RISK FACTORS TIED TO STUDENT ACHIEVEMENT: REDEFINING EDUCATIONAL DISADVANTAGE

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AUTHORIZATION TO SUBMIT

DISSERTATION

This dissertation of Britney Beth Gandhi, submitted for the degree of Doctor of Philosophy in Education with a major in Educational Leadership and titled "Risk Factors Tied to Student Achievement: Redefining Educational Disadvantage," has been reviewed in final form. Permission, as indicated by the signatures and dates given below, is now granted to submit final copies.

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DEDICATION

I dedicate my dissertation to all members of my family who have supported me throughout this process: my husband, son, parents and siblings. Our son was born during this process and he has been the biggest blessing in our lives. I also dedicate this dissertation to the students with whom I have had the privilege to work during my educational career; my hope for them is that no educational disadvantage will ever get in the ways of their ambitions, capabilities, and dreams.

ABSTRACT

Educational disadvantage has been a focus in the United States for decades. The primary factor behind educational disadvantage has been low-income level since Lyndon B Johnson's War on Poverty in 1964. Title I funds were a result of this legislation, but over 50 years of research have indicated that the achievement gap between low-income students and their peers is not decreasing. This quantitative study explores challenges beyond low-income that affect student achievement; specifically, this study presents 19 risk factors (including low-income level) that impact student learning. The research analyzes a school district's upper elementary students in Colorado and the achievement results from the 2017-2018 state assessment. Using statistical analyses including correlation and regression analyses, the study determines relationships between risk factors and student achievement. The results indicated that eight risk factors had an impact on student achievement including special education, free/reduced lunch, African American or Hispanic, English Language Learner, teacher turnover, mobility rate, new principal, and teacher vacancy. The study found that educational disadvantage should be determined by a variety of risk factors and not the single factor of family low-income rate.

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Chapter I

Introduction

The American public-school system identifies students as "disadvantaged" based almost solely on family income level (U.S. Department of Health & Human Services, 2018). However, family income is not the only factor that can cause a student to be disadvantaged. In a study on chronic absenteeism, researchers identified 18 specific risk factors affecting students' achievements which caused them to be considered educationally disadvantaged. These risk factors were broken down into the categories of neighborhood, school, and student, all of which can cause students major challenges that lead to educational disadvantage (Bryk, Bender Sebring, Allensworth, Luppescu, & Easton, 2010; Fantuzzo, LeBoeuf, & Rouse, 2014; Nauer, Mader, Robinson, & Jacobs, 2014). Neighborhood factors include poverty rate and male unemployment, school factors include teacher turnover and student suspensions, and student factors include special education participation and being an English Language Learner (Nauer et al., 2014).

Now that educational disadvantage has been broken down into categories and several risk factors, schools and districts can realize that family income is not the only challenge students face and may choose to help combat those other challenges. Federal funding, however, is provided to "disadvantaged" students based only on family income level. The primary reason for this allocation of funds is that students from low-income families perform at a lower level than other students (Aikens & Barbarin, 2008; Baker & Coley, 2013; Bromberg & Theokas, 2013; Brooks-Gunn & Duncan, 1997; Dynarski & Kainz, 2016; Lubienski & Lubienski, 2006; Reardon, 2013). Title I legislation is the avenue the United States uses to channel additional funds to students from poorer households, but there is little evidence to show that these funds

have made a difference (Carter, 1983; Chait et al., 2001; Kosters & Mast, 2003; Puma, Karwait, Price, & Ricciuti, 1997).

Schools and districts need to be able to channel resources into specific areas that meet the needs of their respective students. When students' basic needs are met, they can focus more easily on learning. This study will examine a school district in Colorado and will further explore the risk factors that previous studies identified. It will also add another step: identifying whether relationships exist between individual risk factors and student achievement. Schools within one district may have different risk factors that affect their students' learning; once identified, schools can focus on combating those risk factors unique to them.

Statement of the Problem

Family income level is the greatest indicator of academic success, even more than race (Baker & Coley, 2013), and it is more important than ever to close the widening educational achievement gap between poor and non-poor students (Reardon, 2013). The United States has utilized family income as a determinant for educational disadvantage and the funding of coordinating programs (U.S. Department of Health & Human Services, 2018); family income is measured by the annual Bureau of the Census, Population Division (Sonnenberg, 2016). Additionally, schools collect information on poverty levels based on student eligibility for Free/Reduced-Priced Meals (F/RPM) (Cruse & Powers, 2006). The National School Lunch Program provides breakfast and lunch to students at low-cost or for free (United States Department of Agriculture Food and Nutrition Service, 2017). However, there are limitations with using family income level and F/RPM as the indicator for students being disadvantaged: not all eligible students and families submit the paperwork to determine eligibility, and there are other major challenges these children face. Challenges include family demographics, language,

unemployment, and living in impoverished neighborhoods (Bryk et al., 2010). Cruse and Powers (2006) found that F/RPM data are not precise enough for school districts to utilize for the poverty rates.

Using family income level to determine extra support for students' education is too broad an indicator. Neighborhood, family, school, and student factors play a part in each student's individual education and path to academic success or failure (Bryk et al., 2010; Fantuzzo et al., 2014; Nauer et al., 2014). Four urban U.S. cities have started to utilize a different method to identify educational disadvantage. These cities recognized that chronic absenteeism (which is considered missing at least 10 percent of the school year) negatively impacted student achievement, and they in turn identified risk factors that were tied to chronic absenteeism. Rather than label schools as high poverty and low poverty, these studies broke down neighborhood, school, and student factors into the risk factors tied to chronic absenteeism, giving districts, Local Education Agencies (LEAs), and states a more detailed and accurate depiction of each school's poverty levels. Examples of the risk factors include student mobility, Child Protective Services (CPS) involvement, and teacher turnover (Bryk et al., 2010; Fantuzzo, et al., 2014; Nauer et al., 2014).

In a New York study, the Office of the Mayor set a goal to identify truly disadvantaged schools (Nauer et al., 2014). The city recognized that even though many schools received Title I funding and had the same "low-income" label, some schools, neighborhoods, and students faced greater challenges than others. The needs of schools that had similar rates of poverty can vary greatly depending on the challenges students face within families and neighborhoods (Nauer et al., 2014).

Table 1

Risk Factors Categorized into Student, School and Neighborhood Factors

Student Factors	School Factors	Neighborhood Factors
Students eligible for free/reduced priced meals	Principal turnover	Child poverty level
Students in temporary housing	Teacher turnover	Poverty rate
Special education students	Teacher vacancy	High school education or below
African American or Hispanic students	Student mobility	Adult professional
Students identified as English Language Learners	Student suspensions	Male unemployment
Students identified as migrants	CPS involvement	Presence of public housing in a school zone
Students identified as refugees		Presence of homeless shelter in school zone

Note. Adapted from "A Better Picture of Poverty," by K. Nauer, N. Mader, G. Robinson, T. Jacobs, B. Cory, J. Moss, and A. Bloodworth, 2014, Center for New York City Affairs. Adapted with permission.

However, there has yet to be a study that identifies a relationship between each of these risk factors and student achievement. These four cities and/or districts (Chicago, Philadelphia, New York City, and the Houston Independent School District) recognized that chronic absenteeism has a relationship to student achievement, and therefore, delineated the factors within chronic absenteeism (Nauer et al., 2014). A further study could identify that some risk factors have a stronger relationship to student achievement, which would lead to conversation about where districts are spending funds.

Consequently, the purpose of this study is to determine whether relationships exist between elementary student academic achievement and risk factors for students, neighborhoods, and schools in Betty Lou School District (the name of this school district is anonymized to protect the identities of schools and their educators). Specifically, this study will examine the relationships between reading and math test results (from the State of Colorado Measures of Academic Success) and the risk factors identified by New York City and the other studies listed above.

Background

In the United States, students from low-income families have shown lower academic achievement than other students (Aikens & Barbarin, 2008; Baker & Coley, 2013; Bromberg & Theokas, 2013; Brooks-Gunn & Duncan, 1997; Dynarski & Kainz, 2016; Lubienski & Lubienski, 2006; Reardon, 2013). The United States has attempted to combat this gap since the 1960s through Title I legislation; the aim was to ensure that the gap in achievement was met with resources and government support. Established under Lyndon B. Johnson's Elementary and Secondary Act, Title I was the country's first attempt at closing the gaps between these groups of students (Office of Education, 1969). Through this legislation, federal funds are allotted to states and then passed down to Local Education Agencies (LEAs) to distribute to schools with high percentages of low-income students. Title I continues today, affecting more than 12 million students; despite five decades of evaluations and adjustments to Title I legislation, however, there is little evidence to show that low-income students are catching up to their peers (Carter, 1983; Chait et al., 2001; Kosters & Mast, 2003; Puma et al., 1997).

With the implementation of Adequate Yearly Progress (AYP) through 2001's No Child Left Behind (NCLB) Act, all schools must make certain levels of progress each year. However,

fifteen years later, many schools were still not meeting the mark. It is up to the discretion of districts and schools as to how they utilize Title I funding. In December 2015, President Obama signed the Every Student Succeeds Act (ESSA) to replace NCLB. The bill increases Title I funding from $14.4 billion to $15 billion in 2017 and to $16.2 billion in 2020. Additionally, states can increase the monies set aside for school improvement purposes from 4% to 7% (Burke, 2015).

Despite the changes made to Title I over the last 50 years, the education gap not only remains but is, in fact, widening. There has been a 40% increase in the socioeconomic achievement gap in the last 25 years, (Reardon, 2013), meaning students who come from families with a higher income perform better academically than students from lower income households. High income students are improving at a faster rate than low income students (Bromberg & Theokas, 2013). The income achievement gap is now surpassing the race gap; achievement gaps between the poor and non-poor are twice as large as the achievement gap between Black and White students (Baker & Coley, 2013). Schools receive funding based on their percentage of students eligible for free/reduced-priced meals, but recent data has shown that this is not effective (Baker & Coley, 2013; Bromberg & Theokas, 2013; Reardon, 2013).

For the past 50 years, Title I legislation has been implemented with the goal of equalizing educational opportunities for American children, despite socioeconomic status (Chait et al., 2001). The funding system has seen many changes with the addition of new programs like the Comprehensive School Reform Demonstration Program, the Reading Excellence Act, and increased flexibility in how funds can be spent. For example, in the 1990s, the model changed to allow school-wide programs, giving Title I identified schools (those in which at least 50 percent

of students qualify for free or reduced lunch) the option to apply funds to school-wide initiatives instead of specific students (Chait et al., 2001).

The past three United States presidents have implemented changes to Title I through Goals 2000 (Klein, 2015), the No Child Left Behind Act (U.S. Department of Education, 2001), and the Every Student Succeeds Act (Every Student Succeeds Act, 2015). Despite continuous changes and hopeful improvements to the funding model with achievement growth in low-income students, studies have shown that the income achievement gap has remained the same or widened (Aikens & Barbarin, 2008; Baker & Coley, 2013; Bromberg & Theokas, 2013; Brooks-Gunn & Duncan, 1997; Lubienski & Lubienski, 2006; Reardon, 2013). Most school districts now use a combination of federal funds (Title I) and local and state funds and grants, which could make it challenging to specifically track the usage and, therefore, effectiveness of Title I. Additionally, while Title I eligibility is examined each year, the Census data is delayed by several years, and, therefore, disparities exist between Title I formula calculations and accurate poverty calculations (Shaul, 2002).

Research Questions

This research study employs a quantitative methods design, determining whether relationships exist between risk factors and student achievement. Specifically, the study will determine whether specific risk factors have a correlation with student achievement as measured by the spring 2018 Colorado Measures of Academic Success (CMAS) for 3rd-5th grade students in Betty Lou School District in a city in the state Colorado. The results may vary across the district as schools and their zones face different challenges than one another. In this study, the specific research questions are:

1. In Betty Lou School District, what are the strengths of the relationships between the risk factors?
2. In Betty Lou School District, which of the risk factors have a relationship with student achievement?
3. In Betty Lou School District, how do schools with similar risk factors perform in student achievement?

Description of Terms

Several terms will be used throughout this study to shape the focus and create a clear picture of the topics, methodology, and findings. Many of the terms are utilized in K-12 education and state accountability.

Achievement gap. The difference in the performance between each Elementary and Secondary Education Act (ESEA) subgroup within a participating local education agency (LEA) or school and the statewide average performance of the LEA's or State's highest achieving subgroups in reading/language arts and mathematics as measured by the assessments required under the ESEA (U.S. Department of Education, 2012).

Adequate yearly progress (AYP). The measure by which schools and school districts are held accountable to specific standards, student achievement, and student growth under the No Child Left Behind Act of 2001 (Editorial Projects in Education Research Center, 2011).

Chronic absenteeism. The attendance rate assigned to a student when he/she misses 10 percent or more of any school year (Chang & Romero, 2008).

Educational disadvantage. The impediments to education arising from social or economic disadvantage which prevent students from deriving appropriate benefit from education in schools (U.S. Department of Education, 1998).

Free/reduced lunch (F/RL). The eligibility of school-aged American children for free or reduced meals at public schools. Eligibility is based on household income eligibility requirements (Shahin, 2017).

Income achievement gap. The academic achievement difference between school-aged children based on household income. School eligibility for socioeconomic level is determined by an annual free or reduced lunch form that is given out in the fall and completed by families to turn into the school (Harbin Sacks, 2016).

Limited English proficient (LEP). School-aged children for whom English is not their first language and who have minimal ability to understand, speak, read, or write English (Limited English Proficiency, 2017).

Local education agencies (LEAs). A public board of education or other public authority legally constituted within a State for either administrative control or direction of, or to perform a service function for, public elementary schools or secondary schools in a city, county, township, school district, or other political subdivision of a State, or for a combination of school districts or counties that is recognized in a State as an administrative agency for its public elementary schools or secondary schools (Department of Education, 2012).

No Child Left Behind (NCLB). A reauthorization of the Elementary and Secondary Education Act with an increase in school accountability overseen by former President George W. Bush (U.S. Department of Education, 2001).

Poverty threshold. The tool utilized and updated each year by the U.S. Census Bureau which measures federal rates of poverty. For 2017, the poverty threshold was $25,100 for a family of four (U.S. Department of Health and Human Services, 2018).

Principal turnover. The rate at which a school district changes, loses, non-renews or fires principals (school leaders) (DeAngelis & White, 2011).

Risk factors. Family or child characteristics (demographic, home, environment, or neighborhood) that increase the likelihood of negative outcomes (O'Higgins, Seba, & Luke, 2015).

Socioeconomic status. A composite measure of factors including income, education, and occupation (Winkelby, Jatulis, Frank, & Fortmann, 1992).

Special education (SPED). The educational services provided to students with an identified disability (U.S. Department of Education, 2017a).

Student achievement. The mastery of skills and concepts set for each grade level or course. This can be determined by course grades, assessments, state assessment or national assessments (Chicago EL Education, 2017).

Student mobility. Any time a student changes schools for reasons other than grade promotion; generally, it refers to students changing schools during the school year (Sparks, 2017).

Teacher turnover rate. The rate at which teachers leave or resign from the district or transition from the classroom teaching position to another position within the school or district, expressed as a percentage. The State of Colorado determines this number by comparing the reported numbers of classroom teachers in one year against the reported numbers from the previous years (Colorado Department of Education, 2017).

Significance of Study

For over half a century, the United States has used one measure, the poverty threshold, as the primary determinant for Title I funding (U.S. Department of Education, 2015a). The poverty

threshold uses one indicator – household income – to determine whether families fall above or below the poverty threshold. Income rates are determined by household monthly income and numbers are rounded to the next dollar (Food and Nutrition Service, U.S. Department of Agriculture, 2017). If they fall below the poverty threshold, families indicate this on a school lunch form schools use to report their income levels to the state and federal governments. As a result, funding is allocated in certain amounts to each school district (Kosters & Mast, 2003; Shaul, 2002). The below table shows the most up to date federal income eligibility guidelines.

Figure 1

Income Eligibility Guidelines

INCOME ELIGIBILITY GUIDELINES

Effective from July 1, 2017 to June 30, 2018

HOUSEHOLD SIZE	FEDERAL POVERTY GUIDELINES	REDUCED PRICE MEALS - 185 %					FREE MEALS - 130 %				
	ANNUAL	ANNUAL	MONTHLY	TWICE PER MONTH	EVERY TWO WEEKS	WEEKLY	ANNUAL	MONTHLY	TWICE PER MONTH	EVERY TWO WEEKS	WEEKLY
48 CONTIGUOUS STATES, DISTRICT OF COLUMBIA, GUAM, AND TERRITORIES											
1	12,060	22,311	1,860	930	859	430	15,678	1,307	654	603	302
2	16,240	30,044	2,504	1,252	1,156	578	21,112	1,760	880	812	406
3	20,420	37,777	3,149	1,575	1,453	727	26,546	2,213	1,107	1,021	511
4	24,600	45,510	3,793	1,897	1,751	876	31,980	2,665	1,333	1,230	615
5	28,780	53,243	4,437	2,219	2,048	1,024	37,414	3,118	1,559	1,439	720
6	32,960	60,976	5,082	2,541	2,346	1,173	42,848	3,571	1,786	1,648	824
7	37,140	68,709	5,726	2,863	2,643	1,322	48,282	4,024	2,012	1,857	929
8	41,320	76,442	6,371	3,186	2,941	1,471	53,716	4,477	2,239	2,066	1,033
For each add'l family member, add	4,180	7,733	645	323	298	149	5,434	453	227	209	105
ALASKA											
1	15,060	27,861	2,322	1,161	1,072	536	19,578	1,632	816	753	377
2	20,290	37,537	3,129	1,565	1,444	722	26,377	2,199	1,100	1,015	508
3	25,520	47,212	3,935	1,968	1,816	908	33,176	2,765	1,383	1,276	638
4	30,750	56,888	4,741	2,371	2,188	1,094	39,975	3,332	1,666	1,538	769
5	35,980	66,563	5,547	2,774	2,561	1,281	46,774	3,898	1,949	1,799	900
6	41,210	76,239	6,354	3,177	2,933	1,467	53,573	4,465	2,233	2,061	1,031
7	46,440	85,914	7,160	3,580	3,305	1,653	60,372	5,031	2,516	2,322	1,161
8	51,670	95,590	7,966	3,983	3,677	1,839	67,171	5,598	2,799	2,584	1,292
For each add'l family member, add	5,230	9,676	807	404	373	187	6,799	567	284	262	131
HAWAII											
1	13,860	25,641	2,137	1,069	987	494	18,018	1,502	751	693	347
2	18,670	34,540	2,879	1,440	1,329	665	24,271	2,023	1,012	934	467
3	23,480	43,438	3,620	1,810	1,671	836	30,524	2,544	1,272	1,174	587
4	28,290	52,337	4,362	2,181	2,013	1,007	36,777	3,065	1,533	1,415	708
5	33,100	61,235	5,103	2,552	2,356	1,178	43,030	3,586	1,793	1,655	828
6	37,910	70,134	5,845	2,923	2,698	1,349	49,283	4,107	2,054	1,896	948
7	42,720	79,032	6,586	3,293	3,040	1,520	55,536	4,628	2,314	2,136	1,068
8	47,530	87,931	7,328	3,664	3,382	1,691	61,789	5,150	2,575	2,377	1,189
For each add'l family member, add	4,810	8,899	742	371	343	172	6,253	522	261	241	121

Note. Shahin, J., U.S. Department of Agriculture (2017). Child nutrition programs: Income eligibility guidelines.

There are several challenges with this method. First, income is not always reported accurately; school lunch forms do not require proof of income, but, rather, families simply write in a number. Second, families may not turn in the school lunch form at all, in which case students living in poverty would not be counted in the school's numbers and additional funds for them would not be administered. Third, with the shift of Title I funds to school-wide programming, specific impoverished students may not be targeted as the funds are being used for school-wide efforts (when the school has at least 50% of its student body eligible for free or reduced lunch) (Aud, 2007; Chait et al., 2001; Roza & Lake, 2015).

This study goes beyond the challenges of the Title I funding model and dives deeper into how the United States identifies truly disadvantaged students. Based on three previous studies, other risk factors have been identified that may give a more accurate picture of disadvantaged students that goes beyond income level (Bryk et al., 2010; Fantuzzo et al., 2014; Nauer et al., 2014). In Betty Lou School District, there are several schools that have about the same poverty rate (based on household income level), but the challenges faced by students in these schools and communities vary greatly. One has a high immigrant population, resulting in a large percentage of the student body being labeled as LEP, another community has an extremely high crime rate, and another has a population of SPED students that is double the state average. This study will examine which risk factors have the most impact (or strongest relationship) with student achievement. Based on this information, school districts may choose to allocate funds differently to schools to combat the specific challenge faced by each school and its community.

Theoretical Framework

To frame this study, ecological systems theory is utilized to explain how a child's qualities are affected and determined by his or her environment (Bronfenbrenner, 1977). As they

grow up, children are in different ecosystems, beginning with the home ecological system, expanding to the school system, and then to the larger society and culture. According to the model, there are five levels of external influence which affect development, including the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1977). Since this study will focus on multiple risk factors that affect children, organized into the categories of neighborhood, school, and student factors, the ecological systems theory will help to explain how these factors affect a child's overall development and, consequently, academic success.

Overview of Research Methods

For this quantitative study, data will be collected from about 2,500 3rd-5th grade students in 14 schools in Betty Lou School District. Data will include the achievement results from the 2017-2018 Colorado Measures of Academic Success (CMAS). Data will also be included from multiple sources to gather student, school, and neighborhood factors; sources will include American Community Survey (for census tract data) and Betty Lou School District Human Resources. A correlational research approach will be utilized to identify relationships between student achievement and the risk factors (categorized into student, school, and neighborhood) using IBM SPSS Statistics software. Several analyses will be utilized to identify relationships including descriptive analysis, regression analyses, and a correlational analysis.

Chapter II

Review of Literature

Introduction

This study aims to address the lack of research linking risk factors to student achievement. The study will use elementary student achievement data from a state assessment in one of the largest school districts in the state of Colorado. The goal of the study will be to find whether relationships exist between specific risk factors and student achievement.

The literature review will synthesize information and research on the existing educational achievement gap between students from low socioeconomic status and their peers and the United States' effort to combat this gap through Title I. Then, the literature review will show the connection between chronic absenteeism and academic progress; chronic absenteeism will be broken down into 20 risk factors with three example studies. The scope of the review will demonstrate a thorough understanding of current knowledge and the deficiency of research tying the specific risk factors to student achievement. The research will be framed by the Ecological Systems Theory, which suggests that one's environment affects one's development.

Low Socioeconomic Status and the Achievement Gap

Studies have shown that, historically, an achievement gap exists between students from low income families and their more affluent peers (Aikens & Barbarin, 2008; Baker & Coley, 2013; Bromberg & Theokas, 2013; Brooks-Gunn & Duncan, 1997; Geiselmann, 2009; Lubienski & Lubienski, 2006; Reardon, 2013). Data from the past 50 years has brought to light that this achievement gap has actually widened over the past several decades, showing a 40% increase in the socioeconomic achievement gap from students born in the 1970s to those born 25 years later (Reardon, 2013). Income has demonstrated to be more of an indication of academic success than

race, which is a change from the mid-20th century (Reardon, 2013). The official poverty rate was adopted in 1969 and, in 2011, 46 million Americans were identified as living in poverty, which was about 15% of the U.S. population; in this same survey, 22% of American children were identified as living in poverty (Baker & Coley, 2013).

Data from the National Assessment of Educational Progress (NAEP) from 2003 to 2011 found that the United States has improved over the last decade in getting more students to the advanced level of achievement (Bromberg & Theokas, 2013). Low income students only improved by one percentage point at the advanced level, however, while the high-income students performing at the advanced level increased by five percentage points. Low income students (as well as Black and Hispanic students) were more than three times as likely as their peers to perform within the lowest achievement category (Bromberg & Theokas, 2013). In a study to determine the impact of school and principal factors on student achievement, the researcher found that only one variable was a significant predictor of student achievement: free and reduced lunch (Gieselmann, 2009).

Data was drawn from several national educational studies' results to determine whether a relationship exists between poverty and educational and other important life outcomes (Baker & Coley, 2013). Results found that (1) the achievement gap between the poor and the non-poor is twice as large as the achievement gap between Black and White students, (2) fourth-graders who were eligible for free lunch scored 29 points lower on the National Assessment of Educational Progress than those not eligible (a similar pattern was seen for eighth graders), and (3) seniors at the lowest levels of family income scored about 100 points lower on the 2012 SAT Critical Reading Assessment than those at the top (Baker & Coley, 2013).

Students entering school in kindergarten from different socioeconomic backgrounds already show a gap in cognition and academic ability (Aikens & Barbarin, 2008). A national study was conducted to examine income achievement gaps using the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999. Over 20,000 students participated in grades kindergarten, first, and third, which led to a finding of an 11.1-point difference between students from low and high income backgrounds (Aikens & Barbarin, 2008). This gap continued to widen; by third grade, a 27.2-point difference existed between the two groups of students. The researchers found that children who lived in poverty when they entered kindergarten were more likely to continue to be behind as they got older (Aikens & Barbarin, 2008). Data from the 2003 National Assessment of Educational Progress found similar results: students with similar demographic backgrounds but lower income levels (as determined by F/RL eligibility) scored 7.2 points lower than their peers who did not qualify for F/RL (Lubienski & Lubienski, 2006).

Poverty affects students in a variety of negative ways, as presented in a study that utilized longitudinal data sets including the Panel Study of Income Dynamics (PSID), the National Survey of Families and Households (NSFH), the National Longitudinal Survey of Youth (NLSY), Children of the NLSY (the follow-up of the children born to the women in the original NLSY cohort), the National Health and Nutrition Examination Survey (NHANES), and the Infant Health and Development Program (IHDP) (Brooks-Gunn & Duncan, 1997). Results from the study found that children from low-income households are three times more likely to experience developmental delays than children living above the poverty threshold. They were more likely to be enrolled in special education. Academically, children who live in poor households for a period of at least four years scored six to nine points lower on the assessments than children who had never lived below the poverty threshold (Brooks-Gunn & Duncan, 1997).

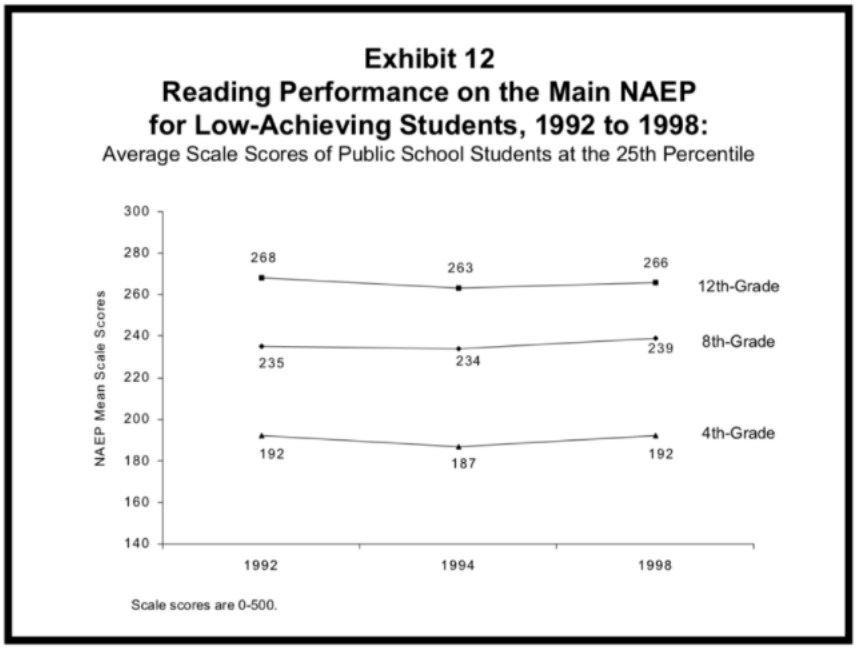
When comparing children from extremely impoverished households (incomes less than half of the poverty threshold) to children well above the poverty threshold (household incomes 1.5 to twice the poverty line), the gap widened to scores between 6 and 13 points lower on the standardized assessments that rated achievement, IQ, and verbal ability (Brooks-Gunn & Duncan, 1997).

Despite funding changes over the last century aimed to increase low-income students' achievements, results have been minimal; since implementing student mastery expectations and holding all campuses to the same standards, results have seen little improvement (Chait et al., 2001). Reading growth was minimal and math results showed a slight increase, but high-income students increased achievement at the same rate, keeping the income gap steady (Chait et al., 2001).

Several studies have been conducted that analyze other factors attributed to the socioeconomic achievement gap including family, neighborhood, and school factors (Aikens & Barbarin, 2008; Barton, 2003; Benson & Borman, 2010; Brooks-Gunn & Duncan, 2007; Lee & Burkam, 2002; Neuman & Celano, 2006). One study analyzed reading achievement at the entry of school and for three years afterward using the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) and the 2000 U.S. Census data. Results indicated that neighborhood factors and social context made an impact on students' reading achievement levels at the entry to school and in the summers between school years (Benson & Borman, 2010). They also found that during the kindergarten school year, school social context impacted students' reading achievement (Benson & Borman, 2010).

Figure 2

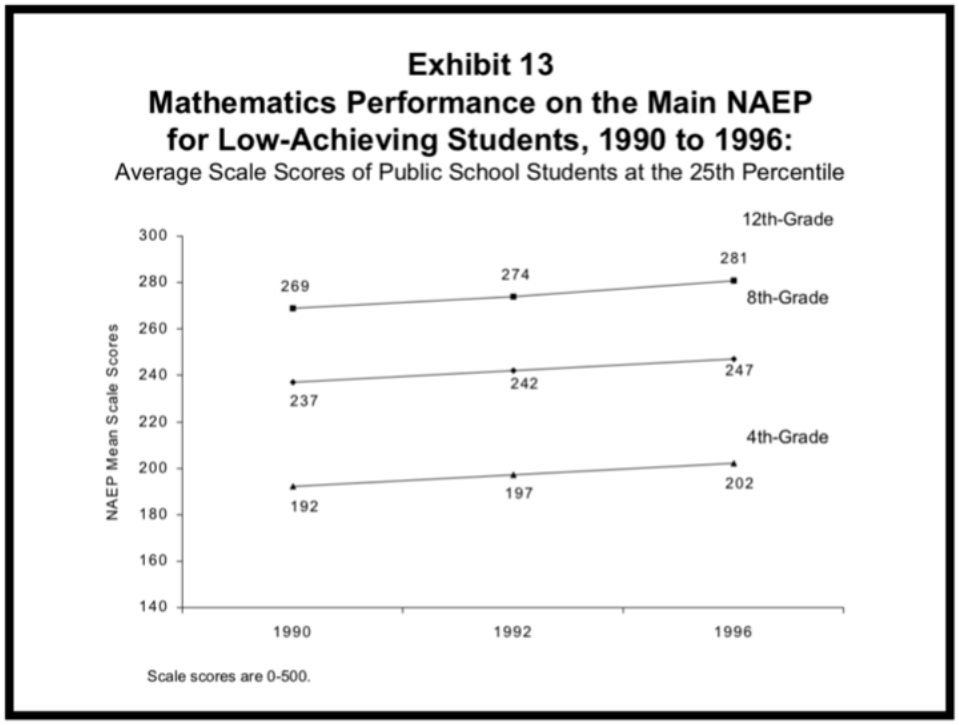
Reading Performance on the Main NAEP for Low-Achievement Students



Note. Chait, R., Hardcastle, D., Kotzin, S., LaPointe, M., Miller, M., Rimdzius, T., ... & Thompson-Hoffman, S. (2001). High Standards for All Students: A Report from the National Assessment of Title I on Progress and Challenges since the 1994 Reauthorization.

Figure 3

Math Performance on the Main NAEP for Low-Achievement Students, 1992 to 1998



Note. Chait, R., Hardcastle, D., Kotzin, S., LaPointe, M., Miller, M., Rimdzius, T., ... & Thompson-Hoffman, S. (2001). High Standards for All Students: A Report from the National Assessment of Title I on Progress and Challenges since the 1994 Reauthorization.

In an effort to promote reading improvement for students from low-income families from a neighborhood and community perspective, the William Penn Foundation donated $20 million to transform Philadelphia libraries to increase technology and text access (Neuman & Celano, 2006). Researchers, philanthropists, and community advocates wanted to know whether a community-based initiative focusing on equalized resources and funding would help close the achievement gap for students in low-income neighborhoods. With the implementation of new resources and technology in the libraries, the results indicated several findings: there was high library use at all sites, including those in low-income neighborhoods; while usage was just as

high for low-income students, the texts they accessed were at a lower level (58% of the time low-income students read below grade level texts); in the preschool section, most middle-income children came in with a parent, and therefore had more engagement with the books; on the contrary, most low-income students came in alone and had less text engagement; and with increased technology, many low-income students utilized the computers to play instead of to read (Neuman & Celano, 2006).

A variety of school and family factors affect students living in low-income households, as found in a study that synthesized several other studies (Barton, 2003). Results indicated that students from low income families are more likely to be in schools where teachers have fewer years of experience, there is a higher rate of teacher turnover, teachers are more likely to be absent, technology is less readily available, the mobility rate is three times as likely than students who are at middle- or high-income schools, and parental involvement is reported to be a moderate or serious problem (Barton, 2003).

Schools with a higher percentage of low-income students may already be disadvantaged when students enter its doors; schools with a high number of low-income students can receive fewer resources, less parental support, attract fewer high-quality teachers, and have to address more student challenges and needs than schools serving more affluent students (Lee & Burkam, 2002). Another study supported findings that children in schools with high levels of poverty showed slower reading growth in primary grades, but alternately found that teacher background and preparedness did not lead to this decline. Instead, family social context was identified as the greatest indicator of socioeconomic academic disparities in reading growth (Aikens & Barbarin, 2008).

Longitudinal data sets from PSID, NLSY, and Children of the NLSY pinpointed home environment, family structure, and neighborhood factors as the primary causes of the income achievement gap (Brooks-Gunn & Duncan, 1997). While family income did have a small negative impact on graduation rates and years of schooling, parent education, family structure, and neighborhood factors were more impactful (Brooks-Gunn & Duncan, 1997). The cognitive outcomes for young children from low-income homes may be determined by home environment. Specifically, warmth of mother-child interactions and the home's physical condition can affect cognitive outcomes in young children (Brooks-Gunn & Duncan, 1997).

Finally, the study found that differences in the home environment, as indicated on the HOME scale, make a substantial impact on the effect of income for preschool children's cognitive development and elementary children's academic achievement (Brooks-Gunn & Duncan, 1997).

A study through the U.S. Department of Education's Institute of Education Sciences examined disadvantaged student access to effective teachers across 29 school districts (Isenberg et al., 2013). The results determined that (1) disadvantaged students did not receive equal access to effective teaching, (2) schools and districts can reduce student achievement gaps between disadvantaged students and their peers by two percentile points by providing equal access to effective teaching to both groups, and (3) access to effective teaching for disadvantaged students did not change over time (Isenberg et al., 2013). Finally, the researchers found that the biggest factor tied to unequal access to effective teaching was the school assignment of students and teachers (Isenberg et al., 2013).

Theoretical Framework

Bronfenbrenner's (1977) Ecological Systems Theory is being used to frame this study; this theory posits that one's environment, and the varying levels of one's environment, affects an individual and his/her development. The theory was created to enhance school psychology practice and research (Burns, Warmbold-Brann, & Zaslofsky, 2015). The first level is microsystem, the system closest to someone which could include home, work, family, co-workers, and peers. Bronfenbrenner (1977) states that this is the most influential level of human development. The next levels are mesosystem (interactions between different parts of a person's microsystem, like a child's parents and teachers), exosystem (a system in which one is not directly involved but affects them), and the macrosystem (one's cultural environment) (Bronfenbrenner, 1977).

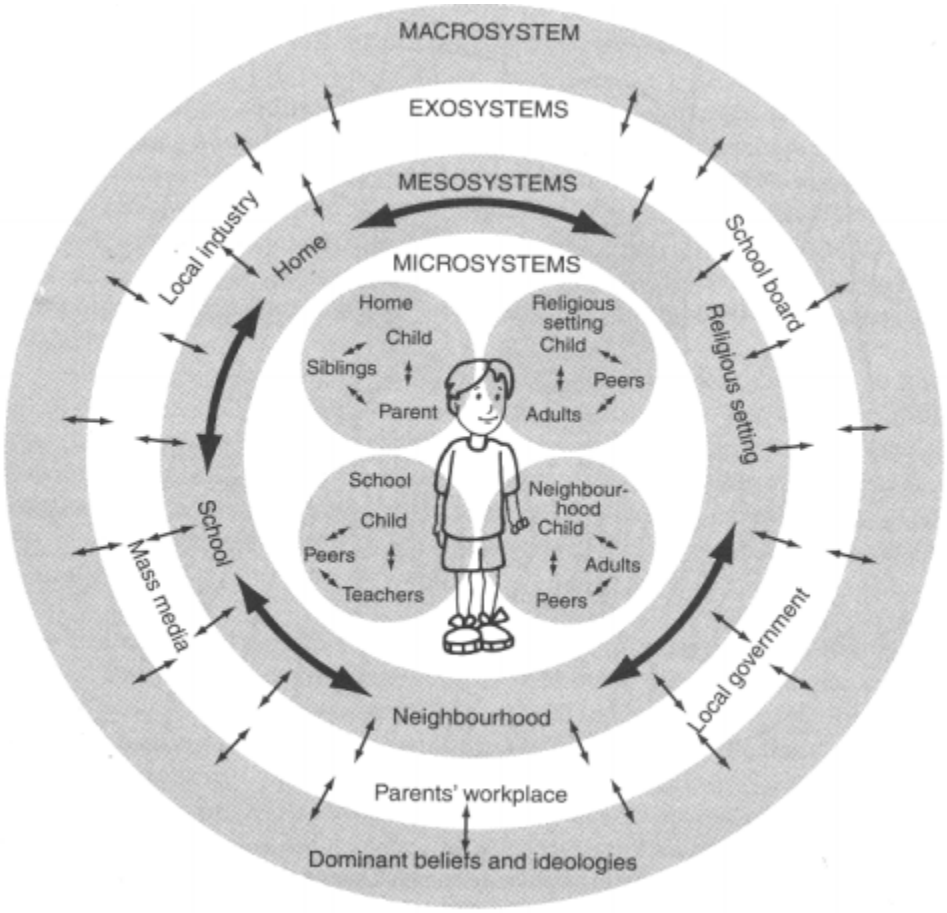
Since the creation of the theory, authors of many studies have utilized the theory to frame their work. In one study, researchers utilized an Ecological Systems Theory to complete a review of literature in an effort to pinpoint the best developmental practices for youth programming. They found that organizations need to develop connections with other programs, families, and schools in order to create the connections between students' environmental levels (Duerden & Witt, 2010). In another study, researchers utilized Ecological Systems Theory to determine whether specific environments (and the people in those environments) contributed to the success of minority high school student athletes. They found that microsystems, in the form of supportive parents, coaches, and teachers, had a large impact on the students' success; the exosystem and macrosystem were also impactful as seen through a team approach and cultural competence (Harris, Hines, Kelly, Williams, & Bagley, 2014).

This study aims to determine which risk factors most affect student achievement; the risk factors are divided into three categories: student, school, and neighborhood. Each of these factors fall into the varying levels of the Ecological Systems Theory, which may help to explain why some have a greater impact and others may have a lesser impact. For example, risk factors in the microsystem may have a bigger impact; neighborhood factors, which could fall into exosystem or macrosystem may have a lesser impact. The results of the study may show that the impact of the levels may vary per student, school, or neighborhood. For example, for some HSD2 students in this study, neighborhood factors may play a big role in their achievement, while for others the school factors may play a bigger role. Using the Ecological Systems Theory, most students' individual factors will fall into their mesosystem; neighborhood factors may fall into students' mesosystems while for others the neighborhood factors will be of less impact and will be part of their macrosystems (Bronfenbrenner, 1977). Figure 4 demonstrates a visual representation of the Ecological Systems Theory.

Bronfenbrenner (1989) refined his research to add a fifth level of one's environment: the chronosystem, which is the development of systems over time. Several studies have utilized the theory to frame their own study and design. A 2008 article utilized Bronfenbrenner's (1989) theory to study internet use during childhood; specifically, the looked at the effect that environment affects childhood internet usage. The study utilized the visual in Figure 4, which demonstrates the theory centered around the child.

Figure 4

The Ecological Approach

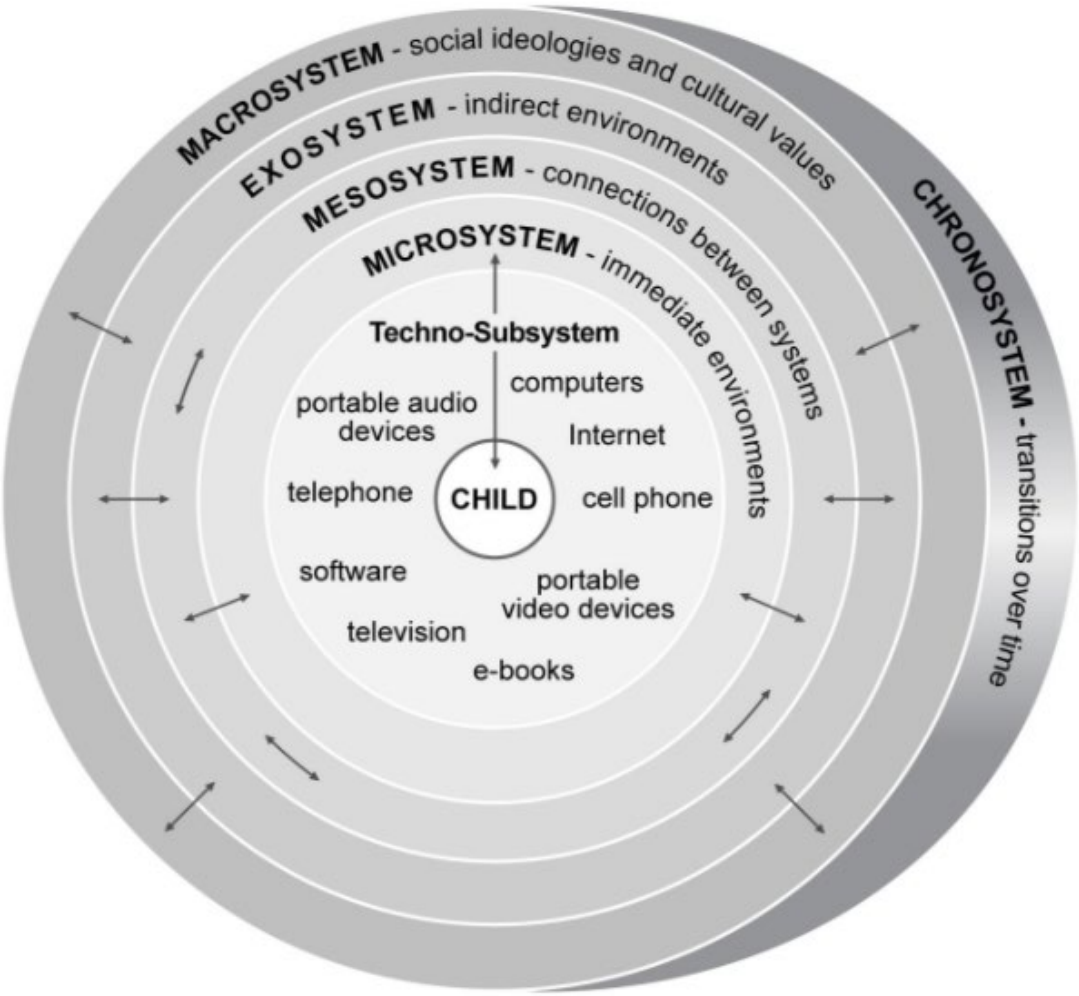


Note. Penn, H. (2005). Understanding early childhood education. *Issues and controversies. Glasgow: Bell & Bain Ltd*.

There have several visual variations of the theory to demonstrate the effect of one's environment on the individual. Figure 5 is another visual but demonstrates the Ecological Systems Theory with the addition of the level chronosystem.

Figure 5

The Ecological Techno-Subsystem



Note. Johnson, G. M., & Puplampu, K. P. (2008). Internet use during childhood and the ecological techno-subsystem. *Canadian Journal of Learning and Technology*, *34*(1).

The Ecological Systems Theory will be used to frame this study in order to determine which environmental factors (in the form of risk factors) have the biggest impact on student achievement in Betty Lou School District. Table 2 shows the risk factors categorized into the levels of the Ecological Systems theory.

Table 2

Risk Factors by Environmental Level from the Ecological Systems Theory

Risk Factor	Environmental Level
Students eligible for free/reduced priced meals	Microsystem
Students in temporary housing	Microsystem
Special education students	Microsystem
African American or Hispanic students	Microsystem
Students identified as English Language Learners	Microsystem
Students identified as migrants	Microsystem
Students identified as refugees	Microsystem
Principal turnover	Mesosystem
Teacher Turnover	Mesosystem
Teacher vacancy	Mesosystem
Student mobility	Mesosystem
Student suspensions	Mesosystem
CPS involvement	Mesosystem
Child poverty level	Exosystem
Poverty Rate	Exosystem
High school education or below	Exosystem
Adult professional	Exosystem
Male unemployment	Exosystem
Presence of public housing in a school zone	Exosystem
Presence of homeless shelter in school zone	Exosystem

As demonstrated in Table 2, the student risk factors fall into the closest and most impactful environmental level: microsystem. The school factors fall into the environmental level of mesosystem, which is the interaction of the different microsytems in which children find themselves. In this case, the microsystem is the interaction of student and school. Finally, the

neighborhood factors fell into the environmental level of exosystem; their neighborhood is an important part of the child but not as impactful as family or school. The levels of the ecological systems will help to interpret the results, indicating which levels have the greatest impact on student growth and achievement.

History of Title I

When the Supreme Court ruled in the 1954 case, Brown vs. Board of Education, that the segregation of children by race was a violation of the 14th Amendment, conversation arose regarding the quality of education being afforded to Black children. This led to a wider discussion about other disadvantaged children, those who came from poor families or were of a different race (Jennings, 2000; Schugurensky, 2011). When elected to office in 1964, President Lyndon B. Johnson declared a war on poverty, hence the inception of Title I, a federal funding system that would give aid to disadvantaged children (Office of Education, 1969). The primary purpose was to ensure equal educational opportunity for all children, regardless of income or socioeconomic level, as well as to close the socioeconomic achievement gap by providing resources for schools serving low-income students (Chait et al., 2001).

For Title I purposes, poverty is defined as the number of poor children in the school district area, per census data (Shaul, 2002). As of 2017, the poverty threshold is $24,300 for families of four (Obamacare.net, 2017). When Title I first began in 1965, students were eligible for Title I grants if their families were considered low-income (family income was less than $2,000) or if the children belonged to families receiving welfare payments under Aid for Families with Dependent Children (AFDC). Title I funds ($1 billion in 1965) were to be used for programs to benefit educationally deprived children, but states had flexibility and discretion on how to utilize the funds (Kosters & Mast, 2003). In order to determine how much funding each

state receives, the number of poor children in a school district is multiplied by the state's average per-pupil expenditure (Shaul, 2002).

Within ten years of Title I's inception, changes were made (Klein, 2015). In 1974, amendments were put in place that altered the low-income threshold and the AFDC components of the allocation formula. Due to income inflation, many families were no longer below the poverty line; therefore, the income poverty line was raised by 17.9% due to an increase in the customer price index (U.S. Department of Health, Education and Welfare, 1976). In 1978, schools with 75% or more of their children from low-income families were permitted to use Title I funds for schoolwide programs (Aud, 2007). Per a congressional mandate, the Sustaining Effects study began a three-year data collection effort (starting in school year 1976-1977) to determine the effectiveness of Title I. Students who began at about an average academic level profited most from the program; on the other hand, students who began at a lower level of academic achievement appeared to profit minimally (Carter, 1983).

To demonstrate that Title I funds were being used properly, during the 1980s many schools utilized the monies to use aides to pull out students from general instruction in order to give them personalized teaching and attention (Puma & Drury, 2000). In the early 1990s, another study was commissioned by Congress, a three-year national longitudinal research project called the Prospects Study (Puma et al., 1997). The results indicated that the starting point for achievement levels were lower for students in high poverty schools than in low poverty schools, and this gap remained essentially unchanged as students moved into higher grades (Puma et al., 1997).

In 1994, a shift in program implementation occurred with President Clinton's Goals 2000 bill (Klein, 2015) along with the Improving American's School Act (IASA) (Chait et al., 2001).

States receiving funds had to have academic standards, define levels of student mastery, and assess student achievement. Students in all schools, including those with a high percentage of low-income students, would be held to the same academic standards. The goal was to promote high expectations and excellence in all schools (Chait et al., 2001). The bill also lowered the eligibility threshold so that schools could qualify for Title I if at least 50% (down from 75%) of students came from low-income families (Jennings, 2000).

Another major change to Title I programming in 1994 was the expansion of schoolwide programs, which increased school district and campus flexibility of funds (Chait et al., 2001). In this new model, funds did not have to be directly allocated to specific low-income use, but could also be used for schoolwide measures and initiatives if the school was considered a Title I school (Chait et al., 2001). Additionally, schools moved away from traditional pull-out programs in which students were pulled out of their general education classrooms to received remedial instruction; the reason for the change was results found that the improvements were not significant enough to close the gap between students in high- and low-income schools (Chait et al., 2001).

Title I funds have since been used for the integration of five new initiatives. The Comprehensive School Reform Demonstration Program (CSRD) helps schools identify and adopt school reforms models that have prepare students to meet new high-level standards. The Reading Excellence Act (REA) requires schools to implement a K-3 reading program and provide professional development for those grade level teachers in an effort to improve reading levels. Another initiative is the Title I Accountability Grants, which gives school districts more funds to implement interventions while also permitting students to transfer from schools identified as needing improvement to higher-achieving district schools. The final two initiatives

are the 21st Century Community Learning Centers, which supports and creates after-school programs that focus on academic achievement for at-risk children, and the Class Size Reduction Act that provides additional funds to schools to hire more teaching personnel in an effort to reduce class sizes (Chait et al., 2001).

An increase in specific targeting of high-poverty schools has led to an increase of the schools that receiving funding, but not the level or intensity of services (Chait et al., 2001). It is challenging to accurately determine the effectiveness of the Title I funds because most schools and districts use both federal and state funds to address student needs, making it difficult to differentiate the impact of specific Title I funds on student achievement (Chait et al., 2001).

There is a negative correlation between teacher spending using Title I funds and high poverty rates (Dynarski & Kainz, 2016). A study of spending in schools across the United States uncovered that the spending on instructional staff does not differ based on receipt of Title I funds or poverty levels. This suggests that Title I funds are not used wisely but are rather utilized on programs that do not result in academic achievement for students in need (Dynarski & Kainz, 2016).

Several types of Title I grants are in place, but Basic Grants are the most commonly utilized form of Title I funds and are the easiest to attain. Districts are eligible if they have at least 10 low-income students and the number of low-income students is more than 2% of the district's student population (Shaul, 2002). In 1999, 92% of American school districts received this funding, which accounted for 85% of the Title I funds distributed (Shaul, 2002). Another option, Concentration Grants, require school districts to have 6,500 low-income students or at least 15% low-income student population; in 1999, 60% of American school districts received this funding, resulting in 15% of the total Title 1 funds allocated (Shaul, 2002). This

complicated funding system, which allocated funds to most school districts in the United States and gave schools the options as to how they would spend the dollars, resulted in differences in actual funding per state, school district, and school (Shaul, 2002).

The No Child Left Behind Act of 2001 built upon the Goals 2000 Bill; it reduced the poverty threshold from 50% to 40% and identified schools that failed to meet AYP (U.S. Department of Education, 2001). States were required to track student progress and to disaggregate results by race, ethnicity, income, English proficiency, and disability status.

In December 2015, President Obama signed the Every Student Succeeds Act (ESSA) to replace NCLB (Every Student Succeeds Act, 2015). The bill increased Title I funding from $14.4 billion to $15 billion in 2017, and to $16.2 billion in 2020. Additionally, states can increase the monies set aside for school improvement purposes from 4% to 7% (Burke, 2015). ESSA holds the expectation that there must be change and accountability in the country's lowest performing schools (U.S. Department of Education, 2015b). Specifically, a funding formula was added called Title I-A; these funds will be utilized to support the instructional needs of students from low-income families (Every Student Succeeds Act, 2015). President Trump, along with Secretary of Education DeVoss, increased the 2018 Title I budget by $1 billion. The new funds maintain current Title I funding while distributing additional monies to school districts that adopt "student-centered weighted student funding formulas combined with open enrollment systems," (U.S. Department of Education, 2017b, section Creating New Education Options through School Choice).

Under ESSA, a school district qualifies for Title I's Basic Grant if they have must have at least ten children (ages 5 to 17) who qualify for at least one of the following four categories:

1. Families with incomes at or below the poverty level (according to Department of Commerce)
2. Families with incomes above the poverty level, but who receive local assistance through Part A of Title IV of the Social Security Act (i.e., Temporary Aid to Needy Families, or TANF) (according to Department of Health and Human Services)
3. Institutions for neglected and delinquent children that local governments administer (according to Department of Education)
4. Foster homes in which the foster parents receive payments from a state or county for the children's support (according to Department of Health and Human Services

(Sonnenberg, 2016)

Additionally, the number of students who fall into at least one of these categories must account for at least 2% of the student population. The U.S. Department of Education utilizes these numbers with the per-pupil cost of education in each state to determine grant allocation (Sonnenberg, 2016).

Despite many updates to Title I funding models, there is little evidence to show that Title I is significantly improving student performance (Aud, 2007; Kosters & Mast, 2003; Chait et al., 2001). As evidenced through data from the National Assessment of Educational Progress, students from low-income backgrounds are not catching up to their more affluent peers (Kosters & Mast, 2003). With the many changes to Title I funding over the years, several elements have been added such as grants that make the funding model complex and potentially challenging to comprehend (Aud, 2007; Roza & Lake, 2015).

Chronic Absenteeism and Student Achievement

Many studies have been conducted that show a relationship between chronic absenteeism and lower rates of student achievement (Balfanz & Byrnes, 2012; Balkis, Arslan & Duru, 2016; Chang & Romero, 2008; Connolly & Olson, 2012; Spradlin, Cierniak, Shi, & Chen, 2012). A student is considered chronically absent when he or she misses at least 10% of the school year (Chang & Romero, 2008; Spradlin et al., 2012; Balfanz & Byrnes, 2012). Students who qualify for free or reduced-price lunch are more likely to have higher rates of absence, which in turn leads to lower standardized test scores (Morrissey, Hutchison, & Winsler, 2014).

Chronic absenteeism negatively affects students' academic achievement (Chang & Romero, 2008; Connolly & Olson, 2012; London, Sanchez & Castrechini, 2016; Spradlin et al., 2012). Students in kindergarten and twelfth grade have the highest rates of chronic absenteeism (London et al., 2016). The Early Longitudinal Study showed consequences of chronic absenteeism when it occurs in early education. With data from over 20,000 students, it was found that being chronically absent in kindergarten is related to lower academic performance in first grade, and this was especially true for Latino children (Chang & Romero, 2008). Being chronically absent in kindergarten is a predictor of the lowest levels of achievement by the time students reach the end of fifth grade (Chang & Romero, 2008). Students who are chronically absent in kindergarten are likely to continue to be chronically absent in future years (London et al., 2016).

Another study found a negative relationship between absenteeism and student achievement, a negative relationship between parents' education levels and absenteeism, and a negative relationship between absenteeism and students' academic self-perception, their attitudes about school and instructors, and their motivation (Balkis et al., 2016). High school students in

Indiana who were not chronically absent performed higher academically than their chronically absent peers. Students missing less than 2.5% of school days scored the highest average scale score on the Indiana Statewide Testing for Educational Progress-Plus (ISTEP+) 8th grade English Language Arts assessment; the study found these findings to be true for all subgroups, including different racial groups, students on F/RL, those in special education, and those with limited English proficiency. Children with higher attendance rates scored at higher levels on both English language arts and math portions of the test than children with lower attendance rates. For example, in the 3rd grade math test, chronically absent students scored nearly 50 scale points lower than students who missed fewer than five days. This was the same pattern for students in the 6th grade cohort.

Attendance in early grades of kindergarten and Pre-K is important to students' academic achievement (Connolly & Olson, 2012). Specifically:

- Children living in poverty have higher rates of school absenteeism.
- Students who were not chronically absent in Pre-K or K had higher social skills and Language/Literacy Skills.
- Students who were never chronically absent were more likely to be Kindergarten Ready than peers who were chronically absent in Pre-K or K.
- Students who were chronically absent in both Pre-K and K were more likely to be retained by three years later.
- Students who were chronically absent in both Pre-K and K scored lower on the first grade SAT10.
- Students who were chronically absent in both Pre-K and K scored lower on the second grade SAT10, especially in math.

(Connolly & Olson, 2012).

Studies show a relationship between academic achievement and chronic absenteeism. If a student is chronically absent, he or she is more likely to be behind academically. He or she is also less likely to graduate on time and more likely to be retained (Chang & Romero, 2008; Connolly & Olson, 2012; London et al., 2016; Morrissey et al., 2014; Spradlin et al., 2012). For the graduating class of 2010, about 88% of students with good attendance (missing fewer than five days) graduated; only 24% of students who were chronically absent graduated (Spradlin et al., 2012).

Chronic absenteeism has a negative impact on student achievement, and a New York study broke down chronic absenteeism into additional risk factors to determine greatest areas of disadvantage (Nauer et al., 2014). Those risk factors will be identified in the next section, and will describe how some studies have been conducted to analyze those risk factors.

Redefining Disadvantage

Through efforts like Title I, the United States has attempted to equal the playing field between disadvantaged students and their more affluent peers, providing extra funding to schools with a higher population of students from low socioeconomic households (Elementary and Secondary School Act, 1965). Title I eligibility has been based solely on family income level as determined by F/RM and Census Bureau data. However, there may be more targeted ways to identify and combat disadvantage. In the last decade, efforts in Chicago, Philadelphia, and New York City have started to identify disadvantage in a manner other than household income, (Bryk et al., 2010; Fantuzzo et al., 2014; Nauer et al., 2014).

In addition to household income, schools can organize themselves in different ways in order to improve themselves (Bryk et al., 2010). Despite many schools having similar levels of

poverty, some are more challenging to reform. Three different reasons for this challenge are neighborhood structures, relationships and resources, and children living under "extraordinary circumstances" (Bryk et al., 2010, p.7). Some of these extraordinary circumstances included neglect and abuse, homelessness, foster care, and domestic violence. These students learned at about the same rate as other students, but when a school has a high proportion of these needs, it is more difficult for schools to succeed (Bryk et al., 2010). The Ecological Systems Theory may consider these neighborhood factors as part of students' mesosystems and even microsystems because they can impact students at such a high level (Bronfenbrenner, 1977). These schools and communities are considered truly disadvantaged because they have extremely high needs and the students' disadvantages fall into many categories. Specifically, these schools face a three-strike problem: they are highly stressed organizations, they exist in challenging communities, and they confront extreme human needs on a daily basis. Not all schools with low-income students, challenges, and minority students face the same challenges and should therefore have the same solutions. It is suggested that more work needs to be done, including more research, in order to make real changes to truly disadvantaged schools (Bryk et al., 2010)

Researchers from the University of Pennsylvania conducted a study to examine the relationships between student risk factors and measures of reading, math, and attendance (Fantuzzo et al., 2014). They studied a cohort of third graders from the School District of Philadelphia to identify risk factors (specifically biological and familial risk) and aggregate them at the school level (Fantuzzo et al., 2014). Data was pulled from the Kids Integrated Data System (KIDS), Department of Public Health, Department of Human Services, and Office of Supportive Housing. They identified ten risk factors, some of which include homeless shelter stay, child maltreatment, race/ethnicity, economically disadvantaged, and teen mothers. Using multilevel

linear modeling to estimate the effects of the risk factors on student academic achievement, the study found that the most harmful risk factor is low maternal education. They found this risk factors were significantly related to poor reading, mathematics, and attendance. (Fantuzzo et al., 2014). Other risk factors that were found to have a negative impact on student achievement were poor prenatal care, homelessness, and child maltreatment. The authors recommend examining further research of publicly monitored risk factors to better understand the cause of disadvantage and possibly begin to combat them (Fantuzzo et al., 2014).

The Center for New York City Affairs undertook a research study to identify New York City's truly disadvantaged public schools (Nauer et al., 2014). Continuing their work on chronic absenteeism, particularly in elementary schools, with this new study the authors aimed looked at schools with high rates of chronic absenteeism through a different lens. They called this a total risk factor of social and educational factors in the schools (Nauer et al., 2014). The team identified risk factors in order to use indicators that are not commonly-used to measure poverty. The researchers (Nauer et al., 2014) used the argument that when about 80% of NYC public school students are eligible for free or reduced-lunch prices, the methods being used to identify disadvantage are too broad. Using the term "deep poverty," the researchers identified schools that had a high percentage of the risk factors, including percentage of students living in temporary or public housing, number of students' families that have faced allegations of child abuse or neglect, and adult educational attainments in the community served by the school (Nauer et al., 2014). Risk factors also included school factors such as school safety, turnover of administration, turnover of faculty, and suspension rates. The researchers found a correlation between schools with high levels of chronic absenteeism and those with the highest number of risk factors (Nauer et al., 2014).

As an example, in the 2015-2016 school year, HISD started the work of risk factors as well, identifying 20 (including free/reduced lunch eligibility). They categorized the risk factors into student, school, and neighborhood factors.

When the HISD elementary schools are sorted by chronic absenteeism (with the highest levels at the top), the factors are displayed using a color-coding system; the darker the blue, the stronger the impact of that risk factor. There emerges a very clear picture of both the kinds of and the volume of educational disadvantage associated with that location: a "heat map" of educational disadvantage (Figure 6).

Table 1

Risk Factors Categorized into Student, School and Neighborhood Factors

Student Factors	School Factors	Neighborhood Factors
Students eligible for free/reduced priced meals	Principal turnover	Child poverty level
Students in temporary housing	Teacher turnover	Poverty rate
Special education students	Teacher vacancy	High school education or below
African American or Hispanic students	Student mobility	Adult professional
Students identified as English Language Learners	Student suspensions	Male unemployment
Students identified as migrants	CPS involvement	Presence of public housing in a school zone
Students identified as refugees		Presence of homeless shelter in school zone

Note. Adapted from "A Better Picture of Poverty," by K. Nauer, N. Mader, G. Robinson, T. Jacobs, B. Cory, J. Moss, and A. Bloodworth, 2014, Center for New York City Affairs. Adapted with permission.

As evidenced by this study, the higher the level of chronic absenteeism, the more risk factors each campus has, even if they are different risk factors. Each campus is different and has its own challenges, but the common denominator is chronic absenteeism. Every single HISD elementary school with 14-15 risk factors (the most) failed to meet AYP in 2014-2015 and therefore students did not achieve academically. The opposite is true for campuses with low chronic absenteeism and few risk factors; most of these campuses met AYP.

Figure 6

Houston ISD Chronic Absenteeism and Risk Factor Heat Map

Figure B-1. 2015 Family, School, and Neighborhood Risk Factors for Chronic Absenteeism

Total Number of Risk Factors	2015 Rating	School Name	Chronic Absenteeism	Free Lunch Eligible	Students in Temp. Housing	Special Ed. Students	Black or Hispanic	ELL Students	Students Not Ident. as GT	Immigrant Students	Refugee Students	Principal Turnover	Teacher Turnover	Teacher Vacancy	Student Mobility	Student Transfers	Student Suspensions	Student Safety Issues	CPS Involvement	Child Poverty	Poverty Rate	HS Education or Below	Lack of Adult Professionals	Male Unemployment	Public Housing	Homeless Shelter
18	IR	Sugar Grove MS	-0.100	0.100	1.270	-0.566	-1.089	-1.268	-1.458	-0.758	-1.829	-2.000	-1.079	-2.000	-0.459	-2.000	-0.100	-1.169	-1.143	-0.431	-0.313	-0.308	0.568	0.696	2.000	-2.000
	MET	Fleming MS	0.420	-1.557	-1.105	-0.882	-1.907	0.629	-1.648	1.656	-0.145	-0.111	-0.210	-1.219	-0.392	-2.000	-1.605	0.100	2.000	-1.814	-2.000	-1.119	-0.607	-0.906	2.000	-2.000
17	IR	Blackshear ES	-0.567	-0.390	0.100	-0.143	-1.626	1.152	-1.160	1.793	-0.173	-2.000	-2.000	2.000	-0.748	-2.000	-2.000		2.000	-1.407	-1.428	-0.100	-1.526	-0.823	-2.000	-2.000
		Fondren MS	-0.469	0.313	0.312	-0.286	-0.308	-0.920	-1.690	0.335	-1.890	-0.111	-1.778	-0.810	-0.596	-2.000	-1.239	-0.179	2.000	-0.769	-0.568	0.201	-0.377	-0.314	2.000	-2.000
15	MET	Grissom ES	0.100	-1.467	-2.000	0.321	-1.528	-0.415	-0.573	1.186	2.000	-1.216	-1.507	2.000	0.251	-2.000	-0.100		-2.000	-0.289	-0.238	-0.490	-1.070	-0.606	2.000	2.000
		McGowen ES	0.112	-0.735	-0.657	-0.977	-1.921	1.856	-0.857	1.867	2.000	-0.100	-0.738	2.000	0.111	-2.000	-1.258		-2.000	-0.200	-0.100	-0.838	-2.000	-2.000	2.000	2.000
14	IR	Mading ES	-1.061	-0.100	-0.305	-1.534	-1.784	1.530	-1.509	1.906	2.000	-1.216	-1.138	2.000	-0.100	2.000	-1.611		2.000	-0.500	-0.143	-0.649	-2.000	-2.000	2.000	2.000
13	IR	Foster ES	-1.963	-1.592	0.709	-1.024	-1.764	1.973	-1.775	2.000	2.000	-0.100	0.515	2.000	-0.232	-2.000	-2.000		2.000	-1.054	-0.939	-0.421	-1.539	-0.668	2.000	2.000
	MET	Looscan ES	-0.460	-0.986	2.000	-1.163	-1.843	-0.237	-0.596	1.633	2.000	-0.100	-2.000	2.000	0.109	-2.000	-0.296		2.000	-1.607	-0.921	-0.956	-0.882	0.273	2.000	2.000
		Durkee ES	0.678	-0.641	2.000	-1.441	-1.685	-0.439	-0.612	1.671	2.000	-0.100	-0.151	2.000	0.361	-2.000	0.263		2.000	-1.319	-1.653	-1.726	-0.149	-0.370	2.000	2.000
		Pugh ES	0.684	-1.446	2.000	-1.116	-1.784	-0.285	-0.787	0.346	2.000	-0.100	-0.873	2.000	0.510	2.000	-0.242		2.000	-0.542	-0.407	-1.422	-0.502	-0.565	2.000	2.000
11	IR	Burrus ES	-0.100	-0.850	-0.101	0.738	-1.587	1.867	-1.266	1.630	2.000	2.000	-0.668	2.000	-0.148	2.000	0.773		2.000	-0.764	-0.802	-0.459	-0.100	-0.509	2.000	2.000
	MET	Eliot ES	0.875	-1.415	1.512	-1.395	-1.843	-0.189	-0.435	0.685	2.000	-0.100	-0.873	2.000	-0.310	-2.000	0.846		2.000	0.100	-0.167	-1.808	0.815	1.014	2.000	2.000
10	IR	Montgomery ES	-0.770	-0.349	-2.000	-0.097	-1.626	0.143	-0.647	0.499	1.383	2.000	0.284	2.000	0.317	-2.000	-0.272		2.000	0.175	0.303	-0.489	-0.478	-0.248	2.000	2.000
		Ross ES	0.739	-0.464	0.100	0.599	-1.626	1.072	-0.751	2.000	2.000	-1.216	-0.100	2.000	0.100	2.000	0.623		2.000	-0.926	-0.825	-0.985	-0.302	-0.249	2.000	2.000
	MET	Southmayd ES	0.177	-1.153	1.607	-0.375	-1.862	-0.487	0.318	1.837	2.000	-0.100	0.529	2.000	0.347	-2.000	1.765		2.000	-0.100	-0.252	-1.051	0.167	0.157	-2.000	2.000
		Herrera ES	0.703	-1.760	2.000	-0.560	-1.508	-0.424	-0.488	1.799	2.000	2.000	-0.181	-1.195	0.872	2.000	1.935		2.000	-0.201	-0.514	-1.645	0.969	1.051	2.000	2.000
		Braeburn ES	1.426	-1.728	1.091	0.182	-1.705	-1.593	-0.477	-0.966	-0.339	2.000	0.812	2.000	0.624	-2.000	0.318		2.000	-1.224	-1.151	-0.362	0.299	0.680	2.000	2.000
9	IR	Milne ES	-1.084	-1.070	2.000	-0.606	-1.390	0.831	-0.855	1.670	2.000	-0.100	-0.380	2.000	-0.197	-2.000	-1.211		2.000	0.338	0.152	0.762	0.160	0.325	2.000	2.000
	MET	Law ES	-0.234	-0.600	1.617	-0.560	-1.331	0.420	-0.392	1.921	2.000	2.000	-0.104	2.000	-0.308	-2.000	1.103		2.000	1.045	1.162	0.591	-0.100	-0.523	2.000	2.000
7	IR	Codwell ES	-1.450	-0.328	0.906	0.135	-1.725	1.856	-1.218	2.000	2.000	-0.100	0.830	2.000	0.163	2.000	-1.790		2.000	0.116	0.446	0.100	-1.060	-0.322	2.000	2.000
3	MET	Wilson Mont.	1.519	1.449	1.444	-0.100	2.000	-0.315	0.395	1.335	2.000	2.000	1.910	2.000	0.197	2.000	1.759		2.000	1.655	1.369	1.731	2.000	2.000	2.000	-2.000
1	MET	Garden Oaks M..	1.388	1.466	0.760	0.431	1.723	-0.107	0.308	1.259	2.000	2.000	0.605	2.000	0.555	2.000	1.931		2.000	1.340	1.219	0.890	1.427	1.143	2.000	2.000

White cell indicates data unavailable.

-2.000 2.000

Sorted by count of school's factors that are below HISD average (0.00). Showing bounded Z-Scores. Elementary and secondary schools not compared to each other.

Note. Price, L.E., Provencher, S.A. & Stevens, C.J. (2018). Teacher Incentive Fund STEM Grant in Houston ISD: A Descriptive Overview. Houston ISD: Department of Research and Accountability.

Risk factors. The risk factors that HISD identified are sorted into three categories: student, school, and neighborhood. Literature explains that each of these categories have an impact on student learning and achievement.

Student factors. Individual student, home, and parent factors have an impact on student academic achievement and overall wellbeing (Evans, 2004; Isaacs, 2012; Marcella, Howes, & Fuligni, 2014; Pinder, Prime, & Wilson, 2014; Tsereteli, Martskvishvili, Aptarashvili, Darsavelidze, & Sadzaglishvili, 2010; Woolley & Bowen, 2007).

In a study on psychosocial conditions on students living in poverty, researchers found that poor children were more likely to have exposure to family violence and separation, lack of stability, and turmoil within the home (Evans, 2004). The findings indicated that poor children had less support from their parents and their parents were considered more authoritative. At home, these children watched more TV and had less access to reading and texts than their more advantaged peers (Evans, 2004). In another study that assessed student risk, children with the highest cumulative risk score experienced the least amount of literacy activities in the home. Some predictors of family literacy activities included immigrant status and home language (Marcella et al., 2014).

Researchers used the Early Childhood Longitudinal Study-Birth Cohort to determine why poor children enter kindergarten at a lower readiness level than more affluent children and whether there are intervention areas that can help improve early skills and behaviors. Results indicated that more affluent children are ready for school at age five as compared to their poorer peers (75% and 4%, respectively). Children from "near poor" households (incomes just above the poverty line) are prepared for school at age five at 59%. Researchers found that the major contributors to school readiness included parenting behaviors, preschool attendance, maternal

depression, parents' education, low birth weight, and prenatal exposure to tobacco. Overall, researchers found that attending preschool has the biggest impact on children being school ready at age five (Isaacs, 2012).

Parent involvement has an impact on student achievement; one study found a relationship with student achievement and parents discussing homework and progress with their children (Pinder et al., 2014). Another found a relationship between parents' attitudes towards their children's academics and students' self-competence; specifically, the higher the parent involvement than the higher the students' self-competence (Tsereteli et al., 2010). Woolley and Bowen (2007) found that when students reported having a supportive, positive adult relationship, they also reported being engaged positively in school.

School factors. Schools themselves, including teachers, also impact student achievement (Ahmad & ur Rehman, 2014; Bellibas, 2016; Fram, Miller-Cribbs, & Van Horn, 2007; Hattie, 2008; Marcella et al., 2014; Pàmies-Rovira, Senent-Sànchez, & Essomba Gelabert, 2016; Tsereteli et al., 2010). Teacher attitude towards students affects student achievement; in a study to determine the impact of teacher attitudes on academics, researchers found that adopting a disciplined or friendly attitude resulted in higher achievement (Ahmad & ur Rehman, 2014). Classrooms at high minority schools have less equipped classrooms, teachers with fewer years at the school, and lower levels of certification (Fram et al., 2007).

John Hattie (2008) describes 800 meta-analyses he conducted to identify the influences that had the greatest impact on student achievement. In the results, Hattie (2008) ranks the influences from greatest impact to least impact; the most impactful factor was *teacher estimates of achievement* with an effect size of 1.62, followed by *collective teacher efficacy* ($d = 1.57$).

School leadership can have a major impact on student learning, as discovered by a study funded by the Spanish government that studied factors leading to student success in socioeconomically disadvantaged neighborhoods. Researchers found that school leadership and teacher involvement in school decision making, specifically distributive leadership, were important factors leading to school and student success (Pàmies-Rovira et al., 2016). School culture also affects students; in a separate study, research found relationships between student self-competence and school climate and culture. The researchers found that the classroom climate had a positive effect on self-competence (Tsereteli et al., 2010). Finally, a 2016 study found that small class sizes and smaller total enrollment results in higher student achievement on assessments (Bellibas, 2016).

Neighborhood factors. Finally, neighborhoods and their elements also can have an impact on student growth and academic achievement (Ainsworth, 2002; Heberle, Thomas, Wagmiller, Briggs-Gowan, & Carter, 2014). In one study, the researcher gathered information on 10th grade student achievement and broke them down by zip code. He identified factors affecting student achievement, including neighborhood factors, family information, school factors, and educational outcomes. The researcher identified several results from the data. For example, he found that low SES neighborhoods resulted in lower math and reading scores for 10th grade students. Overall, the researcher found that neighborhood factors do predict academic achievement and may have as much impact as family and school factors. He found that specific mediators account for 40% of neighborhood effect on academic achievement, including "collective socialization, social control, social capital, perception of opportunity, and institutional characteristics" (Ainsworth, 2002, p. 117).

A study on how the risk factor of neighborhood disadvantage affected toddlers' behavior was conducted utilizing a parent survey in four low socioeconomic areas of Connecticut. The results indicated a significant but small association between neighborhood disadvantage and toddlers' negative behavior. The behaviors increased when parents reported family disadvantage, parenting behavior, depressive symptoms with the family's adults, and toddler exposure to conflict or violence. They also found a relationship "between family social disadvantage and disruptive behavior" (Heberle et al., 2014, p. 2056).

Conclusion

For half a century, the United States has poured funds into schools with high levels of students who are eligible for free or reduced lunch; despite these efforts, the achievement gap between students from low income households and their more affluent peers has not closed. In some cases, it has even widened. Utilizing household income as the sole or primary factor to determine disadvantage is not sufficient. Some cities have identified risk factors (derived from chronic absenteeism) that break down disadvantage more specifically, but further studies have not been conducted to determine which risk factors have the strongest relationship to student achievement. The levels of students' environment, as explained through the Ecological Systems Theory, have not been explored through these risk factors and may provide further explanation as the full impact of the risk factors.

Chapter III

Design and Methodology

Introduction

Research design and methodology requires that specific elements be incorporated including identifying and defining the problem, formulating a hypothesis to solve the problem, analyzing the implications of the problem through reasoning, and testing in order to accept or reject the hypothesis (Hoy & Adams, 2016). This chapter discusses the research design utilized for this study and details the methods used to collect and analyze data related to 3rd, 4th, and 5th grade results on the Colorado Measures of Academics (CMAS) and the 19 risk factors identified for each of the 14 schools. While 20 risk factors were identified, CPS involvement was not able to be reported to schools. This chapter also includes an explanation of the participants and limitations of the study.

Three research questions drove this study and were utilized to explore the data and relationships between the different data sources in order to determine which risk factors have the greatest impact on student achievement. These questions included:

1. In Betty Lou School District, what are the strengths of the relationships between the risk factors?
2. In Betty Lou School District, which of the risk factors have a relationship with student achievement?
3. In Betty Lou School District, how do schools with similar risk factors perform in student achievement?

The purpose of this study is to determine whether specific risk factors have a relationship with student achievement. The results of this study could impact how school and district leaders

prioritize combatting specific challenges within their schools and districts. Ultimately, targeting specific challenges could result in improved learning and achievement for students in our country. Chapter three provides more detail and explanation of this study's data collection, research design, and specific analytical methods.

Research Design

This quantitative research study utilized a correlational research design to explore relationships between variables using statistical analyses. Specifically, data was collected from a variety of sources to determine whether relationships existed, and the strength of any relationships, between 3rd, 4th, and 5th grade Colorado CMAS English Language Arts and math achievement data and 19 risk factors identified as student, neighborhood, or school. Reading and math achievement was defined as the percentage of students receiving a proficient rating on the state assessments. A correlational research design lent itself to compare quantitative data both independently and in-conjunction with the other (Creswell, 2013). Risk factors were identified in Table 1 and are listed again below.

There was not any new data that was collected for this study; rather, this study used post hoc data and utilized several methods to analyze and answer research questions about that data. The ecological systems theory was utilized to determine how environmental factors affect student growth and potential achievement. The microsystem typically has the biggest impact on students, and the risk factors that fall under "student factors" fall into this microsystem level. Many of the school and neighborhood factors fall into the mesosystem and exosystem levels.

Table 1

Risk Factors Categorized into Student, School and Neighborhood Factors

Student Factors	School Factors	Neighborhood Factors
Students eligible for free/reduced priced meals	Principal turnover	Child poverty level
Students in temporary housing	Teacher turnover	Poverty rate
Special education students	Teacher vacancy	High school education or below
African American or Hispanic students	Student mobility	Adult professional
Students identified as English Language Learners	Student suspensions	Male unemployment
Students identified as migrants	CPS involvement	Presence of public housing in a school zone
Students identified as refugees		Presence of homeless shelter in school zone

Note. Adapted from "A Better Picture of Poverty," by K. Nauer, N. Mader, G. Robinson, T. Jacobs, B. Cory, J. Moss, and A. Bloodworth, 2014, Center for New York City Affairs. Adapted with permission.

Participants

Participants in this study were 3rd-5th grade students in Betty Lou School District during the 2017-2018 school year who took the CMAS reading and math assessments and whose scores were reported from the state. There were a little under 2,500 records from the 14 elementary schools in the Betty Lou School District. Student identities remained anonymous, and their scores were differentiated with random numbers. The researcher never received the student names from the Betty Lou School District. When the data was received, the student numbers had already been assigned by the school district.

Betty Lou School District is located in the southeast portion of this Colorado city and

includes thirteen traditional elementary schools, one K-8 school, three middle schools, one Career Readiness Academy, two high schools, four charter schools, and one homeschool program. The district covers 19 square miles and has a total of 12,319 students. The student race breakdown is as follows: 50% Hispanic, 25% White, 14% African American, 7% Two or More Races, 2% Asian, 1% Native Hawaiian/Pacific Islander, and 1% Native American. The elementary schools have a range of free and reduced lunch populations of 55% to 90%, and the district has an 80% graduation rate.

Table 3

Participant Demographics

Demographics		Count
Number participant cases (n)		2,493
Grade		
	3	834
	4	877
	5	781
Gender		
	Female	1,189
	Male	1,303
Ethnicity		
	African American	348
	Asian	41
	Hawaiian/Pacific Islander	32
	Hispanic	1,319
	Native American	16
	Two or more	208
	White	528

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Data Collection

The collection of data came from various sources across the city and across the state of Colorado. A research request was made to Betty Lou School District to access student performance data for the 2017-2018 CMAS Reading and Math Assessment as well as Betty Lou School District Human Resource information to gather information on teacher and principal turnover. The request was approved in May of 2018 by the district. At that time, CMAS data had not yet been released by the state to the school districts; they were later released in August of 2018. The researcher conducted several phone conferences with members of the Betty Lou School District Research and Accountability team in the fall of 2018 to fully explain and discuss the specific data points that were needed for this study. The Research and Accountability Team collected the requested data and organized it into an Excel spreadsheet. The information was sent electronically from the Betty Lou School District Research and Accountability Team to the researcher in November of 2018.

The data was organized by individual student (with the name deleted and a number assigned) and each requested data point next to each student's name. Those data points included student demographic information (ethnicity, gender, grade, F/RL, special education, ELL, and temporary housing) and CMAS ELA and math scores. The CMAS scores included the scale score, raw score, and growth data for the previous years (for 4th and 5th grade students). The school data was also listed in an Excel spreadsheet. Each school was listed with the requested data points, including out of school suspension rate, mobility rate, teacher turnover, new principal, and number of principals in five years. The researcher removed the school names and randomly assigned a letter to each school. Therefore, in this study the schools are not identifiable.

Several other data points were gathered from websites available to the public. These included data from the Colorado Measures of Academic Success (CMAS), 2012-2016 American Community Survey (census track data), and data and further information on homeless populations and public housing from Pikes Peak United Way. All of these data were accessed from their public websites.

Specifically, the 19 risk factors were collected from the sources listed in Table 3.

Table 4

Risk Factors by Source

Student Factors	Source
Students eligible for free and reduced lunch	Betty Lou School District
Students in temporary housing	Betty Lou School District
Special education students	Betty Lou School District
African American or Hispanic students	Betty Lou School District
Students identified as English Language Learners	Betty Lou School District
Students identified as migrants	Betty Lou School District
Students identified as refugees	Betty Lou School District
School Factors	**Source**
Principal Turnover	Betty Lou School District
Teacher Turnover	Betty Lou School District
Teacher Vacancy	Betty Lou School District
Student Mobility	Betty Lou School District
Student Suspensions	Betty Lou School District
Neighborhood Factors	**Source**
Child Poverty Level	2012-2016 American Community Survey 5-Year Estimates

Poverty Rate	2012-2016 American Community Survey 5-Year Estimates
High School Education or Below	2012-2016 American Community Survey 5-Year Estimates
Adult Professional	Unable to locate
Male Unemployment	2012-2016 American Community Survey 5-Year Estimates
Presence of Public Housing in a School Zone	Affordable Housing Listserv
Presence of Homeless Shelter in a School Zone	Homeless Shelters and Social Services

In order to keep school information anonymous, school names were taken out and were assigned a letter from A to N. They were not organized or labeled in any particular order. Neighborhood factors were retrieved and organized by zip code; the 14 elementary schools in this study fell into three zip codes. The neighborhood factors data came from the American Community Survey (United States Census Bureau, 2016), the Affordable Housing Listserv, (GoSection8, 2018), and the Homeless Shelters Directory (Homeless Shelters and Social Services, 2018).

Analytical Methods

The quantitative research analyzed post hoc data retrieved from the Betty Lou School District Research and Accountability office, the Betty Lou School District Human Resources office, the 2012-2016 American Community Survey 5-Year Estimate, and from several public websites. Student demographics were determined by transferring the data file from the Betty Lou School District and to SPSS 25 for Macintosh and conducting several exploratory tests, including frequencies and descriptives. School factors were also delivered in an Excel file; initial descriptives were conducted using Excel functions, including frequencies. The mean scores for

each school for ELA and math CMAS results were determined using Excel. Risk factor rates were sorted by each school to determine groupings of school by risk factor. This also helped the researcher determine whether outliers existed within risk factor groups based on school mean scores above or below the district average. The researcher then transferred the school factor information to SPSS 25.

Several statistical analyses were utilized to examine data and identify relationships between student assessment results and the 19 risk factors. A descriptive analysis was conducted to describe all factors, identify their average mean, median, and mode frequencies, to identify the average prevalence each risk factor had in each campus, as well as to identify the subsequent outliers. These analyses determined the numbers that occurred most frequently, the middle achievement scores, and the measure of central tendency, which provided several helpful data points (Field, 2016). The descriptive analysis also identified risk factor frequency by school, which indicated the prevalence of the risk factor by each campus.

A correlational analysis was conducted to identify the relationship amongst risk factors and to determine if a reduced set of risk factors with strong correlation amongst each other could be identified. Correlational research is conducted to observe existing relationships without interfering with the variables (Field, 2016). The analyses were conducted twice to determine whether grade levels were substantially different than schools' combined scores. The results indicated that they were not different, so grade levels were run together, and scores were reported as a combined number for all three grade levels. Correlation analyses did indicate relationships between risk factors.

Regression analyses are utilized when one variable is predicted from another variable and a parameter is included (Field, 2016). In this study, several regression analyses were conducted

to identify the relationship between each of the factors and student achievement. Before conducting the multiple regression analyses, the researcher checked each of the assumptions for multiple regression. These included assumptions of normality, linearity of continuous variables, outliers, homogeneity of variance of dichotomous variables, independence of errors, and multicollinearity. All assumptions were met, so the researcher continued on with the analyses. The regression analyses predicted which risk factors may have an impact on student achievement as described by the CMAS ELA and math assessments.

Published, standardized instruments were not used to analyze data in this study. The statistical tests utilized in this study accurately answered the questions set forth as the guide for the research. Research Question 1 was answered using correlational analyses. The strength of the relationships between risk factors were described and analyzed. Research Question 2 was answered utilizing multiple regression analysis. Predictions were able to be made based on the regression analyses. Research Question 3 was answered using descriptives and frequencies from both SPSS and Excel.

The researcher had hoped to include all three sets of risk factors (student, school, and neighborhood) in the data. However, the neighborhood data could not be used in analysis due to the small sample size. Prior to beginning the study, the researcher attempted to collect the neighborhood data by school, but the information was only available by zip code. This limited the sample size to just three, causing the researcher to remove the neighborhood factor from analysis.

This study looked at risk factors affecting student achievement; the risk factors were broken down into the categories of student, school, and neighborhood. The neighborhood risk factors were not used in analysis due to small sample size; the school factor CPS involvement

was not used in analysis because this information is not given to schools. Correlations between the student risk factors of free/reduced lunch, temporary housing, special education, African American or Hispanic heritage, and English Language Learners were investigated. The student risk factors of being a migrant or refugee were not included due to small sample size. Correlations between the school risk factors of principal turnover, teacher turnover, teacher vacancy, student mobility, and student suspensions were investigated. Regression analyses were run between all student and school risk factors and CMAS scores for the ELA and math assessments. The results of all correlations and regressions are indicated in Chapter 4.

Limitations

There were several limitations to this study. First, the study encompassed only one school district and did not take into account any elements from Betty Lou School District that may have been unique from other districts. Another limitation was that several risk factors were not included in analyses due to small sample sizes and inability to collect specific data points. The research study utilized ex post facto data, so conclusions could be generalized and causal relationships could not be determined beyond the time frame of the data used. School neighborhood factor data was not included in any of the analyses due to the manner in which the data was collected; this data was available only by zip code, and the elementary schools fell into just three zip codes, making the sample size too small. Finally, the CMAS assessment data captured just one year of data and did not explore growth data from previous years.

Protection of Human Rights and Approval

The researcher took the training National Institutes of Health (NIH) on protecting human research participants (Appendix D). Additionally, any research involving human participants conducted by Northwest Nazarene University must be reviewed and approved by the Human

Research Review Committee to protect the rights and safety of any participants. There are three levels of HRRC approval required for conducting research that includes human participants. The first level is Exempt, in which there is no known physical, psychological, spiritual or economic risk OR research with less than minimal risk that meets certain criteria such as the study of existing records and data that is publicly available; Expedited research is one that presents no more than minimal risk to participants. Full Review research is when there is more than minimal risk to participants and does not meet the criteria for an exempt or expedited review (HRRC Handbook, 2014).

The application for this study on risk factors affecting student achievement was submitted to the HRRC met the criteria of being "exempt" because the study utilized existing records that can be made available to the public in the state of Colorado. The study was also deemed "exempt" because the quantitative research solely analyzed ex post facto data. Northwest Nazarene University's HRRC reviewed the protocol for this study and granted full approval to conduct research.

Chapter IV

Results

Introduction

In this chapter, the eight student and five school risk factors are described, including their frequencies. Crosstabulation shows the frequency of the risk factor at each of the 14 elementary schools. Descriptives for the CMAS ELA and math assessments are described. Correlations are presented to demonstrate relationships between risk factors and to indicate the strongest relationships. Multiple linear regression results for student and school risk factors are presented that answer the research questions. Finally, average scores for each school are analyzed; differences in scores between schools with similar risk factors are discussed.

Descriptive Results of Risk Factors

There was a total of 2,492 individual reported scores from the 3rd, 4th, and 5th grade students from the 14 Colorado elementary schools. The scores were from both the ELA and math CMAS exam from spring 2018.

Student factors. Frequency data showed the percentage of each student risk factor for the overall student scores. Table 4 shows the breakdown of student risk factor frequency for the Betty Lou School District as a whole.

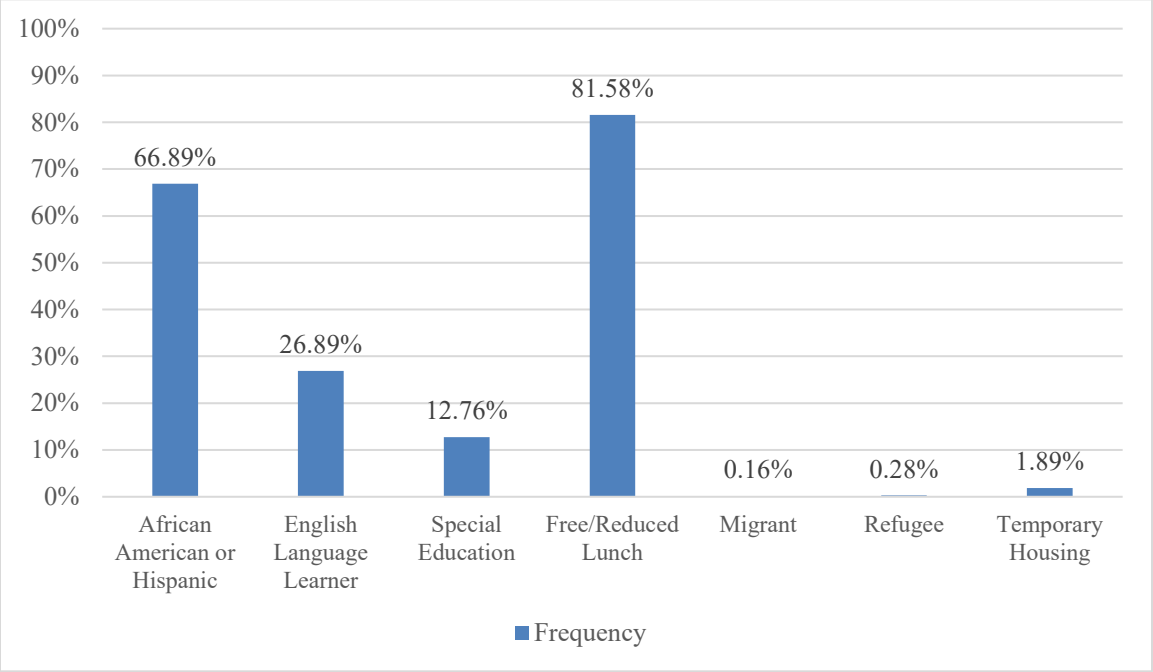
Table 5
Student Risk Factor Frequency

Risk Factor	Frequency	Percent
African American or Hispanic	1,667	66.9
ELL	670	26.9
Special Education	318	12.8
Free or Reduced Lunch	2,033	81.6
Migrant	4	.2
Refugee	7	.3
Temporary Housing	47	1.9

Figure 7 displays the student risk factor frequencies in graph format, giving a visual representation to demonstrate the varying degrees of risk factor numbers. In Betty Lou School District, the risk factor with the greatest frequency is free/reduced lunch, with 81.58% of the district qualifying. The next greatest student risk factor in terms of frequency is African American or Hispanic heritage, with 66.89% of the school district population. Additionally, 26.89% of the school district are considered English Language Learners, and 12.76% qualify for special education service. Temporary housing, migrant, and refugee all fall below 2%.

Figure 7

Student Risk Factor Frequency



The risk factors of migrant and refugee resulted in samples sizes that were too small for accurate testing. In the 2,492 cases, there were just four occurrences of migrant (0.2%) and seven occurrences of refugee (0.7%). Due to the small sample sizes, the researcher excluded these two

risk factors for the remainder of the study; therefore, they were not included in the correlation or regression analyses.

Crosstabulations of each of the student risk factors by school showed the frequency of each risk factor at each of the 14 elementary schools, as displayed in Table 5. School G had the highest rate of free and reduced lunch with 91.5%; School N had the lowest rate of free and reduced lunch with 61.7%. For students living in temporary housing, School B had the highest rate with 5.6%, and School A, School E, School J, School K, and School L all had the lowest rate of temporary housing with 0.0%. For students identified as special education, School J had the highest rate with 18.7%, while School E had the lowest with 7.0%. For schools with populations of students identifying as either African American or Hispanic, School L had the highest rate with 79.1%, while School N had the lowest rate with 46.8%. School C had the highest rate of English Language Learners at 50.0%, while School N had the lowest with 5.8%. For schools with populations of students identifying as either African American or Hispanic, School L had the highest rate with 79.1% while School N had the lowest rate with 46.8%. Only three schools had any students with migrant students (School C $n = 1$, School H $n = 2$, and School K $n = 1$), while the rest had none. Only four schools had any students with refugee students (School A $n = 2$, School H $n = 1$, School I $n = 1$, and School L $n = 3$), while the rest had none.

Table 6

Number and Rates of Student Risk Factors by School

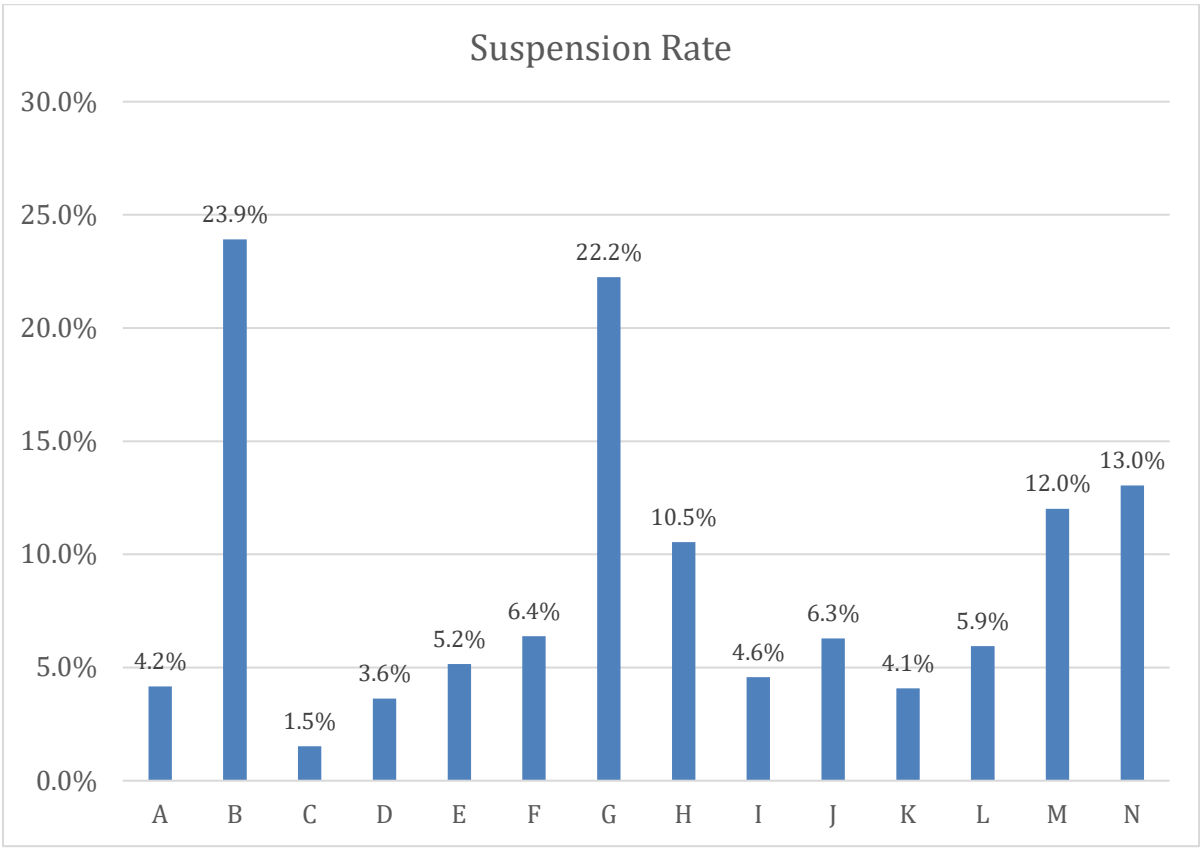
School	FRL	Temporary Housing	Special Education	AA or Hispanic	ELL
A	.87	.00	.10	.74	.28
B	.86	.06	.18	.56	.22
C	.86	.05	.14	.79	.50
D	.90	.08	.17	.71	.21
E	.64	.00	.07	.61	.16
F	.87	.02	.13	.64	.32
G	.92	.04	.10	.75	.23
H	.81	.02	.13	.64	.22
I	.83	.09	.10	.61	.22
J	.69	.00	.18	.67	.32
K	.85	.00	.13	.72	.37
L	.85	.00	.10	.79	.48
M	.89	.08	.13	.54	.10
N	.62	.04	.17	.47	.06

School factors. Five of the six school factors were able to be successfully retrieved from Betty Lou School District. CPS Involvement was not able to be retrieved as this is not information that the district collects. The remaining five factors are displayed below in terms of frequency rates at each campus.

During the 2017-2018 school year, School B had the highest suspension rate with 23.9% while School C had the lowest rate with 1.5%. Suspension rate was determined by dividing the total number of out of school suspensions in the 2017-2018 school year by the number of students enrolled in the school. This frequency chart indicates large differences between schools in Betty Lou School District.

Figure 8

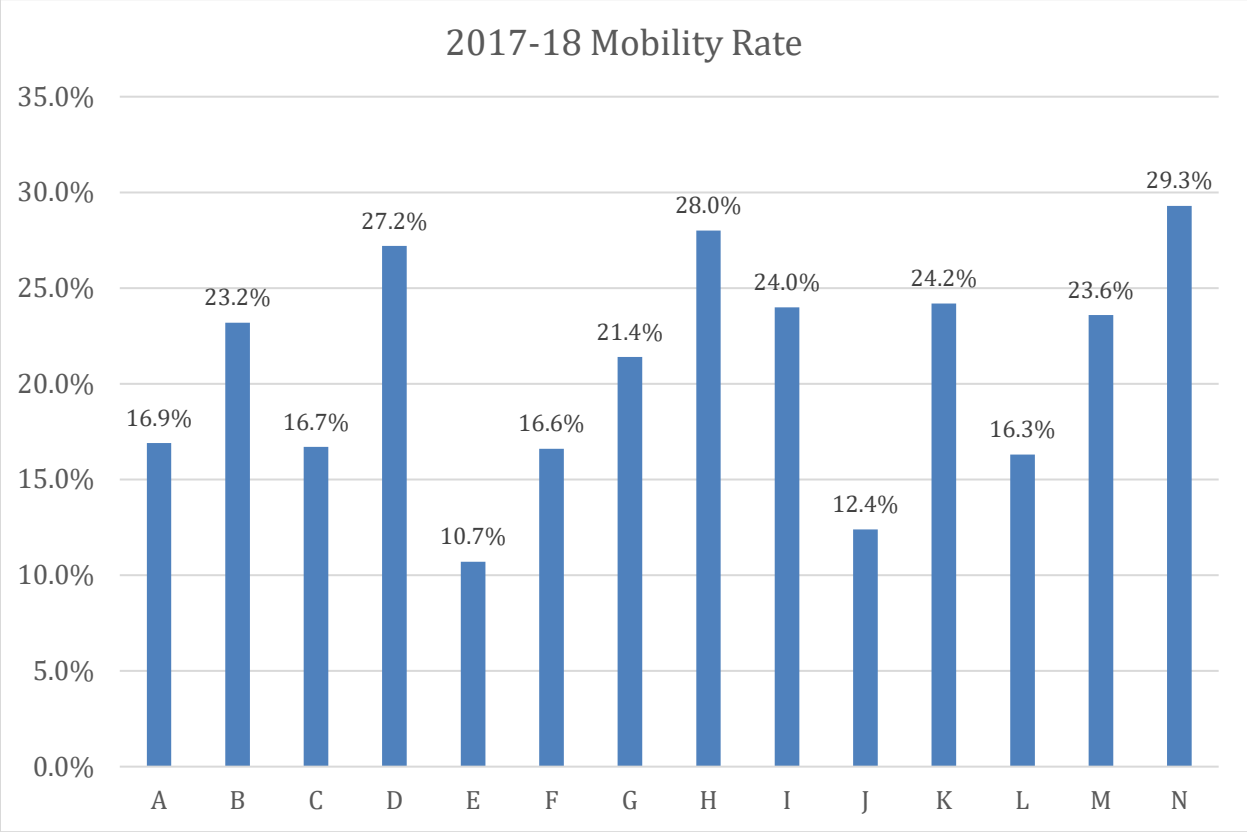
Suspension Rates by School



In the 2017-2018 school year, School N had the highest mobility rate at 29.3% and School E had the lowest mobility rate at 10.7%. The Betty Lou School District is in a city with over ten other school districts, so transferring between schools and school districts is common. There is also a military base in the city, which can add to higher levels of mobility. Some of the campuses with higher mobility rates may be closer to other districts and/or the military base.

Figure 9

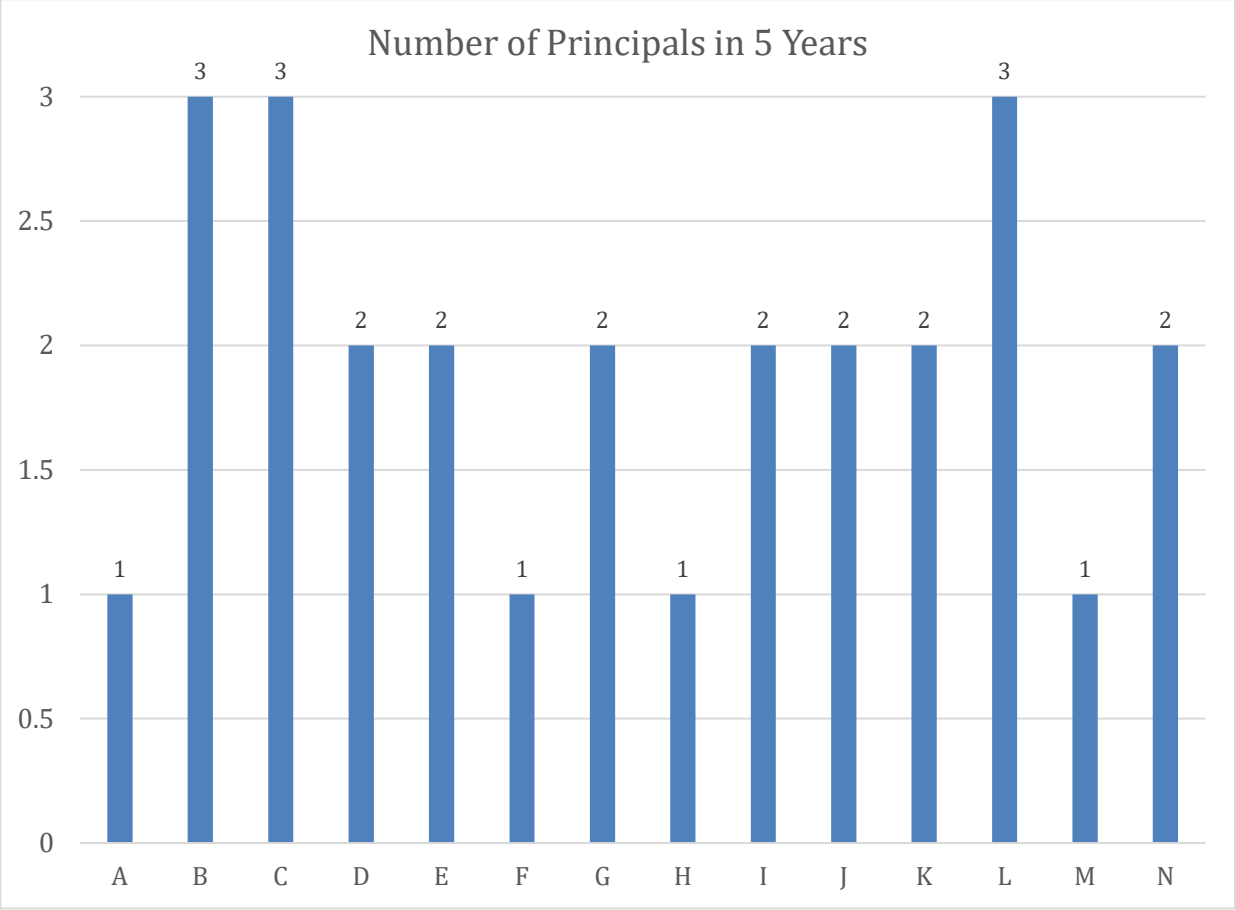
Mobility Rates by School



For the factor of principal turnover, data showed the number of principals each school had in the previous five years. The lowest number was one principal and the highest was three principals in that time frame. For that five-year timeframe, three schools were on their third principal (Schools B, C, and L), seven schools were on their second principal (Schools D, E, G, I, J, K, and N), and four schools had just one principal (Schools A, F, H, and M).

Figure 10

Number of Principals in 5 Years by School



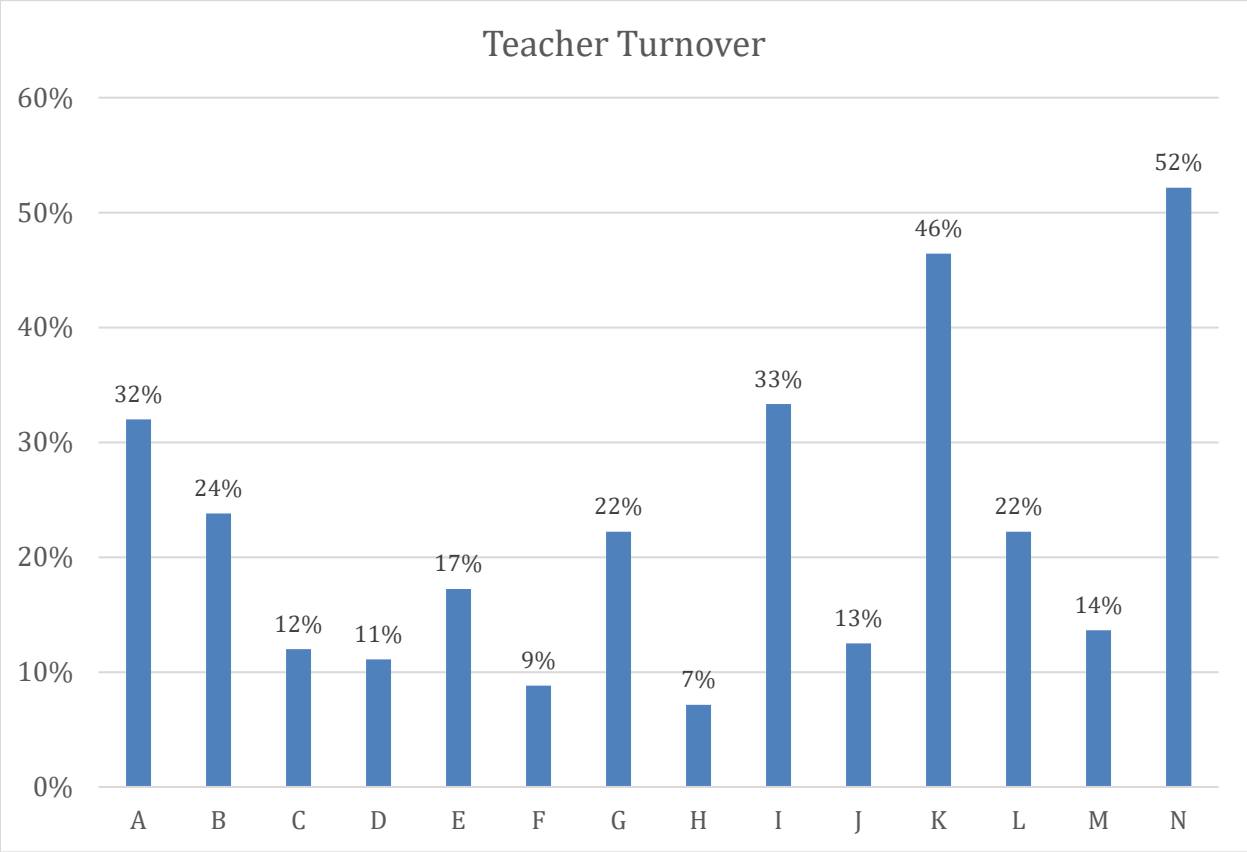
For the purpose of the multiple regression used to analyze the hypothesis, the factor of principal turnover is addressed by whether each of the 14 schools had a new principal in the 2017-2018 school year. Two of the fourteen schools had a new principal during the 2017-2018 school year (School C and School E).

School N had the highest rate of teacher turnover during the 2017-2018 school year, with 52% of teachers leaving and being replaced by new teachers. School H had the lowest rate of teacher turnover at 7.0%. Teaching positions that were added or taken away were not part of the

consideration for this data. For the purposes of this study, teacher turnover rate was the number of teachers that left teaching positions and that had to be filled before the next school year. Only two of the 14 schools had vacant teaching positions at the beginning of the school year, with Schools B and L each having one.

Figure 11

Teacher Turnover Rates by School

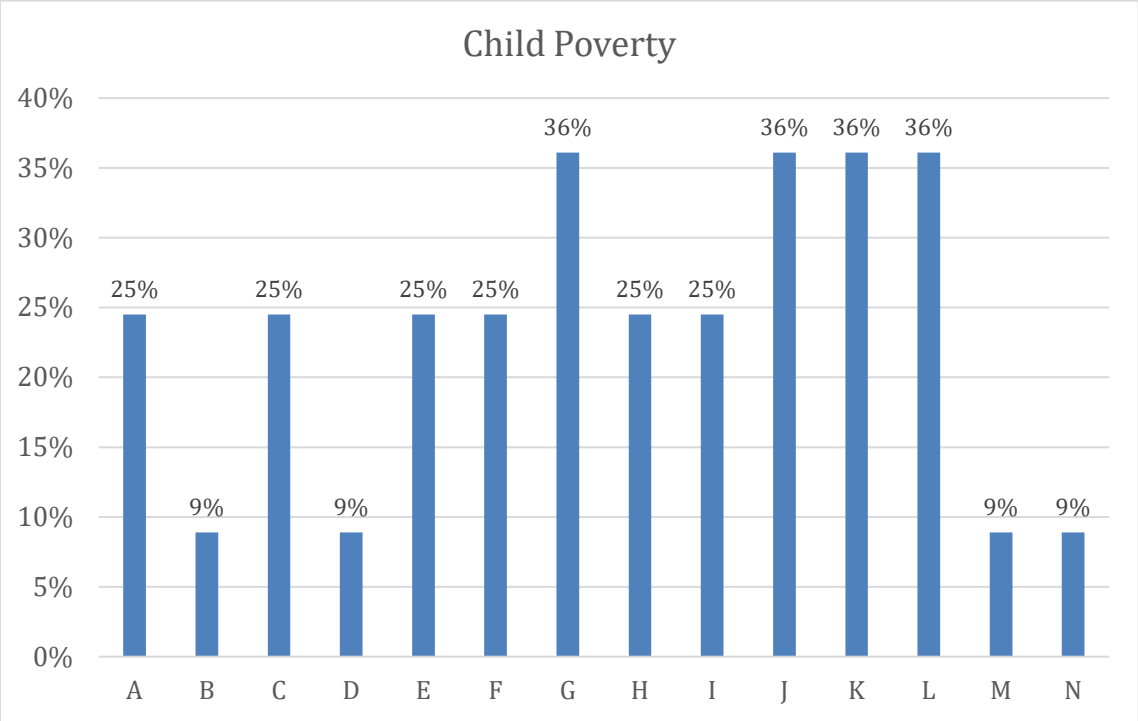


Neighborhood factors. Neighborhood factors were retrieved, by zip code, using census and local data. The 14 schools fell into three zip codes, so the neighborhood factors have three participants. The neighborhood risk factors of child poverty and poverty rate are described. Child

poverty describes the percentage of children in the zip code living in poverty, while poverty rate describes the percentage of all people (children and adults) living in poverty. In this study, for child poverty, the highest rate was 36% and the lowest was 9%.

Figure 12

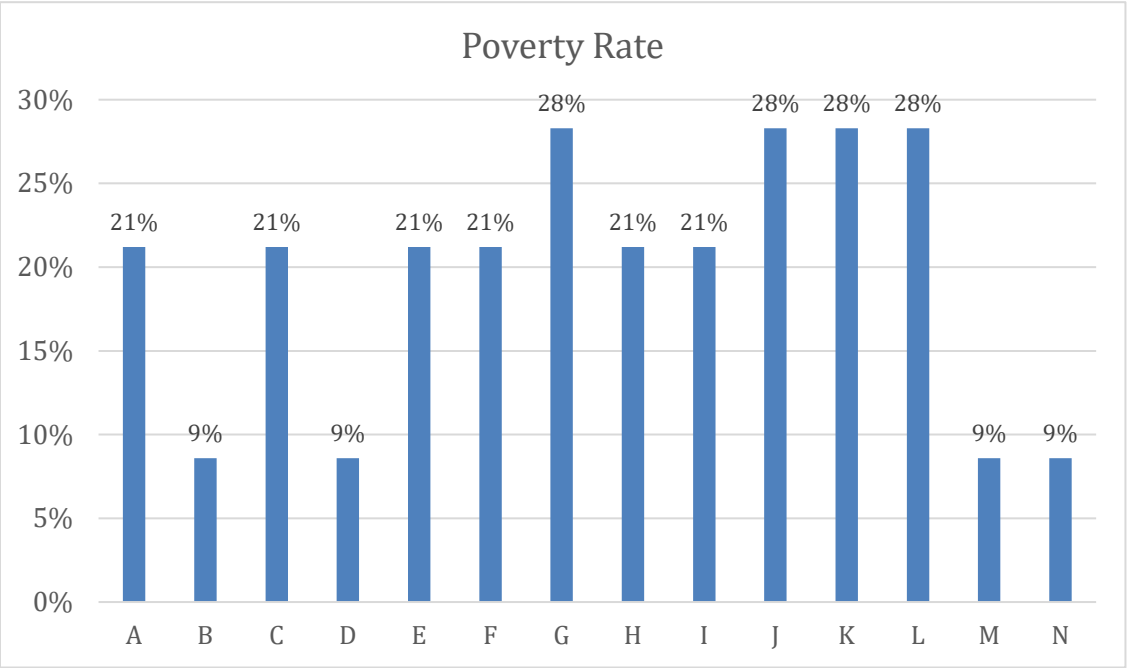
Child Poverty Rate by School



The highest poverty rate was 28% and the lowest was 9%. The schools with the highest poverty rates were Schools G, J, K, and L. These rates came from the 2016 census and were therefore conducted about a year before the data was collected from the Betty Lou School District.

Figure 13

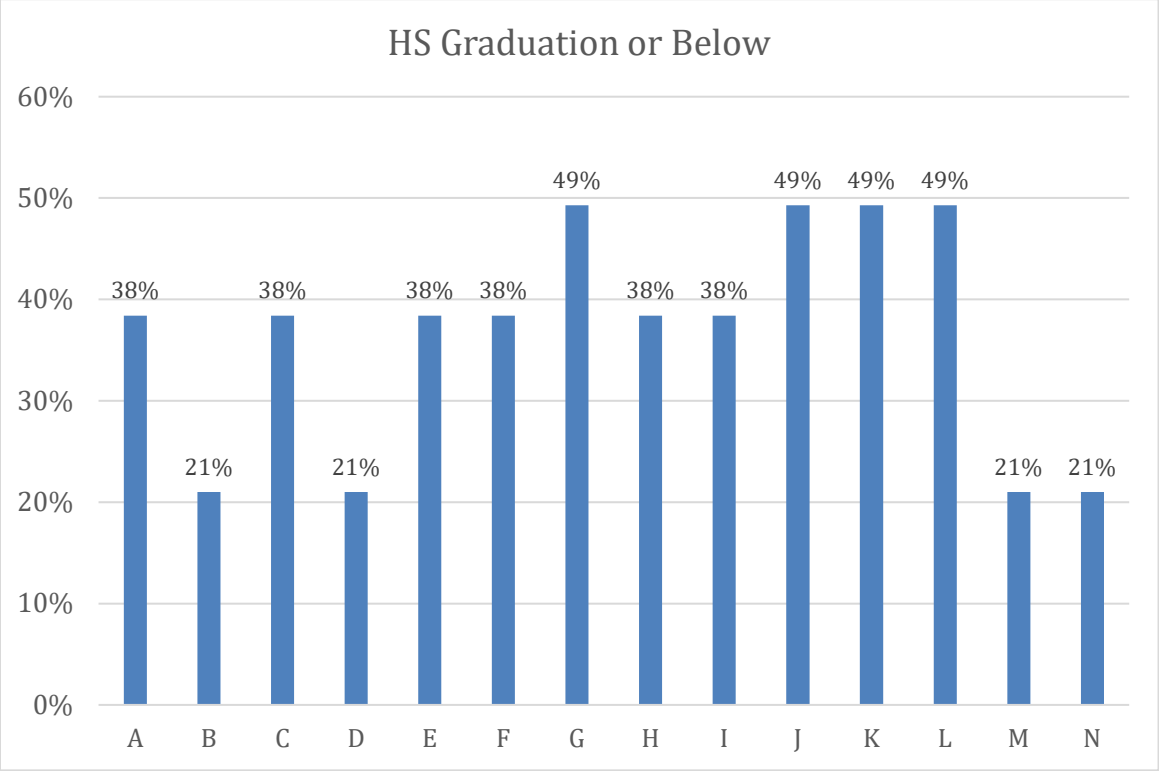
Poverty Rates by School



The highest rate for adult population having a high school graduation or below was 49%, and the lowest was 21%. This risk factor is useful in determining whether parts of the neighborhood population extended their education by attending at least a two-year college. As indicated by this data, at four of the 14 schools in the Betty Lou School District had neighborhood populations of about half who stopped pursuing education post high school.

Figure 14

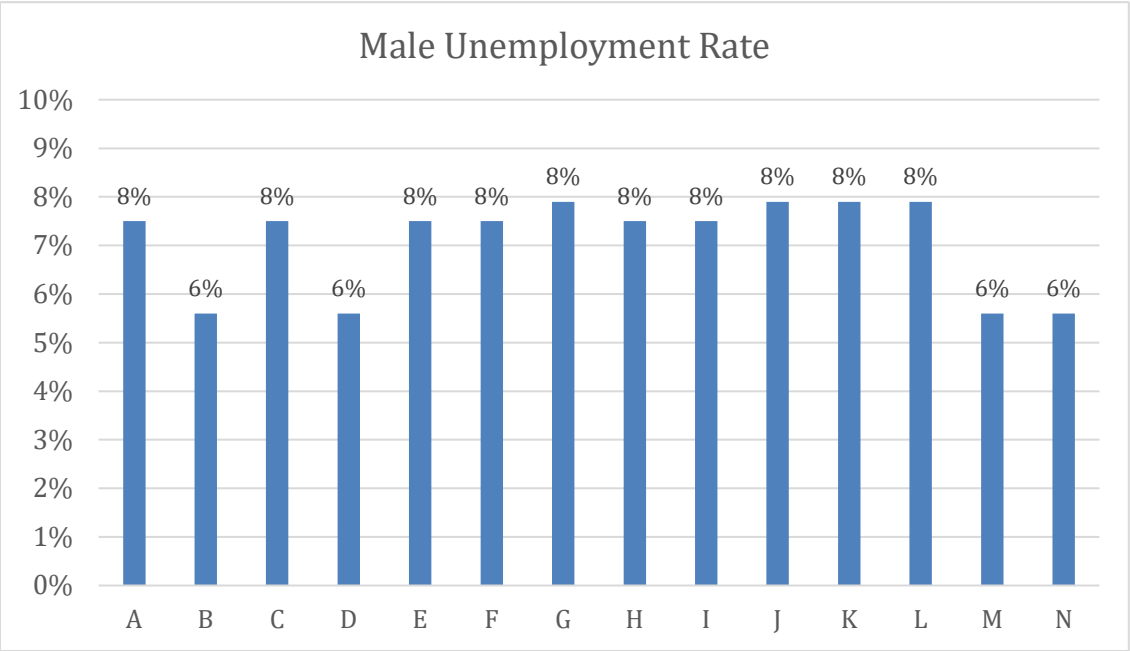
High School Graduation or Below Rates by School



The highest rate of male unemployment was 8% and the lowest was 6%. These rates indicate that there was very little variance in male unemployment throughout the neighborhood zip codes in the Betty Lou School District. Other risk factors showed much bigger differences in neighborhood factors.

Figure 15

Male Unemployment Rates by School



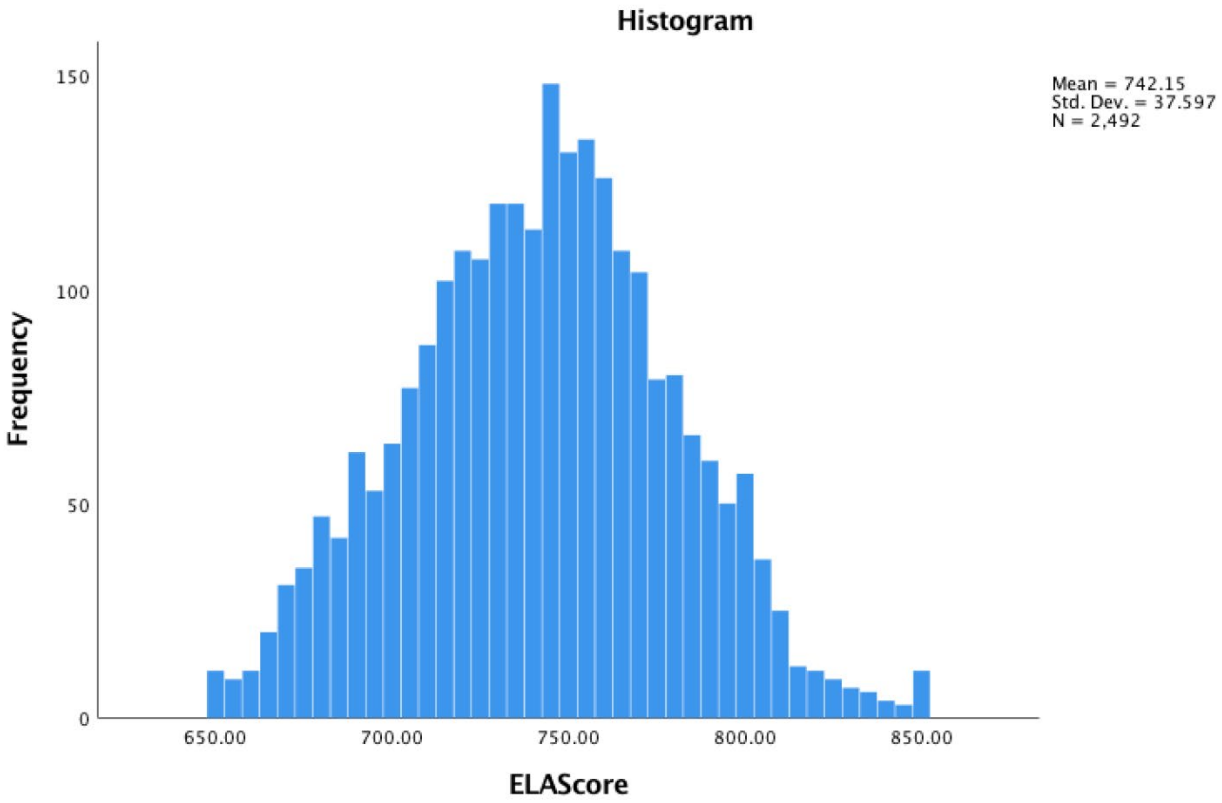
Seven of the 14 schools did have public housing offered in their zip codes and six did not. The schools in neighborhoods offering public housing were Schools B, D, G, J, K, L and M. Four of the schools had a homeless shelter in their neighborhood, while 10 of the schools did not. The schools that had a homeless shelter in their neighborhoods were Schools B, D, M, and N.

CMAS Score Descriptions

The mean score for the ELA exam (grades 3-5) was 742.15. The minimum score was 650 and the maximum was 850. The distribution pattern seems to be normal, based on visual inspection of the frequency histogram of ELA scores (see Figure 16). Analysis of skewness and kurtosis yielded perspective values of .027 (*SE* = .049) and -.255 (*SE* = .098), further verifying a normal distribution.

Figure 16

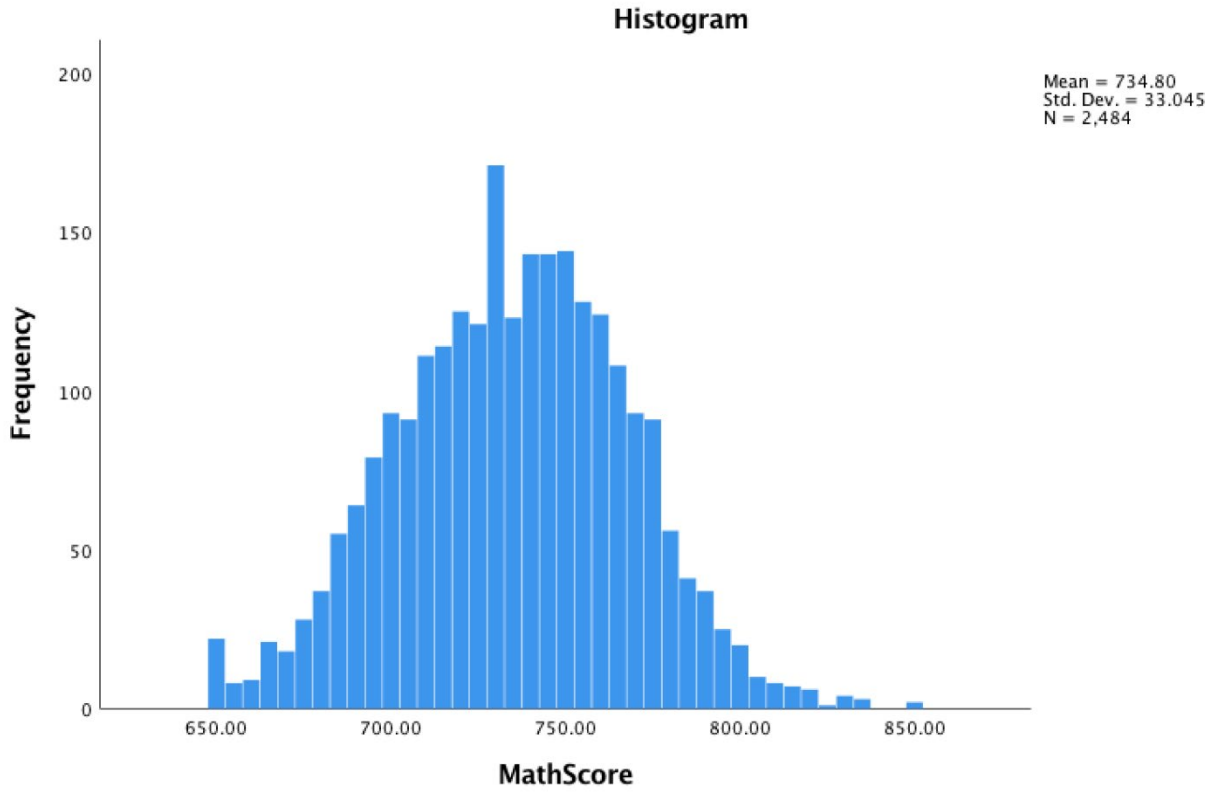
ELA Scores



The mean score for the math exam (grades 3-5) was 734.80. The minimum score was 650 and the maximum was 850. The distribution pattern seems to be normal, based on visual inspection of the frequency histogram of math scores (see Figure 31). Analysis of skewness and kurtosis yielded perspective values of -.043 (*SE* = .049) and -.114 (*SE* = .098), further verifying a normal distribution.

Figure 17

Math Scores



The average score for each school's ELA and math achievement on the CMAS assessment was determined to show differences between schools; the average scores are displayed in Table 6.

Table 7

CMAS Score by School

School	ELA Mean	Math Mean
A	738.18	740.38
B	746.59	733.42
C	730.05	732.77
D	749.37	730.59
E	769.43	756.32
F	742.54	735.68
G	739.79	730.73
H	747.92	742.22
I	742.42	736.18
J	744.01	731.07
K	732.03	729.01
L	723.15	713.35
M	734.81	734.71
N	739.35	732.4

Correlation Results

A Pearson's correlation was run to assess the relationship between each student and school risk factor. Table 7 displays the risk factor correlations with each other. Two of the risk factors showed a significant relationship.

Table 8

Risk Factor Correlation

		FRL	TH	SPED	AA/H	ELL	OSS	NP	TT	Mob.	Vac.
F/RL	Correl.	1	.349	-.087	.497	.342	.119	-.302	-.274	.203	.247
	Signif.		.221	.728	.070	.232	.686	.293	.342	.486	.396
TH	Correl.	.349	1	.270	-.344	-.386	.256	-.118	-.079	.568*	.072
	Signif.	.221		.350	.229	.172	.378	.689	.788	.034	.806
SPED	Correl.	-.087	.270	1	-.307	-.101	.229	-.316	-.004	.370	.053
	Signif.	.766	.350		.285	.732	.431	.272	.989	.193	.858
AA/H	Correl.	.497	-.344	.023	1	.825**	-.387	.176	-.253	-.407	.396
	Signif.	.070	.229	.285		.000	.172	.584	.383	.149	.162
ELL	Correl.	.342	-.386	-.101	.825**	1	-.434	.222	-.197	-.472	.272
	Signif.	.232	.172	.732	.000		.121	.446	.500	.088	.347
OSS	Correl.	.119	.256	.229	-.387	-.434	1	-.332	.077	.340	-.239
	Signif.	.686	.378	.431	.172	.121		.245	.795	.234	.410
NP	Correl.	-.302	-.118	-.316	.176	.222	-.332	1	-.243	-.501	-.167
	Signif.	.293	.689	.272	.548	.446	.245		.402	.068	.569
TT	Correl.	-.274	-.079	-.004	-.253	-.197	.077	-.243	1	.328	-.182
	Signif.	.342	.788	.989	.383	.500	.795	.402		.253	.534
Mob.	Correl.	.203	.568*	.370	-.407	-.472	.340	-.501	.328	1	.058
	Signif.	.486	.034	.193	.149	.088	.234	.068	.253		.843
Vac.	Correl.	.247	.072	.053	.396	.272	-.239	-.167	-.182	.058	1
	Signif.	.396	.806	.858	.162	.347	.410	.569	.534	.843	

Note. *Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed).

There were two sets of factors that had statistically significant correlations with one another; both of these correlations were large. There was a statistically significant large positive correlation between ELL students and African American or Hispanic students, $r(12) = .825$, $p = .000$. There was a statistically significant large positive correlation between mobility rate and temporary housing, $r(12) = .568$, $p = .000$. There was not a statistically significant correlation

between free and reduced lunch and temporary housing, $r(12) = .349$, $p = .221$. There was not a statistically significant correlation between free and reduced lunch and special education, $r(12) = -.087$, $p = .766$. There was not a statistically significant correlation between free and reduced lunch and African American or Hispanic, $r(12) = .497$, $p = .070$. There was not a statistically significant correlation between free and reduced lunch and ELL, $r(12) = .342$, $p = .232$. There was not a statistically significant correlation between free and reduced lunch and out of school suspension, $r(12) = .119$, $p = .686$. There was not a statistically significant correlation between free and reduced lunch and a new principal, $r(12) = -.302$, $p = .293$. There was not a statistically significant correlation between free and reduced lunch and teacher turnover, $r(12) = -.274$, $p = .342$. There was not a statistically significant correlation between free and reduced lunch and mobility rate, $r(12) = .203$, $p = .486$. There was not a statistically significant correlation between free and reduced lunch and teacher vacancy, $r(12) = .247$, $p = .396$.

There was not a statistically significant correlation between temporary housing and special education, $r(12) = .270$, $p = .350$. There was not a statistically significant correlation between temporary housing and African American or Hispanic, $r(12) = -.344$, $p = .229$. There was not a statistically significant correlation between temporary housing and ELL, $r(12) = -.386$, $p = .172$. There was not a statistically significant correlation between temporary housing and out of school suspension, $r(12) = .256$, $p = .378$. There was not a statistically significant correlation between temporary housing and a new principal, $r(12) = -.118$, $p = .689$. There was not a statistically significant correlation between temporary housing and teacher turnover, $r(12) = -.079$, $p = .788$. There was not a statistically significant correlation between temporary housing and teacher vacancy, $r(12) = .072$, $p = .806$.

There was not a statistically significant correlation between special education and African American or Hispanic, $r(12) = -.307$, $p = .285$. There was not a statistically significant correlation between special education and ELL, $r(12) = -.101$, $p = .732$. There was not a statistically significant correlation between special education and out of school suspension, $r(12) = .229$, $p = .431$. There was not a statistically significant correlation between special education and a new principal, $r(12) = -.316$, $p = .272$. There was not a statistically significant correlation between special education and teacher turnover, $r(12) = -.004$, $p = .989$. There was not a statistically significant correlation between special education and mobility rate, $r(12) = .370$, $p = .193$. There was not a statistically significant correlation between special education and teacher vacancy, $r(12) = .053$, $p = .858$.

There was not a statistically significant correlation between African American or Hispanic and out of school suspension, $r(12) = -.387$, $p = .172$. There was not a statistically significant correlation between African American or Hispanic and a new principal, $r(12) = .176$, $p = .548$. There was not a statistically significant correlation between African American or Hispanic and teacher turnover, $r(12) = -.253$, $p = .383$. There was not a statistically significant correlation between African American or Hispanic and mobility rate, $r(12) = -.407$, $p = .149$. There was not a statistically significant correlation between African American or Hispanic and teacher vacancy, $r(12) = .396$, $p = .162$.

There was not a statistically significant correlation between ELL and out of school suspension, $r(12) = -.434$, $p = .121$. There was not a statistically significant correlation between ELL and a new principal, $r(12) = -.222$, $p = .446$. There was not a statistically significant correlation between ELL and teacher turnover, $r(12) = -.197$, $p = .500$. There was not a statistically significant correlation between ELL and mobility rate, $r(12) = -.472$, $p = .088$. There

was not a statistically significant correlation between ELL and teacher vacancy, $r(12) = .272$, $p = .347$.

There was not a statistically significant correlation between out of school suspension and a new principal, $r(12) = -.332$, $p = .245$. There was not a statistically significant correlation between out of school suspension and teacher turnover, $r(12) = .077$, $p = .795$. There was not a statistically significant correlation between out of school suspension and mobility rate, $r(12) = .340$, $p = .234$. There was not a statistically significant correlation between out of school suspension and teacher vacancy, $r(12) = -.239$, $p = .410$.

There was not a statistically significant correlation between a new principal and teacher turnover, $r(12) = -.243$, $p = .402$. There was not a statistically significant correlation between a new principal and mobility rate, $r(12) = -.501$, $p = .068$. There was not a statistically significant correlation between a new principal and teacher vacancy, $r(12) = -.167$, $p = .569$.

There was not a statistically significant correlation between teacher turnover and mobility rate, $r(12) = .328$, $p = .253$. There was not a statistically significant correlation between teacher turnover and teacher vacancy, $r(12) = -.182$, $p = .534$. There was not a statistically significant correlation between mobility rate and teacher vacancy, $r(12) = .058$, $p = .843$.

Regression Results

A multiple linear regression was calculated to predict ELA scores based on the student factors of having African American or Hispanic heritage, ELL, special education, free/reduced lunch, and temporary housing. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.005. There was homogeneity of variances for all student factors, as assessed by the Homogeneity of Variance test using a One-way ANOVA. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized

deleted residuals greater than ±3 standard deviations. The assumption of normality was met, as assessed by a Q-Q Plot.

The multiple regression model statistically significantly predicted ELA score ($F(7, 2{,}484) = 81.304$, $p < .000$), with an R^2 of .186. Participants' ELA score is equal to 764.69 – 8.78 (African American or Hispanic) – 11.715 (ELL) – 39.77 (special education) – 10.20 (free/reduced lunch) – 1.54 (in temporary housing). All independent variables are coded as 1 if the student had the demographic and 0 if they did not. Participants' ELA scores decreased by 8.78 points if they were African American or Hispanic, decreased by 11.71 points if ELL, decreased by 39.78 points if in special education, decreased by 10.2 points if on free/reduced lunch, and decreased by 1.54 points if living in temporary housing. Four of the five factors were significant predictors of ELA score: African American or Hispanic, ELL, special education, and free/reduced lunch. The factor temporary housing was not a significant predictor.

Table 9

Summary of Multiple Regression Analysis: ELA Scores and Student Factors

Variable	*B*	SE_B	β
Intercept	764.684	1.775	
African American or Hispanic	-8.776	1.551	-.110*
ELL	-11.715	1.666	-.138*
Special Education	-39.770	2.046	-.353*
Free/Reduced Lunch	-10.203	1.795	-.105*
Temporary Housing	-1.540	5.035	-.006

Note. * $p < .05$, *B* = unstandardized regression coefficient; SE_B = Standard error of the coefficient; β = standardized coefficient

A multiple linear regression was calculated to predict math scores based on the student factors of being African American or Hispanic, ELL, special education, free/reduced lunch, and temporary housing. There was independence of residuals, as assessed by a Durbin-Watson

statistic of 2.03. There was homogeneity of variances for all student factors, as assessed by the Homogeneity of Variance test using a One-way ANOVA. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized deleted residuals greater than ±3 standard deviations. The assumption of normality was met, as assessed by a Q-Q Plot.

The multiple regression model statistically significantly predicted math scores ($F(7, 2{,}476) = 68.412$, $p < .000$), with an R^2 of .162. Participants' math scores are equal to 752.79 – 9.94 (African American or Hispanic) – 6.66 (ELL) – 33.44 (special education) – 6.29 (free/reduced lunch) – 5.53 (in temporary housing). All independent variables are coded as 1 if the student had the demographic and 0 if they did not. Participants' math scores decreased by 9.94 points if they were African American or Hispanic, decreased by 6.66 points if ELL, decreased by 33.44 points if in special education, decreased by 6.29 points if on free/reduced lunch, and decreased by 5.53 points if living in temporary housing. Four of the five factors were significant predictors of ELA score: African American or Hispanic, ELL, special education, and free/reduced lunch. The factor temporary housing was not a significant predictor.

Table 10

Summary of Multiple Regression Analysis: Math Scores and Student Factors

Variable	*B*	SE_B	β
Intercept	752.787	1.591	
African American or Hispanic	-9.937	1.386	-.142*
ELL	-6.651	1.488	-.089*
Special Education	-33.436	1.827	-.338*
Free/Reduced Lunch	-6.294	1.607	-.074*
Temporary Housing	-5.530	4.537	-.023

Note. * $p < .05$, *B* = unstandardized regression coefficient; SE_B = Standard error of the coefficient; β = standardized coefficient

A multiple linear regression was calculated to predict ELA score based on the school factors of principal turnover, teacher turnover, student mobility, teacher vacancy, and student suspensions. There was linearity between ELA scores and the school factors of principal turnover, teacher turnover, student mobility, and teacher vacancy as assessed by a correlations table. Linearity did not exist between math scores and the school factor of student suspensions (p = .418). There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.024. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized deleted residuals greater than ±3 standard deviations. The assumption of normality was met, as assessed by a Q-Q Plot.

The multiple regression model statistically significantly predicted ELA scores (F(5, 2,486) = 12.151, $p < .000$), with an R^2 of .024. Participants' ELA scores are equal to 741.626 +12.096 (principal turnover) – 20.639 (teacher turnover) + 8.616 (mobility rate) – 4.916 (teacher vacancy) + 21.35 (suspensions). Participants' ELA scores increased by 12.1 points if the school had a new principal, decreased by 20.64 points with a higher rate of teacher turnover, increased by 8.6 points if the school had a higher mobility rate, decreased by 4.92 points if there was a teacher vacancy at the school, and increased by 21.35 points at a school with a higher suspension rate. Three of the five factors were significant predictors of ELA score: new principal, teacher turnover, and teacher vacancy. The factors mobility rate and school suspensions were not significant predictors.

Table 11

Summary of Multiple Regression Analysis: ELA Scores and School Factors

Variable	*B*	SE_B	β
Intercept	741.626	3.662	
New Principal	12.096	2.509	.121*
Teacher Turnover	-20.639	6.075	-.073*
Mobility Rate	8.616	16.118	.013
Teacher Vacancy	-.4916	2.363	-.046*
School Suspension	21.345	13.384	.037

Note. * $p < .05$, *B* = unstandardized regression coefficient; SE_B = Standard error of the coefficient; β = standardized coefficient

A multiple linear regression was calculated to predict math score based on the school factors of principal turnover, teacher turnover, student mobility, teacher vacancy, and student suspensions. There was linearity between math scores and the school factors of principal turnover, teacher turnover, student mobility, and teacher vacancy as assessed by a correlations table. Linearity did not exist between math scores and the school factor student suspensions (p = .078). There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.025. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized deleted residuals greater than ±3 standard deviations. The assumption of normality was met, as assessed by a Q-Q Plot.

The multiple regression model statistically significantly predicted math scores (F(5, 2,478) = 24.256, $p < .000$), with an R^2 of .047. Participants' math score is equal to 734.169 +11.351 (principal turnover) – 16.142 (teacher turnover) + 27.767 (mobility rate) – 14.728 (teacher vacancy) -15.87 (suspensions). Participants' math scores increased by 11.35 points if the school had a new principal, decreased by 16.14 points with a higher rate of teacher turnover, increased by 27.77 points if the school had a higher mobility rate, decreased by 14.73 points if

there was a teacher vacancy at the school, and decreased by 15.87 points at a school with a higher suspension rate. Four of the five factors were significant predictors of math score: new principal, teacher turnover, mobility rate, and teacher vacancy. School suspension was not a significant predictor.

Table 12

Summary of Multiple Regression Analysis: Math Scores and School Factors

Variable	*B*	SE_B	β
Intercept	734.169	3.187	
New Principal	11.351	2.181	.130*
Teacher Turnover	-16.142	5.290	-.065*
Mobility Rate	27.767	14.031	.048*
Teacher Vacancy	-14.728	2.054	-.156*
School Suspension	-15.870	11.644	-.031

Note. * $p < .05$, *B* = unstandardized regression coefficient; SE_B = Standard error of the coefficient; β = standardized coefficient

A multiple linear regression model was not run for neighborhood factors because a sample size of three was not sufficient to retrieve significant predictions.

Risk Factor Similarities and Score Differences

Within the 14 elementary schools, several had similar risk factor challenges. Despite similarities between risk factors, there were also differences between schools' ELA and math mean scores. This section will describe the schools that had similar risk factors but differences in ELA and/or math mean scores.

Student factors. Table 12 shows the mean CMAS scores by school for the ELA and math tests, as well as the frequency of each risk factor by school. The bolded numbers are discussed in this section; they indicate high risk factor frequencies, yet higher than average test scores.

Table 13

Student Risk Factors and Mean Scores

School	ELA Mean	Math Mean	FRL	Temp. Hous.	Sp. Ed.	AA or H	ELL
A	738.18	**740.38**	**0.87**	0	0.1	**0.74**	0.28
B	**746.59**	733.42	0.86	0.06	**0.18**	0.56	0.22
C	730.05	732.77	0.86	0.05	0.14	0.79	0.5
D	**749.37**	730.59	**0.9**	**0.08**	**0.17**	**0.71**	**0.21**
E	769.43	756.32	0.64	0	0.07	0.61	0.16
F	**742.54**	735.68	0.87	0.02	0.13	0.64	0.32
G	739.79	730.73	0.92	0.04	0.1	0.75	0.23
H	747.92	742.22	0.81	0.02	0.13	0.64	0.22
I	742.42	736.18	0.83	0.09	0.1	0.61	0.22
J	**744.01**	731.07	0.69	0	**0.18**	0.67	**0.32**
K	732.03	729.01	0.85	0	0.13	0.72	0.37
L	723.15	713.35	0.85	0	0.1	0.79	0.48
M	734.81	734.71	0.89	0.08	0.13	0.54	0.1
N	739.35	732.4	0.62	0.04	0.17	0.47	0.06
District	742.15	734.8					

For the risk factor Free/Reduced Lunch, 11 of the 14 schools had F/RL rates above 80%. Two of the schools with the highest F/RL rates had the highest results for the ELA test: School D had a 90% F/RL rate and the average ELA score was 749.37, over seven points above the district average. School B had an 86% F/RL rate and their average ELA score was 746.59, over 5 points above the district average. On the contrary, School N had the lowest F/RL rate in the district at 62%, and their average ELA score was 739.35, about three points below the district average. On the math exam, most of the schools with the highest rates of F/RL were near or below the district average. The exception was School A, which had a mean math score of 740.38, about five points

higher than the district average. Like the ELA exam, School N has the lowest F/RL rate but performed about two points lower than the district average on the math exam (732.4).

Overall, the rates for temporary housing were lower (the school with the highest rate had 9% and five schools did not have any students in temporary housing); however, the results still indicated that School D had the second highest rate of temporary housing at 8% but also had the second highest average ELA score at 749.37, about seven points higher than the district average. Alternatively, School L does not have any students in temporary housing but had the lowest average ELA score in the district (723.15). On the math test, the two schools with the highest and lowest scores both had zero students in temporary housing.

Results for Special Education indicated that the three schools with the highest rates of special education (18%, 17%, and 17%) all had ELA scores above the district average. School B was four points above (746.59), School J was 2 points above (744.01), and School D was seven points above (749.37). Of the five schools with the lowest rates of special education (ranging from 7-10%), three scored below the district average. For math, the top five schools with highest rates of special education did not score above the district average.

The risk factor of having African American or Hispanic heritage showed different results on the ELA test than the previous risk factors. Of the five schools with the highest rates of African American or Hispanic students (ranging from 71% to 79%), only one school scored above the district average on the ELA test. School D has a student population of 71% who are African American or Hispanic, but scored seven points above the district average. Alternatively, School N has the lowest rate of African American or Hispanic students (47%), but scored below the district average on the ELA assessment by about three points. For math, again only one school of the top five highest percentage of African American or Hispanic students scored higher

than the district average (School A with 740.38). Of the five schools with the lowest rates of African American or Hispanic students, four scored at or above the district average.

There were fewer surprises in scores when analyzing schools based on ELL populations. For the ELA exam, most of the five schools with the highest rates of ELL students scored lower than the district average. The exceptions were Schools J and F; School J has an ELL population of 32% and scored about two points higher than the district average. School F has an ELL population of 32% and scored about a half a point higher than the district average. For math, all five of the schools with the highest rates of ELL students performed lower than the district average.

School factors. Table 13 indicates the mean CMAS scores by school for the ELA and math tests, as well as the frequency of each risk factor by school. The bolded numbers are discussed in this section; they indicate high risk factor frequencies, yet higher than average test scores.

The risk factor out of school suspension showed that the school with the highest rate of suspension (School B with 24%) performed above the district average for the ELA test by about four points. Alternatively, the four schools with the next highest rates of suspension (from 12% to 22%) scored below the district average on the ELA test. For math, the three schools with the top three highest rates of out of school suspension all performed lower than the district average.

Table 14

School Risk Factors and Mean Scores

School	ELA Mean	Math Mean	OSS	New Prin	Tchr Turn.	Mobility	Tchr. Vac.
A	738.18	**740.38**	0.04	No	**0.32**	0.169	No
B	**746.59**	733.42	**0.24**	No	0.24	0.232	No
C	730.05	732.77	0.02	Yes	0.12	0.167	No
D	**749.37**	730.59	0.04	No	0.11	**0.27**	**Yes**
E	**769.43**	**756.32**	0.05	**Yes**	0.17	0.11	No
F	742.54	735.68	0.06	No	0.09	0.17	No
G	739.79	730.73	0.22	No	0.22	0.21	No
H	**747.92**	**742.22**	0.11	No	0.07	**0.28**	No
I	742.42	**736.18**	0.05	No	**0.33**	0.24	No
J	744.01	731.07	0.06	No	0.13	0.12	No
K	732.03	729.01	0.04	No	0.46	0.24	No
L	723.15	713.35	0.06	No	0.22	0.16	Yes
M	734.81	734.71	0.12	No	0.14	0.24	No
N	739.35	732.4	0.13	No	0.52	0.29	No
District	742.15	734.8					

The risk factor of having a new principal applied to only two schools; the other 12 elementary schools had returning principals during the 2017-2018 school year. Of the two with new principals, School E performed above the district average on both the ELA and math assessments. School E had an average score of 769.43 on the ELA test, a 27-point difference above the district average. The average math score was 756.32, which was about 21 points above the district average. The other school with a new principal was School C, which performed about 12 points below the district average on ELA and about two points below the district average on math.

The four schools with the highest teacher turnover rates (ranging from 32% to 52%) all had ELA scores below the district average. School N had the highest rate of teacher turnover

(52%) and had an ELA score of 739.35, about three points below the district average. For math, two of the four schools with the highest teacher turnover rates had scores above the district average (School I's mean score was 736.18, about 1.5 points above the district average, and School A's mean score was 740.38, about 5.5 points above the district average).

Mobility rates indicated that the two of four schools with highest movement had ELA scores above the district average. School H (mobility rate of 28%) had an average ELA score of 747.92, about five points above the district average, while School D (mobility rate of 27%) had an average ELA score of 749.37, about seven points above the district average. The two schools with the lowest mobility rates (11% and 12%) also had scores above the district average. This included School E, which had the highest average ELA score with 769.43. For math, only one school with a high rate of mobility had scores above the district average; School H (mobility rate of 28%) had an average math score of 742.22, about 7.5 points above the district average. Again, School E had the highest average math score (756.32, about 22 points above district average) and also had the lowest mobility rate at 11%.

The final school risk factor is teacher vacancy; only two schools had vacancies throughout the school year. Of those two schools, one outperformed the district in ELA scores. School D had a teacher vacancy during the 2017-2018 school year and performed above the district average in ELA score by about seven points, with an average score of 749.37. School L also had a teacher vacancy but performed under the district average by nearly 20 points with an average score of 723.15. Neither of the two schools performed above the district average on the math assessment.

Hypotheses Results

Question 1. In Betty Lou School District, what are the strengths of the relationships between the risk factors? A Pearson's correlation was run to assess the relationship between each student risk factor and school risk factor. There were two sets of factors that had statistically significant correlations with one another. There was a statistically significant large positive correlation between ELL students and African American or Hispanic students, $r(12) = .825$, $p = .000$. There was a statistically significant large positive correlation between mobility rate and temporary housing, $r(12) = .568$, $p = .000$.

The other risk factors did not show any statistically significant relationship with each other, including free and reduced lunch with temporary housing, special education, African American or Hispanic heritage, ELL, out of school suspension, a new principal, teacher turnover, mobility rate, and teacher vacancy.

Though there were only two sets of risk factors that had statistically significant relationships with one another, both sets were large correlations. There was a statistically significant large positive correlation between ELL students and African American or Hispanic students, $r(12) = .825$, $p = .000$. Of all relationships, this was the strongest relationship between all risk factors. In Betty Lou School District, as the number of ELL students increases, so does the number of African American or Hispanic students. This can be seen as understandable because the majority of English Language Learners in Betty Lou School District are Hispanic; for most of them, their first language is Spanish.

The second strongest relationship between risk factors was between mobility rate and temporary housing. There was a statistically significant large positive correlation between mobility rate and temporary housing, $r(12) = .568$, $p = .000$. This is also understandable because

when students and their families are highly mobile, they may be situated in temporary housing until their next housing becomes available.

Question 2. In Betty Lou School District, which of the risk factors have a relationship with student achievement? A multiple linear regression was calculated to predict ELA and math scores based on the student factors of African American or Hispanic heritage, ELL, special education, free/reduced lunch, migrant, refugee, and temporary housing. Table 14 indicates the impact of these risk factors on the assessments.

Table 15

Student Risk Factor Impact on Student Achievement

	SPED	ELL	F/RL	AA or Hispanic
ELA	-39.78 points	-11.71 points	-10.2 points	-8.78 points
Math	-33.44 points	-6.66 points	-6.29 points	-9.94 points

The multiple regression model statistically significantly predicted ELA scores ($F(7, 2{,}484) = 81.304$, $p < .000$), with an R^2 of .186. Of the five student risk factors, four had a relationship with student achievement on the ELA state assessment. Participants' ELA scores decreased by 8.78 points if they were African American or Hispanic, decreased by 11.71 points if ELL, decreased by 39.78 points if in special education, and decreased by 10.2 points if on free/reduced lunch.

A multiple linear regression was calculated to predict math scores based on the student factors of African American or Hispanic heritage, ELL, special education, free/reduced lunch, migrant, refugee, and temporary housing. The multiple regression model statistically significantly predicted math scores ($F(7, 2{,}476) = 68.412$, $p < .000$), with an R^2 of .162. Of the five student risk factors, four had a relationship with student achievement on the math state

assessment. Participants' math scores decreased by 9.94 points if they were African American or Hispanic, decreased by 6.66 points if ELL, decreased by 33.44 points if in special education, and decreased by 6.29 points if on free/reduced lunch.

A multiple linear regression was calculated to predict ELA and math scores based on the school factors principal turnover, teacher turnover, student mobility, teacher vacancy, and student suspensions. Table 15 indicates the impact of these risk factors on the assessments.

Table 16

School Risk Factor Impact on Student Achievement

	New Principal	Tchr. Turnover	Mobility Rate	Tchr. Vacancy
ELA	+12.1 points	-20.64 points	---	-4.92 points
Math	+11.35 points	-16.14 points	+27.77 points	-14.73 points

Note. --- indicates that there was not a statistically significant relationship

The multiple regression model statistically significantly predicted ELA scores ($F(5, 2{,}486) = 12.151$, $p < .000$), with an R^2 of .024. Of the five school risk factors, three had a relationship with student achievement on the ELA state assessment. Participants' ELA score increased by 12.1 points if the school had a new principal, decreased by 20.64 points with a higher rate of teacher turnover, and decreased by 4.92 points if there was a teacher vacancy at the school.

A multiple linear regression was calculated to predict math scores based on the school factors of principal turnover, teacher turnover, student mobility, teacher vacancy, and student suspensions. The multiple regression model statistically significantly predicted math scores ($F(5, 2{,}478) = 24.256$, $p < .000$), with an R^2 of .047. Of the five school risk factors, four had a relationship with student achievement on the math state assessment. Participants' math scores increased by 11.35 points if the school had a new principal, decreased by 16.14 points with a

higher rate of teacher turnover, increased by 27.77 points if the school had a higher mobility rate, and decreased by 14.73 points if there was a teacher vacancy at the school.

The multiple regression analyses indicated that most of the student risk factors did impact student achievement. In Betty Lou School District, four of the five student factors were significant predictors of student achievement, and all four of those indicated a negative relationship. Special education had the largest negative impact on student score. For students qualifying for special education, ELA scores decreased by 39.78 points for the ELA exam and decreased by 33.44 points for the math exam. The next largest impact on student achievement for the ELA exam was ELL, with scores decreasing by 11.71 points. This is followed by free and reduced lunch and African American or Hispanic students with declines in scores by 10.2 points and 8.78 points, respectively. For the math scores, the biggest negative impact on student achievement following special education was African American or Hispanic heritage by a 9.94-point reduction. This was followed by ELL with a decline of 6.66 points and free/reduced lunch by 6.29 points.

The multiple regression analyses indicated that most of the school risk factors also impacted student achievement. Alternatively, the school risk factors had both positive and negative impacts. Mobility rate showed a positive impact on math test scores with an increase of 27.77 points. Having a new principal positively impacted math and ELA scores with 12.1 points and 11.35 points, respectively. Teacher turnover had the largest negative impact on student scores with a decline of 20.64 points for the ELA test and a decline of 16.14 points for the math test. Teacher vacancy also had a negative impact with a decline of 4.92 points on the ELA test and 14.73 points on the math test.

As indicated by this data, special education had the largest negative impact of all risk factors on student achievement. Student scores declined by over 30 points on both the ELA and math assessments. Nationally, an achievement gap continues to exist between students on individual education plans (IEPs) and students not on these plans (Thurlow, Albus, & Lazarus, 2017). Gaps exist between students on IEPs (and therefore in special education) in elementary schools, but that gap grows even greater by middle and high school. In 2014-2015, the average gaps in middle school and high school scores across states spanned from 28 to 38 percentage points in reading and mathematics (Thurlow et al., 2017). Special education students do receive funding by the state and federal governments; federal funds come through the Every Child Succeeds Act (ESSA) and Individuals with Disabilities Act (IDEA), (American Speech-Language-Hearing Association, 2019). These funds are separate from the Title I monies described in this study. While funds are made available to students received special education services, previous research and this study shows that students' disabilities are negatively impacting their learning.

Teacher turnover had the next highest negative impact on student achievement with about a 20- and 16-point reduction for ELA and math assessments, respectively. As evidenced from this data, a higher rate of teacher turnover negatively impacts how students achieved on the state assessment. Other studies have also found that teacher turnover negatively affects both ELA and math student achievement (Ronfeldt, Loeb, & Wyckoff, 2013). When teachers leave a school and new teachers begin, there is a natural and understandable learning curve that may impact that time that it takes for the teacher to become comfortable and/or effective in their pedagogy and content area. Consequently, student learning may suffer.

Free/reduced lunch did negatively impact student achievement, but it had less of an impact than most of the other statistically significant factors. ELA scores decreased by 10.2 points and math scores decreased by 6.29 points. This supports the research indicating that students from lower-income homes may struggle more academically (Aikens & Barbarin, 2008; Baker & Coley, 2013; Bromberg & Theokas, 2013; Brooks-Gunn & Duncan, 1997; Dynarski & Kainz, 2016; Lubienski & Lubienski, 2006; Reardon, 2013). However, the results of this study show that low-income students (as determined by free/reduced lunch) is not the primary, and certainly not the only, factor negatively impacting student learning.

Other findings indicated that some of the risk factors had a positive impact on student learning. Mobility rate had the highest positive impact on student achievement scores with an increase of 27.77 points on the state math assessment. While this may seem counterintuitive, there are different reasons that this could be the case. In this Colorado city, there are 11 school districts, including Betty Lou School District. Student movement across those districts is common, and while mobility can be a challenge, it can also be a benefit for some campuses based on the students they lose or gain. This could be one of the reasons that mobility rate had a positive impact on student scores.

The final risk factor that had a positive impact on student achievement on the CMAS assessments was the school having a new principal. School leadership and improved student achievement are empirically linked (Wallace Foundation, 2011). According to Louis, Leithwood, Wahlstrom, and Anderson (2010), school leadership is the second most important factor to student learning. A new principal is considered a risk factor because, like a new teacher, there is an adjustment period that may impact both teacher and student performance. Alternatively, a new principal can have a positive impact very quickly with new ideas, strategies, and

methodologies. This could have been the case in Betty Lou School District, which had two new principals during the 2017-2018 school year.

Question 3. In Betty Lou School District, how do schools with similar risk factors perform in student achievement? Risk factors for each school were identified and grouped based on rates. The results indicated that, for schools with similar challenges (described as risk factors), there are some schools outperforming the district averages on both ELA and math assessments.

School D had a mean ELA score about seven points higher than the district average and also had some of the highest rates in all student risk factor categories (F/RL, temporary housing, special education, African American or Hispanic, and ELL). School B scored about four points higher than the district average and tied for the highest special education population at 18%. In fact, all three schools with the highest rates of special education scored above the district average on the ELA assessment. However, none of those three schools scored above the district average in math. School F had one of the highest ELL rates in the district and performed slightly above the district average. Finally, School J scored about two points above the district average and had one of the highest rates of special education and ELL.

School A performed about six points above the district average for the math assessment and had the second highest rate of teacher turnover. Two other schools had high rates of teacher turnover (Schools K and N), but scored below the district average in math. School B scored above the district average in ELA and had the highest out of school suspension rate; School G had a similar suspension rate but scored below the district average. School E was one of the two schools with a new principal during the 2017-2018 school year, but still performed above the district average in both ELA and math assessments. One item to consider however, is this new

principal was an assistant principal and teacher at this school for many years and therefore was not new to the campus. School C also had a new principal but performed below the district average on both tests. School H had one of the three top highest mobility rates but had higher performance on both assessments. Finally, School I was one of the top four schools with teacher turnover and scored above the district average in math.

This data indicates that some schools have higher student achievement than other schools with similar risk factor rates. There could be a variety of reasons to explain the differences in scores between groups that face similar challenges; these reasons will be addressed in Chapter 5 and are important items to consider for educational practitioners.

Chapter V

Discussion

Introduction

The purpose of this study was to determine whether relationships exist between elementary student academic achievement and risk factors for students, schools, and neighborhoods. Educational disadvantage has been primarily defined by the singular factor of free and reduced lunch eligibility (U.S. Department of Health & Human Services, 2018), and has generally not accounted for any other factors. Chronic absenteeism has been tied directly to lack of educational progress, and studies on chronic absenteeism identified risk factors that are tied to students being chronically absent (Bryk et al., 2010; Fantuzzo et al., 2014; Nauer et al., 2014). This study further explored those risk factors to determine whether they had an impact on student achievement.

This chapter answers this study's research questions, as listed below.

1. In Betty Lou School District, what are the strengths of the relationships between the risk factors?
2. In Betty Lou School District, which of the risk factors have a relationship with student achievement?
3. In Betty Lou School District, how do schools with similar risk factors perform in student achievement?

This study went beyond the measure of free and reduced lunch to determine whether relationships exist between additional risk factors and student achievement as assessed by a state standardized test. This research attempted to give school district leaders and school leaders additional information as to which risk factors were most affecting their students' achievement.

Findings

The researcher compiled demographic data from Betty Lou School District, a medium-sized school district in Colorado, in the categories of student and school. Fourteen elementary schools were included in the study with a total of 2,492 student assessment results from grades 3-5. All student risk factor data were collected from the school district, including ethnicity, special education participation, ELL qualification, refugee qualification, free and reduced lunch participation, and temporary housing. The school district provided student achievement data from the spring 2018 CMAS math and English tests. School risk factors were also collected from the district. Neighborhood risk factor information was collected from public websites in the zip codes in which the elementary schools are located.

Several risk factors were not included in analysis for a variety of reasons. The student risk factors migrant and refugee were not included in analyses because samples sizes were too small. The school factor of CPS involvement was not included because this was not information that school districts receive. Finally, the neighborhood factor frequencies were included, but were not used in the analysis due to how the schools were clustered. The 14 elementary schools were clustered into three zip codes, which is how the neighborhood factor data were collected. A sample size of three was too small to include in analyses.

The researcher utilized descriptive statistics to analyze and interpret the data. Measures involving frequency were used to describe the rates of all student factors, school factors, and neighborhood factors. The researcher utilized SPSS 25 for Macintosh to facilitate analysis of data; analysis included descriptive, correlation, and multiple regression analyses.

When determining the descriptive results, the research utilized a crosstabulation to determine the highest and lowest rates of student factors at each campus. School G had the

highest rate of free and reduced lunch with 91.5%; School N had the lowest rate of free and reduced lunch with 61.7%. For students living in temporary housing, School B had the highest rate with 5.6%, and School A, School E, School J, School K, and School L all had the lowest rates of temporary housing with 0.0%. For students identified as specific education, School J had the highest rate with 18.7%, while School E had the lowest with 7.0%. School L had the highest rate of African American or Hispanic students with 79.1%, while School N had the lowest rate with 46.8%. School C had the highest rate of ELL students at 50.0%, while School N had the lowest with 5.8%. Only three schools had any students with migrant students (School C $n = 1$, School H $n = 2$, and School K $n = 1$), while the rest had none. Only four schools had any students with refugee students (School A $n = 2$, School H $n = 1$, School I $n = 1$, and School L $n = 3$), while the rest had none.

School risk factors descriptions showed the rates of each school risk factors. During the 2017-2018 school year, School B had the highest suspension rate with 23.9%, while School C had the lowest rate with 1.5%. School N had the highest mobility rate at 29.3%, and School E had the lowest mobility rate at 10.7%. Three schools were on their third principal in the last five years (Schools B, C, and L), seven schools were on their second principal in five years (Schools D, E, G, I, J, K, and N), and four schools had just one principal in five years (Schools A, F, H, and M). Two of the fourteen schools had a new principal during the 2017-2018 school year (School C and School E). School N had the highest rate of teacher turnover with 52% of teachers leaving and being replaced by new teachers. School H had the lowest rate of teacher turnover at 7.0%. Schools B and L each had one teacher vacancy at the beginning of the school year.

For neighborhood risk factors, schools were grouped into three clusters by zip code. For child poverty, the highest rate was 36% and the lowest was 9%. The highest poverty rate was

28% and the lowest was 9%. The highest rate for high school graduation or below was 49%, and the lowest was 21%. The highest rate of male unemployment was 8% and the lowest was 6%. Eight of the 14 schools did have public housing offered in their zip codes, and six did not have public housing. Four of the schools had a homeless shelter in their neighborhood, while 10 of the schools did not.

Descriptive statistics were utilized to gather information on the ELA and math exam scores. For each exam, the minimum score was 650 and the maximum was 850. During the 2018 spring assessment in Betty Lou School District, the mean score for the ELA exam (grades 3-5) was 742.15. The mean score for the math exam (grades 3-5) was 734.80. Schools were analyzed by risk factor rate and ELA and math average school score to determine differences between schools with similar risk factors. The findings indicated that were differences in scores, despite similarities in risk factors.

A Pearson's correlation was run to assess the relationship between each student and school risk factor. Initially, the researcher ran a Pearson's correlation for all 2,492 student scores but determined that the results may not be accurate since all school enrollments were not the same. Data can become skewed when schools have very different numbers in pupil enrollment. Consequently, the researcher ran the Pearson's correlation with the risk factor rates for each school, resulting in a sample size of 14 (the number of elementary schools). There were two sets of factors that had statistically significant correlations with one another; both of these correlations were large. There was a statistically significant large positive correlation between ELL students and African American or Hispanic students, $r(12) = .825$, $p = .000$. There was a statistically significant large positive correlation between mobility rate and temporary housing, $r(12) = .568$, $p = .000$.

The final analyses utilized in this study were multiple linear regressions. These analyses were calculated to predict ELA and math scores based on the student risk factors and school risk factors. Results of the multiple regressions indicated that most of the student risk factors did impact student achievement. In Betty Lou School District, four of the five student factors were significant predictors of student achievement, and all four of those indicated a negative relationship. Special education had the largest negative impact on student score. Students' ELA scores decreased by 39.78 points for the ELA exam and decreased by 33.44 points for the math exam. The student risk factor ELL had the next biggest impact, with scores decreasing by 11.71 points. This is followed by free and reduced lunch and African American or Hispanic students, with declines in scores by 10.2 points and 8.78 points, respectively. For the math scores, the biggest negative impact on student achievement following special education was African American or Hispanic heritage, with a 9.94-point reduction. This was followed by ELL with a decline of 6.66 points and free/reduced lunch by 6.29 points.

School risk factors also impacted student achievement. However, the school risk factors had both positive and negative impacts. Mobility rate showed a positive impact on math test scores with an increase of 27.77 points. Having a new principal positively impacted math and ELA scores with 12.1 points and 11.35 points, respectively. Teacher turnover had the largest negative impact on student scores with a decline of 20.64 points for the ELA test and a decline of 16.14 points for the math test. Teacher vacancy also had a negative impact with a decline of 4.92 points on the ELA test and 14.73 points on the math test.

Schools were then organized based on similarities with risk factor rates. The results indicated that for schools with similar challenges (described as risk factors), there are some schools outperforming the district averages on both ELA and math assessments. School D had a

mean ELA score about seven points higher than the district average and also had some of the highest rates in all student risk factor categories (F/RL, temporary housing, special education, African American or Hispanic, and ELL). School B scored about four points higher than the district average and tied for the highest special education population at 18%. In fact, all three schools with the highest rates of special education scored above the district average on the ELA assessment. However, none of those three schools scored above the district average in math. School F had one of the highest ELL rates in the district and performed slightly above the district average. Finally, School J scored about two points above the district average and had one of the highest rates of special education and English Language Learners.

School A performed about six points above the district average for the math assessment and had the second highest rate of teacher turnover. Two other schools had high rates of teacher turnover (Schools K and N) but scored below the district average in math. School B scored above the district average in ELA and had the highest out of school suspension rate; School G had a similar suspension rate but scored below the district average. School E was one of the two schools with a new principal during the 2017-2018 school year, but still performed above the district average in both ELA and math assessments. One item to consider however, is this new principal was an assistant principal and teacher at this school for many years and therefore was not new to the campus. School C also had a new principal but performed below the district average on both tests. School H had one of the three top highest mobility rates but had higher performance on both assessments. Finally, School I was one of the top four schools with teacher turnover and scored above the district average in math.

Theoretical Framework

The Ecological Systems Theory (Bronfenbrenner, 1977) was used to frame this study. This theory posits that one's environment affects an individual and his or her development. Ecological Systems Theory also asserts that the varying levels within one's environment has varying levels of effect upon a person. According to the model, there are five levels of external influence that affect development; these include the microsystem (this is the closest system and includes home, work, and family), mesosystem (interactions between different parts of a person's microsystem like a child's parent and teachers), exosystem (a system in which one is not directly involved but affects them), and the macrosystem (one's cultural environment). Most students' individual factors and the school factors fall into the microsystems and mesosystems levels of this theory.

Within this study, the risk factors that affected students' achievement can also be framed by the Ecological Systems Theory. The student risk factors of special education, ELL, free/reduced lunch, and African American or Hispanic fall into the students' microsystems and mesosystems. Students' individual demographics come from their families; they impact them daily both at school and at home. The school risk factors of new principal, teacher turnover, mobility rate, and teacher vacancy fall into both microsystem and mesosystem for the students.

As evidenced from this study, varying levels of students' environment do affect their progress and development. The microsystem level is the most influential level of human development (Bronfenbrenner, 1977). Most of the risk factors from this study that did have a statistically significant impact on student learning fall into this impactful level. The exosystem and macrosystem may have been assessed in this study, but at a more distant level. A student's exosystem is a system in which one is not directly involved, but it impacts them. The school

district, for example, has leaders that makes decisions for students on a daily basis; students are not necessarily directly involved with those leaders, but those decisions impact the students and could impact the factors leading to their achievement. The macrosystem (students' cultural environment) may have impact on students' achievement but were not directly studied in this research.

Implications for Practitioners

This research found that there are a variety of risk factors that impact student achievement, ranging from personal student factors to school factors. Schools receive Title I funding for free/reduced lunch numbers and rates, but this research found that free/reduced lunch was not the only factor impacting student achievement. Moreover, this research indicated that other risk factors had a bigger impact on student achievement than free/reduced lunch. The largest impact by any risk factors was special education; students' scores decreased by over 30 points on both the ELA and math assessments if they were identified as special education. Schools and districts do receive funding for students in special education, but it should continue to be a focus for practitioners. Special education is a very large umbrella topic within education and encompasses a wide spectrum of student needs, disabilities, and challenges. Disability categories in Colorado schools include autism spectrum disorder, deaf-blindness, developmental delay, hearing impairment, intellectual disability, multiple disabilities, orthopedic impairment, other health impaired (OHI), serious emotional disability, specific learning disability, speech or language impairment, traumatic brain injury, and visual impairment (Colorado Department of Education, 2018). The wide variety of needs and challenges can make it difficult for educators to target all needs, as well as the needs of the other risk factors. However, it is so important to keep

at the forefront of thinking that students with disabilities are being the most negatively impacted in their achievement.

Teacher turnover was the second highest risk factor that negatively impacted student achievement on the 2017-2018 CMAS assessment, with a reduction of 20.64 average points on the ELA assessment and a reduction of 16.14 points on the math assessment. John Hattie's list of Influences on Student Achievement found that, out of 250 influences, collective teacher efficacy had the biggest impact on student achievement with an effect size of 1.57 (Visible Learning, 2017). Teacher turnover negatively affects student achievement regardless of the types of teachers who leave (Hanushek, Rivkin & Schiman, 2016). Additionally, the negative effects of teacher turnover are more highly concentrated in lower-achieving schools (Hanushek et al., 2016). Practitioners, including school district leaders and school leaders, must take time, effort, and resources to retain highly effective teachers and to support the learning of all teachers in order to reduce turnover rates. This should be a focus for districts and schools given the large impact that teacher turnover has on student achievement, as demonstrated by this research.

With a high rate of teacher turnover can come the existence of teacher vacancy at the beginning of or throughout a school year. Teacher vacancy also had a significant negative impact on student achievement in this study, showing a reduction of math scores of 14.73 points and a reduction of ELA scores of 4.92 points. Without a permanent, consistent teacher in a classroom, student learning will most likely suffer. In this study, a school was determined to have a teacher vacancy if they had at least one classroom teaching vacancy at any point during the school year. While the vacancies may not have been for the entire year, even missing out on instruction for part of the year can impact student learning. Similar to teacher turnover, schools

and districts must make every effort to have the most quality educators in classroom settings for the entire school year.

School leaders may make every effort to fill teaching positions in the spring and summer, but, in some states, teachers can resign last minute, leaving schools and districts with teaching vacancies. State education practitioners and leaders may need to consider imposing penalties on teachers who do not follow through with signed contracts by a certain period of time. For example, in the state of Texas, educators who have signed a contract and then resign later than the 45th day preceding the first day of instruction (typically in July) may face sanctions by the State Board for Educator Certification. These sanctions may include suspending an educator's state teacher credentials (Texas Classroom Teachers Association, 2019). Similar sanctions should be considered by other states to avoid students being without a teacher at the beginning of the school year.

Students qualifying for free/reduced lunch did have a negative impact on student scores in this study, showing a reduction of ELA scores by 10.2 points and a reduction of math scores by 6.29 points. Title I monies are distributed to districts and then on to schools based on their F/RL numbers, but practitioners should continue to reevaluate the use of those dollars annually. Practitioners, whether at the district or school levels, should conduct their own internal studies to assess whether the Title I dollars are being used in the ways to most benefit students from low-income households.

Practitioners should continue to implement best instructional strategies for ELL students, which should include staying up to date on new research for best practices. Even within the same school district, schools may provide different instructional programming, grouping, or interventions for ELL students. Practitioners should continuously determine which practices

work best for their students and adjust as needed. School district leaders should identify the schools that are seeing the most improvement for ELL students and look to replicate those practices across all schools.

Students identified as African American or Hispanic had a reduction in ELA and math scores by 8.78 points and 9.94 points, respectively. Research has shown that racial gaps exist between White students and Black students (Bacharach, Baumeister, & Furr, 2002) and between White students and Hispanic students (Reardon & Galindo, 2009). The findings from this study supported that research, and many schools and districts are well aware of this gap. Practitioners must continue to identify gaps that exist between racial groups at their schools and districts and work to find ways to address these gaps.

The risk factor new principal had a positive impact on schools in this study. There were two schools with a new principal; one of the schools had below average scores and the other school (School E) had the highest mean scores in the district. Since having a new principal is considered a risk factor, it leads to several questions for School E. Was this new principal a veteran principal somewhere else and was brought in to help the school? Was the new principal in another position at School E beforehand, so there was less of a transition? Why did the previous principal leave? These are questions districts should ask when they see strong achievement results in schools that have specific risk factors.

Within this study, not all schools with similar risk factor rates resulted in the same levels of student achievement. Some schools with the highest levels of risk factor rates outperformed the district average on the ELA and/or math CMAS assessments. For example, School D fell into the highest rates of all student risk factors, had one of the highest mobility rates, and had a teacher vacancy during the school year, but had an average school ELA score seven points above

the district average. Betty Lou School District should analyze this specific campus to determine what educational practices, leadership strategies, and school culture elements are in place to show such performance despite facing multiple risk factors.

Schools A, E, H, and I scored above the district average on the math assessments, but faced some of the highest rates of the risk factors of teacher turnover, new principal, mobility rate, and teacher turnover, respectively. Betty Lou School District should take the time to dive deeper into the instructional practices at these schools as well as determine what strategies are conducted to combat these challenges. Other schools and districts should conduct similar analyses in order to spread the knowledge of best practices throughout school districts.

Ultimately, there are many factors that affect student achievement, and to varying degrees. Practitioners must determine the factors that are most negatively impacting student achievement at their respective schools and create strategic plans around these factors. When practitioners attempt to address all of these risk factors, resources can become too widely distributed and strategies can become too watered down. Practitioners must consistently assess and revise their plans to address the highest student need within their respective student bodies. Also, needs can change, even year to year, as student populations change and grow. This is even more reason that practitioners must regularly assess and reassess, and then adjust, their strategic plans. Additionally, school district leaders must understand that every campus has its own needs, and that the strategies used at one campus may not be what is best for the other campuses.

At a federal level, educational practitioners should consider that funding based solely on low-income households (typically determined by free/reduced lunch forms) is not making a strong enough impact on student achievement. As evidenced in this study, other risk factors are having as strong an impact, and even stronger impacts, on student achievement than family

income level. Title I monies have been distributed nationally since 1964, and research does not indicate that is having a positive impact. Therefore, educators should advocate to their political representatives for resources that address factors other than income level.

Limitations

Within this study there were several limitations. One limitation was that several of the identified risk factors were not included in analyses. Two of the risk factors had too small of sample sizes within the schools, and all of the neighborhood risk factors were grouped into just three zip codes which was too small for analysis. Another risk factor was not analyzed because it was not able to be retrieved by Betty Lou School District. Another limitation was that this study only focused on one school district and the study did not take into account any characteristics that may have been unique from other school districts. This study utilized only ex post facto data, meaning conclusions may have been generalized and the causal relationships were only determined within one school year and one testing session. Finally, the data from the CMAS assessment was from just one school year and did not analyze or explore student growth data from previous years.

Recommendations for Further Research

The risk factor that most negatively impacted student achievement in this study was special education. Further research could dive deeper into special education by teasing out specific student disabilities most impacting achievement. Additional research could analyze relationships between special education teachers and student achievement, because teacher turnover within the special education arena may indicate additional challenges.

Evaluating the use of Title I monies within a school district could give district leaders an idea of how schools are using the funds and which strategies are most positively impacting

student learning. Further research could be conducted by analyzing students with multiple risk factors and determining whether specific combinations of risk factors had a larger or smaller impact on student learning. Finally, research could be conducted in a school district with a larger geographic area that would enable a researcher to include neighborhood factors in analyses. This study did not make determinations about neighborhood risk factors since the geographic size did not allow for a large enough sample size of zip codes.

Within this study, the Pearson's correlation was conducted between each school using their risk factor rates. The correlation was not conducted at the student level since school enrollment numbers were too varied. A school district with more consistent pupil enrollments could conduct a correlation for each student and the risk factors in order to provide new or updated information on the relationship between risk factors.

Conclusion

This quantitative study was conducted to determine whether relationships exist between risk factors and student achievement. Previous studies indicated that chronic absenteeism had an impact on student achievement, and the studies identified risk factors that were tied to chronic absenteeism (Bryk et al., 2010; Fantuzzo et al., 2014; Nauer et al., 2014). This study extended that research by determining whether any of those risk factors had a relationship with each other and with student achievement. Data for student achievement results came from the 2017-2018 CMAS assessment for grades 3, 4, and 5. Risk factor data was collected from the Betty Lou School District research team and included student risk factor information (free/reduced lunch, temporary housing, special education, African American or Hispanic, English Language Learners, migrant, and refugee) and school risk factor information (principal turnover, teacher turnover, teacher vacancy, student mobility, and student suspensions).

Statistical analyses indicated that there were two sets of risk factors that had statistically significant correlations with one another. There was a statistically significant large positive correlation between ELL students and African American or Hispanic students, $r(12) = .825$, $p = .000$. There was a statistically significant large positive correlation between mobility rate and temporary housing, $r(12) = .568$, $p = .000$.

The results of this study support previous research that indicated that a variety of risk factors impact student learning. Specifically, the risk factors that significantly affected student achievement in Betty Lou School District on the 2017-2018 CMAS assessments were special education, free/reduced lunch, African American or Hispanic heritage, ELL, teacher turnover, new principal, mobility rate, and teacher vacancy. Special education had the biggest impact on student achievement with a reduction of 39.78 points on the ELA assessment and 33.44 points on the math assessment. Teacher turnover had the second biggest impact with a reduction of 20.64 points on the ELA assessment and 16.14 points on the math assessment. The other risk factors that had negative impacts on student achievement were ELL (-11.71 points on ELA and -6.66 points on math), free/reduced lunch (-10.2 points on ELA and -6.29 points on math), teacher vacancy (-4.92 points on ELA and -14.73 points on math), and African American or Hispanic heritage (-8.78 points on ELA and -9.94 points on math). Two risk factors had positive impacts on student achievement: new principal (+12.1 points on ELA and +11.35 points on math) and mobility rate (+27.77 points on math).

This study also found that schools with similar risk factors do not necessarily have the same achievement results. Several schools with the highest levels of challenge (as defined by risk factor frequency) had higher levels of performance on the CMAS assessment than schools with similar challenges. Some of these schools even outperformed schools with lower levels of

challenge. The research demonstrates that the risk factors do affect student achievement, but that does not necessarily mean that students will be impacted by the challenges presented at home or at school.

This research indicates that educational disadvantage cannot be defined solely by low-income level; no single factor has a lone negative impact on student achievement. Low-income students have been a focus of legislation that has resulted in Title I funding to states, districts, and schools for over 60 years. This study supports the research showing that low-income level does impact student learning. However, it also asserts that other risk factors, including special education, teacher turnover, ELL, African American or Hispanic heritage, and teacher vacancy, are having as much, and an even greater, negative impact on student learning.

This study shows that a variety of risk factors are impacting student achievement; one implication is that additional resources may be needed for other risk factors, and not just low-income through Title I. There are resources for special education through ESSA and IDEA, but further research and attention is needed to drill down to specific needs for students with disabilities and the resources needed by their schools and teachers. Ultimately, this study determined that educational disadvantage is not determined by a single factor, but rather by a variety of risk factors. Student achievement can be both negatively and positively affected by risk factors, and educators should take the time and resources to determine which of the risk factors are most affecting their students in order to provide the resources, educators, and programming to best address these challenges. Additionally, this study showed that schools with similar risk factors do not necessarily have the same academic outcomes for students, and schools and districts should identify best practices of schools that are outperforming other schools with similar risk factors.

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Appendix A

Permission to Utilize Visual

Re: Permission to Use Visual in Dissertation Inbox ×

Korbla Puplampu <PuplampuK@macewan.ca> Fri, Dec 15, 2017, 11:56 AM

to Britney

Hello Britney:

Thanks for your message and sorry for my slow response. Glad your work is coming along and hope you continue to make progress.

You have our permission to use the diagram in the article you mentioned.

Many best wishes.

Korbla Peter Puplampu, PhD
Department of Sociology
Grant MacEwan University
City Centre Campus
Rm 6-396L, 10700 - 104 Avenue
Edmonton - Alberta
CANADA T5J 4S2

Appendix B

Permission to Utilize Visual

Helen Penn H.Penn@uel.ac.uk via nnu.edu Tue, Jan 2, 2018, 11:48 AM

to Britney

Im sorry for the delay in replying. It is fine to use the picture- Good luck with the PhD. Helen Penn

---

From: Britney Gandhi <bgandhi@nnu.edu>
Sent: 13 December 2017 17:06:06
To: Helen Penn
Subject: Permission to Use Visual in Dissertation

Greetings Professor Penn,

I am emailing to request your permission to use the below visual from your book *Understanding Early Childhood Education: Issues and Controversies* in my dissertation at Northwest Nazarene University. I am utilizing Bronfenbrenner's ecological systems theory to frame my work and your visual would be a wonderful addition to my study.

Please let me know if this is permissible. Thank you!

Best,
Britney Gandhi
PhD Candidate, Northwest Nazarene University

Appendix C
Research Request Approval

May 16, 2018

Britney Gandhi

Dear Ms. Gandhi:

[redacted] is pleased to approve the research study "Risk Factors Tied to Student Achievement: Redefining Educational Disadvantage." The study is being conducted in partial fulfillment of doctoral degree requirements at Northwest Nazarene University. [redacted] is providing de-identified CMAS data from 2017-18 for all 3rd – 5th grade students as well as the following demographic data: free/reduced meals eligibility status; English Language Learner status; special education status; temporary housing, migrant, and refugee status if data are available; and race/ethnicity. [redacted] is also providing the following school-level data: principal turnover; teacher turnover; teacher vacancy; student mobility; and student suspensions. The projected date of completion is December 31st, 2018.

Approval to conduct the study in [redacted] is contingent upon the requirements set forth in the Research Request form provided, and on meeting the following conditions:

- The researcher must follow the guidelines of [redacted] and Northwestern Nazarene University regarding the protection of human subjects and confidentiality of data.
- The [redacted] Research, Data and Accountability (RDA) Department will monitor this study to ensure compliance to ethical conduct guidelines established by the Department of Health and Human Services, Office for Human Research Protection (OHRP) as well as disclosure of student records outlined in the Family Educational Rights and Privacy Act (FERPA).
- In order to eliminate potential risks to study participants, the reporting of proposed changes in the research activities must be promptly submitted to the [redacted] Research, Data and Accountability Department for approval prior to implementing changes. Non-compliance with this guideline could impact the approval of future research studies with [redacted]
- A final report of findings must be submitted to the [redacted] Research, Data and Accountability Department within 60 days of completion.
- All reports and/or publications that are prepared using the data should be provided to [redacted] prior to release.

Any other changes or modifications to the current proposal must be submitted to the Research, Data and Accountability Department for approval. Should you need additional information or have any questions concerning the process, please call

Sincerely,

Appendix D

NIH Certificate of Completion

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Britney Gandhi** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 01/27/2017.

Certification Number: 2295398.

Appendix E

Permission to Utilize Visual

From: **Kim Nauer** [redacted]
Subject: Re: Permission to use risk factor information
Date: March 25, 2019 at 9:34 AM
To: Britney Gandhi [redacted]

Hi Britney,

You are certainly welcome to use the info and the model. Anything you want to do is great. Let me know how it works out for your students.

:-)

Kim

On Mon, Mar 25, 2019 at 8:44 AM Britney Gandhi <britneygandhi@gmail.com> wrote:

> Good Morning Ms. Nauer,
>
> My name is Britney Gandhi and I am a PhD student at Northwest Nazarene University in Idaho. I am also a school principal and next year will transition to a superintendent role.
>
> My dissertation is looking at student risk factors stemming from chronic absenteeism like the ones you and your team published about in "A Better Picture of Poverty." Specifically, I am conducting a quantitative analysis in my previous school district to determine whether any of those risk factors have a relationship with student achievement.
>
> For part of my literature review I discuss other studies that have looked at these risk factors, including your own. I created a table of the risk factors from your study and am requesting your permission to utilize this information. I have attached the table for your reference.
>
> Thank you, Ms. Nauer, and I look forward to hearing from you!
>
> Regards,
> Britney Gandhi
> Principal, Richland Jr/Sr High School, Colfax, ND
> PhD Candidate, Northwest Nazarene University

--
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