**Walsh University**

# The Effects of District Characteristics on the Achievement of Students with Disabilities

A Thesis by

**Christopher Dougherty**

Psychology Community/ Clinical and Sociology
Applied Family Studies

Submitted in partial fulfillment of the requirements
for a

**Bachelor of Arts Degree with University Honors**

**May 2021**

Accepted by the Honors Program

| | |
|---|---|
| Lori A. Fiala | *4/16/2021* |
| ***Thesis Advisor*** | ***Date*** |
| Michelle Bemiller | 4-14-21 |
| ***Thesis Reader*** | ***Date*** |
| Rachel Constance Lori A. Fiala | 4/16/0221 |
| ***Honors Co-Directors*** | ***Date*** |

Abstract

The effects of district-level characteristics on the achievement of students with disabilities has received minimal attention in research. Some characteristics that have been found to have significant effects on general student achievement, however, include district-level socioeconomic status, percent minority population, and instructional spending. In a few studies, some of the same factors have also been found to have effects on the achievement of students with disabilities. Specifically, time in the least restrictive environment and access to special education teachers have been found to affect the achievement of students with disabilities. The current study aimed to find further support for the relationships between the achievement of students with disabilities and the district characteristics of instructional spending, number of special education teachers, time in the least restrictive environment, and number of school psychologists. It adds to the current body of knowledge by also considering the moderating effects of percent minority and percent low SES students on these relationships. Data was drawn from the Ohio Department of Education website from 108 public school districts in Northeast Ohio. Significant relationships between academic achievement and the independent variables of instructional spending, time in least restrictive environment, and special education teachers was found. The impact of both the number of special education teachers and amount of instructional spending on achievement was found to vary by different levels of the percent of low SES students in the district.

Table of Contents

List of Figures



List of Tables

# The Effects of District Level Characteristics on the Achievement of Students with Disabilities

Education is supposed to be the great equalizer. It should allow for individuals from all walks of life to be able to compete with each other on a level playing field. There are obvious limitations to this when looking at higher education. Despite the free, public K-12 education provided in America, there are great disparities. Using income data from the U.S. Census Bureau (2020) and school data from the Ohio Department of Education (2019), the relationship between affluence and school success is clear. Within Ohio, the top five highest performing school districts have a median family income of $104,746 while the lowest performing districts have a median family income of $31,512. It is clear that relationships between district characteristics and school achievement exist. However, the question of how student achievement varies by other district characteristics is greatly unknown. Even more unknown is how these characteristics affect the achievement of those students with disabilities.

During the 2018-2019 academic year 15.4 percent of Ohio's school age population were students with disabilities. That equates to 271,090 children who were given special education services during that year (Office for Exceptional Children, 2020). This is a significant number of children who are grouped separate from traditional students. One aspect of this distinction being made is that districts have specific goals regarding the achievement of students with disabilities. Prior research has explored the interaction of demographic variables, such as race, sex, and SES, on the achievement of students both with and without disabilities on the individual student level (Stevens & Schulte, 2017).

Exploring how district characteristics are correlated with variance in achievement of students with disabilities will provide insight into what the best learning environment might be for students with disabilities. Specifically, the number of special education teachers, number of

school psychologists, spending per pupil, and the instructional environment of students with disabilities will be explored. Furthermore, how these factors are mediated by the demographic variables of race and class at the district level will be explored. A large amount of focus is placed on student achievement within the education system. Student achievement is typically measured using standardized tests given at the state level. This method is used often, including the present study, because of the availability of data collected from the test and the standardized nature of the test.

## Review of the Literature

It is well-researched and acknowledged that racial disparities are present in the students served in special education. However, whether these disparities are overrepresentation (Albrecht, Skiba, Chung, Middelberg, & Losen, 2012; Cooc, 2016; Morgan et al., 2018; Sullivan & Bal, 2013) or underrepresentation (Coco, 2016; Hibel, Farkas, & Morgan, 2010; Morgan et al., 2015; Sullivan & Bal, 2013) is questioned. The explanations for these disparities also vary throughout the literature, from the effects of socioeconomic status (Cooc, 2016; Hibel, Farkas, and Morgan, 2010; Morgan et al., 2015; Nevison & Zahorody, 2019; Travers, Krezmien,Mulcahy, & Tincani, 2014; ), to the racial makeup of a school (Cooc, 2016; Hibel, Farkas, & Morgan, 2010; Robinson & Norton, 2019). Of greater interest for the current study is how these factors, at a district level, affect the achievement of students with disabilities.

### Legislation and Disabilities

The current standards for special education in the United States are outlined in the Individuals with Disabilities Education Act (IDEA). This document ensures that children with disabilities have access to free and public education as well as sets guidelines and expectations for this education. One of the key concepts with-in IDEA is that the education must be

appropriate for each child receiving it (U.S. Department of Education, 2017a). The Every Student Succeeds Act (ESSA) lays out expectations for education systems that apply to all students, not only those with disabilities. These laws provide equal educational opportunity for all students regardless of race, language, or socioeconomic status (U.S. Department of Education, 2017b). In 2004, the U.S. Department of Education amended the IDEA to integrate concepts from the No Child Left Behind Act (Hurder, 2014).

IDEA defines a disabled child as having, an "intellectual disability, a hearing impairment, a speech or language impairment, a visual impairment, serious emotional disturbance, an orthopedic impairment, autism, traumatic brain injury, another health impairment (includes attention deficit- hyperactivity disorder), a specific learning disability, deaf-blindness, or multiple disabilities" (U.S. Department of Education, 2018: par. 1). The literature on disparities focuses on intellectual disabilities, speech or language impairment, emotional disturbances, autism, and learning disabilities. These are referred to as high incidence disabilities (Sullivan et al., 2012).

Within the state of Ohio, the expectations of IDEA are still enforced. The Ohio Department of Education has taken clear steps to ensure that the education provided to students with disabilities is appropriate. This is done in both the standards and the assessments that are set up for students with disabilities. The Ohio Learning Standards- Extended lay out the standards of achievement for students with "significant cognitive disabilities" and ensures they are given adequate methods to learn and display knowledge (Ohio Department of Education, 2020a). These standards are then used to design Ohio's Alternate Assessment for Students with Significant Cognitive Disabilities. These assessments provide students who qualify to show their knowledge in mathematics, English, science, and social studies (Ohio Department of Education,

2020b). To determine if a student qualifies for the Alternate Assessments, a flow chart (Appendix 1) is used. Essentially, this chart asks a series of questions to determine if the student has a disability that hinders cognitive and/or adaptive behavioral function and requires intensive instruction and support to make sufficient progress in their grade level work (Ohio Department of Education, 2014).

**Race, Socioeconomic Status, and Disability**

General overviews of previous research have found inconclusive results regarding racial disproportionality within special education (Cruz & Rodl, 2018). Asian Americans are typically found to be underrepresented in most special education categories (Kincaid & Sullivan 2017, Morrier & Gallagher 2012; Hibel et al., 2010; Coco, 2016; Sullivan & Bal, 2013), except the Autism Spectrum Disorder category (Cooc, 2016). Black students are thought to be overrepresented in special education (Shifrer et al., 2011; Albrecht et al., 2012; Sullivan & Bal, 2013; Morrier & Gallagher, 2012). Conflicting findings were produced for high incidence disabilities (Morgan et al., 2015; Hibel et al., 2010). Hispanic students have been found to be underrepresented in special education (Morrier & Gallagher, 2012; Morgan et al., 2015; Sullivan & Bal, 2013; Hibel, Farkas & Morgan, 2010; Morgan et al., 2018). Hispanic and black students are underrepresented in Autism cases (Travers et al., 2013; Travers et al., 2014). This disproportionality is explained by the class-disability and race-class intersections (Nevison & Zahorody, 2019; Travers et al., 2014; Morgan et al., 2015; Hibel, et al., 2010; Cooc, 2016). Underrepresentation also appears to have ties to the racial makeup of the school or state. Schools with higher Asian populations were found to have higher rates of disproportionality (Cooc, 2016). Hibel et al. (2010) found that schools with higher minority populations were less likely to place students into special education in general. Due to the strong relationship between race and

socioeconomic status, it is necessary to explore the effects of both variables together and in isolation.

Socioeconomic status is operationalized by a combination of income, education level, and occupation (Reeves et al., 2016). One clear indicator of low SES is living in poverty. Children who have disabilities have the greatest probability of living in poverty out of all students at public schools (Hurder, 2014). The exact direction of this correlation is unknown, but for certain there is a relationship between SES and disability prevalence. Autism has a strong correlation with SES. Autism prevalence appears to increase with higher levels of SES (Cooc, 2016; King & Bearman, 2011; Thomas et al., 2012; Durkin et al., 2017). However, studies conducted in Sweden (Rai et al., 2017) and France (Delobel et al., 2015) found that autism was actually more prevalent among lower SES populations. Most other disabilities appear to have an inverse relationship with SES (Russel et al., 2016; Rowland et al., 2018; Shifrer et al., 2011; Santiago et al., 2011; Griggs et al., 2019). Studies that found underrepresentation of minorities also concluded that low SES is correlated with a lower prevalence of disabilities (Morgan et al., 2015; Zuckerman et al., 2014).

The concepts of race and SES are strongly correlated in the United States. Reeves and colleagues (2016) looked at poverty across races using a five-dimensional measure. The dimensions included low income, limited education, lack of health insurance, living in a low-income area, and unemployment. Seventy percent of Hispanics and 65% of blacks met the threshold for at least one of the dimensions. By contrast, approximately 37% of whites met these cut offs. This gap widens when looking at what percentage of each race met the threshold for multiple dimensions. Data released by the National Center for Educational Statistics supports these findings on minority representation in poverty. White and Asian Americans had the lowest

poverty rates in 2013 at 13 percent. By contrast, black, Native, and Hispanic Americans had the highest rates among racial groups at 39%, 36% and 32%, respectively (Kena et al., 2015).

**Student Achievement and District Characteristics**

Available research that focuses on school district characteristics focuses on variables tied to administrative actions (Leithwood & Azah, 2017) or teaching methods and focus (Leithwood, 2010). There is evidence that schools with higher levels of minorities and higher levels of poverty score lower on state testing (Logan et al., 2012). These effects were found to be both combined and individual. This same study found that the level of urbanization had no effect on student achievement. Lumpkin (2016) also found a negative correlation between poverty and achievement. The results also supported the idea that higher minority populations are correlated with low achievement. A study by Owens (2018) supported the findings that both high income and lower levels of minorities are associated with higher achievement on math and reading tests. Similar to Logan and colleagues (2012), these factors were found to have individual and joint effects. Perry and McConney (2010) explored the relationship between socioeconomic status and achievement within Australian schools. The results were similar to those of studies done in America. Districts with higher mean levels of socioeconomic status, had high achievement. This was true for all students within the district regardless of their individual socioeconomic status.

One district characteristic that has been found to have drastic effects on student achievement is funding. However, where this funding is allocated is very important when determining the effectiveness of increased funding. Increased funding that goes toward teachers' salaries has little benefit for student achievement. In fact, increasing teachers' salaries without increased funding toward the budget may lead to lower achievement. This is due to the fact that the increased funding for salaries would come from other areas such as resources or services

(Greaves & Sibieta, 2019). Instead of teachers' salaries, the most important funding for student achievement is instructional spending. Rauscher (2018) explored this relationship using district data from Kansas from 2009 through 2015. The results of this study supported the idea that decreased instructional spending leads to lower achievement for all students. However, there was also variance based on racial and socioeconomic characteristics. Decreased funding was found to have more drastic effects on the achievement of Black students as well as Hispanic students. In addition to racial and ethnic minorities, low income students were also more greatly affected by decreased funding. Ballard and Maiden (2019) support the initial findings that spending on instruction is positively correlated with student achievement. Test scores from standardized math and reading assessments were used to measure achievement.

The research on achievement is even more limited when looking at students with disabilities. Again, there is more support for characteristics related to instruction such as time in the general education classroom, the least restrictive environment, being beneficial for the achievement of students with disabilities. Cosier et al (2013) supported this claim and measured student achievement using math and reading assessment scores. McMahon and colleagues (2011) found supporting results as well, but measured student achievement using grade point averages. Packard et al. (2011) found that co teaching in the general education classroom may actually not be beneficial for students with learning disabilities. However, these findings are based on a small and specific sample of ninth graders with learning disabilities at one school. Conflicting results were found by Walsh (2012). A school district in Maryland was studied and findings suggested that co-teaching had drastic positive effects on increasing the achievement of students with disabilities in both math and reading. There is some support that district level SES is positively correlated with student achievement (Cosier et al., 2013). One study found that rural schools

allowed for better achievement for students with disabilities (Telfer & Howley, 2014). However, this was based on instructional methods that lend themselves to smaller schools. A study by Wu, Morgan, and Farkas (2014) explored the interaction of disability and race and its effects on student achievement. Both race and disability are individually associated with lower achievement. However, there was no evidence of a combined effect. The current research looks to help fill this gap in the literature.

**The Role of Special Education Teachers and School Psychologists**

The achievement of students with disabilities is significantly higher when their teachers have completed a special education degree compared to a general education degree. These findings were based on the comparison of math and reading achievement test scores (Feng & Sass, 2013). However, there are conflicting results in regard to the benefits of special education certified teachers. Gilmour (2019) found that learning disabled students with higher academic ability benefitted from a teacher that was certified in both special education and the content area. On the other hand, students with lower ability and emotional-behavioral disorders were better taught by general education teachers. Overall, the results of this study indicated that teacher certification may not be related to achievement. Although special education teachers receive some sort of specialization, they still must meet multiple needs and complete a variety of tasks. Vannest and Hagan-Burke (2010) examined how much time special education teachers spend on different tasks each day. Academic instruction, instructional support, and paperwork were the tasks that accounted for the most time.

Like special education teachers, school psychologists are specialized professionals. School psychologists specialize in the application of psychology with children specifically as learners in the education process. This takes many forms from the diagnosis of multiple disorders

or disabilities, assessment, intervention, and development of programs, among other tasks (American Psychological Association, 2005). A method of intervention that has become more popular in recent years is Response to Intervention (RtI). This method involves multiple interventions and monitoring progress and changing intervention as needed. School psychologists serve an important role in this process as the primary assessors with-in schools (Sullivan & Long, 2010). Although school psychologists have the qualifications to fulfill many important needs within the school environment, they are limited in what tasks they can complete due to understaffing. This causes most school psychologists to be limited to completing the primary role of assessment and diagnosis for disabilities (Walcott & Hyson, 2018). Albritton, Mathews and Boyle (2019) found supporting evidence of this from their survey specifically looking at early childhood school psychologist. The importance of the role of school psychologist to identify students with disabilities as effectively and early on as possible cannot be overstated. The benefits of early identification and intervention have been found for autism (Koegel et al., 2013) and learning disabilities (McNamara, Scissons, & Gutknecth, 2011). Early identification and treatment are vital as they allow for the best chances for the student to receive necessary services or treatments to aid their development, close achievement gaps, and prevent any further disabilities from developing (Aron & Loprest, 2012).

There is no question that a disproportionate representation of racial minorities exists in special education. Future research is needed to determine whether this disproportionality is an example of over- or under-representation of minority groups as well as an exploration of the causes of this disproportionality. Further research is also needed to determine how the achievement of students with disabilities is impacted. Specifically, there is a hole in the research regarding the effects of instructional spending, number of special education teachers, number of

psychologists, amount of time in the least restrictive environment, percent minority students, and percent low SES students, on the achievement of students with disabilities.

## Methodology

### Data

An original data set was created and analyzed using existing data from the Ohio Department of Education (ODOE). Data regarding the district characteristics of interest were found through the 2018-2019 Ohio School Report Cards. Districts are required to share enrollment and staff data with the ODOE yearly. This is where the data for the district characteristics of interest originated. The data used for measures of achievement for students with disabilities, as well as data regarding the instructional time of the students with disabilities, will come from data files provided by the ODOE. The data is gathered by scoring of state tests by the ODOE or through the required reporting of the other measures. A request was made to the ODE for special education data from the 2018-2019 academic year to match the data available from the School Report Cards. Both sources provide district level data, so the unit of analysis for the study is the individual school districts. Specifically, 108 districts from eight Northeast Ohio counties have been chosen for analysis. The districts selected provide a representative sample of race, SES, and urbanization. The range for the variable looking at the percentage of minority students in the districts ranged from just over one percent to 100 percent. Looking at the variable for percentage of low socio-economic status students also had a large range from a little under four percent to 100 percent.

## Measures

### *Dependent Variables*

The outcome variable of interest is the achievement of students with disabilities. Two measures provided by the Special Education Profiles will be used to represent achievement. The two measures of achievement are the *math and reading proficiency rates* for students with disabilities. These are the percentages of students with disabilities, in all grades, who achieved proficiency or higher on the statewide math and reading assessments. The variables used in analyses are percentages that have a possible range from zero to 100.

### *Independent Variables*

Four district characteristics are identified as independent variables. The first and second characteristics are provided as *counts of the number of school psychologists and special education teachers per 1000 students*. The third characteristic of interest is the *spending in U.S. dollars per pupil*. These three variables will be found through the ODE School Report Cards. The fourth characteristic of interest is the percentage of students with Individual Education Plans or IEPs who spend at least 80 percent of the day or more in the general education classroom. This variable was found through the special education data sets provided by the ODE. For all variables, a higher value indicates more of that variable (i.e. more school psychologists/special education teachers, more dollars spent, and more students with disabilities spending the majority of the school day in a general classroom).

### *Moderating Variables*

The percentage of students in the district who are *racial and ethnic minorities* is the first characteristic of interest. This was determined by subtracting the percentage of white non-Hispanic students (the measure commonly found on the school report cards) from 100. The

second moderating variable is the *percentage of students who are economically disadvantaged*. This reflects the percentage of students in a district who received free or reduced-price meals. The final variables for analyses are measured as a percentage ranging from 0-100.

**Conceptual Model, Hypotheses, &Analytical Procedure**

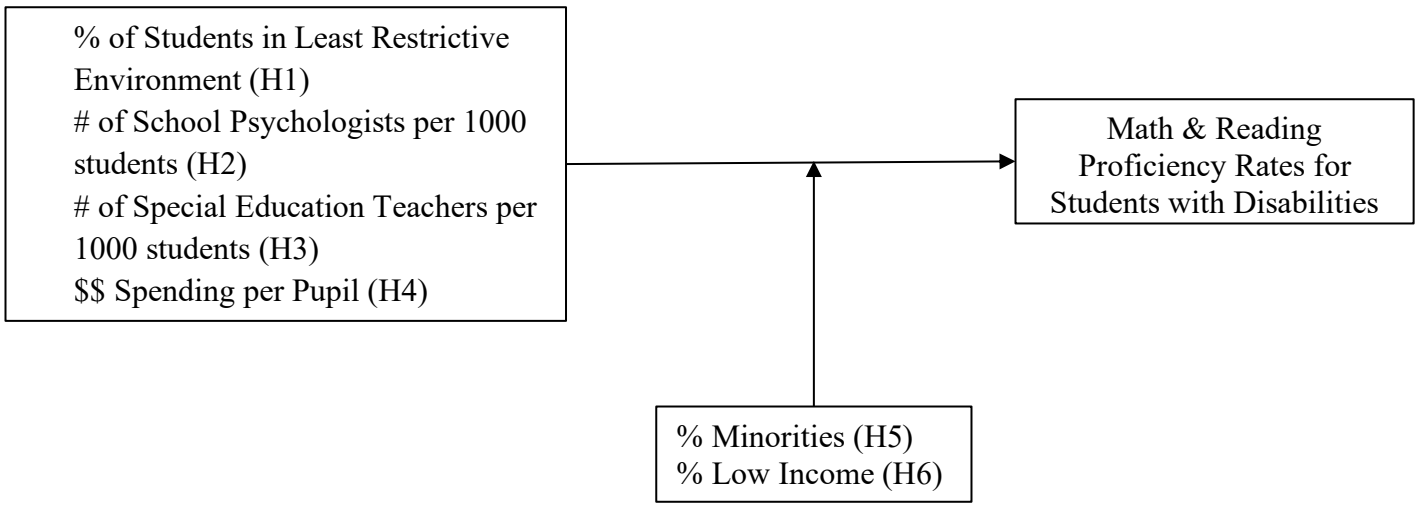



***Figure 1.*** **Conceptual Model**

H1: Greater percentages of students served in the least restrictive environment will be positively associated with math and reading proficiency rates.

H2: Higher numbers of school psychologists will be positively associated with math and reading proficiency rates.

H3: Higher numbers of special education teachers will be positively associated with math and reading proficiency rates.

H4: Greater spending per pupil will be positively associated with math and reading proficiency rates.

H5: The relationships between the independent variables and the math and reading proficiency rates will vary by the percentage of minority students in the school district.

H6: The relationships between the independent variables and the math and reading proficiency rates will vary by the percentage of low-income students in the school district.

Variables were described individually using descriptive statistics including minimum and maximum values as well mean and standard deviation. Because all measures are numerical, all

focal relationships were preliminary assessed at the bivariate level using Pearson's r correlations. Regressions were ran for each outcome variable separately to identify which independent variable has the strongest impact when all four are included in the same model and to test the moderating effects.

## Results

### Descriptive Statistics

The percent of students with disabilities who met the reading proficiency standard in the districts studied ranged from 9.55 percent to 70.76 percent. However, the average percentage for all the districts was 34.06 percent (S.D.= 13.40 percent). The percent of students who met the math proficiency standard presented a similar distribution, with a minimum value of 8.45 percent and a maximum value of 77.74 percent. The average value was 33.67 percent (S.D.= 13.86 percent). This suggests that students are doing similarly in the two subjects. The primary independent variable of focus was the percentage of students with disabilities that spend 80 percent or more of their day in the general education classroom. This would be considered the percentage of students in a least-restrictive environment. This measure varied from 17.26 percent to 88.89 percent. The average value was 66.58 percent (S.D.= 10.73 percent).

A number of other potentially impactful variables were also considered in the study. The number of school psychologists per 1,000 students varied from zero to 3.60. The average was 1.08 school psychologists per 1,000 students (S.D.= 0.62). The variable of special education teachers per 1,000 students ranged from 0.10 to 23.90, with an average of 12.80 (S.D.= 3.83). The instructional spending per student varied between districts from $5,035.00 to $13,471.00. The average spending was $7,299.30 (S.D.= $1,414.34). The moderating variable of percentage of minority students in the district ranged from 1.50 percent to 100 percent. The average

percentage of minority students was 23.80 percent (S.D.= 26.00). The second moderating variable, the percentage of low socioeconomic status students, varied from 3.80 percent to 100 percent. The average value for this variable was 38.43 percent (S.D.= 26.67).

Table 1.
*Descriptive Statistics for Study Variables*

| | Mean | SD | Min | Max |
|---|---|---|---|---|
| **Reading Proficiency (%)** | 34.06% | 13.40% | 9.55% | 70.76% |
| **Math Proficiency (%)** | 33.67% | 13.86% | 8.45% | 77.74% |
| **Students in LRE (%)** | 66.58% | 10.73% | 17.26% | 88.89% |
| **School Psychologist per 1,000 Students** | 1.08 | 0.62 | 0.00 | 3.60 |
| **Special Ed Teachers per 1,000 Students** | 12.80 | 3.83 | 0.10 | 23.90 |
| **Instructional Spending per student ($)** | 7299.30 | 1414.34 | 5035.0 0 | 13471.00 |
| **% Minority Students** | 23.80% | 26.00% | 1.50% | 100% |
| **% Low SES Students** | 38.43% | 26.67% | 3.80% | 100% |

**Bivariate Results**

The relationship between the percentage of students in the least restrictive environment and the reading proficiency rate of students with disabilities was significant, but only at the 90% confidence level, $r(106) = 0.180$, $p < 0.10$. The relationship between the percentage of students with disabilities who spend 80 percent of the school day in the regular education classroom and the math proficiency rate for students with disabilities was also significant using the same confidence level, $r(106) = .176$, $p < 0.10$. An increase in the percentage of students in least-restrictive environments is at least somewhat associated with an increase in both reading and math proficiency rates for students with disabilities, but the relationship is weak. The relationship between the number of school psychologists per 1,000 students and the reading proficiency rate of students with disabilities was not significant, $r(106) = -0.023$, $p > .05$. The

relationship between the number of school psychologists per 1,000 students and the math proficiency rates was also not significant, r (106) = -.060, p > .05.

The relationship between the number of special education teachers per 1,000 students and the reading proficiency rate of students was significant, r (106) = -0.343, p < 0.05. An increased proportion of special education teachers per 1,000 students was associated with a decrease in the reading proficiency rate of students with disabilities. The relationship between the number of special education teachers per 1,000 students and the math proficiency rate of students was significant, r (106) = -0.393, p < 0.05. An increased proportion of special education teachers per 1,000 students was associated with a decrease in the math proficiency rate of students with disabilities. The relationship between the instructional spending per student, and both the reading and math proficiency rates was significant and moderate in strength, r (106)= 0.500, p < 0.05, and r (106)= 0.430, p < 0.05. An increase in instructional spending was associated with increases in both the reading and math proficiency rates.

Table 2.

*Correlations of Key Study Variables*

| | ***1*** | ***2*** |
|---|---|---|
| **Reading Proficiency (% Passing)** | 1.000 | |
| **Math Proficiency (% Passing)** | 0.926 | 1.000 |
| **Students in least Restrictive Environment** | 0.180* | 0.176* |
| **School Psychologist per 1,000 Students** | -0.023 | -0.060 |
| **Special Ed Teachers per 1,000 Students** | -0.343** | -0.393** |
| **Instructional Spending** | 0.500** | 0.430** |

*** p < 0.05  * p < 0.10*

**Multivariate Results for Reading Proficiency**

When controlling for each independent variable in the current study, the relationship between the number of special education teachers and reading proficiency rates was significant, b= -0.92, t(103)= -3.65, p<.05. For a one unit increase in the number of special education teachers the reading proficiency rate decreased by .92 percent. The relationship between instructional spending and reading proficiency was also significant, b= 4.55, t(103)= 5.77, p<.05. For each 1,000 dollar increase in instructional spending per student the reading proficiency rate increases by 4.55 percent. The relationship between reading proficiency and the percent of students in the least restrictive environment was not significant, b=0.11, t(103)= 1.01, p> .05. The relationship between the number of school psychologists and reading proficiency was also not significant, b= -0.47, t(103)= -0.24, p>.05. These variables combined explain 32 percent of the variance in reading proficiency, adjusted r2= .32, F(103)= 13.67, p< .05.

Adding in the moderating variables of percent minority and percent low SES, while still controlling for each individual variable changed the significance of relationships. The relationship between reading proficiency and instructional spending remained significant, b= 3.56, t(101)= 5.13, p< .05. For a 1,000 dollar increase in instructional spending reading proficiency increased by 3.56 percent. The relationship between percent of low SES students and reading proficiency was also significant, b= -0.26, t(101)= -5.26, p< .05. For a one percent increase in low SES students reading proficiency decreases by 0.26 percent. These variables combined explain 60 percent variance in reading proficiency, adjusted r2= .60, F(101)= 24.78, p< .05. All other relationships between reading proficiency and the remaining independent or moderating variables were not significant.

Table 3.
*Regression for Reading Proffiency Rate*

| | Model 1 | | | | Model 2 | | | | Model 2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **b** | **s.e.** | **Beta** | **t** | **b** | **s.e.** | **Beta** | **t** | **b** | **s.e.** | **Beta** | **t** |
| **Constant** | 34.05 | 1.06 | | 32.05 ** | 34.06 | 0.84 | | 40.34 ** | 31.94 | 1.01 | | 31.73 ** |
| **Least Restrictive Env.** | 0.11 | 0.11 | 0.09 | 1.01 | -0.08 | 0.09 | -0.06 | -0.86 | -0.11 | 0.09 | -0.08 | -1.18 |
| **School Psychs** | -0.47 | 1.94 | -0.02 | -0.24 | 1.68 | 1.64 | 0.08 | 1.02 | 1.54 | 1.73 | 0.07 | 0.89 |
| **Special Ed Teachers** | -0.92 | 0.31 | -0.26 | -3.02 ** | -0.27 | 0.26 | -0.08 | -1.03 | -0.32 | 0.25 | -0.09 | -1.26 |
| **Instructional Spending** | 4.55 | 0.79 | 0.48 | 5.77 ** | 3.56 | 0.69 | 0.38 | 5.13 ** | 2.48 | 0.72 | 0.26 | 3.43 ** |
| **Percent Minority Students** | | | | | -0.06 | 0.05 | -0.13 | -1.22 | -0.04 | 0.06 | -0.08 | -0.73 |
| **Percent Low SES Students** | | | | | -0.26 | 0.05 | -0.52 | -5.26 ** | -0.30 | 0.05 | -0.60 | -6.10 ** |
| **Interactions** | | | | | | | | | | | | |
| ***Least Restrictive X Minority*** | | | | | | | | | 0.00 | 0.00 | -0.02 | -0.10 |
| ***Least Restrictive X LowSES*** | | | | | | | | | 0.00 | 0.01 | 0.00 | 0.00 |
| ***School Psychs X Minority*** | | | | | | | | | -0.01 | 0.07 | -0.02 | -0.17 |
| ***School Psychs X LowSES*** | | | | | | | | | -0.07 | 0.06 | -0.12 | -1.03 |
| ***Special Ed X Minority*** | | | | | | | | | -0.01 | 0.01 | -0.11 | -0.76 |
| ***Special Ed X LowSES*** | | | | | | | | | 0.04 | 0.01 | 0.33 | 2.63 ** |
| ***Spending X Minority*** | | | | | | | | | 0.04 | 0.03 | 0.08 | 1.10 |
| ***Spending X LowSES*** | | | | | | | | | -0.09 | 0.03 | -0.24 | -3.22 ** |
| **Adj. R2** | | | 0.32 | | | | 0.60 | | | | 0.68 | |
| ***F*** | | | 13.67** | | | | 24.78** | | | | 14.04** | |

***p < 0.05*

Lastly, the interactions of the moderating variable on the independent variables were explored. Only two of these interactions were significant. First, the interaction between percent low SES and number of special education teachers was significant, b=0.04, t(93)= 2.63, p< .05. Figure two below shows the interaction of these two variables. The blue line represents the focal relationship between the number of special education teachers and reading proficiency in school districts with small percentages of low SES students, one standard deviation below the mean or 12 percent low SES. The negative slope of this line indicates that in these districts, increased numbers of special education teachers is correlated with decreased reading proficiency. The orange line represents the relationship between the number of special education teachers and reading proficiency within districts with average, within standard deviation of the mean or about 40 percent, low SES students. The slope of this line is slightly negative indicating that there is little relationship between the two variables, but that increasing numbers of special education

teachers in these districts is associated with decreasing reading proficiency. Finally the grey line represents the relationship between number of special education teachers and reading proficiency in districts with a high percentage of low SES students, more than one standard deviation above the mean or 65 percent. The positive slope of this line indicates that in districts with more low SES students, increased numbers of special education teachers are correlated with increased reading proficiency rates.

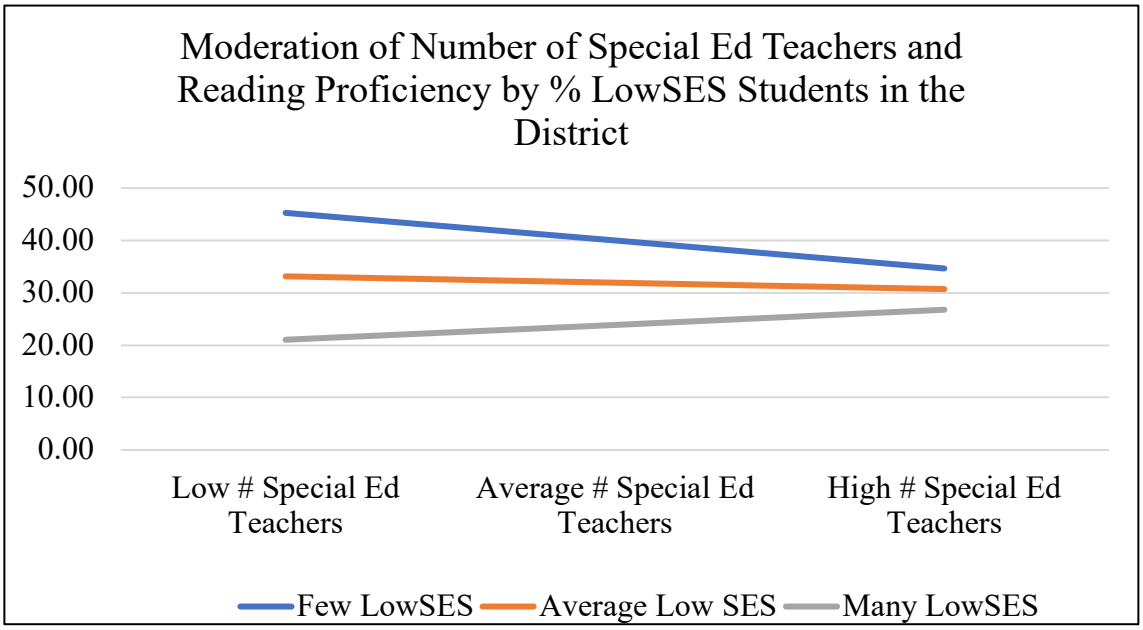



***Figure 2*. Moderation of Number of Special Ed Teachers and Reading Proficiency by % Low SES Students in the District**

The second significant interaction was that of percent low SES and instructional spending, b=-0.09, t(93)= -3.22, p< .05. Figure three below shows the interaction of these two variables. The blue line represents the focal relationship between instructional spending and reading proficiency in school districts with small percentages of low SES students, one standard deviation below the mean or 12 percent low SES. The positive slope of this line indicates that in these districts, increased instructional spending is correlated with increased reading proficiency. The orange line represents the relationship between instructional spending and reading

proficiency within districts with average, within one standard deviation of the mean or about 40 percent, low SES students. The slope of this line is also positive indicating that increased instructional spending in these districts is associated with increased reading proficiency. The slope or strength of this relationship was less impactful in the average districts compared to those with lower levels of low SES students. Finally the grey line represents the relationship between instructional spending and reading proficiency in districts with a high percentage of low SES students, more than one standard deviation above the mean or 65 percent. This line has no slope, which indicates that in districts with more low SES students there is no effect on reading proficiency by increasing instructional spending.

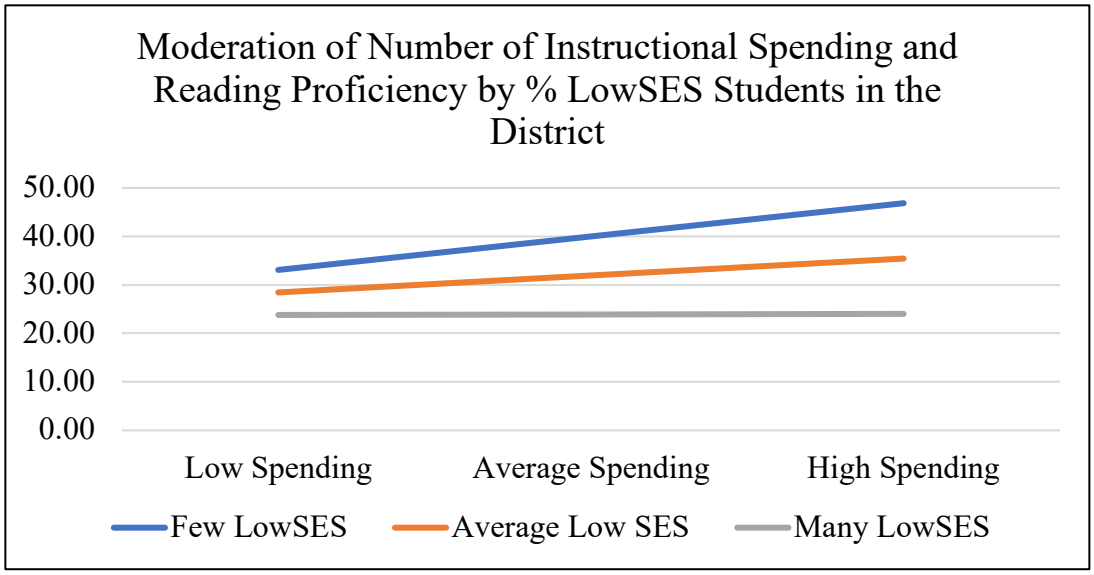



***Figure 3*. Moderation of Instructional Spending and Reading Proficiency by % Low SES Students in the District**

**Multivariate Results for Math Proficiency**

When controlling for each independent variable in the current study, the relationship between the number of special education teachers and math proficiency rates was significant, b= -1.18, t(103)= -3.65, p<.05. For a one unit increase in the number of special education teachers the math proficiency rate decreased by 1.18 percent. The relationship between instructional

spending and math proficiency was also significant, b= 3.99, t(103)= 4.78, p<.05. For each 1,000 dollar increase in instructional spending per student the math proficiency rate increases by 3.99 percent. The relationship between math proficiency and the percent of students in the least restrictive environment was not significant, b=0.08, t(103)= 0.70, p> .05. The relationship between the number of school psychologists and math proficiency was also not significant, b= -0.68, t(103)= -0.33, p>.05. These variables combined explain 29 percent of the variance in reading proficiency, adjusted r2= .29, F(103)= 11.92, p< .05.

Adding in the moderating variables of percent minority and percent low SES, while still controlling for each individual variable changed the significance of relationships. The relationship between math proficiency and instructional spending remained significant, b= 2.99, t(101)= 4.21, p< .05. For a 1,000 dollar increase in instructional spending math proficiency increased by 2.99 percent. The relationship between percent of low SES students and math proficiency was also significant, b= -0.27, t(101)= -5.44, p< .05. For a one percent increase in low SES student's math proficiency decreases by 5.44 percent. These variables combined explain 58 percent variance in math proficiency, adjusted r2= .58, F(101)= 25.78, p< .05. All other relationships between reading proficiency and the remaining independent or moderating variables were not significant.

Table 4.
*Regression for Math Profficiency Rate*

| | Model 1 | | | | Model 2 | | | | Model 2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **b** | **s.e.** | **Beta** | **t** | **b** | **s.e.** | **Beta** | **t** | **b** | **s.e.** | **Beta** | **t** |
| **Constant** | 33.66 | 1.12 | | 29.95 ** | 33.67 | 0.86 | | 39.03 ** | 31.04 | 1.01 | | 30.88 ** |
| **Least Restrictive Env.** | 0.08 | 0.11 | 0.06 | 0.70 | -0.14 | 0.09 | -0.10 | -1.45 | -0.16 | 0.09 | -0.12 | -1.79 |
| **School Psychs** | -0.68 | 2.05 | -0.03 | -0.33 | 1.92 | 1.68 | 0.09 | 1.14 | 1.62 | 1.73 | 0.07 | 0.94 |
| **Special Ed Teachers** | -1.18 | 0.32 | -0.33 | -3.65 ** | -0.46 | 0.26 | -0.13 | -1.75 | -0.60 | 0.25 | -0.16 | -2.37 ** |
| **Instructional Spending** | 3.985 | 0.83 | 0.41 | 4.78 ** | 2.989 | 0.71 | 0.31 | 4.21 ** | 1.77 | 0.72 | 0.18 | 2.46 ** |
| **Percent Minority Students** | | | | | -0.09 | 0.05 | -0.17 | -1.71 | -0.06 | 0.06 | -0.11 | -1.03 |
| **Percent Low SES Students** | | | | | -0.27 | 0.05 | -0.53 | -5.44 ** | -0.33 | 0.05 | -0.64 | -6.74 ** |
| **Interactions** | | | | | | | | | | | | |
| **Least Restrictive X Minority** | | | | | | | | | -0.01 | 0.00 | -0.20 | -1.27 |
| ***Least Restrictive X LowSES*** | | | | | | | | | 0.01 | 0.01 | 0.15 | 1.00 |
| ***School Psychs X Minority*** | | | | | | | | | 0.03 | 0.07 | 0.07 | 0.49 |
| ***School Psychs X LowSES*** | | | | | | | | | -0.07 | 0.06 | -0.13 | -1.15 |
| ***Special Ed X Minority*** | | | | | | | | | -0.03 | 0.01 | -0.26 | -1.88 |
| ***Special Ed X LowSES*** | | | | | | | | | 0.05 | 0.01 | 0.39 | 3.23 ** |
| ***Spending X Minority*** | | | | | | | | | 0.04 | 0.03 | 0.10 | 1.34 |
| ***Spending X LowSES*** | | | | | | | | | -0.10 | 0.03 | -0.27 | -3.73 ** |
| **Adj. R2** | | | 0.29 | | | | 0.58 | | | | 0.66 | |
| ***F*** | | | 11.92** | | | | 25.78** | | | | 15.54** | |

***p < 0.05*

Lastly, the interactions of the moderating variable on the independent variables were explored. Only two of these interactions were significant. First, the interaction between percent low SES and number of special education teachers was significant, b=0.05, t(93)= 3.23, p< .05. Figure four below shows the interaction of these two variables. The blue line represents the focal relationship between the number of special education teachers and math proficiency in school districts with small percentages of low SES students, one standard deviation below the mean or 12 percent low SES. The negative slope of this line indicates that in these districts, increased numbers of special education teachers is correlated with decreased math proficiency. The orange line represents the relationship between the number of special education teachers and math proficiency within districts with average, within standard deviation of the mean or about 40 percent, low SES students. The slope of this line is slightly negative indicating that there is little relationship between the two variables, but that increasing numbers of special education teachers

in these districts is associated with decreasing math proficiency. Finally, the grey line represents the relationship between the number of special education teachers and math proficiency in districts with a high percentage of low SES students, more than one standard deviation above the mean or 65 percent. The positive slope of this line indicates that in districts with more low SES students, increased numbers of special education teachers are correlated with increased math proficiency rates.

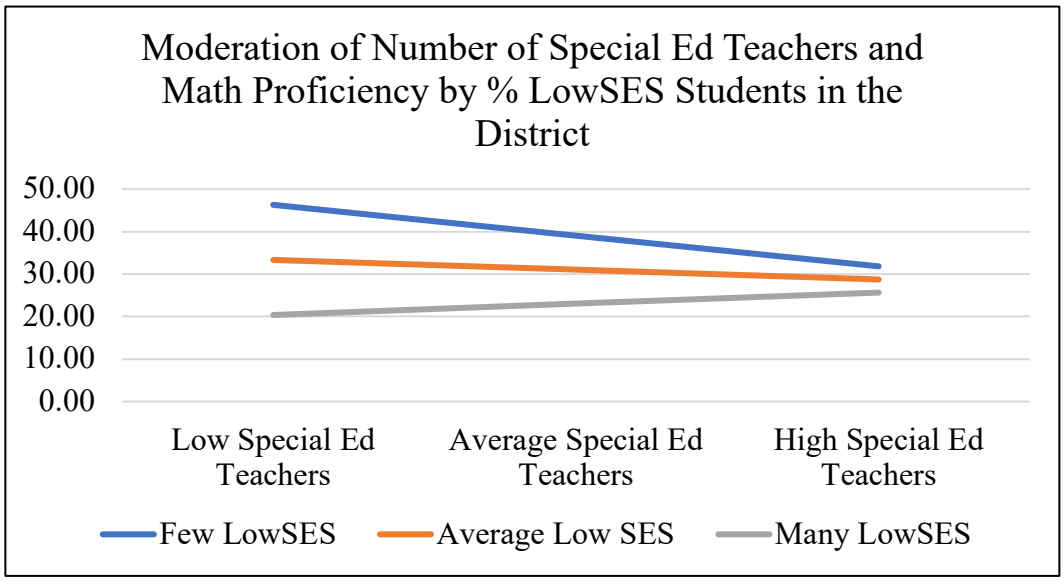



***Figure 4*. Moderation of Number of Special Education Teachers and Math Proficiency by % Low SES Students in the District**

The second significant interaction was that of percent low SES and instructional spending, b=-0.10, t(93)= -3.73, p< .05. Figure five below shows the interaction of these two variables. The blue line represents the focal relationship between instructional spending and math proficiency in school districts with small percentages of low SES students, one standard deviation below the mean or 12 percent low SES. The positive slope of this line indicates that in these districts increased instructional spending is correlated with increased math proficiency. The orange line represents the relationship between instructional spending and math proficiency

within districts with average, within one standard deviation of the mean or about 40 percent, low SES students. The slope of this line is also positive indicating that increased instructional spending in these districts is associated with increased math proficiency. The slope or strength of this relationship was less impactful in the average districts compared to those with lower levels of low SES students. Finally the grey line represents the relationship between instructional spending and math proficiency in districts with a high percentage of low SES students, more than one standard deviation above the mean or 65 percent. The negative slope of this line indicates that in districts with more low SES students increased instructional spending is correlated with decreased math proficiency.

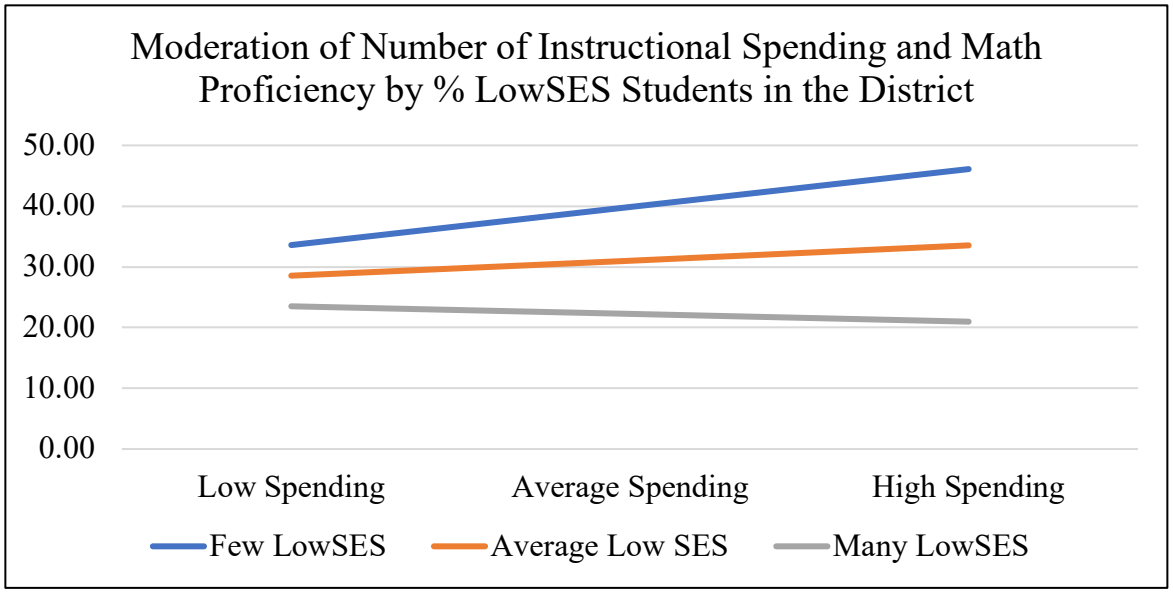



***Figure 5*. Moderation of Instructional Spending and Math Proficiency by % Low SES Students in the District**

## Discussion

The present study aimed to add to research on student achievement. Specifically, it sought to fill the gap in the research regarding the achievement of students with disabilities. The current findings that an increase in the percentage of students with disabilities that spend 80

percent or more of their instructional time in the general classroom is correlated with high rates of proficiency on math and reading assessments, provides further support to, and is in line with, past findings on the importance of students being in the least restrictive environment (Cosier et al, 2013; McMahon et al., 2011). This outcome was expected and well in line with hypothesis one that predicted this relationship. However, this relationship was only significant in the bivariate analysis. In the multivariate analysis, there was no significant relationship between time in the least restrictive environment and achievement on math or reading achievement tests. This change in significance occurred when controlling for number of special education teachers, number of school psychologists, and instructional spending.

The relationships between the number of special education teachers per 1,000 students and assessment proficiency rates were significant in the bivariate analysis, as well as model one of the multivariate analysis. The current findings on the number of special education teachers per 1,000 students were counter to what was predicted in hypothesis three. An increase in the number of special education teachers was found to be associated with lower achievement on math and reading assessments for students with disabilities. While these findings were contrary to the hypothesis in the present study, the findings did not necessarily go against past research. Past findings on this relationship have been divided with some studies supporting the benefits of special education certified teachers (Feng & Sass, 2013) and other studies stating that they may be harmful to, or have no effect, on student achievement (Gilmour, 2019). A possible explanation for the negative relationship between special education teachers and achievement of students with disabilities is that there might be a relationship between the number of special education teachers and the amount of time students with disabilities spend in the general education classroom.

The relationships between instructional spending and math and reading proficiency rates were also significant in both the bivariate and multivariate results. These findings were as expected with an increase in spending being associated with increased math and reading proficiency rates among students with disabilities. This relationship was predicted in hypothesis four. These findings are also in line and further support past research on the relationship between instructional spending and achievement with students with and without disabilities (Ballard & Maiden, 2019; Rauscher, 2018).

The fourth characteristic studied was the number of school psychologists per 1,000 students. While the relationship between school psychologists and student achievement has not been studied directly, the basis for hypothesis two came from Aron and Loprest (2012). However, the relationship that these authors discussed between school psychologists and the achievement of students with disabilities was not supported by the bivariate or multivariate results of the present study. No significant relationship between the number of school psychologists and the achievement of students with disabilities was found.

Of particular interest in the present study was the interaction and potential moderating relationship of percent low SES and minority students on the four independent variables. When isolating all the other variables, percent low SES students had a significant relationship with math and reading proficiency. Both of these relationships were negative, indicating that increased percentages of low SES students is associated with decreased achievement. These findings are consistent with past research on the relationship between SES and achievement (Logan et al., 2012; Lumpkin, 2016; Owens, 2018; Perry & McConney, 2010). However, there was no significant relationship between percent minority and either form of achievement. This conflicts with much of the past research on achievement (Logan et al., 2012; Lumpkin, 2016;

Owens, 2018). It is likely that this is because the present study isolated the variable of percent minority from percent low SES. It is well researched and accepted that these variables are strongly correlated (Reeves et. al., 2016). These findings suggest that variance in achievement by race may be due to underlying differences in SES. Looking at the moderating effects of these variables, there were only two significant interactions for each measure of achievement. In all four cases low SES was the moderating variable, indicating that percent minority had no effect. The interaction between percent low SES and number of special education teachers was significant for both math and reading proficiency rates. The trend of this interaction was almost identical for both dependent variables. Among districts with low or average levels of low SES students, increased numbers of special education teachers were associated with decreased achievement. However, in districts with above average percentages of low SES students, increased numbers of special education teachers were associated with increased achievement. The other significant interaction was between percent low SES students and instructional spending. This interaction was significant for both math and reading proficiencies. The trends for this interaction were similar for math proficiency and reading proficiency. Among districts with low or average levels of low SES students, increased instructional spending was associated with increased achievement. However, in districts with above average percentages of low SES students, increased instructional spending was associated with decreased math achievement. There was no relationship between spending and reading achievement in districts with high percentages of low SES. These interactions highlight the importance of considering multiple variables when implementing change and policy. Policy makers must consider the SES make up of districts when proposing new policy, funding and structure for schools.

**Implications for Policy**

The present findings should be used to create policy that uses resources in the most effective way to increase the achievement of students with disabilities. The most important takeaway from the multivariate analysis and analysis of the moderating variables is that different interventions are needed based on the socioeconomic makeup of a district. Looking first at low SES districts, there should be a push for increased numbers of special education teachers within these districts. Increased proportions of special education teachers per 1000 students were found to have a positive effect of math and reading proficiency rates of students with disabilities in low SES districts. One other implication from the current study for low SES districts is that simply pouring more funding into instructional spending may not lead to an increase in achievement. Among low SES districts increased instructional spending was correlated with no change in achievement for reading proficiency and a decrease in math proficiency for students with disabilities. Combined, the findings on the effects of instructional spending and special education teachers in low SES districts supports that funding in these districts should be used to higher more special education teachers instead of toward increasing the instructional spending. Among average and high SES districts an increased number of special education teachers was correlated with decreased math and reading proficiency rates among students with disabilities. This relationship was stronger among the high SES districts, among average SES districts the strength of weak and almost nonexistent. Increased instructional spending within high and average SES districts was correlated with increased achievement on math and reading assessment for students with disabilities. These finding on instructional spending and special education teachers once again can be used to inform policy within high and average SES districts. These districts, especially high SES ones, should cut back on the number of special education teachers. The

funding that is allocated for special educator salaries should be moved toward increasing the instructional spending per student in order to maximize the achievement of students.

**Limitations**

There are multiple limitations to the present study. The largest limitation or possible source of error within the present study is the discrepancies in sources of data. The data used for the independent variables including number of special education teachers, number of school psychologists, and instructional spending all came from the ODE School Report Cards. These files use data from all the students within the school district. The rest of the data used in the present study came from the ODE Special Education Profiles. Unlike the school report cards, these files only include data from students with disabilities within each district. This would mean that the populations that the data was drawn from are not identical. Another limitation to this study was the sample and sample size. Only 108 districts were analyzed providing for a relatively small sample. Also, because this study focused on districts within Northeast Ohio, the districts were somewhat limited in representative value. While the ranges for the percentages of low SES and minority students were large, ranging from about 3 percent to 100 percent, the mean value for both variables were well below 50 percent, indicating that the data represented more districts with fewer minorities and low income students. A final limitation of the present study is that due to children being a protected population, it was not possible or reasonable to find or get access to information on any level smaller than whole districts.

**Future Research**

Future and larger studies should look to identify trends in student achievement between specific disability categories. Another potential path for future research involves exploring the relationship between school psychologists and the achievement or wellbeing of students with

disabilities. The relationship laid out by Aron and Loprest (2012) lays conceptual ground for such a relationship to exist as school psychologists are often tasked with diagnosing students with disabilities which therefore allow the students access to the additional necessary resources. Possibly starting at a lower unit of analysis such as individual students to see if there is any evidence of this relationship at that level would be beneficial. A further potential path for future research is to conduct deeper analysis of race and SES effects on achievement to determine if race, when isolated from SES, has any effect on achievement. As well as determining if the effectiveness of other interventions or policies vary based on the makeup of the district. Finally, a larger study that may be able to get access to such data, should explore how private and charter schools compare to public schools on their ability to foster the success of students with disabilities.

## Conclusion

The findings of the present study add to the pool of research on student achievement, with specific focus on students with disabilities. This research should be used in addition to the past and present research to inform policy and decision making to help students reach their greatest potential. Special attention should be paid to the SES make up of districts when implementing change as the effectiveness of interventions and policies vary by district because of this characteristic.

References

Albrecht, S., Skiba, R., Chung, C., Middelberg, L., & Losen, D. (2012). Federal policy on disproportionality in special education: Is it moving US forward? *Journal of Disability Policy Studies*, *23*(1), 14–25. https://doi.org/10.1177/1044207311407917

Albritton, K., Mathews, R., and Boyle, S. (2019) Is the role of the school psychologist in early childhood truly expanding? A national survey examining school psychologists' practices and training experiences. *Journal of Applied School Psychology, 35:1, 1-19*, DOI: 10.1080/15377903.2018.1462280

American Psychological Association. (2005). School Psychology. Retrieved from: https://www.apa.org/ed/graduate/specialize/school

Aron, L., & Loprest, P. (2012). Disability and the Education System. *The Future of Children, 22*(1), 97-122. Retrieved December 21, 2020, from http://www.jstor.org/stable/41475648

Ballard, S & Maiden, J. (2019). An examination of school district spending and student achievement in Oklahoma. *Journal of Education Finance. 44*(1), 1–22.

Cooc, N. (2016). Examining the Underrepresentation of Asian Americans in Special Education: New Trends from California School Districts. *Exceptionality*, *26*(1), 1–19. https://doi.org/10.1080/09362835.2016.1216847

Cosier, M., Causton-Theoharis, J., & Theoharis, G. (2013). Does access matter? Time in general education and achievement for students with disabilities. *Remedial & Special Education*, *34*(6), 323–332. https://doi.org/10.1177/0741932513485448

Cruz, R., & Rodl, J. (2018). An Integrative Synthesis of Literature on Disproportionality in Special Education. *The Journal of Special Education*, *52*(1), 50–63. https://doi.org/10.1177/0022466918758707

Delobel, M., Ehlinger, V., Klapouszczak, D., Maffre, T., Raynaud, J., Delpierre, C., & Arnaud, C.. (2015). Socioeconomic Disparities and Prevalence of Autism Spectrum Disorders and Intellectual Disability. PloS one. 10. e0141964. 10.1371/journal.pone.0141964

Durkin, M., Maenner, M., Baio, J., Christensen, D., Daniels, J., Fitzgerald, R., ... Yeargin-Allsopp, M. (2017). Autism spectrum disorder among US children (2002-2010): Socioeconomic, racial, and ethnic disparities. *American Journal of Public Health*, *107*(11), 1818-1826. https://doi.org/10.2105/AJPH.2017.304032

Feng, L., & Sass, T. R. (2013). What makes special-education teachers special? Teacher training and achievement of students with disabilities. *Economics of Education Review*, *36*, 122–134. https://doi.org/10.1016/j.econedurev.2013.06.006

Gilmour, A. (2019). Teacher Certification Area and the Academic Outcomes of Students With Learning Disabilities or Emotional/Behavioral Disorders. Journal of Special Education, 54(1), 40–50. https://doi.org/10.1177/0022466919849905

Greaves, E., & Sibieta, L. (2019). Constrained optimisation? Teacher salaries, school resources and student achievement. Economics of Education Review, 73. https://doi.org/10.1016/j.econedurev.2019.101924

Griggs, S., Ratner, H., Hannigan, J., Delaney, B., & Chiodo, L. (2019). Violence exposure, conflict, and health outcomes in inner-city African American adolescents. *Nursing Forum*, *54*(4), 513–525. https://doi.org/10.1111/nuf.12365

Hibel, J., Farkas, G., & Morgan, P. (2010). Who is placed into special education? *Sociology of Education*, *83*(4), 312–332. https://doi.org/10.1177/0038040710383518

Hurder, A. J. (2014). Left behind with No "Idea": Children with disabilities without means. *Boston College Journal of Law & Social Justice*, *34*(2), 283–310.

Kena, G., L. Musu-Gillette, J. Robinson, X. Wang, A. Rathbun, J. Zhang, S. Wilkinson-Flicker, A. Barmer, and E. Dunlop Velez. (2015). *The condition of education 2015* (NCES 2015-144). National Center for Education Statistics. https://nces.ed.gov/pubs2015/2015144.pdf

Kincaid, A., & Sullivan, A. (2017). Parsing the relations of race and socioeconomic status in special education disproportionality. *Remedial and Special Education*, *38*(3), 159–170. https://doi.org/10.1177/0741932516671199

King, M. D., & Bearman, P. S. (2011). Socioeconomic status and the increased prevalence of autism in California. *American Sociological Review*, *76*(2), 320–346. https://doi.org/10.1177/0003122411399389

Koegel, L., Koegel, R., Ashbaugh, K., and Bradshaw, Jessica. (2013). The importance of early identification and intervention for children with or at risk for autism spectrum disorders. *International Journal of Speech-Language Pathology. 16.* 10.3109/17549507.2013.861511.

Leithwood, K. (2010). Characteristics of school districts that are exceptionally effective in closing the achievement gap. *Leadership & Policy in Schools*, *9*(3), 245–291. https://doi.org/10.1080/15700761003731500

Leithwood, K., & Azah, V. N. (2017). Characteristics of high-performing school districts. *Leadership & Policy in Schools*, *16*(1), 27–53. https://doi.org/10.1080/15700763.2016.1197282

Logan, J. R., Minca, E., & Adar, S. (2012). The geography of inequality: Why separate means unequal in American public schools. *Sociology of Education*, *85*(3), 287–301. https://doi.org/10.1177/0038040711431588

Lumpkin, R. B. (2016). School Buildings, Socioeconomic Status, Race, and Student Achievement. Journal of Intercultural Disciplines, 15, 170–185.

McMahon, S. D., Keys, C. B., Berardi, L., & Crouch, R. (2011). The ecology of achievement among students diverse in ethnicity and ability. *Journal of Community Psychology*, *39*(6), 645–662. https://doi.org/10.1002/jcop.20458

McNamara, J., Scissons, M., and Gutknecth, N. (2011). A Longitudinal Study of Kindergarten Children At Risk for Reading Disabilities: The Poor Really Are Getting Poorer. *Journal of Learning Disabilities*, *44*(5), 421–430. https://doi.org/10.1177/0022219411410040

Morgan, P., Farkas, G., Cook, M., Strassfeld, N., Hillemeier, M., Pun, W., … Schussler, D.. (2018). Are Hispanic, Asian, Native American, or language-minority children overrepresented in special education? *Exceptional Children*, *84*(3), 261–279. https://doi.org/10.1177/0014402917748303

Morgan, P., Farkas, G., Hillemeier, M., Mattison, R., Maczuga, S., Li, H., & Cook, M. (2015). Minorities are disproportionately underrepresented in special education: Longitudinal evidence across five disability conditions. *Educational Researcher, 44*, 278–292. https://doi.org/10.3102/ 0013189X15591157

Morrier, M., & Gallagher, P. (2012). Racial disparities in preschool special education eligibility for five southern states. *Journal of Special Education*, *46*(3), 152–169. https://doi.org/10.1177/0022466910380465

Nevison, C., & Zahorodny, W. (2019). Race/Ethnicity-resolved time trends in United States ASD prevalence estimates from IDEA and ADDM. *Journal of Autism and Developmental Disorders*, *49*(12), 4721–4730. https://doi.org/10.1007/s10803-019-04188-6

Ohio Department of Education. (2014). Ohio AASCD decision making flow chart. Retrieved from https://oh-alt.portal.cambiumast.com/core/fileparse.php/3153/urlt/AASCDParticipationCriteriaFlowChartFinal0825141.pdfOhio Department of Education. (2019a). *Ohio school report cards*. https://reportcard.education.ohio.gov/

Ohio Department of Education. (2019b). *Ohio's special education profiles.* http://education.ohio.gov/Topics/Special-Education/Special-Education-Data-and-Funding/District-Level-Performance-Data

Owens, A. (2018). Income segregation between school districts and inequality in students' achievement. *Sociology of Education*, *91*(1), 1–27. https://doi.org/10.1177/0038040717741180

Packard, A., Hazelkorn, M., Harris, K., and McLeod, R. (2011). Academic achievement of secondary students with learning disabilities in co-taught and resource rooms. *Journal of Research in Education, 21(2),* 100-117. https://eric.ed.gov/?id=EJ1098399

Perry, L. B., & McConney, A. (n.d.). Does the SES of the school matter? An examination of socioeconomic status and student achievement using PISA 2003. Teachers College Record, 112(4), 1137–1162.

Rai, D., Lewis, G., Lundberg, M., Araya, R., Svensson, A., Dalman, C., Carpenter, P., & Magnusson, C.. (2012). Parental socioeconomic status and risk of offspring autism spectrum disorders in a Swedish population-based study. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*, 467-476. https://doi.org/10.1016/j.jaac.2012.02.012.

Rauscher, E. (2017). Education Funding and Inequality in Kansas 2009-2015. Kansas Journal of Law & Public Policy, 27(3), 401–433.

Reeves, R., Rodrigue, E., & Kneebone, E. (2016). *Five evils: Multidimensional poverty and race in America*. The Brookings Institution. https://www.brookings.edu/wp-content/uploads/2016/06/ReevesKneeboneRodrigue_MultidimensionalPoverty_FullPaper.pdf

Rowland, A., Skipper, B., Rabiner, D., Qeadan, F., Campbell, R., Naftel, A., & Umbach, D. (2018). Attention-deficit/hyperactivity disorder (ADHD): Interaction between socioeconomic status and parental history of ADHD determines prevalence. *Journal of Child Psychology & Psychiatry*, *59*(3), 213–222. https://doi.org/10.1111/jcpp.12775

Russell, A., Ford, T., Williams, R., & Russell, G. (2016). The association between socioeconomic disadvantage and attention deficit/hyperactivity disorder (ADHD): A systematic review. *Child Psychiatry and Human Development*, *47*(3), 440–458. https://doi.org/10.1007/s10578-015-0578-3

Santiago, C., Wadsworth, M., & Stump, J. (2011). Socioeconomic status, neighborhood disadvantage, and poverty-related stress: Prospective effects on psychological syndromes among diverse low-income families. *Journal of Economic Psychology*, *32*(2), 218–230. https://doi.org/10.1016/j.joep.2009.10.008

Shifrer, D., Muller, C., & Callahan, R. (2011). Disproportionality and learning disabilities: parsing apart race, socioeconomic status, and language. *Journal of Learning Disabilities*, *44*(3), 246–257. https://doi.org/10.1177/0022219410374236

Stevens, J. J., & Schulte, A. C. (2017). the interaction of learning disability status and student demographic characteristics on mathematics growth. *Journal of Learning Disabilities*, *50*(3), 261–274. https://doi.org/10.1177/0022219415618496

Sullivan, A., and Bal, A. (2013). Disproportionality in special education: Effects of individual and school variables on disability risk. *Exceptional Children*, *79*(4), 475–494. https://doi.org/10.1177/001440291307900406

Sullivan, A. and Long, L. (2010), Examining the changing landscape of school psychology practice: A survey of school-based practitioners regarding Response to Intervention. *Psychology in the Schools*, *47: 1059-1070.* https://doi.org/10.1002/pits.20524

Sullivan, T., Helms, S., Bettencourt, A., Sutherland, K., Lotze, G., Mays, S., … Farrell, A. (2012). A Qualitative Study of Individual and Peer Factors Related to Effective Nonviolent versus Aggressive Responses to Problem Situations among Adolescents with High Incidence Disabilities. *Behavioral Disorders*, *37*(3), 163–178. https://doi.org/10.1177/019874291203700304

Telfer, D., & Howley, A. (2014). Rural schools positioned to promote the high achievement of students with disabilities. *Rural Special Education Quarterly, 33*(4), 3-13. https://doi.org/10.1177/875687051403300402

Thomas, P., Zahorodny, W., Peng, B., Kim, S., Jani, N., Halperin, W., & Brimacombe, M. (2012). The association of autism diagnosis with socioeconomic status. *Autism: The International Journal of Research & Practice*, *16*(2), 201–213. https://doi.org/10.1177/1362361311413397

Travers, J., Krezmien, M., Mulcahy, C., & Tincani, M. (2014). racial disparity in administrative autism identification across the United States during 2000 and 2007. *The Journal of Special Education*, *48*(3), 155–166. https://doi.org/10.1177/0022466912454014

Travers, J., Tincani, M., & Krezmien, M. (2013). A multiyear national profile of racial disparity in autism identification. *The Journal of Special Education*, *47*(1), 41–49. https://doi.org/10.1177/0022466911416247

U.S. Department of Education. (2017a). *About IDEA*. https://sites.ed.gov/idea/about-idea/.

U.S. Department of Education. (2017b). *Every Student Succeeds Act (ESSA).* https://www.ed.gov/essa

U.S. Department of Education. (2018). *Sec. 300.8 Child with a disability*. https://sites.ed.gov/idea/regs/b/a/300.8.

Vannest, K., & Hagan-Burke, S. (2010). Teacher Time Use in Special Education. *Remedial and Special Education*, 31(2), 126–142.

Walcott, C. M., & Hyson, D. (2018). *Results from the NASP 2015 membership survey, part one: Demographics and employment conditions.* National Association of School Psychologists. https://www.nasponline.org/Documents/Research%20and%20Policy/Research%20Center/NRR_Membership_Survey_2015_Walcott_and_Hyson_ 2018.pdf

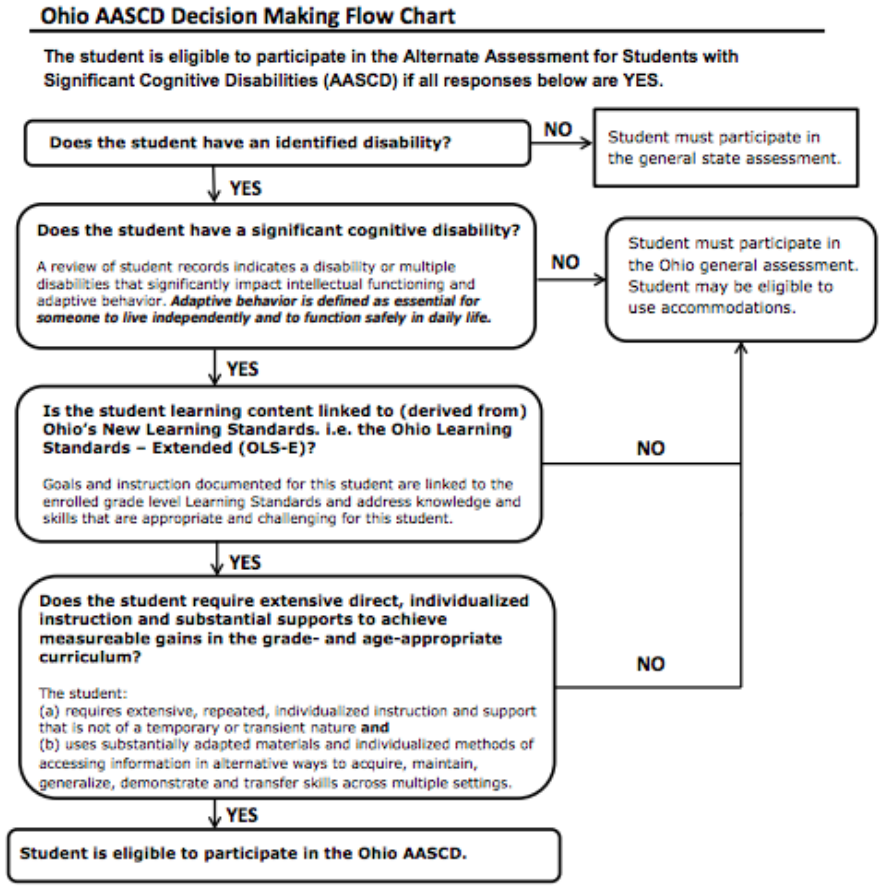
Walsh, J. (2012). Co-Teaching as a School System Strategy for Continuous Improvement, Preventing School Failure: Alternative Education for Children and Youth, 56:1, 29-36, DOI: 10.1080/1045988X.2011.555792

Wu, Q., Morgan, P. L., & Farkas, G. (2014). Does minority status increase the effect of disability status on elementary schoolchildren's academic achievement? *Remedial & Special Education*, *35*(6), 366–377. https://doi.org/10.1177/0741932514547644

Zuckerman, K., Mattox, K., Sinche, B., Blaschke, G., & Bethell, C. (2014). Racial, ethnic, and language disparities in early childhood developmental/behavioral evaluations: A narrative review. *Clinical Pediatrics*, *53*(7), 619–631. https://doi.org/10.1177/0009922813501378

# Appendix

1.


Ohio AASCD Decision Making Flow Chart
The student is eligible to participate in the Alternate Assessment for Students with Significant Cognitive Disabilities (AASCD) if all responses below are YES.
Does the student have an identified disability?
NO
Student must participate in the general state assessment.
YES
Does the student have a significant cognitive disability?
A review of student records indicates a disability or multiple disabilities that significantly impact intellectual functioning and adaptive behavior. Adaptive behavior is defined as essential for someone to live independently and to function safely in daily life.
NO
Student must participate in the Ohio general assessment. Student may be eligible to use accommodations.
YES
Is the student learning content linked to (derived from) Ohio's New Learning Standards. i.e. the Ohio Learning Standards – Extended (OLS-E)?
Goals and instruction documented for this student are linked to the enrolled grade level Learning Standards and address knowledge and skills that are appropriate and challenging for this student.
NO
YES
Does the student require extensive direct, individualized instruction and substantial supports to achieve measureable gains in the grade- and age-appropriate curriculum?
The student:
(a) requires extensive, repeated, individualized instruction and support that is not of a temporary or transient nature and
(b) uses substantially adapted materials and individualized methods of accessing information in alternative ways to acquire, maintain, generalize, demonstrate and transfer skills across multiple settings.
NO
YES
Student is eligible to participate in the Ohio AASCD.
In addition, evidence for the decision for participating in the AASCD is Not Based on:
1. A disability category or label
2. Poor attendance or extended absences
3. Native language/social/cultural or economic difference
4. Expected poor performance on the general education assessment
5. Academic and other services student receives
6. Educational environment or instructional setting
7. Percent of time receiving special education
8. English Learner (EL) status
9. Low reading level/achievement level
10. Anticipated disruptive behavior
11. Impact of student scores on accountability system
12. Administrator decision
13. Anticipated emotional duress
14. Need for accommodations (e.g., assistive technology/AAC) to participate in assessment process
August 25, 2014