category. The prevailing logic asserts that disproportionality is the result of ethnically and culturally diverse students being differentially affected by the deleterious effects of poverty. Despite considerable research regarding the prevalence of overrepresentation, few studies have been undertaken to examine the relationship between multiple variables and district rates of disproportionality.

The purpose of this study is to determine the impact of multiple district-level variables on ethnic disproportionality in special education and to address one limitation in the work of Skiba et al. (2005), which examined the relative impact of multiple variables on overrepresentation in special education in the State of Indiana. Additionally, this study will examine the role of multiple variables for ethnic groups that were previously excluded from analysis. District-level data from across Ohio will be examined for four disability categories. Disproportionality will be measured using the rate ratio method. A hierarchical multiple linear regression analysis will be conducted to determine the relationship between disproportionality and district-level variables using the SPSS

program. The significance of this study is to further illuminate the extent to which economic and other variables may account for the disproportionate representation of ethnically and culturally diverse students in special education, and to guide future discussions of educational policy reform.

The results support the hypotheses that diverse students are disproportionately represented in Ohio and that variables do not operate in the same way with respect to disproportionality across subgroups, or within subgroups across disability categories. Some of the relationships are counterintuitive and all are exceedingly complex. Poverty alone cannot account for ethnic disproportionality in special education.

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CHAPTER I
INTRODUCTION

The disproportionate representation of ethnically and socio-culturally diverse children in special education classes is an issue that has plagued special education for at least four decades. In Dunn (1968), US Office of Education statistics described the growing number of teachers serving students with Mild Mental Retardation (MMR) and articulated the belief that, of students served in these separate classes,

> "about 60 to 80 percent of the pupils…are from low status backgrounds - including Afro-Americans, American Indians, Mexicans, and Puerto Rican Americans; those from nonstandard English speaking, broken, disorganized, and inadequate homes; and children from other nonmiddle class environments" (p. 6).

Since Dunn (1968), the persistence of overrepresentation has been extensively documented (Harry & Anderson, 1994; O'Connor & Fernandez, 2006; Oswald, Coutinho, Best, & Singh, 1999; Patton, 1998; Skiba et al., 2006). Such disproportionate representation is problematic if it is a symptom of institutional racism or a failure of public education to adequately address the needs of students within a certain demographic.

Though significant research has focused on the existence of the issue of disproportionate representation, it is only recently that research has turned to examining the underlying variables that may contribute to the problem (Coutinho & Oswald, 2000; Coutinho, Oswald, & Best, 2002; Skiba et al., 2005). In discussing the issue of disproportionate representation of ethnically and socio-culturally diverse students, a correlation between ethnicity and poverty is assumed to be an explanatory factor (Skiba et al., 2005). However, recent research has demonstrated that the correlation between poverty and disproportionate representation of ethnically and socio-culturally diverse students in special education is not an obvious one (Skiba et al., 2005; Coutinho et al., 2002). In determining how to respond to the disproportionate representation of ethnically and socio-culturally diverse students in special education, educators and policy-makers must have a reasonable understanding of the underlying factors that may contribute to the phenomenon.

Purpose

The purpose of this study is to determine whether the outcomes in Skiba et al. (2005) for Indiana also describe the relative impact of poverty on placement in special education with respect to race in Ohio. In Skiba et al. (2005), results demonstrated that poverty is a "weak and inconsistent predictor of disproportionality" in special education when poverty and race are considered in a multivariate analysis (p. 141). This study is completed in an attempt to further clarify whether underlying variables, such as extent of poverty in a district, percentage of student population in different racial groups, district resources, and academic-behavioral measures may have a relationship with the disproportionate referral to special education of students from ethnically and socio-

culturally diverse backgrounds. Such understanding is crucial to any decision of whether to enact or attempt to develop a coherent educational policy reform aimed at addressing ethnic disproportionality in special education. Additionally, this study will examine outcomes for racial and ethnic groups over and above those considered in Skiba et al. (2005), which focused on African American students. By examining outcomes for African American and Hispanic students, this study will contribute new information to the discipline.

Data specific to Indiana was utilized in Skiba et al. (2005). In discussing the limitations of the study, the authors noted that "further demonstrations from other states would be valuable to ensure that the data used in this study are not somehow idiosyncratic with respect to these variables" (Skiba et al., 2005, p. 141). This study will replicate the work of Skiba et al. (2005) in an effort to address this limitation and to add to the growing body of research concerning the factors that may contribute to continued ethnic disproportionality in special education. Though this study examines the relative impact of variables on ethnic disproportionality in special education, the purpose is not to draw causal inferences based on the data.

Research Questions

Two research questions, based on Skiba et al. (2005), guided this study:

1. What is the nature of representation in special education in Ohio?

2. How do race, poverty, district resources, and academic-behavioral measures predict the degree of disproportionality in a district?

With respect to the first research questions, it is hypothesized that ethnically and socio-culturally diverse groups are not proportionately represented in special education.

With respect to the second research question, it is hypothesized that race, poverty, district resources, and academic-behavioral measures do not predict the degree of disproportionality equally well.

<div align="center">Significance</div>

The importance of this study is to further illuminate the extent to which economic and other educational variables may account for disproportionate representation of ethnically diverse students in special education. A thorough understanding of how variables operate with respect to disproportionate representation of ethnically diverse students in special education is vital to directing the development of coherent discussions and educational policy initiatives regarding this issue. This study will contribute to such an understanding.

If poverty and other predictor variables can be found to equally impact the probability that a student will be found eligible for special education services, then policy reforms designed to alleviate the negative educational effects of poverty may decrease the extent of disproportionate ethnic representation in special education. If, however, poverty and other predictor variables do not predict ethnic disproportionality equally well, then some other underlying variable or variables may exist that would be better addressed through different reforms or policy initiatives. For example, in Dunn (1968), the discussion of disproportionate representation of ethnically and socio-culturally diverse students indicated a belief that this phenomenon is the result of a failure by public education to adequately serve these students due to cultural bias. While Coutinho et al. (2002) echoed the concerns in Dunn (1968), it was also hypothesized in Coutinho et al. (2002) "that minority groups may be differentially susceptible to educational disability"

(p. 50). Disproportionate representation that is influenced by cultural bias would indicate a need to continue to reform identification and evaluation procedures, while differential susceptibility to disability may signify a need to reform early intervention and service delivery models. In any case, further cultivating an understanding of the factors which may influence ethnic disproportionality in special education can serve to direct the development of an educational system that is more equitable and just for all students.

Definition of Terms

For the purposes of this study, the following definitions will be used.

Disproportionate ethnic representation will be defined as an unequal proportion of students from a specific ethnic group in a disability category, when the proportion of students in that ethnic group is taken in comparison with the proportion of Caucasian students in the same disability category.

Ethnic disproportionality and *disproportionate representation* will be used interchangeably with disproportionate ethnic representation.

Rate Ratio will be defined as described in Hosp and Reschly (2003):

$$\text{``}ES = \text{Rate Ratio} = \frac{\dfrac{\text{Frequency of Group A in referred sample}}{\text{Frequency of Group A in population}}}{\dfrac{\text{Frequency of Group B in control sample}}{\text{Frequency of Group B in population}}\text{''}} \quad \text{(p. 7),}$$

where *ES* is the effect size.

Group A will consist of students belonging to a specific non-Caucasian ethnic group in a disability category, while Group B will consist only of Caucasian students in a disability category. Disproportionate representation of an ethnic group occurs when the equation above yields an effect size (ES) $\neq 1.00$. This criterion allows for underrepresentation as

well as overrepresentation. The rationale for using this particular calculation, rather than other methods for calculating disproportionality, will be further discussed in the "Methodology" section.

Underrepresentation will be defined as a rate ratio for an ethnic group as calculated by the above equation in which (ES)<1.

Overrepresentation will be defined as a rate ratio for an ethnic group as calculated by the above equation in which (ES)>1.

Cognitively Disabled (CD) will be defined as "(mental retardation)…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," as described in the Operating Standards for Ohio's Schools Serving Children with Disabilities (p.3) and reported by individual school districts in the Interactive Local Report Card (iLRC).

Emotional Disturbance (ED) will be defined as

> "a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance: (i) An inability to learn that cannot be explained by intellectual, sensory, or health factors; (ii) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers; (iii) Inappropriate types of behavior or feelings under normal circumstances; (iv) A general pervasive mood of unhappiness or depression; (v) A tendency to develop physical symptoms or fears associated with personal or school problems. The term includes

schizophrenia. The term does not apply to children who are socially

maladjusted, unless it is determined that they have an emotional

disturbance,"

as described in the Operating Standards for Ohio's Schools Serving Children with

Disabilities and reported by individual school districts in the iLRC (pp. 3-4).

Speech and Language Impairments (SLI) will be defined as "a communication disorder,

such as stuttering, impaired articulation, a language impairment, or a voice impairment,

that adversely affects a child's educational performance," as described in the Operating

Standards for Ohio's Schools Serving Children with Disabilities (p. 5) and reported by

individual school districts in the iLRC.

Specific Learning Disabilities (SLD) will be defined as

"a disorder in one or more of the basic psychological processes involved

in understanding or in using language, spoken or written, that may

manifest itself in an imperfect ability to listen, think, speak, read, write,

spell, or to do mathematical calculations, including conditions such as

perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia,

and developmental aphasia,"

as described in the Operating Standards for Ohio's Schools Serving Children with

Disabilities and reported by individual school districts in the iLRC (p. 5).

Achievement Gap will be defined as any disparity in the academic achievement between

students of different racial or ethnic groups, male and female students, or students of

different socioeconomic backgrounds.

CHAPTER II
REVIEW OF THE LITERATURE

Confirming the Issue

In his 1968 article, Dunn was among the first to call attention to the disproportionate representation of ethnically and socio-culturally diverse students in special education. Dunn (1968) argued that the "proliferation of self contained special schools and classes raises serious educational and civil rights issues" (p. 6). Though he stopped short of leveling a charge of institutional racism, Dunn clearly implied that the mass placement of ethnically diverse students in separate special education classes was tantamount to maintaining educational segregation. As the problem of ethnic disproportionality in special education has persisted over four decades, it seems that Dunn's concerns were not unfounded.

At the forefront of educational policy reform, Dunn advocated system-wide changes to address the issue of ethnic disproportionality in special education. Dunn supported a revision of the evaluation process, as well as pedagogical and curricular changes. Numerous changes have occurred in special education since Dunn's seminal article. Schools continue to revise the pre-referral process, evaluations take more than intelligence quotients into account, and many districts are shifting toward a more inclusive educational model. The 1997 reauthorization of the Individuals with

Disabilities Education Act (IDEA) provides for the construction of databases at the state level to determine if disproportionality is an issue. Still, nearly 40 years after the publication of his article Dunn's concern about disproportionate representation of ethnically and socio-culturally diverse students in special education remains at the center of debates regarding equitable education for all students.

Given the benefits of special education, one might question whether overrepresentation is actually problematic. It is true that special education offers advantages including individualized instruction, smaller class size, and higher per pupil expenditure. Despite the apparently positive nature of these supports, a number of studies have linked unnecessary placement in special education with negative outcomes. Artiles articulated concerns about inappropriate special education placement, including "a number of negative issues, such as the kinds of outcomes typically associated with disability labels, namely, low achievement level, low completion rate, high dropout rate, limited access to the general education curriculum" (as cited in Chamberlain, 2005, p. 110). MacMillan and Reschly (1998) posited that overrepresentation is a problem because special education is often perceived as ineffectual, students are excluded from the regular education setting, and a special education label carries negative connotations. These factors may outweigh the benefits derived from receiving special education services. Additionally, MacMillan and Reschly (1998) explained that overrepresentation fosters increasingly negative attitudes toward certain disability categories, such as Cognitively Disabled (CD) and Emotionally Disturbed (ED). Overrepresentation, especially in these two categories, may also serve to reinforce negative attitudes and stereotypic thinking about the ethnic and racial groups that are disproportionately

represented. Finally, overrepresentation is an issue if it results in the unnecessary exclusion of students from a particular ethnic or socio-cultural background from the general education setting, or is indicative of institutional structures and pedagogy that are insufficient to meet the needs of diverse students.

Issues surrounding overrepresentation should not detract from the critical need to provide students with disabilities access to vital educational services. However, in elucidating Dunn's (1968) argument for a more inclusive educational model, Reschly (2002) asserted that the mere fact of overrepresentation is not a problem by itself. Overrepresentation is an issue because the labels assigned to children in order to provide services result in stigmatization and because special education may not reliably benefit all of the children receiving services. Dunn and Reschly both called for opportunities for students to receive needed services without the negative effects of also receiving a pejorative label, as well as the development of alternative, more effective services. Overly restrictive educational placement is indeed an issue; however Dunn was clearly concerned with what he perceived as overwhelmingly large proportions of ethnically and culturally diverse students in segregated settings.

Gaviria-Soto and Castro-Morera (2005) argued that there is an important difference between mere overrepresentation and overrepresentation that is the result of bias. First, the simple fact of overrepresentation of one or another ethnic group in special education is not necessarily a problem in itself; students from a particular ethnic group in a given district may have been differentially affected by factors that lead to a real need for special education services. A situation of bias is present "when the probability of being in a [Special Education Program] because of the personal characteristics of the subject is

greater simply by reason of belonging to a certain ethnic minority" (Gaviria-Soto & Castro-Morera, 2005, p. 542). Studies that seek to explain the relative impact of race compared to other factors with respect to a student's probability of being referred to special education should reveal situations in which disproportionate minority representation in special education is the result of bias.

Following Dunn's (1968) article, further research has explored the problem of ethnic disproportionality in special education. Zhang and Katsiyannis (2002) included data for the entire United States for the 1998-1999 school year. The data confirmed that ethnic disproportionality continues to be a problem in special education, particularly for African American students, across all disability categories. Zhang and Katsiyannis noted the "need for further analysis of district-level data" (p. 185) in order "to understand the complex issue of overrepresentation" (p. 185). District-level data, such as that included in this study and in Skiba et al. (2005), should uncover any underlying factors that might contribute to ethnic disproportionality in special education.

Hypothesizing the Role of Cultural Conflict

Many have postulated about the variables that contribute to the issue of disproportionate representation of ethnically diverse students in special education. Blanchett, Mumford, and Beachum (2005) asserted that the problem of overrepresentation in special education is the result of a general education environment that is either unable or unwilling to adequately serve all students. The study utilized a focus group to uncover community members' concerns and perspectives about urban school failure. The study found that focus group members cited "lack of appropriate prereferral interventions and supports in the general education setting" as one

contributing factor to ethnic disproportionality in special education (Blanchett et al., 2005, p. 76). Other factors identified by the focus group included the tendency of general educators to immediately refer students to special education when they demonstrate learning difficulties, teachers' lack of cultural awareness, and the overall structure of public education. Though the perspectives provided by the focus group are of great importance, the study did not yield quantitative data that could indicate the extent to which these factors contribute to the problem of ethnic disproportionality in special education.

Cultural incongruence may also be a factor in the overrepresentation of culturally diverse students in special education. Shealey and Lue (2006) argued that teacher education programs and district professional development initiatives have failed to adequately provide pre-service and practicing teachers with sufficient resources and strategies required to meet the needs of diverse learners, particularly in urban settings. According to the authors, the ways in which race, culture and disability coalesce to impact teachers' perceptions of ethnically and culturally diverse students play a large role in the prevalence of overrepresentation of ethnically diverse students in special education. As an antidote, Shealey and Lue (2006) advocated for teacher education programs to improve instruction aimed at developing the cultural competency of pre-service teachers and that districts engage in culturally responsive reform of both pedagogy and professional development.

Linguistic Bias

In addition to cultural differences, language differences may also increase the likelihood that a student will be found eligible for special education services. Research

has acknowledged the persistent need for accurately identifying students with special education needs, calling for improved assessment procedures and a greater continuum of services than to the overall effectiveness of special education programs (Reschly, 2002). Fletcher and Navarrete (2003) reported that Latino students are more likely to be inappropriately placed in special education classes than non-Hispanic students. The Education for All Handicapped Children Act (P.L. 94-142, 1975) and its subsequent reauthorizations [renamed the Individuals with Disabilities Education Act (IDEA) in 1990] provide for assessments to determine a child's eligibility for special education and related services. The study stressed that many of the assessments and procedures used to identify children in need of special education services "have not been found to be reliable and valid for that purpose, particularly with students from culturally and linguistically diverse backgrounds" (Fletcher & Navarrete, 2003, p. 44). Despite the fact that previous legislation as well as the most recent reauthorization of IDEA (P.L. 108-446, 2004) explicitly provide for evaluation in a "language and form most likely to yield accurate information on what the child knows and can do, academically, developmentally, and functionally, unless it is not feasible to provide or administer" (Sec. 614.3.v), linguistically diverse students continue to be inappropriately found eligible for special education services.

Academic and ability assessments that are culturally or linguistically biased may be neither valid nor reliable for culturally diverse students, yet such assessments influence a student's placement in special education. Harris et al. (2004) argued that an assessment is sufficiently reliable only for the group on which the test was normed. Unless the reference group for a given assessment is composed of proportionately

ethnically diverse individuals, the reliability of the assessment remains questionable for

ethnically or culturally diverse students. The content and format of a test may influence

the validity of the instrument for assessing ethnically and culturally diverse students as

well. The study pointed out that a number of background assumptions about students'

knowledge base and experiences are built into assessments. If a test fails to account for a

variety of background experiences, or fails to include representations of ethnically and

culturally diverse students, the instrument may not yield a valid assessment of diverse

students' abilities. As long as assessment instruments are not sufficiently valid or reliable

for ethnically and culturally diverse students, ethnically and culturally diverse students

will continue to test lower than their Caucasian peers and remain at risk for inappropriate

placement in special education.

<div align="center">Improving Assessment Practices</div>

Skiba, Knesting, and Bush (2002) called for the development of culturally

competent assessment, but took a different perspective on the inherent inadequacies of

standardized assessments than the stance assumed in Harris et al. (2004). Citing a variety

of previous studies, the analysis in Skiba et al. (2002) explained that standardized

measures of intelligence and aptitude have not demonstrated inadequacies in construct

validity, in that they are generally constructed adequately to assess aptitude across

populations. Further, the authors stated that standardized Intelligence Quotient (IQ) and

achievement tests have not demonstrated flaws in predictive validity or item bias at the

individual item level, though they qualify this by explaining that some studies suggest

that an item-level analysis may be an insufficient determinant because the use of other

statistical methods have demonstrated item bias.

However, factors unrelated to test construction may contribute to bias in standardized assessments. The authors cited factors such as language differences and socioeconomic differences between examiner and examinee, degree of examiner-examinee familiarity, and other forms of examiner bias that may impact the validity of standardized tests for non-white and non-middle class populations. In developing a model of culturally competent assessment that would address these and other aspects of examiner bias, the article advocated training initiatives that would further develop the cultural competence of examiners, particularly in the use of teacher-rating scales and aspects of assessment that require interpretation.

Even if all possible forms of testing bias are eliminated, standardized measures of ability and achievement may not result in equitable assessment for ethnically and socio-culturally diverse students. Skiba et al. (2002), argued that even if standardized aptitude and achievement tests are non-biased, that different populations may continue to demonstrate different mean scores does not necessarily lead to the conclusion that these results are somehow reflective of a difference in inherent ability. Such a result may be indicative of the possibility that schooling, as well as other formal and informal social structures, contribute to unequal educational, social, economic opportunities. The structures of schooling that the authors cite as contributing to inequality of opportunity include inequalities in facilities and other school resources, pedagogical constructs and curricular content (rote learning versus critical thinking; dominance of white, middle class characters in literary selections), teacher expectations, disproportional disciplinary consequences, tracking, and teacher retention rates and levels of experience. In this light, Skiba et al. emphasized that it should not be considered surprising that standardized

measures of achievement and ability do not reflect situations of bias because "as long as cultural and educational inequities systematically disadvantage entire classes of individuals, valid tests will accurately reflect the outcomes of those biases" (Skiba et al., 2002, p. 72). Therefore, it is to this inequality of opportunity that educators and policy makers should direct reform efforts to address overrepresentation in special education, underrepresentation in gifted education, and the black-white achievement gap.

In order to develop assessment strategies that are equitable for all students, a number of factors must be considered. As defined in Skiba et al. (2002), culturally competent assessment goes beyond constructing unbiased assessments. Culturally competent assessment also includes data collection that is equitable and capable of aiding educators in recognizing biases inherent in the overall structure of education.

In addition to eliminating subtle forms of bias such as examiner predisposition, Skiba et al. (2002) explained that in order for assessment to be culturally competent, assessment must take into account the influence that cultural factors and the structure of schooling may have on ethnically diverse students. Finally, the authors recommended using the results of assessments to discern where educational disadvantage exists; responding appropriately to educational disadvantage; examining local data on disproportionality in special education and discipline; continually evaluating educational structures including curriculum, pedagogy, and teacher quality; and using forms of direct assessment.

However, some scholars argue that standardized assessments are not necessarily biased, even if certain groups of students consistently score lower than others. Thernstrom and Thernstrom (2003) explored two common criticisms of standardized

assessments. First, Steele's argument (as cited in Thernstrom and Thernstrom, 2003) that African American students underperform on standardized assessments due to "stereotype threat" is dismantled. This argument claims that students of a particular group experience anxiety in testing situations that inhibits exam performance because of an overwhelming fear that poor performance will reinforce stereotypes about the intellectual ability of the group. The authors examine minority students' performance on the SAT test compared with the same group's overall collegiate academic achievement. Because the SAT consistently overestimate the predicted college performance for some groups, and because the same students do not score as well as their Caucasian peers on no-stakes assessments, the authors concluded that "stereotype threat" as a form of testing bias cannot account for racial disparities on standardized assessments.

The more familiar argument that the actual content of standardized assessments is the source of bias is also dismantled. Thernstrom and Thernstrom (2003) argued that mathematics assessments cannot be culturally biased with respect to content and that the charge of content bias cannot be proven in assessments that are more language-based. Presently, standardized assessments are carefully constructed using statistical techniques that can identify and eliminate biased questions. Critics would counter that these measures are insufficient to eliminate invisible biases built into the test. However, Thernstrom and Thernstrom (2003) explained that students of racial and ethnic minorities typically do not score poorly on items that would appear to presume knowledge related to a specific cultural or class background. Though standardized assessments may reveal disparities in achievement, the tests themselves may not be the source of bias.

The Role of Poverty

Other studies point to poverty as a primary factor contributing to ethnic disproportionality in special education. Artiles et al. (2002) argued that, "poverty can contribute both directly and indirectly to the risk of school failure, special education placement, or both" (p. 5). There is no doubt that poverty can have a dramatic impact on a child's school achievement. Lack of adequate health care, improper nutrition and unstable housing are but a few of the obstacles faced by children living in poverty. The authors also acknowledged the complexity of the problem of disproportionate representation of ethnically diverse students in special education and called for future studies that are "comprehensive, interdisciplinary, and transcend analyses of placement figures" (p. 8). Studies that meet these criteria by evaluating the quantitative relationship between poverty, race, and placement in special education are beginning to emerge.

However, in Skiba et al. (2005), results demonstrated that there is a weak correlation between poverty and ethnic disproportionality in special education, when race and poverty are considered in a multivariate analysis. The study aimed to address two primary questions:

"To what extent do poverty (as measured by free lunch status) , district resources, and academic-behavioral measures account for ethnic disproportionality in special education; and What are the relative contributions of race, poverty, school resources, and academic-behavioral outcomes to the probability of diagnosis in special education? In particular, how do race and poverty influence that prediction?" (Skiba et al., 2005, p. 134).

Data for the study were drawn from the *Uniform Ethnic and Racial Questionnaire* and the *Uniform Federal Placement Questionnaire*. Poverty level was measured using free lunch data.

The results of the Ordinary Least Squares (OLS) regression indicated that the factors which influence disproportionality vary depending on which disability category is considered. This means that if disproportionality is an issue in a state or district, there may be more than one possible explanatory factor, given the disability category or categories in which the problem exists. Therefore, disproportionality in special education may not be addressed by ameliorating only one aspect of educational inequity.

The results of the logistic regression indicated that five of the variables influence rates of special education identification. The findings of Skiba et al. (2005) demonstrated that "both poverty and race proved to be significant predictors of identification," though both variables do not consistently predict disproportionality (p. 135). School resources, academic, and behavioral variables were also important factors, but not with the same degree of consistency as poverty and race. Additionally, the study found that "poverty also influences the odds of identification when considered independent of race" (p. 138), and that "race continues to significantly influence the odds of special education service when the effect of poverty is held constant" (p. 139). This suggests that both variables are operating independently with respect to placement in special education.

The study utilized an ideal type analysis to clarify the relationships among poverty and race with respect to special education placement. The results of the ideal type analysis indicated that, while "the effect of poverty on racial disparity changes depending on the level of poverty…*at all economic levels*, African Americans are

disproportionately represented in special education disability categories" (Skiba et al., 2005, p. 139). In the category of speech and language impairment, rates of service increased as poverty level increased, while in the category of learning disability, rates of service decreased as poverty level increased. However, the study found that in both categories, African American students were underrepresented at all economic levels. In the categories of mild mental retardation, moderate mental retardation, and emotional disturbance, the ideal type analysis revealed that an increase in poverty level correlated to a larger discrepancy in the rate of special education placement for African American students, compared to placement rates for students of other backgrounds.

The results of the study reinforce that the relationship between poverty, race, and placement in special education are complex. Most importantly, it is clear that poverty alone cannot account for racial disproportionality in special education. The study found that, in fact, "when race and poverty are considered simultaneously, knowledge of race appears to be a more important predictor of special education identification than knowledge of poverty status" (Skiba et al., 2005, p. 141). The study noted two major limitations. First, the data were drawn from only one state. In light of this limitation, the authors call for similar studies focused on data from other states, which would serve the field by supporting or refuting the results of this study. Secondly, the data used in the study are district averages which may not accurately convey the interactions between race and poverty. A study focused on the relationships between race, poverty, and special education placement on an individual level may possess more power to explain the root causes of disproportionality in special education. Still, multiple variables may contribute

with varying degrees of significance to the problem of minority overrepresentation in special education.

Following the quantitative study of the effects of race and socioeconomic variables on ethnic disproportionality in special education, Skiba et al. (2006) conducted a qualitative study focused on practitioners' perspectives on the issue. The study was completed by interviewing school psychologists, principals, assistant principals and teachers about their perspectives regarding ethnic disproportionality in special education, particularly minority overrepresentation, and the variables that contribute to the phenomenon. Among the factors that practitioners cited as contributing to disproportionate representation of ethnically diverse students in special education, poverty seemed to be viewed as the primary variable. The researchers acknowledged the complex nature of the issue, stating that "the factors that appear to make a contribution to inequity at the local level are numerous and seem to interact in subtle and often counterintuitive ways" (Skiba et al (2006), p. 1451). Perhaps most interestingly, the study results showed that practitioners seemed reserved in their discussion of race and cautious of connecting minority overrepresentation to racial bias.

In relation to educational policy initiatives, the authors cautioned against the designation of enrollment caps for special education and argued that an influx of resources to the general education setting will probably be required to reduce minority overrepresentation in special education. Placing an arbitrary limit on the number of students who can receive special education services would only deprive students who require an individualized program from receiving a free, appropriate public education.

Moreover, a one-size-fits-all educational policy runs counter to the spirit of individualized education as outlined in IDEA.

In an effort to clarify the relationship between ethnicity and other variables with respect to disproportionate representation in special education, another study also showed that background variables excluding race cannot fully account for overrepresentation (Oswald et al., 1999). Though the researchers argued that poverty as a background variable is insufficient to explain the extent of overrepresentation, the authors acknowledges that "poverty, at least in extreme forms, can place a child at greater risk of poor school performance, and the poverty rate for African American families in the United States is estimated to be about three times that of the rate for all families" (Oswald et al., 1999, p. 196). Though the nature of extreme poverty is not defined in the study, abject poverty might include chronic hunger and malnutrition, chronic illness due to lack of adequate healthcare, and homelessness. One difficulty in studying ethnic disproportionality in special education that the authors note is the use of different statistical and data collection methods, which have yielded wildly different results including the conclusion that African American students have lower rates of disability in comparison to students of other ethnic and racial groups. Additionally, disproportionate representation has been defined differently by different researchers. The authors defined disproportionality as "the extent to which membership in a given ethnic group affects the probability of being placed in a specific special education disability category" (Oswald et al., 1999, p. 198). This method is equivalent to the relative risk ratio, as defined in Hosp and Reschly (2003).

The Role of Multiple Variables

The study conducted by Oswald et al. (1999) utilized data from the results of a survey administered by the U.S. Department of Education, Office of Civil Rights to school districts across the United States, selected via stratified random sampling. After excluding districts with missing data, the sample consisted of a district-level analysis of 4,455 school districts. The six background variables included median home value, median household income, percentage of children living below the poverty level, percentage of children designated as "at risk," percentage of adults in the community without a high school diploma, and percentage of children who are designated Limited English Proficient.

First, the authors analyzed the relationship between the background variables and a child's identification as having MMR or SED (Severe Emotional Disturbance), without consideration of race. The researchers found that the environmental variables explained much of the variability in the rate of identification for the two disability categories. The next test took race into account and demonstrated that ethnicity did influence a child's rate of identification as MMR or SED, even after accounting for background variables. However, the study results showed different effects for SED and MMR. For MMR, "as poverty increased, more African American students were identified MMR" but "fewer students were identified as SED, and disproportionate representation of African American students as SED was the worst in the wealthiest districts" (Oswald et al., 1999, p. 203). Finally, the authors called for future investigations to include other disability categories, more ethnic groups, more background variables, gender, and Least Restrictive Environment (LRE), focusing on data from the national, state, and local levels.

Recognizing the complex interactions between race and other background variables with respect to special education placement is crucial to the development of coherent policy reform that will ensure equitable access to education for all students.

Expanding on prior research regarding the interaction of background variables and overrepresentation, Hosp and Reschly's (2004) study included academic measures in the analysis of ethnic disproportionality in special education. The authors stated that previous studies confirming the existence of disproportionality have been consistent, but that it is necessary to include academic measures because "achievement is a strong predictor of referral for assessment or intervention, with approximately 55% of students referred primarily for academic problems and 33% referred with academic problems as a secondary issue" (Hosp and Reschly, 2004, p. 187). In this study, academic achievement was indicated by the percentage of students who passed the state standardized reading and mathematics examinations. Because demographic and economic variables can impact overall achievement, the researchers included additional demographic variables, such as the racial composition of a district and number of students with disabilities, as well as other economic indicators.

The findings in Hosp and Reschly (2004) indicated that the economic indicators were more important predictors, while academic indicators were the weakest predictors of variance in the ratio of representation rates, as calculated by the relative risk ratio. The authors explained that this result could be due to the possibility that the other indicators affect academic achievement, or because "the variables in the academic block were all more strongly correlated than were the variables in the other blocks," though the academic indicators "did contribute significantly to 8 of the 12 models" (p. 194). Given

that the academic indicators did have some relationship with the rate of disproportionate representation in a district, the authors suggested that future investigations continue to incorporate economic, demographic, and achievement variables. Further, the researchers recommended the implementation of interventions that focus on raising achievement.

In addition to the consideration of more variables, other researchers have called for more consistently applied statistical methods. MacMillan and Reschly (1998) explained that studies of ethnic disproportionality in special education inherently assume that all ethnic groups would be represented proportionately in a completely unbiased system. The underlying assumption is that ethnic disproportionality exists because our educational system is in some way biased. However, different ethnic groups might be disproportionately represented in special education due to a variety of other factors. For example, the prevailing logic asserts that African American students are overrepresented in special education due to a higher poverty rate among African Americans. Other factors, such as socioeconomic variables, school climate, or district resources could also account for overrepresentation. Still, the two models typically used to determine the extent of ethnic disproportionality are undergirded by the assumption of inherent bias.

However, the two models often yield very different results. To calculate the proportion of ethnic representation by the first model, "the percent of children *in a disability category* who are members of a given ethnic group," the number of children from a specific ethnic group that are in a given disability category is divided by the total number of children in the disability category (MacMillan and Reschly, 1998, p. 16) (italics in original). To calculate the proportion of ethnic representation by the second model, "percent of group in category or program," take the number of children from a

specific ethnic group in a given disability category and divide by the total number of children who are in that ethnic group (p. 16). A hypothetical example will clarify the difference.

To illustrate the dissimilarities yielded by the two models, imagine a school district that has 100 students, of whom 12 are African American, 73 are White/non-Hispanic, four are Asian, nine are Hispanic, one is Native American, and one is multiracial. If two African American children, two White/non-Hispanic children, and one Hispanic child are identified as MMR, the total MMR population of the district is five students. According to the first model, 40% of the MMR population is African American, though African American students make up only 12% of the total district population. By the same calculation, 40% of the MMR population is White/non-Hispanic and 10% is Hispanic, though these groups make up 73% and 9% of the district population, respectively. By the second model, 16% of African American students are identified as MMR, while 2.3% of White/non-Hispanic and 11% of Hispanic students are in the same disability category. Though both calculations may demonstrate overrepresentation, each yields a different perspective regarding the extent of the problem.

Clearly, a uniform model for calculating the extent of ethnic disproportionality in special education is in order. The Relative Risk Ratio, as defined in Hosp and Reschly (2003), appears to address this need. Taking the demographics of the same fictitious school district into account, African American students will be considered as "Group A" and White/non-Hispanic students will be considered as "Group B" in the expression

"ES = Rate Ratio = $\dfrac{\dfrac{\text{Frequency of Group A in referred sample}}{\text{Frequency of Group A in population}}}{\dfrac{\text{Frequency of Group B in control sample}}{\text{Frequency of Group B in population}}}$"

(Hosp and Reschly, 2003,p. 7).

For African American students, the resulting effect size is

$$ES = \frac{\frac{2}{12}}{\frac{2}{73}} = 6.08.$$

For Hispanic students, the resulting effect size is

$$ES = \frac{\frac{1}{9}}{\frac{2}{73}} = 4.05.$$

In the fictitious school district, African American students are 6.08 times more likely and Hispanic students are 4.05 times more likely to be identified as MMR as their White/non-Hispanic peers. One drawback to using the Relative Risk Ratio is the assumption that White/non-Hispanic students constitute an appropriate control group (Hosp and Reschly, 2003). If White/non-Hispanic students are actually underrepresented in the population, the calculation would yield an artificially large effect size. This concern will be addressed more fully in the methodology section.

In addition to consistency in statistical methods for calculating ethnic disproportionality in special education, MacMillan and Reschly (1998) advocated the construction of more explicitly defined variables. For example, defining a child's ethnicity is not as straightforward as it may seem. Because there is no uniform procedure for defining ethnicity, there is significant variability in who determines a child's ethnic

designation: in some cases the parent makes the designation, in other cases a school official determines ethnicity. In addition, the article highlighted variability in how it is determined that a child falls into the "multi-ethnic" category because at times, only the mother's ethnicity is considered, while in other cases the father's ethnicity is taken into account. Despite this variability in determining ethnicity, the article explained that ethnicity is typically viewed as an independent variable in studies of ethnic disproportionality. Furthermore, significant variability exists in how states define disability categories, but studies of ethnic disproportionality in special education do not take such variability into account.

Though variability in determining ethnicity and disability category is significant, if educational researchers are interested in determining the extent of disproportionality within one uniform system, for example a single school district, it should still be possible to reliably determine whether one ethnic group or another is differentially susceptible to placement in special education. As a partial antidote to this variability, MacMillan and Reschly (1998) suggested that future studies account for socioeconomic differences when determining the extent of overrepresentation because they infer that socioeconomic variables probably constitute a bigger risk factor than race. Regardless of future findings, the authors caution against the implementation of quotas for special education placement, which may only deny access to vital services for students who are truly in need.

Other studies indicate a need for additional qualitative research. Harry, Sturges, and Klingner (2005) argued that while quantitative research has uncovered important relationships between quantifiable variables, there is a need for more qualitative studies to investigate how the attitudes and beliefs of school personnel may contribute to

overrepresentation. In the three-year study, the researchers investigated how referral and assessment processes contribute to ethnic disproportionality and also sought to determine what alternatives to current practice might reduce overrepresentation while simultaneously improving the delivery of services to students. The study was designed to reflect the belief that the structure of the referral process, including bias and errors implicit in that process, may stimulate overrepresentation. The methods consisted of extensive interviews with administrators and teachers, which revealed that participants held the following seven beliefs regarding the causes of overrepresentation:

"1. Family/community influences (including parental participation in children's schooling)

2. External pressures on schools (school district, state, federal)

3. Deficits seen as intrinsic to child

4. Teacher skills/biases

5. School system/administrative decisions

6. Errors/bias in psychological assessment

7. Errors/bias in bilingual assessment" (Harry et al., 2005, p. 7).

Additionally, the study results showed that of the teachers who were interviewed, the majority viewed the locus of disability as within the child or as a result of the child's home environment, as opposed to being the result of the structure of the referral process or schooling in general. The results of this study indicate that more variables may be at issue than are typically considered in quantitative studies of overrepresentation. Specifically, if teacher and administrator attitudes reflect an incorrect belief that

overrepresentation is not due to structural inequities in the referral process, such inequities (if they do in fact exist) will be much more difficult to remedy.

<div align="center">Institutional Bias</div>

One difficult but necessary question to consider is whether ethnic disproportionality in special education is the result, wholly or in part, of some form of institutional bias. Ferri and Connor (2005) argued that "overt racially segregating schooling practices have given way to largely under-acknowledged and more covert forms of racial segregation, including some special-education practices" (p. 454). Among such practices, the authors cited inflexible notions of what constitutes intelligence and ability as one means by which racial segregation is perpetuated through tracking and the development of separate classes for students with "lower" intelligence and ability.

Ferri and Connor (2005) argued that the inclusion movement for students with disabilities is equivalent to desegregation. While increased inclusion is vital for students whose needs can be met in the general education setting, the authors seemed not to notice the benefits that many students derive from special education. Students should be educated with their non-disabled peers to the maximum extent possible, but many students require a smaller, more structured setting that will enable them to meet their individual academic and behavioral goals. It is easy to look at the racial composition of many special education classes and conclude that an institutional bias is operating to segregate students. However, moving forward with policy initiatives that assume a sinister motive without examining the influence of other variables on ethnic disproportionality may only deny students access to crucial services.

In contrast, Kauffman, Bantz, and McCullough (2002) argued that specialized settings are not equivalent to resegregation and are absolutely essential if students with the most intensive educational needs are to be academically successful. The authors explained that those who unfairly characterize special education as ineffective hold the belief that "because it is seen as "special" or "different," [special education] inevitably results in identifying and stigmatizing children and segregating them from their peers without disabilities" (p. 150). This view is damaging because it encourages resistance to the more specialized instruction that is required by students with the most intensive educational needs and discourages the development of a full continuum of services. The authors argued that separate placements for students with intensive educational needs is not equivalent to racial segregation, regardless of the racial composition of the program, because

> "the difference between these two types of segregation lies in the fact that ethnicity (a group identity) is a variable presumably irrelevant to the instructional needs of a student, whereas academic ability and performance are variables directly related to the selection and delivery of appropriate instruction" (p. 156).

A case study of a self-contained classroom for students with SED in a regular public school setting was presented. In this classroom, students experienced academic and behavioral success that they had not been able to achieve in the general education environment. If students present educational and behavioral needs that require highly specialized instruction outside the general education setting, ethnicity should not be a factor in determining whether a student has access to such specialized instruction in the

same way that ethnicity should not figure into whether a student has access to gifted education classes.

Nevertheless, students of racial and ethnic minority status continue to remain underrepresented in gifted education, with the exception of Asian American students. Ford (1998) cited statistics from the U.S. Office of Civil Rights that demonstrate a pattern of minority underrepresentation in gifted education dating from 1978 through 1992. Of the four ethnic and racial groups considered, African American, Hispanic, and American Indian students were consistently underrepresented in gifted education programs. Asian American students were consistently overrepresented in gifted education programs.

The overrepresentation of Asian American students in gifted education contributes to the stereotype of Asian Americans as the model minority. Stereotypes are damaging for a myriad of reasons, but this particular stereotype masks struggles with cultural identity and difficulties unique to students of Southeast Asian descent. Ngo and Lee (2007) explored the ways in which this stereotype impacts students of Vietnamese, Laotian, Hmong, and Cambodian descent. These students are simultaneously saddled with the model minority label while they are typecast as low-achieving gang members. Because statistics regarding the achievement of Asian American students groups students of any Asian ancestry together, issues of educational equity specific to students of Southeast Asian descent are obscured. In particular, statements that Asian American students are overrepresented in gifted education do not take into account the variability of educational success experienced by students of different Asian ethnic groups.

In discussing issues of minority overrepresentation in special education and underrepresentation in gifted education, educators and policy makers must bear in mind

that disproportionate representation is problematic in situations of bias and

discrimination. However, simply calculating the ethnic demographics of a single

program may not yield descriptive data that are sufficient for inferring institutional bias.

Kauffman et al. (2002) argued that if the goal of American education truly is to ensure

equal access to educational opportunity for all students, critics of special education must

concede that some students will require intensive supports and structure that is in fact

unequal to the intensity of services provided in the general education setting. Such

services are 'unequal' in the sense that they are more intensive and individualized than

the services that non-disabled students typically require in order to be academically and

socially successful. Dismantling special education programs, specifically self-contained

classrooms, without careful consideration of how such programs provide for the

academic and social success of students with intensive needs is in opposition to the goals

of IDEA to provide a free, appropriate public education for all students, regardless of

disability.

<div align="center">The Structure of Schooling</div>

Other researchers have also looked to the structure of schooling to account for

overrepresentation. Salend, Duhaney, and Montgomery (2002) argued that the research

fails to consider the fact that institutional racism results in overrepresentation. This

institutional racism is manifest in what the authors referred to as disparate treatment and

disparate impact. As the authors explained,

> "*disparate treatment* refers to treating students differently because of their
>
> characteristics and membership in a certain population such as racial and

linguistic groups. *Disparate impact* refers to similar treatment having

different effects on students from different groups" (p. 290).

To remedy institutional bias that may result in overrepresentation, the authors

recommended responding to biased assessments by allowing multidisciplinary teams to

use more flexible assessment procedures, including portfolio assessments. Portfolio

assessment would yield a more accurate portrait of students' specific strengths and needs.

In addition, the authors advocated continued efforts to prevent school failure, including

the development of effective prereferral interventions, culturally sensitive evaluation

teams, culturally responsive curriculum and instructional materials, the use of

instructional strategies such as interdisciplinary units, evaluating disciplinary procedures

for cultural bias, promoting family involvement, diversification of staff, and increased

educator preparation and training.

O'Connor and Fernandez (2006) argued that it is not poverty, but the norms and

structure of schooling in the United States that are responsible for ethnic

disproportionality in special education. After noting that overrepresentation typically

does not occur in "nonjudgmental" disability categories (Deafness, visual impairment),

the authors highlighted the fact that the interpretation of school personnel weigh heavily

in determining whether a child's educational performance is impacted by a "judgmental"

disability (SLI, SLD, ED, CD). In Ohio, a student is referred for testing by a

multidisciplinary team when a disability is suspected. This referral for testing can be

requested by parents or set in motion by school personnel with parental consent. In

addition to intelligence testing administered by a school psychologist, teachers may

conduct academic and behavioral assessments, parents may participate in administering a

behavior rating scale, assessments may be conducted by a speech and language

pathologist or occupational therapist, and medical information is taken into account. In

the absence of a medically identifiable disability, a child may be determined to have an

educational disability on the basis of the aforementioned assessments. In such cases, it is

up to the school personnel, with parental input, to determine if a child qualifies for

services under the disability categories of SLI, SLD, ED, or CD. It is in these judgmental

disability categories that overrepresentation is pervasive.

The prevailing logic attributes overrepresentation in these categories to the

negative effects of poverty. Elucidating this reasoning in what the article referred to as

the "Theory of Compromised Human Development (TCHD)," the authors summarize the

accepted reasoning as follows:

"1. Minorities are more likely to be poor.

2. "Being" poor increases exposure to risk factors that compromise early

development.

3. Compromised early development impinges on school preparedness and

suppresses academic achievement, heightening the need for special education.

4. Thus minorities are more likely to warrant special education" (O'Connor &

Fernandez, 2006, p. 7).

However, the authors argued that the TCHD ignores the reality that the certain aspects of

human development, such as school preparedness, are culturally bound. Because

paradigms of school achievement in the United States are based on what is viewed as

typical development from a White, middle-class perspective, the authors claimed that

children from different ethnic backgrounds or lower socioeconomic status are

automatically placed at a disadvantage by the normative structure of schooling. One can conclude that the authors would agree that if the special education referral process, and schools in general were restructured, then the problem of overrepresentation would diminish.

The Role of Socioeconomic Status

Any discussion of ethnic disproportionality in special education must acknowledge the persistent achievement gap that exists between Caucasian students and African American students. As discussions of the achievement gap are typically constructed along socioeconomic lines, the impact of socioeconomic status on school achievement must be addressed. Rothstein (2004) detailed three clarifications that must be considered in a full discussion of the achievement gap that results from the effects of variability in socioeconomic status. First, quality schools may improve student achievement, but improving the quality of schools alone would not completely eliminate a socioeconomic achievement gap. Secondly, the gap in achievement related to social class may not be remedied by requiring students to demonstrate proficiency on certain criterion-referenced tests. Rothstein (2004) stated that "socioeconomic differences are less of a bar to closing the achievement gap if the gap is measured only as the difference between groups in low-level proficiency" (p. 16). Finally, the fact that some students of lower socioeconomic backgrounds will be able to overcome the effects of socioeconomic status on educational performance must not be taken to mean that any student or all students will be able to do so, or that socioeconomic status has no impact whatsoever on educational achievement.

Socioeconomic status has such a dramatic influence on educational achievement in part because social class has a dramatic influence on many life functions, including the availability of adequate healthcare and stable housing. Socioeconomic status often impacts the quality of healthcare that individuals receive, and "overall, lower-income children are in poorer health" (Rothstein, 2004, p. 37). Attendance is impacted by a student's general health, and poor attendance amounts to missed instructional opportunities. Chronic health issues and environmental risks impact learning, even if students do not miss school and lack of stable housing results higher mobility rates among lower-income families, which negatively impact student achievement (Rothstein, 2004). Though housing reform is a significant social consideration, Rothstein (2004) argued that health care reform represents a central power in reducing the achievement gap. In addition to the development of school-community clinics to serve low-income children and families, Rothstein (2004) advocated for the provision of adequate early childhood education programs, after-school programs, and summer programs. Though such reforms would necessarily represent a significant increase in educational expenditures, if such measures were undertaken to reduce the achievement gap, overrepresentation in special education may decrease and the overall quality of education for students of lower socioeconomic status may be improved. It is important to note that such reforms primarily address economic factors, and that cultural factors also play a significant role in the perpetuation of the achievement gap.

<div style="text-align:center">A Disabilities Paradigm</div>

Reid and Knight (2006) argued from a Disabilities Studies perspective that overrepresentation is the result of how the current educational paradigm characterizes

disability. This paradigm effectively creates structures of disadvantage for students of diverse ethnic and racial backgrounds, which lead to overrepresentation. The authors submitted that certain disability categories, such as LD, MR, and ED, are socially constructed. The authors posited that the medical model on which special education is predicated incorrectly locates disability within a person, rather than characterizing certain disability categories as artifacts of a larger social construct while simultaneously ignoring underlying variables such as race, socioeconomic status, and gender. The authors advocated expansion of the inclusion model to reduce overrepresentation in special education, increase visibility of minority students with disabilities at the post-secondary level, and decrease the extent to which disability is viewed by society as characteristic of abnormality.

<div align="center">Reducing Overrepresentation</div>

Others advocate expanding the use of the Response to Intervention (RTI) model and increasing educators' cultural competence as means to reduce overrepresentation. García and Ortiz (2006) argued that the RTI model, if implemented with a view to students' socio-cultural backgrounds, could be an effective strategy to reduce inappropriate referrals to special education for culturally and linguistically diverse students. Other efforts aimed at reducing failure among culturally and linguistically diverse students may also reduce overrepresentation. To this end, the authors advocated developing a positive school climate that promotes high expectations for all students, encouraging teachers to share responsibility for all students by cooperatively and systematically planning instruction, collaborating with students and families, and providing a range of professional development initiatives aimed at developing educators'

cultural competence. The authors also supported replacing the standard pre-referral model with early interventions in the general education setting as soon as a student demonstrates learning difficulties. Bringing necessary instructional modifications and accommodations into the general education setting at the first sign of academic struggle may remedy a student's difficulties, allowing the student 'catch up' with peers and avoid unnecessary referral for evaluation. Finally, the authors encouraged teachers to use on-going assessment, modify instructional strategies when indicated, and collaborate with other professionals to address the needs of culturally and linguistically diverse students. These strategies, if thoughtfully and systematically implemented, may reduce incidents of school failure that lead to inappropriate special education placement and overrepresentation. The RTI model might constitute one form of intervention and assessment that would enable educational staff to employ a culturally competent approach.

Continuing to develop culturally responsive classrooms and schools may contribute to a reduction in overrepresentation. As Brown (2007) explained, teachers who are culturally responsive are not only cognizant and respectful of diversity, but also have "detailed, factual information about the cultural particularities of specific ethnic groups" (p. 59-60). Echoing the work of Shealey and Lue (2006), the author supported increasing efforts in teacher education programs to develop skills associated with cultural competence in pre-service teachers, as well as increasing training programs for practicing teachers. Teachers who are culturally competent are able to respond to students' individual needs in a way that may improve academic and social outcomes. Culturally responsive teachers know how to use instructional strategies and curriculum "that prevent

failure," including explicit instruction, systematic observation, and a variety of assessment strategies (Brown, 2007, p. 60). In addition, the author advocated the development of culturally responsive schools that provide relevant professional development opportunities, encourage teacher collaboration, and have school-wide policies that reflect a respect for diversity. Careful and systematic implementation of such school reforms may improve learning outcomes for all students, including culturally and linguistically diverse students, thereby reducing the extent of overrepresentation in special education.

In developing schools, classrooms, and special education programs that are responsive to individual students' unique needs, it is necessary to consider the context of the community. Special education students in urban settings may require different modifications and accommodations, compared with students in suburban and rural settings, because "data suggest that special education programs in inner cities face unique challenges and differ from nationally representative data on special education students" (Morse, 2001, p.5). Students in urban settings may face challenges that are not as prevalent in suburban and rural areas, which may lead to increased school failure. For example, "precursors that are associated with dropping out of school—poverty, lack of school success, single-parent families, and limited English proficiency—are prevalent in urban areas" (Morse, 2001, p. 7). In addition to these issues, students with disabilities in urban settings may be at an increased risk for school failure, compared to their non-disabled peers in the same community. Finally, the author argued that students with disabilities in urban settings have different needs than students with disabilities in other communities despite being eligible for special education under the same disability

category, due to the unique challenges present in an urban environment. That is, a

student identified as having a learning disability in an urban setting may require different

modifications and accommodations than a student with a learning disability who is being

educated in a suburban or rural setting. All of these considerations must be taken into

account when designing modifications and accommodations for students with disabilities

in urban settings. Taken one step further, considering the unique needs of students in

urban schools and designing prereferral interventions that are tailored to meet the needs

present in the specific environment may go a long way in diminishing the extent of

overrepresentation in special education.

CHAPTER III
METHODOLOGY

The purpose of this study was to determine whether the outcomes in Skiba et al. (2005) for Indiana also describe the relative impact of poverty on placement in special education with respect to race in Ohio. The questions that were addressed are:

1. What is the nature of representation in special education in Ohio?

2. How do race, poverty, district resources, and academic-behavioral measures predict the degree of disproportionality in a district?

It was hypothesized that ethnically and socio-culturally diverse groups are not proportionately represented in special education. It was also hypothesized that race, poverty, district resources, and academic-behavioral measures do not predict the degree of disproportionality equally well.

Data Sources

The sample for this study consisted of district- and building-level data for 160 public school districts across Ohio. Data were drawn from information made available by the Ohio Department of Education (ODE) for the 2006-2007 school year, obtained from the Interactive Local Report Card (iLRC) by utilizing the Power User Reports tool. The iLRC is accessible through the ODE Website. The Power User Reports tool allows

the user to obtain reports for multiple buildings, districts, and years for a variety of data categories.

ODE does not report exact data for categories with nine or fewer students. For districts that have between one and nine students in a disability category, ODE simply reports that there are students in the category. For such cases, informed imputation was be used to estimate values for districts. First, the percentage of students of a specific ethnicity in a disability category was calculated for each district. The mean percentage for each disability category by race was then calculated. The mean percentages were then multiplied by the number of students in the ethnic group for each district to estimate the number of students in a disability category with nine or fewer students. Districts with missing values for all disability categories were excluded from the sample. The sample was geographically representative, as it included school districts in urban, suburban, and rural areas. Additionally, the sample was economically representative, including districts ranging from high poverty to very little poverty.

For each district, data included the total student enrollment, percentage of enrollment by race, total student enrollment in each disability category, percentage student enrollment in each disability category by race, dropout rate, percentage of students who scored at each of the five levels of proficiency on state-wide standardized tests for third and tenth grade in reading , student-to-teacher ratio, the number of disciplinary actions (suspensions and expulsions), median income, per pupil expenditure, and average teacher salary. Racial subgroups included African American, Caucasian, and Hispanic students. Disability categories included Cognitively Disabled (CD), Emotional Disturbance (ED), Speech and Language Impairments (SLI) and Specific Learning

Disabilities (SLD). As this study was undertaken in an effort to replicate for the state of

Ohio the work done in Skiba et al. (2005), the statistical methods employed in this study

mirrored those employed in Skiba et al. (2005).

Variables

The independent variables included extent of poverty, percentage of student

population in a racial or ethnic group, percentage of student population in each disability

category by racial or ethnic group, average teacher salary, per pupil expenditure, rate of

suspensions and expulsions, graduation rate, and percentage of students scoring proficient

or higher on third and tenth grade state standardized achievement tests in reading.

Extent of poverty in a district was defined by the median income for each district.

This measure was reparameterized by dividing the median income by 1,000.

Reparameterizing the variable in this way allowed for a description of median income

differences in $1,000 increments, which is a more useful comparison of income

disparities than one dollar units. This differs from the measure used in Skiba et al.

(2005), which only used the number of students receiving free lunch in a district as a

measure of poverty. Research suggests that median income is a more reliable indicator of

the poverty level in a district than free lunch status (Cruse & Powers, 2006).

District Resources included the average teacher salary, per pupil expenditures,

and student-to-teacher ratio in a district. Both average teacher salary and per pupil

expenditures were reparameterized by dividing each value by 1,000. Reparameterizing

the variables in this way allowed for a description of differences in $1,000 increments,

which is a more useful comparison of financial disparities than one dollar units.

Behavioral Measures were defined as the rate of suspensions and expulsions in a district. This variable was calculated by taking the sum of suspensions and expulsions, then dividing this value by the total student population of the district.

Academic Measures were given by the percentage of students scoring proficient or higher on third and tenth grade state standardized achievement tests in reading and district graduation rates. The data available for Ohio differ from the measures considered in Skiba et al. (2005), but yield similar descriptors of student achievement. In Skiba et al. (2005), the mean scores on the state's third grade achievement test, the average SAT scores, and the percentage of students taking the SAT in a district were utilized as indicators of student achievement. Early student achievement in a district was measured by the percentage of students scoring proficient or better on the third grade Ohio Achievement Test in reading. Later student achievement was measured by the percentage of students scoring proficient or better in reading on the Ohio Graduation Test, which is the 10th grade statewide standardized assessment. ODE reports passage rates on each assessment separately as the proportion of students in each category compared to the number of students attempting the assessment. Scoring categories, from lowest to highest, include below basic, basic, proficient, accelerated, and advanced. A student must score at least proficient in order to pass the assessment. Percentage of students scoring proficient or higher on third and tenth grade state standardized achievement tests in reading were calculated by taking the sum of the proportions in the proficient, accelerated, and advanced scoring categories and then multiplying this value by 100.

Behavioral measures were given by the suspension and expulsion rate for a district. The total student population was divided by the sum of suspensions and expulsions for the 2006-2007 school year.

Size of a district was given by the total student population of a district.

Percentage of students of a particular racial or ethnic category was calculated by taking the number of students in the category of interest, dividing this value by the total student population of a district, and then multiplying by 100.

The dependent variables were the extent of disproportionality in a district for each disability category and racial or ethnic group, as measured by the effect size (*ES*) given by the rate ratio for each district. The rate ratio is defined by Hosp and Reschly (2003) as

"*ES* = Rate Ratio =
$$\dfrac{\dfrac{\text{Frequency of Group A in referred sample}}{\text{Frequency of Group A in population}}}{\dfrac{\text{Frequency of Group B in control sample}}{\text{Frequency of Group B in population}}}"$$ (p. 7),

where *ES* is the effect size yielded by this calculation.

The numerator is determined by taking the number of students of a particular ethnicity other than Caucasian in one disability category divided by the number of students of that ethnicity in the total district population. The denominator is determined by taking the number of Caucasian students in one disability category divided by the number of Caucasian students in the total district population. Disproportionate representation of an ethnic group occurs when the equation above yields an effect size (ES) $\neq 1.00$. The rate ratio was calculated for each disability category of interest (CD, ED, SLI, and SLD) for African American and Hispanic students in each district.

The rate ratio is a more reliable determinant of disproportionality than the commonly used composition index, though it is susceptible to limitations. The composition index measures disproportionality by comparing the proportion of students of a given ethnic group in a disability category to the proportion of students in that ethnic group in the total student population (Hosp and Reschly, 2003). As Skiba et al. (2005) explained, "with the composition index, it becomes difficult to find disproportionality when applying the measure to extremely homogeneous (e.g., above 90% of one ethnic group) populations" (p. 133). Though the rate ratio is not normally distributed as a rule, the regression analysis is robust and therefore this value can function as an independent variable (Skiba et al., 2005).

An additional limitation of the rate ratio exists in determining the denominator. In choosing to use Caucasian students as Group B in the denominator, Hosp and Reschly (2003) pointed out that "the implicit assumption is that the odds or rate of identification for Caucasian students is appropriate or accurate" (p. 70). If Caucasian students are actually underrepresented in a given disability category, the resultant effect size for the comparison group may be artificially inflated. Hosp and Reschly (2003) described two other possible methods for calculating the denominator: "1. use the odds or rate for all students not in the target groups" or "2. use the odds or rate for all students in the population of interest" (p.69). However, each of these two methods for calculating the denominator has more significant limitations than the chosen method. As Hosp and Reschly (2003) explained, the first method "does not include a direct comparison of groups because the composition of the denominator changes for each target group" (p. 69). A direct comparison of groups is required in this study, which means that this

method is unsuitable. The second method addresses this limitation, but as Hosp and

Reschly (2003) explained, "as the size of the target group increases, the dependency of

these data increases. This means that the magnitude of the ratio may, in part, depend on

the size of the target group" (p. 69-70). In order to reliably compare data across groups,

the dependency of the data should be minimized. Despite the limitation in calculating the

denominator using Caucasian students as the referent group, this method provides a

consistent group for comparison while addressing the limitations inherent in the

composition index, as well as limitations inherent in alternative methods for designating

the denominator in the relative risk ratio.

Data Analysis

The first research question was addressed by comparing the average ES for each

disability category by race for all districts, calculated using the rate ratio method.

Following the methods utilized in Skiba et al. (2005), the *ES* from the rate ratio

calculations was employed as the dependent variables, indicating the extent of

overrepresentation in a district.

A linear regression and hierarchical multiple linear regression analysis with a

95% confidence interval was used to address the second research question. All dollar

values were reparameterized by dividing each value by $1,000. The first linear

regression model included only median income as a predictor variable to determine the

relationship between poverty and disproportionate representation. A hierarchical

regression to address the academic measures model included the percentage of students

scoring proficient or better on the third and tenth grade standardized achievement tests in

reading multiplied by 100 and the district graduation rate as predictor variables in block

one, with median income as the predictor variable in block two. For the behavioral measures model, district rate of suspensions and expulsions functioned as the predictor variable in block one, with median income serving as the predictor variable in block two. For the district resources mode, average teacher salary, per pupil spending, and student to teacher ratio functioned as the predictor variables in block one. Median income functioned as the predictor variable in block two. For the racial demographics model, the percentage of Caucasian students and the percentage of the racial group of interest for each district operated as the predictor variables in block one, while median income operated as the predictor variable in block two. The regression analyses were accomplished using the SPSS program.

The independent variables included the extent of poverty in a district; percentage of student population in a particular racial or ethnic group in a district; percentage of student population in each disability category, by racial or ethnic group; district resources as indicated by average teacher salary and per pupil expenditures; behavioral measures as indicated by number of suspensions and expulsions in a district; and academic measures as indicated by graduation rate and percentage of students scoring proficient or higher on the third and tenth grade state standardized achievement tests in reading.

CHAPTER IV
RESULTS

The overall sample for this study consisted of 160 public school districts in Ohio. ODE does not report exact statistics for categories with nine or fewer students. For districts that have between one and nine students in a disability category, ODE simply reports that there are students in the category. For such cases, informed imputation was used to estimate values for districts. Districts with missing values for all disability categories were excluded. Of the 613 school districts in the state, 453 districts were excluded based on this factor.

Despite the exclusion of a sizeable number of districts, the sample remained somewhat representative of the state as a whole. Of the 88 counties in Ohio, 52 counties were represented in the sample. Rural districts were underrepresented in the sample (n=29), compared with the actual distribution of rural districts in the state (n=339). A smaller student population in rural areas increases the likelihood of missing data for disability categories by race. Urban and suburban districts were overrepresented in the sample (n=131), compared with the actual distribution of these districts in the state (n=270). More data are available for urban and suburban districts due to larger student populations. The economic distribution of districts included in the sample was representative of the state as a whole. Districts with a moderate to high median income

were slightly underrepresented (n=83) in comparison with the actual distribution of such

districts across the state (n=234), while high poverty districts were slightly

overrepresented (n=77) in comparison with the actual distribution of such districts across

the state (n=214). Table I presents a comparison of the districts included in the sample

with the distribution of geographically and economically similar districts in the state

overall. This evaluation is made by comparing the percentage of districts in each

category, where "actual" represents the distribution across the state and "sample"

represents the distribution included in the sample.

Table I. Distribution of District Demographics.

	Rural	Urban/Suburban	Moderate to High Median Income	Low Median Income/High Poverty
Actual	55%	44%	38.2%	34.9%
Sample	18.13%	81.17%	48%	52%

The average Effect Size (ES) is taken as the measure of proportional

representation for each disability category by race. An ES equal to one represents

perfectly proportionate representation. The farther an ES is from one, the greater the

extent of disproportionate representation. An ES greater than one indicates

overrepresentation, while an ES less than one indicates underrepresentation.   Table II

presents the average ES for each disability category by race in this sample.

Table II. Average Effect Size for Disability Category by Race.

	ES SLI	*ES* ED	*ES* CD	*ES* SLD
African American	4.2926	4.7228	4.5180	1.3484
Hispanic	3.0818	2.0413	1.4887	0.8752

In this sample, African American students were overrepresented in the SLI

($n=160$, $M=4.2926$, $sd=5.33156$; ES=4.2926), ED ($n=160$, $M=4.7228$, $sd=4.42093$;

ES=4.7228), CD (*n*=160, *M*=4.5180, *sd*=5.54386; ES=4.5180), and SLD (*n*=160,

M=1.3484, *sd*=0.81519; ES=1.3484) categories. This means that African American

students are more than four times as likely as their Caucasian peers to be identified as

Speech and Language Impaired; almost five times as likely to be identified as

Emotionally Disturbed; four and a half times as likely to be identified as Cognitively

Disabled; and 1.3 times as likely to be identified as learning disabled. Students of

Hispanic descent were underrepresented in the SLD category (*n*=160, *M*=0.8752,

sd=0.79237; ES=0.8752), but were overrepresented in the SLI (*n*=160, *M*=3.0818,

sd=4.59501; ES=3.0818), ED (*n*=160, *M*=2.0413, *sd*=4.11491; ES=2.0413), and CD

(*n*=160, *M*=1.4887, *sd*=2.44574; ES=1.4887) categories. Based on these findings,

Hispanic students were underserved in the SLD category. However, Hispanic students

were more than three times as likely as their Caucasian peers to be identified as Speech

and Language Impaired; twice as likely to be identified as Emotionally Disturbed; and

almost two and a half times as likely to be identified as Cognitively Disabled.

Tables III through VII present the results of the hierarchical linear regressions

between the predictor variables and the extent of disproportionate representation in a

district. For each test, the ES for each district in each disability category by race was

calculated. The ES served as the criterion variable for each test. Each model was entered

into SPSS using the enter method with casewise comparison in order to maximize the

data, with a 95% confidence interval.

Table III presents the results of the linear regression between poverty and

disproportionate representation. For this model, median income served as the predictor

variable. This measure was reparameterized by dividing the value for each district by

$1,000.

Table III. Results of Linear Regression: Poverty Model.

Disability Category		African American	Hispanic
SLI	b	0.136	0.053
	β	0.232	0.105
	R^2	0.048	0.005
	p	0.003	0.187
ED	b	0.214	0.081
	β	0.442	0.179
	R^2	0.190	0.026
	p	0.0001	0.023
CD	b	0.185	0.063
	β	0.299	0.233
	R^2	0.084	0.048
	p	0.0001	0.003
SLD	b	0.031	0.017
	β	0.347	0.197
	R^2	0.115	0.033
	p	0.0001	0.013

The Poverty Model was significant for all but one subgroup, Hispanic students in the SLI

category [$F(1,158) = 1.758, p = 0.187$]. For African American students in the SLI

category [$F(1158) = 8.999, p = 0.003$], the model accounted for 4.8% of the variance.

Therefore, 4.8% of the difference in the ES scores for each district can be explained by

the Poverty Model.

In the ED category, the model accounted for 19% of the variance among African

American students [$F(1,158) = 38.324, p = 0.0001$] and 2.6% of the variance among

Hispanic students [$F(1,158) = 5.252, p = 0.023$]. The model explains more of the

difference in ES for African American students than Hispanic students in this disability

category. In the CD category, the model accounted for 8.4% of the variance among

African American students [$F(1, 156) = 15.368, p = 0.0001$] and 4.8% of the variance

among Hispanic students [$F(1,158) = 9.095, p = 0.003$]. The Poverty model is able to explain about twice as much of the difference in ES for African American students than it does for Hispanic students.

Table IV presents the results of the hierarchical regression between the Academic Measures Model and disproportionate representation. For the first step of the regression, only Academic Measures were entered as the predictor variable. Academic Measures were given by the percentage of students scoring proficient or better on the third and tenth grade statewide standardized achievement tests in reading multiplied by 100, and the district graduation rate. These variables were entered into block one of the regression. For the second step of the regression, median income was entered into block two to control for the effects of poverty on the overall Academic Measures Model. In the table, "10_r" equals percentage of students scoring proficient or better on 10th grade reading multiplied by 100, "3_r" equals the percentage of students scoring proficient or better on 3rd grade reading multiplied by 100, "grad" equals the district graduation rate, and "inc" equals the district median income.

The Academic Measures model was significant for some subgroups, but not others. For African American students in the SLI category, the regression including only Academic Measures was significant and accounted for 10% of the variance [$F(3,156) = 6.917\ p = 0.0001$]. Prior to controlling for economic factors, the model explains 10% of the difference in overrepresentation rates for African American students in this disability category. After entering the economic variable into the regression, the model remained significant, accounting for 9.5% of the variance [$F(4,155) = 5.161, p = 0.001$].

Table IV. Results of Hierarchical Regression: Academic Measures.

Disability Category		African American Academic only	African American Academic and Economic	Hispanic Academic only	Hispanic Academic and Economic
SLI	b	10_r = 0.102 3_r = 0.158 grad = -0.068	10_r = 0.095 3_r = 0.156 grad = -0.069 inc = 0.009	10_r =0.159 3_r =-0.025 grad =0.018	10_r =0.188 3_r =-0.019 grad =0.021 inc=-0.041
	β	10_r = 0.128 3_r = 0.288 grad = -0.097	10_r = 0.119 3_r = 0.285 grad = -0.098 inc = 0.016	10_r =0.231 3_r =-0.054 grad =0.029	10_r =0.274 3_r =-0.040 grad =0.035 inc =-0.080
	R^2	0.100	0.095	0.025	0.022
	p	0.0001	0.001	0.072	0.112
ED	b	10_r = 0.075 3_r =0.184 grad = -0.056	10_r = -0.038 3_r = 0.160 grad = -0.070 inc = 0.155	10_r =0.032 3_r = 0.098 grad =-0.057	10_r =0.000 3_r =0.091 grad =-0.060 inc =0.044
	β	10_r = 0.113 3_r = 0.406 grad = -0.097	10_r = -0.057 3_r = 0.352 grad = -0.120 inc = 0.318	10_r = 0.052 3_r = 0.232 grad =-0.112	10_r =0.000 3_r =0.216 grad =-0.122 inc =0.098
	R^2	0.182	0.227	0.032	0.030
	p	0.0001	0.0001	0.045	0.067
CD	b	10_r =0.172 3_r =0.103 grad = 0.011	10_r = 0.140 3_r = 0.097 grad = 0.007 inc = 0.044	10_r =0.032 3_r =0.066 grad =-0.009	10_r =0.023 3_r =0.064 grad =-0.010 inc =0.011
	β	10_r =0.207 3_r =0.181 grad = 0.015	10_r = 0.169 3_r = 0.170 grad = 0.010 inc = 0.070	10_r =0.087 3_r =0.262 grad =-0.028	10_r =0.064 3_r =0.255 grad =-0.031 inc =0.043
	R^2	0.125	0.122	0.083	0.078
	p	0.0001	0.0001	0.001	0.002
SLD	b	10_r =0.017 3_r =0.009 grad =0.005	10_r =-0.003 3_r =0.005 grad =0.003 inc =0.029	10_r = 0.004 3_r =0.023 grad =-0.017	10_r =-0.005 3_r =0.021 grad =-0.018 inc =0.012
	β	10_r =0.142 3_r =0.108 grad =0.049	10_r =-0.028 3_r =0.054 grad =0.026 inc =0.319	10_r =0.038 3_r =0.287 grad =0.010	10_r =-0.039 3_r =0.263 grad =-0.174 inc =0.143
	R^2	0.055	0.100	0.44	0.48
	p	0.008	0.0001	0.018	0.020

After considering the effects of poverty, the model is still able to explain 9.5% of the difference in overrepresentation for this group. For Hispanic students in the SLI category, neither run of the model was significant: Academic Measures only [F (3,156) =

2.379, $p = 0.072$] and Academic Measures including the economic variable [$F (4,155) = 1.905$, $p = 0.112$]. This model was not able to explain the differences in representation rates for Hispanic students in this disability category.

For African American students in the ED category, both regressions were significant. When Academic Measures were considered, the model accounted for 18.2% of the variance [$F (3,156) = 12.767$, $p = 0.0001$]. When the economic indicator was entered into the model, it accounted for 22.7% of the variance [$F (4, 155) = 12.651$, $p = 0.0001$]. When the economic indicator was included in the model, an additional 4.5% of the difference in overrepresentation rates was explained. For Hispanic students in the ED category, the model was significant when Academic Measures alone were considered, and accounted for 3.2% of the variance [$F (3,156) = 2.744$, $p = 0.045$]. When the economic indicator was included, the model was not significant for this subgroup [$F (4, 155) = 2.245$, $p = 0.067$]. Prior to the consideration of economic indicators, the Academic Measures Model is able to explain a small portion of the difference in ES scores for Hispanic students in the ED category, but is not able to explain differences in representation rates when economics are included in the model.

For African American students in the CD category, the model was significant when Academic Measures alone were considered, and accounted for 12.5% of the variance [$F (3,154) = 8.457$, $p = 0.0001$]. When economic factors were included, the model remained significant and accounted for 12.2% of the variance [$F (4,153) = 6.428$, $p = 0.0001$]. Including economic indicators in the model does not have a large impact on the amount of difference in ES scores that the model is able to explain. For Hispanic students in the CD category, both versions of the model were significant. Academic

Measures alone accounted for 8.3% of the variance [F (3,156) = 5.828, p = 0.001] and

7.8% of the variance [F (4,155) = 4.386, p = 0.002] is accounted for when economic

factors are included in the model. The addition of economic indicators to the model

decreases the extent to which the model is able to explain differences in effect sizes for

this group.

Both versions of the model were significant for African American students in the

SLD category. Academic Measures alone accounted for 5.5% of the variance [F (3,156)

= 4.094, p = 0.008] and Academic Measures plus the economic variable accounted for

10% of the variance [F (4,155) = 5.401, p = 0.0001] for this subgroup. When economic

indicators are included, the model is able to account for 4.5% more of the difference in

overrepresentation rates for this subgroup. For Hispanic students in the SLD category,

both versions of the model were also significant. When only Academic Measures are

considered, the model accounts for 4.4% of the variance [F (3,156) = 3.454, p = 0.018].

When the economic variable is entered into the model, 4.8% of the variance [F (4,155) =

3.016, p = 0.020] is explained. The model is able to account for slightly more of the

difference in ES for this group when economic indicators are considered.

Of the tests that were significant, only some of the predictor variables remained

significant when poverty was controlled for in the hierarchical regression. For African

American students in the SLI (p=0.029) and ED (p=0.004) categories as well as Hispanic

students in the SLD category (p=0.049), the percentage of students scoring proficient or

better on the third grade statewide standardized achievement test in reading remained

significant. This variable continues to account for differences in effect sizes when the

extent of poverty in a district is held constant, and is able to explain differences in ES

scores that cannot be attributed to poverty. None of the other predictor variables remained significant when poverty was controlled for in the hierarchical regression.

Table V presents the results of the hierarchical regression for the Behavioral Measures model. The suspension and expulsion rate for each district functioned as the predictor variable in block one of the regression, which is displayed as "Discipline Only" in the Table V below. The median income for each district functioned as the predictor variable in block two of the regression to control for the effects of poverty on the overall Behavioral Measures Model, and is displayed as "Discipline plus Economics" in Table IV. The ES for each disability category by race for each district functioned as the criterion variable.

In Table V, "dis" equals the discipline rate given by the rate of suspensions and expulsions for each district and "inc" equals the district median income.

The Behavioral Measures model was significant for some subgroups but not for others. For African American students in the SLI category, the model was significant when Behavioral Measures alone were considered and when economic factors were entered into the model. When only Behavioral Measures were considered, the model accounted for 2.3% of the variance [$F(1,158) = 4.731$, $p = 0.031$]. When Behavioral Measures and economic factors were considered simultaneously, the model accounted for 3.1% of the variance [$F(2,157) = 5.240$, $p = 0.006$]. In either case, only a small proportion of the differences in effect sizes were explained by the model. For Hispanic students in the SLI category, neither the model including only Behavioral Measures [$F(1,158) = 0.467$, $p = 0.495$] nor the model including Behavioral Measures and economic factors [$F(2,157) = 0.899$, $p = 0.049$] was significant. In neither instance was

the Behavioral Measures model able to explain differences in representation rates for this subgroup.

Table V. Results of Hierarchical Regression: Behavioral Measures.

Disability Category		African American Discipline Only	African American Discipline plus Economic	Hispanic Discipline Only	Hispanic Discipline plus Economic
SLI	b	-0.028	dis = -0.017 inc = 0.115	-0.008	dis = -0.003 inc = 0.049
	β	-0.171	dis = -0.100 inc = 0.196	-0.054	dis = -0.019 inc = 0.098
	R^2	0.023	0.051	-0.003	-0.001
	p	0.031	0.006	0.495	0.409
ED	b	-0.037	dis = -0.017 inc =0.194	-0.015	dis = -0.029 inc = 0.071
	β	-0.263	dis = -0.120 inc = 0.399	-0.118	dis = -0.062 inc = 0.157
	R^2	0.064	0.198	0.008	0.023
	p	0.001	0.0001	0.136	0.059
CD	b	-0.037	dis = -0.021 inc =0.159	-0.013	dis = -0.007 inc =0.053
	β	-0.213	dis = -0.121 inc = 0.256	-0.168	dis = -0.097 inc = 0.198
	R^2	0.039	0.091	0.022	0.051
	p	0.007	0.0001	0.033	0.006
SLD	b	0.000	dis = 0.003 inc = 0.035	-0.003	dis = -0.001 inc =0.015
	β	-0.013	dis = 0.129 inc = 0.393	-0.123	dis = -0.060 inc = 0.175
	R^2	-0.006	0.124	0.009	0.030
	p	0.873	0.0001	0.120	0.035

Both versions of the model were significant for African American students in the ED category. Behavioral Measures alone accounted for 6.4% of the variance [$F(1,158) = 11.785, p = 0.001$] and Behavioral Measures plus economic factors accounted for 19.8% of the variance [$F(2,157) = 20.582, p = 0.0001$]. Including economic variables in the model increased the extent to which the model was able to explain differences in overrepresentation rates by 13.4%. Neither Behavioral Measures alone [$F(1,158) =$

2.241, $p = 0.136$] nor Behavioral Measures plus economic factors [$F(2,157) = 2.888$, $p = 0.059$] was significant for Hispanic students in the ED category. Neither version of the model was able to account for differences in representation rates for Hispanic students in this disability category.

For African American students in the CD category, both versions of the model were significant. Behavioral Measures alone accounted for 3.9% of the variance [$F(1,156) = 7.379$, $p = 0.007$] and Behavioral Measures plus economic factors accounted for 9.1% of the variance [$F(2,155) = 8.853$, $p = 0.0001$]. When economic indicators were included, the model was able to explain 5.2% more of the difference in effect sizes than when Behavioral Measures were considered alone. Both versions of the model were also significant for Hispanic students in the CD category. For this subgroup, Behavioral Measures alone accounted for 2.2% of the variance [$F(1,158) = 4.607$, $p = 0.033$] and the inclusion of economic indicators accounted for 5.1% of the variance [$F(2,157) = 5.242$, $p = 0.006$]. Including economic indicators increased the extent to which the model could explain differences in representation rates, though neither version of the model was able to explain a great deal of the difference for this subgroup.

For African American students in the SLD category, considering Behavioral Measures alone was not significant [$F(1,158) = 0.025$, $p = 0.873$] but Behavioral Measures plus economic indicators accounted for 12.4% of the variance [$F(2,157) = 12.206$, $p = 0.0001$]. The model was not able to explain differences in representation rates for this group when Behavioral Measures were considered independent of economic variables. The same is true for Hispanic students in the SLD category: considering Behavioral Measures alone was not significant [$F(1,158) = 2.442$, $p = 0.120$] but

Behavioral Measures plus economic indicators was significant and accounted for 3% of the variance [$F(2,157) = 3.437$, $p = 0.035$]. The model was only able to explain differences in representation rates for Hispanic students in this disability category when economic indicators were entered into the model.

Of the runs that were significant, the district suspension/expulsion rate did not remain significant for any subgroup when controlling for poverty in the hierarchical regression. Behavioral Measures were not able to explain differences in representation rates for any subgroup independent of poverty. A district's rate of suspensions and expulsions cannot account for differences in disproportionality over and above the effects of poverty.

Table VI on the following page presents the results of the hierarchical regression for the District Resources Model. For this model, per pupil spending, average teacher salary, and student to teacher ratio functioned as the predictor variables in block one of the regression, which is displayed as "Resources Only" in the table below. This version of the model considered the impact of District Resources alone, without including economic indicators. Median income functioned as the predictor variable in block two to control for the effects of poverty on the overall District Resources Model, which is displayed as "Resources plus Economic" in Table VI. The ES for each disability category by race functioned as the criterion variable. In the table below, "pps" equals per pupil spending, "tsal" equals average teacher salary, "str" equals student to teacher ratio, and "inc" equals the median income for each district.

Table VI. Results of Hierarchical Regression: District Resources.

Disability Category		African American Resources Only	African American Resources plus Economic	Hispanic Resources Only	Hispanic Resources plus Economic
SLI	b	pps= -0.905 tsal=0.179 str=-0.044	pps=-0.686 tsal=0.046 str=0.006 inc=0.131	pps=-0.427 tsal=0.086 str=-0.006	pps=-0.350 tsal=0.039 str=0.011 inc=0.046
	β	pps=-0.296 tsal=0.191 str=-0.019	pps=-0.224 tsal=0.049 str=0.002 inc=0.224	pps=-0.162 tsal=0.106 str=-0.003	pps=-0.133 tsal=0.048 str=0.006 inc=0.091
	R^2	0.040	0.071	-0.001	-0.001
	p	0.035	0.004	0.420	0.437
ED	b	pps=-1.006 tsal=0.267 str=-0.137	pps=-0.664 tsal=0.059 str=-0.060 inc=0.205	pps= -0.245 tsal= 0.074 str= -0.015	pps= 0.101 tsal=-0.013 str=0.018 inc=0.086
	β	pps=-0.396 tsal=0.344 str=-0.072	pps=-0.261 tsal=0.076 str=-0.032 inc=0.422	pps= -0.104 tsal= 0.103 str= -0.008	pps=-0.043 tsal=-0.018 str=0.010 inc=0.191
	R^2	0.097	0.224	-0.010	0.011
	p	0.0001	0.0001	0.702	0.229
CD	b	pps=-0.669 tsal=0.235 str=-0.282	pps=-0.389 tsal=0.067 str=-0.223 inc=0.168	pps=-0.383 tsal=0.101 str=-0.058	pps=-0.296 tsal=0.048 str=-0.039 inc=0.052
	β	pps=-0.211 tsal=0.242 str=-0.119	pps=-0.122 tsal=0.069 str=-0.094 inc=0.271	pps=-0.272 tsal=0.234 str=-0.056	pps=-0.210 tsal=0.111 str=-0.037 inc=0.194
	R^2	0.031	0.079	0.035	0.057
	p	0.049	0.002	0.035	0.011
SLD	b	pps=-0.030 tsal=0.048 str=0.028	pps=0.012 tsal=0.023 str=0.037 inc=0.025	pps=-0.108 tsal=0.025 str=0.018	pps=-0.081 tsal=0.009 str=0.024 inc=0.016
	β	pps=-0.063 tsal=0.335 str=0.079	pps=0.025 tsal=0.159 str=0.106 inc=0.277	pps=-0.236 tsal=0.180 str=0.052	pps=-0.178 tsal=0.065 str=0.070 inc=0.182
	R^2	0.081	0.132	0.030	0.049
	p	0.001	0.0001	0.051	0.019

The District Resources Model was significant for some subgroups but not for others. For African American students in the SLI category, District Resources alone was significant and accounted for 4% of the variance [$F(3,156) = 3.196$, $p = 0.025$]. When District Resources were considered along with economic variables, the model remained significant and accounted for 7.1% of the variance [$F(4,155) = 4.035$, $p = 0.004$]. When economic indicators are entered into the model, the model is able to account for 3.1% more of the differences in representation rates for this subgroup than when District Resources are considered alone. For Hispanic students in the SLI category, neither District Resources alone [$F(3,156) = 0.946$, $p = 0.420$] nor District Resources plus economic variables [$F(4,155) = 0.950$, $p = 0.437$] was significant. Neither version of the model is able to explain differences in representation rates for this subgroup.

Both versions of the model were significant for African American students in the ED category. District Resources alone accounted for 9.7% of the variance [$F(3,156) = 6.701$, $p = 0.0001$] and District Resources plus economic indicators accounted for 22.4% of the variance [$F(4,155) = 12.462$, $p = 0.0001$]. When economic indicators were entered into the model, the model was able to explain more than two times the extent of disproportionality than District Resources alone. For Hispanic students in the ED category, neither District Resources alone [$F(3,156) =,0.472$ $p = 0.702$] nor District Resources plus economic indicators [$F(4,155) = 1.422$, $p = 0.229$] was significant. Though the model was able to explain a considerable proportion of difference in representation rates for African American students in the ED category, neither version of the model could explain these differences for Hispanic students.

Both District Resources alone and District Resources plus economic factors were significant for African American students in the CD category. District Resources alone accounted for 3.1% of the variance [$F(3,154) = 2.679$, $p = 0.049$] and District Resources plus economic factors accounted for 7.9% of the variance [$F(4,153) = 4.373$, $p = 0.002$]. When economics were considered, the model was able to explain more than double the differences between groups than could be accounted for by District Resources alone. The same is true for Hispanic students in the CD category. The version of the model considering District Resources alone was significant, accounting for 3.5% of the variance [$F(3,156) = 2.904$, $p = 0.035$]. The version that also included economic factors was also significant, accounting for 5.7% of the variance [$F(4,155) = 3.407$, $p = 0.011$]. Again, the model was able to explain more of the difference between groups when economics were considered.

For African American students in the SLD category, both versions of the District Resources model were significant. District Resources alone was significant and accounted for 8.1% of the variance [$F(3,156) = 5.663$, $p = 0.001$]. When economic indicators were considered, the model remained significant and accounted for 13.2% of the variance [$F(4,155) = 7.038$, $p = 0.0001$]. The inclusion of economic factors increased the extent to which the District Resources model was able to explain differences in effect sizes in the SLD category for African American students. For Hispanic students in the SLD category, considering District Resources alone did not result in a significant model [$F(3,156) = 2.655$, $p = 0.051$], but the inclusion of economic factors into the model accounted for 4.9% of the variance [$F(4,155) = 3.028$, $p = 0.019$]. The District Resources model is not sufficient to explain differences in representation rates for Hispanic students

in the SLD category when considered independently of poverty, but when economic

factors are included the model is able to account for a small degree of difference in

representation rates.

Of the versions of the model that were significant, only the predictor variable per

pupil spending remained significant when controlling for poverty in the regression. This

predictor variable remained significant for African American students in the SLI

(p=0.028) and ED (p=0.005) categories and for Hispanic students in the CD category

(p=0.40). Per pupil spending is able to explain differences in representation rates over

and above the effects of poverty for some subgroups. None of the other predictor

variables remained significant when poverty was entered into the regression.

Table VII (on the following page) presents the results of the hierarchical

regression for the Racial Demographics model. For this model, predictor variables in

block one included the percentage of Caucasian students multiplied by 100 and the

percentage of students from the racial or ethnic group of interest multiplied by 100. The

results for these predictor variables are displayed as "Race Only" in the table below.

Median income was entered into block two of the regression to control for the effects of

poverty on the overall Racial Demographics Model, which is displayed as "Race plus

Economics" in Table VII. The ES for each disability category by race for each district

functioned as the criterion variable. In Table VII, "%_C" equals the Caucasian

percentage of the total student population, "%_A" equals the African American

percentage of the total student population, "%_H" equals the Hispanic percentage of the

total student population, and "inc" equals the district median income.

Table VII. Results of Hierarchical Regression: Racial Demographics.

Disability Category		African American Race Only	African American Race plus Economics	Hispanic Race Only	Hispanic Race plus Economics
SLI	b	%_C =0.173 %_A =0.079	%_C =0.161 %_A =0.074 inc =0.064	%_C =0.060 %_H=-0.025	%_C =0.060 %_H=-0.023 inc =0.006
	β	%_C =0.307 %_A =0.058	%_C =0.665 %_A =0.290 inc =0.109	%_C =0.288 %_H=-0.027	%_C =0.285 %_H=-0.026 inc =0.012
	R^2	0.176	0.182	0.076	0.070
	p	0.0001	0.0001	0.001	0.002
ED	b	%_C=0.091 %_A=-0.004	%_C =0.060 %_A =-0.015 inc =0.160	%_C =0.037 %_H=-0.040	%_C =0.031 %_H=-0.026 inc =0.055
	β	%_C =0.451 %_A=-0.017	%_C =0.300 %_A =-0.069 inc =0.330	%_C =0.200 %_H=-0.050	%_C =0.167 %_H=-0.032 inc =0.121
	R^2	0.208	0.304	0.035	0.042
	p	0.0001	0.0001	0.022	0.021
CD	b	%_C =0.096 %_A =0.024	%_C =0.071 %_A =0.016 inc =0.142	%_C =0.025 %_H =0.108	%_C =0.018 %_H =0.125 inc =0.064
	β	%_C =0.378 %_A =0.090	%_C =0.277 %_A =0.060 inc =0.230	%_C =0.227 %_H =0.224	%_C =0.162 %_H =0.259 inc =0.239
	R^2	0.074	0.117	0.065	0.110
	p	0.001	0.0001	0.002	0.0001
SLD	b	%_C =0.022 %_A =0.021	%_C =0.016 %_A =0.019 inc =0.031	%_C =0.007 %_H =0.049	%_C =0.004 %_H =0.054 inc =0.021
	β	%_C =0.587 %_A =0.535	%_C =0.428 %_A =0.481 inc =0.349	%_C =0.118 %_H =0.313	%_C =0.118 %_H =0.348 inc =0.236
	R^2	0.020	0.126	0.091	0.136
	p	0.076	0.0001	0.0001	0.0001

The Racial Demographics Model was significant for some subgroups but not for others. For African American students in the SLI category, racial demographics alone was significant, accounting for 17.6% of the variance [$F(2,157) = 18.033$, $p = 0.0001$]. When economic indicators were entered into the model, the model remained significant

and accounted for 18.2% of the variance [$F(3,156) = 12.793$, $p = 0.0001$] for this subgroup. Both versions of the model are able to explain a moderate degree of the differences between representation rates for students in this subgroup.

For African American students in the ED category, both versions of the model were significant. Racial demographics alone accounted for 20.8% of the variance [$F(2,157) = 21.932$, $p = 0.0001$] and the inclusion of economic indicators accounted for 30.4% of the variance [$F(3,156) = 24.134$, $p = 0.0001$]. Prior to the inclusion of economic factors, the Racial Demographics model was able to explain a moderate degree of the differences in representation rates. When median income was included in the model, the extent to which the model explained these differences increased by almost 10%.

In the CD category for African American students, both versions of the model were significant. Racial Demographics alone accounted for 7.4% of the variance [$F(2,155) = 7.302$, $p = 0.001$] and when economic factors were included the model accounted for 11.7% of the variance [$F(3,154) = 7.918$, $p = 0.0001$] for African American students in the CD category. The model was able to explain a small amount of the differences between district representation rates for African American students, whether or not economic factors were included in the model.

For African American students in the SLD category, run Racial Demographics alone was not significant [$F(2,157) = 2.626$, $p = 0.076$]. When economic indicators were included, the model was significant and accounted for 12.6% of the variance [$F(3,156) = 8.626$, $p = 0.0001$] . The Racial Demographics model could not explain differences in representation rates for African American students in this disability category prior to the

inclusion of economic factors. However, when median income was entered into the model, the model was able to explain 12.6% of the difference between district rates of representation for African American students in the SLD category.

For Hispanic students in the SLI category, both versions of the model were significant. Racial Demographics alone accounted for 7.6% of the variance [$F(2,157) = 7.552$, $p = 0.001$] and the model accounted for 7.0% of the variance [$F(3,156) = 5.010$, $p = 0.002$] when economic factors were considered. The model is able to explain slightly more of the difference between district representation rates before median income is included in the model.

Both versions of the model were also significant for Hispanic students in the ED category. Racial Demographics alone accounted for 3.5% of the variance [$F(2,157) = 3.906$, $p = 0.022$] in district representation rates. When economic factors are considered simultaneously with race, the model accounted for 4.2% of the variance [$F(3,156) = 3.342$, $p = 0.021$]. The extent to which the model is able to explain differences in effect sizes for each district increased slightly when economic variables are included.

For Hispanic students in the CD category, Racial Demographics prior to the inclusion of economic indicators was significant and accounted for 6.5% of the variance [$F(2,157) = 6.499$, $p = 0.002$]. When economic factors were included, the model remained significant and accounted for 11.0% of the variance [$F(3,156) = 7.572$, $p = 0.0001$]. Though Racial Demographics alone can explain some of the difference between district representation rates, the extent to which the model can account for these differences almost doubles when economic factors are included.

For Hispanic students in the SLD category, both versions of the model were significant. When Racial Demographics were considered alone, the model accounted for 9.1% of the variance [$F(2,157) = 8.997$, $p = 0.0001$]. When economic factors were included, the model remained significant and accounted for 13.6% of the variance [$F(3,156) = 9.319$, $p = 0.0001$]. Again, the model was able to explain more of the difference between district representation rates when economic factors were considered.

Of the versions that were significant, only some of the predictor variables remained significant when poverty was controlled for in the regression. In the SLI category, the percentage of Caucasian students in a district remained a significant predictor for both African American ($p= 0.006$) and Hispanic ($p=0.001$) students. For Hispanic students in the ED category, the percentage of Caucasian students in the district remained significant ($p=0.046$). For Hispanic students in the CD category, the percentage of Caucasian students ($p=0.045$) and the percentage of Hispanic students ($p=0.001$) remained significant predictors. For Hispanic students in the SLD category, the percentage of Hispanic students in a district ($p=0.0001$) remained a significant predictor variable when poverty was controlled for in the hierarchical regression. The racial make up of a district was able to explain differences in district representation rates over and above that which can be explained by poverty. When economic factors are held constant, racial demographics continue to explain disproportionality in special education.

CHAPTER V
DISCUSSION AND IMPLICATIONS

Discussion

Research Questions

This study was guided by two research questions. The first research question

focused on whether ethnically and socio-culturally diverse students are proportionately

represented in special education in Ohio. The findings from the average Effect Size (ES)

for each racial group and disability category support the hypothesis that students who are

ethnically and socio-culturally diverse are not proportionately represented in special

education. These results confirm the enduring concerns about disproportionate

representation in special education. Recall that an ES = 1 signifies perfectly equal

representation in a disability category. Therefore, an ES close to 1 indicates relatively

even distribution of racial groups in a disability category.   The findings for the state of

Ohio demonstrate that African American students are more than four times as likely as

their Caucasian peers to be found eligible for special education services in the Speech and

Language Impairment category (ES=4.29260); almost five times as likely to be labeled

Emotionally Disturbed (ES=4.7228); four and a half times as likely to be identified as

Cognitively Disabled (ES=4.5180); and 1.3 times as likely to be labeled Learning

Disabled (ES=1.3484). These results demonstrated that African American students in Ohio are also overrepresented across disability categories. Other studies (Zhang & Katsiyannis, 2002; Artiles et al., 2002) have also found that African American students are overrepresented across all disability categories.

The results of the average effect sizes for Hispanic students as shown in Table II were consistent with earlier research as well, in that this subgroup is overrepresented in some disability categories but not in others (Zhang & Katsiyannis, 2002; and Artiles et al., 2002; Fletcher and Navarrete, 2003). These results are consistent with the findings in Zhang and Katsiyannis (2002) for the SLD category, in which Hispanic students are underrepresented. Hispanic students in Ohio are underserved in this category as well, and are only 0.87 times as likely as their Caucasian peers to be identified as Learning Disabled. The underrepresentation of Hispanic students in the SLD category is inconsistent with the findings in Fletcher and Navarrete (2003), but the overrepresentation of Hispanic students in other disability categories is consistent with the findings in that study.

The overrepresentation of Hispanic students in other disability categories, as shown in Table II, are inconsistent with the findings in Zhang and Katsiyannis (2002), which found Hispanic students to be underrepresented in all disability categories. In Ohio, Hispanic students are more than three times as likely as their Caucasian peers to be found eligible for special education under the Speech and Language Impairment category (ES=3.0818); twice as likely to be labeled Emotionally Disturbed (ES=2.0413); and almost one and a half times as likely to be labeled Cognitively Disabled (ES=1.4887). However, Zhang and Katsiyannis (2002) did not consider Hispanic placement in the SLI

category and that study relied on a national sample disaggregated by state. Some of these discrepancies could be attributed to cross-state variability in ED identification (Artiles et al., 2002). Overall, the results for Hispanic students confirm that this group is generally disproportionately represented across disability categories and that this disproportionality is inconsistently manifest as over- or underrepresentation.

A number of factors may contribute to the observed disproportionality. Cultural mismatch between school and community could play a large role in the variation of representation rates. If school personnel misinterpret linguistic or behavioral differences that are culturally based, or do not provide instruction that is culturally responsive, school failure and inappropriate referral for special education services may result. Instructional practices that are not sufficiently differentiated to accommodate a variety of learning styles could also lead to disproportionate school failure and special education placement. Biased ability and achievement assessments may also give the appearance of cognitive and academic deficits where none actually exist. Issues surrounding school culture may also contribute to disproportionality. Failure to effectively communicate behavioral expectations, as well as adversarial relationships between school and family, can contribute to a climate of low academic achievement. Rather than hastily referring young children with behavioral difficulties to special education, schools should spend time explicitly teaching pro-school behaviors and make efforts to establish effective communication with families of struggling students. These factors may intensify the damaging educational effects associated with poverty and result in reduced educational outcomes, in addition to accounting for disproportionate representation in special education.

The second research question focused on whether multiple variables predict degree of disproportionate representation equally well. The results of the multiple linear regression analysis on the Poverty model are consistent with those in Skiba et al. (2005), which showed that the level of poverty in a district does predict overrepresentation across disability categories for African American students. The Poverty model also accounted for variance among the disproportionate representation of Hispanic students, though not across all disability categories. This model was not significant for Hispanic students in the SLI category. In no case did the Poverty model account for a greater degree of variance than one of the other models included in this study. These findings are consistent with those in Skiba et al. (2005), which demonstrated that poverty was not the ultimate predictor of overrepresentation. These results also support the hypothesis that a variety of predictor variables considered in a multivariate analysis will not account for disproportionality equally well.

The results of the hierarchical multiple linear regression analysis on the Academic Measures model are consistent with the findings in Skiba et al., (2005) in that academic measures inconsistently predicted disproportionate representation in a district. However, Skiba et al. (2005) only considered African American representation in correlations with academic measures. This study included analysis of data for Hispanic students as well. The analysis demonstrated significant correlations for both overrepresentation and underrepresentation with academic measures for African American and Hispanic students across most disability categories, with significant results in thirteen out of sixteen tests.

The Academic Measures model accounted for a greater percentage of the variance than the Poverty model in ten cases. For African American students, this model

accounted for more variance than the Poverty model for both versions of the model in the SLI and CD categories as well as when economic indicators were included in the ED category. For Hispanic students, this model accounted for more variance than the Poverty model in both versions for the CD and SLD categories, as well as when Academic Measures were considered alone in the ED category. The first version of the Academic Measures model accounted for more variance than any other model for African American students in the CD category. When poverty was controlled for in the hierarchical regression, the percentage of students scoring proficient or better on the third grade statewide standardized assessment in reading remained a significant predictor variable for African American students in the SLI and CD categories and for Hispanic students in the SLD category. For these subgroups, the third grade achievement variable was able to account for disproportionate representation over and above the effects of poverty. This suggests that poverty alone is not sufficient to account for disproportionality and supports the hypothesis that not all of the predictor variables account for disproportionality equally well.

The Academic Measures model was not significant for Hispanic students in the SLI category for either version of the model. As the Poverty model was not significant in accounting for variance among Hispanic students in the SLI category, it can be concluded that neither the Academic Measures model nor the Poverty model are significant predictors of disproportionality for Hispanic students in this disability category. The Academic Measures model also failed to significantly account for variance in Hispanic representation in the ED category when the economic variable was entered into the model. When Academic Measures were considered alone, the model accounted for a

greater percentage of the variance among Hispanic students in the ED category than the model that considered only economic variables. This suggests that neither the Academic Measures model nor the Poverty model is sufficient in accounting for variance in Hispanic representation in the ED category, but that economic variables may be a more reliable predictor of disproportionality than academic variables for this subgroup.

The analysis on the Academic Measures model also showed that, at times, the variables within each model operated differently across racial groups and disability categories. Within this model, a district's graduation rate was negatively correlated with African American overrepresentation in the SLI and ED categories and Hispanic overrepresentation in the ED and CD categories before poverty was entered in to the regression. Once the economic variable was entered in to the model, graduation rate continued to be negatively correlated with African American overrepresentation in the SLI and ED categories as well as Hispanic representation in the CD category. However, when poverty was controlled for, graduation rate was negatively correlated with Hispanic underrepresentation in the SLD category. This is both consistent and inconsistent with the findings in Skiba et al. (2005), which showed that drop out rate was negatively correlated with African American overrepresentation in MoMR (Moderate Mental Retardation) and positively correlated with African American overrepresentation in SL (speech and language impairment).

Two variables within the Academic Measures model operated consistently across all groups for all disability categories. Median income and the percentage of students scoring proficient or better on the third grade statewide standardized achievement test in reading were positively correlated with disproportionality for all subgroups. This is true

for both versions of the model, before poverty is entered into the regression and when controlling for poverty. These results are also consistent with those in Skiba et al. (2005), which showed that SAT scores were positively correlated with disproportionality in some cases and negatively correlated in other cases. This suggests that academic measures designed to quantify student achievement can also serve as a predictor of disproportionate representation in special education, though caution should be exercised as different measures of achievement served as predictors for different ethnic groups and disability categories. As third grade achievement in reading was the only variable within the model that remained significant when controlling for poverty, this further supports the conclusion that this variable is necessary to account for disproportionality in some subgroups.

The results of the hierarchical regressions on the Behavioral Measures model were inconsistent with the findings in Skiba et al. (2005), which demonstrated that behavioral measures reliably predicted overrepresentation for each disability category for African American students. However, this study included subgroups that were not included in Skiba et al. (2005). The Behavioral Measures model was significant in ten out of sixteen tests. Of the cases in which this model was significant, Behavioral Measures accounted for more variance than the Poverty model in five instances: when economic variables were included for African American students in all disability categories and when economic variables were included for Hispanic students in the CD category. When poverty was controlled for in step two of the hierarchical regression, Behavioral Measures failed to remain a significant predictor for any subgroup. That the version of the of the Behavioral Measures model that included economic indicators

accounted for more variance than the Poverty model alone indicates that considering disciplinary data may magnify the role of economic variables with respect to disproportionate representation in special education.

Though the Behavioral Measures model did not yield significant results in all cases, an important pattern did emerge. In cases where a significant relationship was found, the outcome was nearly always the opposite of that found by Skiba et al. (2005), which showed a positive correlation between disciplinary actions and overrepresentation. For all but one case in which the overall model was significant, there was an inverse relationship between suspension/expulsion rate and disproportionality. For African American students in the SLI, CD, and ED categories, this inverse relationship was evident in both versions of the model. For Hispanic students, the inverse relationship exists in both versions of the model for the CD category and when Behavioral Measures alone are considered in the SLD category. It is only for the version of the model that considers economic indicators for African American students in the SLD category that there is a positive relationship between disciplinary action and overrepresentation. These results further support the hypothesis that multiple variables operate differently for diverse students across disability categories and from state to state.

The results of the hierarchical regressions on the Behavioral Measures model revealed a relationship between disciplinary actions and special education referrals that is somewhat counterintuitive. For most subgroups, the results can be interpreted as showing that an increase in disciplinary actions correlates with a decreased rate of disproportionality. Though the intent is not to draw causal inferences, this relationship could be accounted for in several ways. It could be concluded that the number of

disciplinary actions decreases as special education referrals increase because students who require intensive behavioral supports receive necessary services. Students who exhibit low levels of task engagement may also receive vital academic supports that in turn decrease acting-out behaviors. Less optimistic explanations must also be explored. Students with academic and behavioral difficulties may be inappropriately identified as eligible for special education services, but may receive additional supports that result in fewer disciplinary referrals.

The results of the hierarchical multiple regression analysis on the District Resources model are somewhat consistent with the results in Skiba et al., (2005), which showed a relationship between district resources and overrepresentation of African American students in the MMR category. The District Resources model did account for some of the variance (3.1% in version one and 7.9% in version two) for African American students in the CD category. Ohio uses the CD category, while Indiana uses MMR and MoMR. Therefore, these results are consistent. This model also considered the relationship between district resources and disproportionate representation for Hispanic students, yielding significant results in a total of 11 out of 16 tests. Most significantly, the District Resources model accounted for more variance than any other model for African American students in the SLD category.

Overall, the District Resources model accounted for more variance than the Poverty model in five out of sixteen cases. This model predicted disproportionality to a greater extent than economic variables alone when both District Resources and economic indicators are considered for African American students in the SLI, ED, and SLD categories and when both District Resources and economic indicators are considered for

Hispanic students in the CD and SLD categories. This suggests that a consideration of the resources available to a district magnifies the effects of other economic variables on disproportionate representation, though District Resources alone are insufficient to account for disproportionality.

The District Resources model proved to be a better predictor of disproportionality than the Behavioral Measures model, in that some aspects of this model remained significant when poverty was controlled for in step two of the hierarchical regression. Per pupil expenditures operated as a significant variable in this model when the economic variable entered into the regression for African American students in the SLI and ED categories and for Hispanic students in the CD category. In all three cases, there was an inverse relationship between per pupil spending and disproportionate representation. This result indicates that as per pupil expenditures increased, the extent of disproportionality decreased.

This model also revealed a variety of relationships between predictor variables and disproportionality. For cases in which this model was significant, there was a positive relationship between average teacher salary and disproportionate representation for all subgroups across disability categories in both runs. As the average teacher salary increased, so did the extent of disproportionate representation. Student-to-teacher ratio had a negative relationship with disproportionate representation for African American students in the SLI, ED, and CD categories and for Hispanic students in the CD category when District Resources alone are considered. When poverty was controlled for in the regression, student-to-teacher ratio had a positive relationship with disproportionality for African American students in the SLI and SLD categories and for Hispanic students in

the SLD category. These results are somewhat inconsistent with those in Skiba et al. (2005), which demonstrated a positive correlation between student-to-teacher ratio and African American overrepresentation in MMR. Overall, this model proved to be an inconsistent indicator of disproportionality for most subgroups. Still, for some subgroups the model demonstrated that improved district resources may correspond with a decrease in disproportionate representation in special education.

Some of these findings run counter to expectations. One would expect a positive relationship between student-to-teacher ratio and disproportionality across the board. However, as student-to-teacher ratio increased, the extent of disproportionate representation decreased for African American students in the ED category and for both groups in the CD category when the effects of poverty were held constant.   This relationship might be accounted for in a number of ways. As class size increases, teachers may be less likely to notice an individual student's learning difficulties. Another possibility is that as teachers are exposed to a greater number of ethnically diverse students, misinterpretation of behavioral differences decreases. In any case, the District Resources model accounts for disproportionality for some subgroups in some disability categories beyond effects that can be attributed to poverty.

In comparison with other models, the Racial Demographics model proved to more consistently account for disproportionate representation. These results are somewhat consistent with those in Skiba et al. (2005), which found knowledge of race to be the most reliable predictor of overrepresentation for African Americans across all disability categories. This model accounted for more variance than the Poverty model in 14 out of sixteen cases. For African American students in the SLD category Racial Demographics

alone was not significant. Though the Racial Demographics model was significant for

African American students in the CD category, the first version of the model did not

account for more variance than economic variables alone. For all other subgroups, the

Racial Demographics model accounted for a greater degree of variance than the Poverty

model. When both Racial Demographics and economic indicators are considered, this

model also accounted for more variance than any other model for African American

students in the SLI and ED categories and for Hispanic students in the ED, CD, and SLD

categories. This suggests that knowledge of race magnifies the variance that can be

accounted for by economic variables.

The Racial Demographics model continued to account for variance in

disproportionality for some subgroups when poverty was entered in to step two of the

regression. The percentage of Caucasian students in a district continued to operate as a

significant variable when poverty was held constant for African American students in the

SLI category and for Hispanic students in the SLI, ED, and CD categories. The

percentage of Hispanic students in a district remained significant for Hispanic students in

the CD and SLD categories. It is alarming that the racial demographics of a district

continue to correlate with overrepresentation even when poverty is held constant. This is

consistent with the findings in Skiba et al. (2005), which found that race continues to

influence the odds of an African American student being identified as eligible for special

education, even when controlling for poverty.

The nature of the relationship between racial demographics and disproportionality

is not consistent for both subgroups across disability categories. There was a positive

relationship between the percentage of African American students in a district and the

degree of disproportionality in the SLI, CD, and SLD categories. In these cases, as the percentage of African American students in a district increased, the degree of overrepresentation also increased. However, for African American students in the ED category the inverse is true. In all disability categories, there was a positive relationship between the percentage of Caucasian students in a district and African American overrepresentation.

For Hispanic students, the relationship was even more inconsistent. In the SLI and ED categories, there was an inverse relationship between the percentage of Hispanic students in a district and Hispanic overrepresentation. However, in the CD and SLD categories, there was a positive relationship between the percentage of Hispanic students in a district and disproportionality. Similar to the outcomes for African American students, there was a positive relationship between the percentage of Caucasian students in a district and Hispanic disproportionality across all disability categories. In all cases, as the percentage of Caucasian students in a district increased, so did the extent of disproportionate representation for African American and Hispanic students.

<div align="center">Limitations</div>

The composition of the sample must be taken into consideration when interpreting the results. Considering each racial group independently resulted in small sample sizes for the Asian/Pacific Islander and American Indian/Alaskan Native groups in all disability categories. Collapsing data for Asian/Pacific Islander, American Indian/Alaskan Native, and multiracial subgroups into one larger group to be compared to African American students could obscure important differences that might exist in the special education representation of each group independently and would not yield

accurate between-groups comparisons. As a result of these considerations, Asian/Pacific Islander, American Indian/Alaskan Native, and multiracial students were excluded from the sample. If a large enough sample size was obtained for students of these groups, additional insights regarding the impact of multiple variables on disproportionate representation in special education may emerge.

The sample of Asian American/Pacific Islander is further complicated by the inclusion of students of many ethnicities into this one racial subgroup. As Ngo and Lee (2007) discussed, the disparate outcomes of students of Southeast Asian descent in comparison with students of other Asian ancestry are often obscured when students of any Asian ancestry are grouped together. As a result, the degree of disproportionality may be much greater for some students in this subgroup.

Some difficulties with the sample were unavoidable, as ODE does not report values for subgroups comprised of fewer than 10 students. In such cases, ODE simply notes that there are students in the category and does not report a value. Several public school districts reported having students of a particular ethnicity in a disability category, but as the number of students in the category was fewer than 10 the exact count was not reported. In these cases, informed imputation was used to estimate the population. Because conservative estimates were used, the extent of disproportionality may be underestimated for some districts. Instances of missing data also necessitated the exclusion of 463 districts. This resulted in a somewhat divergent distribution of economic classes and geographic regions in the sample than is found in the state overall. More than half of the counties in the state were represented in the sample.

Additionally, these data are drawn only from one state for one academic year. The variables included in this study may operate differently in the contexts of different states. Some differences were noted in the outcomes of this study in comparison with the Indiana data addressed in Skiba et al. (2005). Additional variations may exist across other states, or in a national context. The relative importance of different variables may shift from year to year as well. As educational and governmental policies adjust in response to the communities they serve, and as economic and other sociodemographic variables transform over time, the impact of these variables on disproportionality will likely be affected.

Finally, the assumptions inherent in the rate ratio method of calculating the ES for each subgroup constitute a limitation. As Hosp and Reschly (2003) explained, the group assigned as the referent in the denominator is assumed to constitute an appropriate control. In this case, the model assumes that Caucasian students are represented in the correct proportion, and that the proportion of all other students in special education should be compared to this group. If the representation of Caucasian students does not constitute an appropriate control, the resulting ES for other subgroups will be inaccurate. However, this method of calculating disproportionality has fewer limitations than the other models which are commonly used. Therefore, despite this limitation, the rate ratio method is the most appropriate means by which to calculate ethnic disproportionality in special education.

<center>Implications</center>

These findings make clear that a number of variables are related to ethnic disproportionality in special education, and that these variables do not operate

consistently across disability categories or in the same way for students of different ethnic backgrounds. Consequently, education policy reforms aimed at reducing disproportionate representation must be directed at a variety of factors in addition to negating the adverse effects of poverty. Ensuring educational equity for all students requires a consideration of the structure of schooling, including academic and behavioral indicators as well as district and community resources.

Though addressing one variable alone is insufficient, initiatives intended to raise students' academic achievement should continue to be refined as one avenue by which to reduce ethnic disproportionality. Such initiatives should include improved pre- and in-service teacher training in culturally competent teaching and assessment. Teaching and assessment practices must be responsive to the context of the community, taking into account the unique needs of students in urban and rural settings. Improved pre-referral practices, such as the RTI model, can be employed to identify and address learning difficulties in the general education setting, thereby reducing inappropriate special education placement. If data-driven prereferral remediation strategies are able to improve achievement outcomes for a subgroup that is overrepresented in a disability category, the large effect sizes for African American and Hispanic students would be expected to decline and more closely resemble the placement rate of Caucasian students.

Under no circumstances should special education enrollment be limited based on the ethnic composition of a district. Doing so would imply that instances of ethnic disproportionality are always the result of bias (Gaviria-Soto & Castro-Morera, 2005). With so many variables at work, this assumption may actually undermine initiatives aimed at ensuring educational equity by depriving students of crucial services. Rather,

when instances of ethnic disproportionality arise the situation should be closely examined

to determine if a change in teaching or assessment practices are warranted, or if some

other aspect of the educational context must be addressed. Above all, practices in both

general and special education should be responsive to the needs of the individual student.

Contributions to the Field

This study contributes to research in the field in the following ways. It:

- Further confirms the extent of the disproportionate representation of ethnically
  and culturally diverse students in special education;

- Further supports that poverty is not the only variable that accounts for ethnic
  disproportionality in special education;

- Shows that multiple variables operate differently in the context of different states,
  compared with data from Indiana in Skiba et al. (2005);

- Expands the number of ethnic groups considered in a multivariate analysis of
  disproportionate representation in special education, compared with Skiba et al.
  (2005);

- Provides multivariate data for Hispanic students; and

- Expands the number of disability categories considered in a multivariate analysis
  of ethnic disproportionality, compared with Zhang and Katsiyannis (2002).

Suggestions for Future Research

As these data are unique to Ohio, future studies should include data from

additional states. Such investigations could confirm that the relationships found in

this study accurately describe disproportionality in a broader context. Furthermore,

the data in both this investigation and in Skiba et al. (2005) are derived from

Midwestern states. Including states from other regions, as well as national data, will lead to a more complete understanding of how multiple variables operate with respect to ethnic disproportionality.

Similarly, longitudinal studies will clarify whether the influence of multiple variables changes over time. Such investigations will highlight trends or anomalies, further informing intelligent reform and policy development.

<div align="center">Summary</div>

An examination of the average effect size for each racial and ethnic group by disability category revealed disproportionate representation for African American and Hispanic subgroups across disability categories and supported the first hypothesis of this study. The results are consistent with earlier studies demonstrating racial and ethnic disproportionality in special education (Zhang & Katsiyannis, 2002; and Artiles et al., 2002; Fletcher and Navarrete, 2003). However, these studies did not address the representation rates for students receiving services under the SLI disability category. Based on these findings, it can be concluded that students of diverse racial and ethnic backgrounds are not proportionately represented across disability categories in Ohio.

The findings from the linear regression analyses are consistent with those in Skiba et al. (2005) and also support the second hypothesis of this study, that all variables will not predict overrepresentation equally well. In no case was poverty the best predictor of overrepresentation. For Hispanic students in the SLI category, the Poverty model failed to significantly account for the variance in overrepresentation. The Academic Measures model accounted for more variance than any other model for African American students in the CD category. The District Resources mode accounted for more variance than any

other model for African American students in the SLD category. In all other cases, the Racial Demographics model accounted for more variance than any other model.

The findings from the hierarchical regressions are consistent with the results in Skiba et al. (2005). In addition, these findings further support the hypothesis that all variables do not predict the degree of disproportionality in a district equally well. By controlling for the effects of poverty, the impact of the other variables in some models becomes more apparent. The results show that aspects of the Academic Measures, District Resources, and Racial Demographics models continue to account for variance in degree of disproportionality independent of poverty measures. At times, these relationships are the inverse of what would be expected.

The results of the regression analyses are significant for a number of reasons. First, they confirm the findings in Skiba et al. (2005) that knowledge of race is an important predictor of disproportionate special education placement. Secondly, these findings run counter to the prevailing logic, which states that ethnic disproportionality in special education can be attributed almost entirely to poverty. This notion effectively equates race with poverty in explaining disproportionality. However, the results of these analyses show that poverty and race do not predict disproportionality equally well. In fact, these variables correlate with disproportionality to varying degrees for different ethnic subgroups and disability categories. This variation continues even when the effects of poverty are held constant. Therefore, poverty can not reliably be used as the prime explanatory factor for ethnic disproportionality in special education. Additionally, these results further support the original hypothesis that different predictor variables, including poverty, do not predict the degree of disproportionality in a district equally

well. No single model accounted for the greatest degree of variance in disproportionate representation across disability categories for all ethnic subgroups, further demonstrating that the relationships among ethnic disproportionality in special education and sociodemographic variables are far from simple. This complexity should not be disregarded by attributing disproportionality entirely to a single variable such as poverty. The findings reinforce the idea that poverty alone cannot account for ethnic disproportionality in special education. In fact, disproportionate representation cannot be accounted for by any single variable or multivariate model.

By contributing new knowledge to the field, this study has implications for both policy and practice. Educational policy makers should direct reform efforts toward ensuring educational equity through multiple initiatives, including raising the overall academic achievement of school districts and providing professional development opportunities for pre-service and practicing teachers. Teachers and teacher-educators must be aware of the issue, and should employ culturally competent assessment and instruction.

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