

ABSTRACT

Christopher Marcus Barnes, TEACHER QUALITY FACTORS MEDIATING ACHIEVEMENT IN HIGH POVERTY SCHOOLS (Under the direction of Dr. James McDowelle). Department of Educational Leadership, June 2011.

The impact of poverty on student achievement was thoroughly researched. Researchers have determined that poverty has a direct negative impact on student achievement. This study analyzed four aspects of teacher quality potentially mediating the relationship between achievement and poverty. The studied variables were (a) years of experience, (b) advanced degree status, (c) highly qualified status and (d) National Board Certification. North Carolina public schools with valid End-of-Grade test data for 2006-07, 2007-08 and 2008-09 were included. Descriptive statistics, cross tabulations, and the Fisher's Exact test were used to analyze the data. The Fisher's Exact Test was performed to examine the variables within a two by two framework. Twelve contingency tables were constructed to express the relationships among the variables for high poverty schools. The series of Fisher's Exact Tests indicated a significant relationship between teacher years of experience and achievement for high poverty schools for all three years of the study. The test did not indicate a significant association between advanced degree status and achievement for any of the years of the study. The test produced mixed findings for the final two variables, with one out of three years indicating a significant association between highly qualified status and achievement and two out of three years indicating a significant association between National Board Certification and achievement.

TEACHER QUALITY FACTORS MEDIATING ACHIEVEMENT
IN HIGH POVERTY SCHOOLS

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IN HIGH POVERTY SCHOOLS

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CHAPTER 1: INTRODUCTION

Early childhood programs today are being asked to serve an increasing population of ethnically and culturally diverse children, many of whom are characterized "at risk" because of inadequate health care, family instability, and insufficient economic resources. Based on projected data by the U.S. Census Bureau, the number of children living in poverty between 1984 and 2020 is expected to rise from 14.7 million to 20.1 million, an increase of 37% (Blasi, 2002, p. 106).

For nearly four decades, public attention and political interest in the American education system has been mounting (Campbell, Hombo, & Mazzeo, 2000). The *back to basics* movement of the 1970s (Campbell et al., 2000), the results of *A Nation at Risk* in the 1980s (National Commission on Excellence in Education [NCEE], 1983), efforts to establish rigorous state and federal educational standards in the 1990s, and the impact of the reauthorized Elementary and Secondary Education Act (ESEA) in the 2002 (*No Child Left Behind* Act of 2001 [NCLB], 2002) and the proposed revisions to ESEA in 2010 (United States Department of Education [USDE], 2010) has developed an increased and intense emphasis on standards, school reform, standardized testing, accountability, and achievement. No longer calculated solely as part of a larger average, subgroup populations now stand alone for public consideration of their academic growth or lack thereof (Viadero, 2007). While some have suggested that the Obama administration may dismantle the sanctions of the Bush era No Child Left Behind Act, the current blueprints for the proposed revisions to ESEA maintain subgroup considerations. In *A Blueprint for Reform*, the current administration suggests

that, “performance targets, based on whole-school and subgroup achievement and growth, and graduation rates, will guide improvement. . . and those that are meeting all of their performance targets will be recognized and rewarded” (USDE, 2010, p. 9).

While the term *adequate yearly progress* is not mentioned in the current proposal, high-stakes testing and performance targets for subgroups remains a component of ESEA.

One subgroup population of particular interest is identified as *economically disadvantaged*. Using data from the National Assessment of Educational Progress (NAEP), the National Center for Education Statistics (NCES) has documented a thirty year history of student performance and the academic trends of American students. The NCES and independent researchers have produced volumes of materials documenting the detrimental impact of impoverishment on student achievement (Bell, 2001; Brooks-Gunn & Duncan, 1997; Campbell & Ramey, 1994; Campbell et al., 2000; Cavanagh, 2007; Cunningham, 2003; Gershoff, 2003; Gould & Gould, 2003; Huston, McLoyd, & Coll, 1994; Lyman & Villani, 2002; Mackner, Black & Starr, 2003; Stewart, 2007; Viadero, 2007).

With widespread agreement among researchers, the literature documents an irrefutable link between poverty and diminished student achievement and the consequences of being an at-risk student in the American educational system (Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001; Land & Legters, 2002; Leroy & Symes, 2001; Lutkus & Weiner, 2003; Mackner et al., 2003; Pellino, 2004). Educators seek to identify the factors that impact achievement for the economically disadvantaged due partially to the pressure of federal mandates and sanctions regarding student

performance for all subgroup populations. This review present the factors suggested in the literature as mediators of achievement for economically disadvantaged students.

Through a review of relevant literature, a preponderance of research was found to indicate that the classroom teacher is the primary mediator of achievement for all students (Darling-Hammond, 2000; Darling-Hammond, Holtzman, Gatlin, & Heilig, 2005; Ingersol, 1999; Jerald & Ingersol, 2002; Marzano, 2003; Nye, Konstantopoulos, & Hedges, 2004; Rivkin, Hanushek, & Kain, 2005; Wenglinsky, 2000; Wright, Horn, & Sanders, 1997). While a variety of mediating factors are presented and discussed for contextual purposes, the resulting study focuses on issues of teacher quality in an effort to identify patterns and characteristics in high-poverty and low-poverty schools in relation to student achievement and teacher quality.

According to Lenker (2006), nothing in the current literature completely defines teacher quality. Based upon available data sets that are collected consistently across North Carolina's public school system, the researcher has selected National Board Certification, years of experiences, highly qualifies status, and advanced degree status as proxies for teacher quality.

Background to the Study

Childhood poverty has serious implications for educational attainment and achievement (Pellino, 2004). While the term *at-risk* encompasses more than economic impoverishment, poverty itself is considered by some to be the primary factor leading to academic failure (Caldas, 1993; Caldas & Bankston, 1997; Jones & Chant, 2009; Leroy & Symes, 2001; Rumberger & Willms, 1992). Contributing characteristics often associated with economically disadvantaged students include: (a) early or late

adolescent parents; (b) single parent home environment; (c) undereducated parents; (d) unemployed parents; (e) exposure to abuse and neglect; (f) dangerous neighborhoods; (f) homelessness; and (g) inadequate educational institutions (Pellino, 2004). A remarkable increase in the number of American students exposed to economic disadvantage (Blasi, 2002) paired with federal and state requirement to close the achievement gap for all subgroups (NCLB, 2002) has created a renewed focus on the children of poverty (Archibald, 2006; Barton, 2003; Bush, 2002; Chatterji, 2006; Clark & Clark, 2003; Dudley-Marling, Stevens & Gurn, 2007; Eamon, 2005; Elmore, 2003; Fitzsimon, 2007). Politicians, researchers, and educational practitioners make use of statistics that demonstrate a stark reality for economically disadvantaged students. For example, assessments available through the National Center for Educational Statistics (NCES) reveal that prior to entering intermediate grade levels, 60% of impoverished students lack basic competencies in reading (Donahue et al., 2001). Although efforts to improve reading competencies for students in impoverished urban districts have been paired with significant federal expenditures, three decades of data from the National Assessment of Educational Progress (NAEP) disclose consistently low performance for the economically disadvantaged subgroup (Lutkus & Weiner, 2003).

According to Carroll Helm (2007), "Wealth and social status are major factors in determining who learns in our schools, but they are not the only factors" (p. 1). The mandates established through *No Child Left Behind* hold schools responsible for the achievement of all students (NCLB, 2002). Two presuppositions underlying *No Child Left Behind* include: (a) the premise that each school must have 100% of the student population at proficiency on state accountability measures by 2013-14; and (b) the

premise that the school is 100% responsible for student performance on state accountability measures (Welner, 2005). Proponents and opponents of these presuppositions have created intense debate over the capacity of schools to impact student achievement. Those who doubt the capacity of schools to impact student achievement, particularly for the economically disadvantaged, reference the divisive *Coleman Report* (Coleman, Campbell, Hobson, McPartland, & et al., 1966) and suggest that socioeconomic status is most predictive of student achievement, not the efforts of schools (Hanushek, 1989; Hoxby, 2001). Others argue that the variation in student achievement is attributable to the efforts of educators and the characteristics of educational facilities (Ballantine, 2001; Davies & Brember, 1999; Helm, 2007). While there is disagreement on the impact of school contributions versus the impact of external societal factors on student performance, *The Elementary and Secondary Education Act* creates an impetus for educators to address the challenges and identify school characteristics leading to successful academic progress of the economically disadvantaged subgroup. Determining the factors that lead to successful academic progress for economically disadvantaged students are both a legal mandate and a moral imperative.

Statement of the Problem

While a large body of research has documented the achievement disparity between economically disadvantaged students and students from middle-class populations (Donahue et al., 2001; Jones & Chant, 2009; Land & Legters, 2002; Leroy & Symes, 2001; Lutkus & Weiner, 2003; Mackner et al., 2003; Pellino, 2004), few studies explain the range of achievement differences within the economically

disadvantaged subgroup population and often portray this achievement gap as a performance disparity between Caucasian students and minority students (McCall, Hauser, Cronin, Kingsbury, & Houser, 2006). Issues such as (a) low-income household needs, (b) lack of access to healthcare, (c) inconsistent attendance patterns and (d) single parent family structure clearly diminish academic opportunities (Guo & Harris, 2000; Ross, Roberts, & Scott, 1998). Much of the literature uses financial capital models or family process/parental socialization models to explain the needs of economically disadvantaged students (Deary, Der, & Shenkin, 2005; Eamon, 2005; Guo & Harris, 2000; Singh-Manoux, Fonagy, & Marmot, 2006). While the popular literature and media sources often portray achievement differences within the context of ethnicity, some argue that the achievement gap impacts students across ethnic categories and performance ranges (McCall et al., 2006).

An analysis of material and nonmaterial factors yields an informative framework for understanding the negative consequences of poverty such as (a) teenage pregnancy, (b) dropping out of school, (c) diminished mental and physical health, (d) delinquent behavior, and (e) reduced job opportunities (Guo & Harris, 2000). However, recognizing these factors does not suitably suggest an effective method of instructional intervention for impoverished students beyond income redistribution, social services, and other private or governmental entitlement assistance. The review of the literature presented in chapter 2 attempts to establish a general framework for recognizing the challenges of impoverished students through a mediation model. The Poverty/Achievement framework developed for the resulting study was adapted from the Rigor/Relevance framework. The Rigor/Relevance framework was developed by

the International Center for Leadership to examine standards and student achievement through variables identified as taxonomy and application (Daggett, 2005; Jones, Shannon, & Weigel, 2009)

The observed relationship between socioeconomic status (independent variable) and student achievement (dependent variable) has been illustrated in volumes of empirical research. In summary, student achievement generally rises when socioeconomic status increases and falls when socioeconomic status decreases (Bell, 2001; Brooks-Gunn & Duncan, 1997; Campbell et al., 2000; Cavanagh, 2007; Cunningham, 2003; Gershoff, 2003; Gould & Gould, 2003; Lyman & Villani, 2002; Mackner et al., 2003; Stewart, 2007; Viadero, 2007). This seemingly axiomatic relationship notwithstanding, a full review of the literature reveals that other factors interact and mediate the impact of impoverishment on student achievement. This study utilizes a mediation model in order to further explain the relationship between the independent and dependent variables. Through the inclusion of this third, explanatory set of variables, the literature review and resulting study are organized around mediating variables in that they serve to impact the strength of the relationship between socioeconomic status and student achievement. Mediating variables serve to further clarify the relationship between independent and dependent variables.

With a clear link established between poverty and depressed student achievement, the question becomes, how do school leaders provide economically disadvantaged students with the necessary opportunities and support to overcome academic challenges. The literature review presents a variety of mediating variables that address this question. Those variables are divided into: (a) exogenous variables,

those variables that are outside of the model, by definition, in that they are not within the scope of control of school officials; and (b) endogenous variables, those variable that are within the purview of school leaders.

Exogenous variables are described for the purpose of context and most often include home and community related issues that may account for up to 24% of the influence on achievement (Flood, 2003; King, 2005). The endogenous variables range from school structures, such as class size, school size, and resource allocations to issues described within the constructs of teacher quality. The endogenous variables may account for up to 70% of the influence on student achievement (Flood, 2003; King, 2005).

The mediating factors presented in chapter 2 are divided into exogenous variables and endogenous variables based upon the control or lack thereof from the perspective of school-based administrators. The presentation of exogenous variables serves to provide a framework for understanding the complexity of the condition for impoverished students and is in keeping with the conception presented by Boote and Beile (2005) of a thorough, comprehensive literature review. The impact of school-level leadership on student outcomes is mediated by teacher quality (Eilers, & Camacho, 2007; Heck & Hallinger, 2005; Kaplan, & Owings, 2001, 2002; Mangin, 2007; Marks & Nance, 2007; Orr, Berg, Shore, & Meier, 2008; Printy, 2008; Reitzug, West, & Angel, 2008; Robinson, Lloyd, & Rowe, 2008; Sarros, & Sarros, 2007; Wahlstrom & Louis, 2008). Therefore, the focus of the study in Chapter 3 will be on a variety of factors classified as “teacher quality,” endogenous variables that are within the scope of control

for school-level administrators through recruitment, selection, retention and hiring practices.

Purpose of the Study

The purpose of the study was to summarize the major research findings regarding the challenges faced by economically disadvantaged students. In that a range of achievement outcomes exist for economically disadvantaged students, special focus was placed on the teacher quality variables that mediate student achievement.

Two primary considerations throughout the study were:

1. What circumstances impact achievement for economically disadvantaged students as compared to noneconomically disadvantaged students?
2. Do the mediating teacher quality factors identified through the literature have a real impact on disadvantaged students in North Carolina?

The federal No Child Left Behind Act (2001) and North Carolina's school improvement efforts require that schools use research-based methods to increase student performance in all academic areas. In North Carolina, assessment of efforts to increase proficiency for all subgroup populations to 100% by 2013-14 is accomplished through the state testing program of reading, mathematics, writing, and specific subject area tests at the high school level. Federal requirements connect educational funding (Title 1) to the ability of the state to demonstrate *Adequate Yearly Progress* toward the goal of 100% proficiency by the 2013-14 school year. By identifying the challenges of the economically disadvantaged and analyzing the teacher quality characteristics of high-poverty, high-achieving schools, the study has implications for reforming the

organization and structure of high-poverty, low-performing schools in North Carolina in fulfillment of mandates established by the *Elementary and Secondary Schools Act*.

Research Questions

This research study compared the teacher quality characteristics of: (a) high-poverty, high-achieving schools; (b) high poverty, low-achieving schools; (c) low-poverty, high-achieving schools; and (d) low-poverty, low-achieving schools. Using North Carolina public elementary schools and middle schools, variations in characteristics were examined for academic year 2006-07, 2007-08 and 2008-09. The research questions in this study focus on one aspect of a school's impact on achievement, teacher quality. The questions that guided the study were:

1. Is there a relationship between teacher experience (in years) and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?
2. Is there a relationship between advanced degree status and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?
3. Is there a relationship between highly qualified (HQ) status and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?
4. Is there a relationship between National Board Certification and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?

Limitations of the Study

The *official measure of poverty* set by the U. S. Department of Health and Human Services (HHS) is criticized by a variety of researchers who claim that it is an unrealistic definition warranting significant adjustments (Blackburn, 1994; Gershoff, 2003; Hill & Michael, 2001). In their analysis of the National Longitudinal Survey of Youth (NLSY97), Hill and Michael (2001) describe the federal definition of poverty as "...internally inconsistent, outmoded, and unhelpful... (p. 727)." Additional criticism is levied against the U. S. Census Bureau due to the agency's inability to account for the highly mobile population of low or no income citizens (Rodgers, 2000). However, for the purpose of the study, the background information and literature review utilize the official measures of poverty as per federal guidelines. When analyzing student data for North Carolina schools, the study utilizes free and reduced lunch participation as a proxy for poverty. While the U. S. Department of Agriculture (USDA) estimates that in fiscal year 2007, 962,367 North Carolina students applied and participated in the free and reduced lunch program (USDA, 2008), this proxy may underestimate the population of actual impoverished students.

This study was limited to North Carolina public elementary schools and middle schools that participated in the student accountability and testing program between the years 2006-07 and 2008-09. The source of North Carolina state testing results represents student performance for the three year span only. Consequently, the results can only be generalized to the students and schools at the time of data collection and cannot be generalized to other states.

Additionally, this study limits independent variables to those mediating factors that are categorized as endogenous, that is, within the scope of control or influence by the local school administrator. While the exogenous factors such as neighborhood and peer group effect, parental education level and access to adequate health care are briefly addressed in order to present a thorough, comprehensive literature review, multiple studies provide a justification for limiting variable selection to the following teacher quality factors: (a) advanced degree status; (b) National Board Certification; (c) years of experience; and (d) highly qualified status as defined by NCLB. The inclusion of the variables identified as potentially mediating in the literature and impacted by the local school administrator is in keeping with a set of recent studies suggesting school-level leadership's impact on student outcomes is mediated by teacher quality (Eilers, & Camacho, 2007; Heck, & Hallinger, 2005; Kaplan, & Owings, 2001, 2002; Mangin, 2007; Marks & Nance, 2007; Orr et al., 2008; Printy, 2008; Reitzug et al., 2008; Robinson et al., 2008; Sarros & Sarros, 2007; Wahlstrom & Louis, 2008). Therefore, the focus of the resulting study will be on a variety of factors classified as "teacher quality," endogenous variables that are within the scope of control for school-level administrators through recruitment, selection, retention and hiring practices.

Rumberger and Palardy (2005) offer additional justification for this inclusion criterion through their study of both home and school factors and their suggestion that school factors may mediate achievement to a greater degree than home factors. Furthermore, with teacher quality being asserted as having the primary impact on student achievement (Bell, 2001; Darling-Hammond, 2000; Darling-Hammond et al., 2005; Early, Bryant, Pianta, Clifford, Burchinal, & et al. 2006; Guin, 2004; Ingersol,

1999; Jepsen & Rivkin, 2002; Nettles & Herrington, 2007; Peske & Haycock, 2006; Prince, 2002; Rivkin et al., 2005), the author selected to limit variable selection to those suggested in the literature as being a mediator of impoverished student achievement and having the most significant impact on student achievement. Additionally, the Flood (2003) and King (2005) studies determined that family and community accounts for 24% of the influence on student achievement. School structures such as class size, school size, and resource allocations account for approximately 26% and approximately 44% of the influence on student achievement is determined by teacher quality (Flood, 2003; King, 2005). Their studies support the established variable inclusion criteria. However, this inclusion criterion for the study is not to suggest that the exogenous factors are unimportant, but rather that they do not have as significant an impact on impoverished student achievement and are therefore not included in this study.

Organization of Economic Disadvantage

Data from North Carolina elementary and middle schools were organized by percentage of economic disadvantage. Economic disadvantage was determined by the number of students qualifying for free or reduced lunch within the selected time span as released by the Operational Accounting Section and Financial Services of the North Carolina Department of Child Nutrition Services. Schools fitting the grade span criteria were rank ordered using their percentage of economic disadvantage. The schools in the interquartile range were excluded from the study. The schools in the upper and lower quartiles were analyzed and coded. Using two indicators, poverty and achievement, schools were classified as: (a) high poverty, high achieving; (b) high poverty, low achieving; (c) low poverty, high achieving; or (d) low poverty, low achieving.

After categorized, the following issues of teacher quality will be analyzed: (a) years of experience, (b) highly qualified status, (c) acquisition of advanced degrees, and (d) National Board Certification status.

Definition of Key Terms

High Poverty Schools - According to Jerald (2001), a high-poverty school is one in which “The percentage of low-income students is at least 50%” (p. 2). By eliminating the interquartile range of schools, high-poverty in this study equated to schools with a level of economic disadvantage greater than or equal to 75.4%.

Low Poverty Schools - After eliminating the interquartile range for the selected elementary and middle schools, those qualifying as low poverty had a level of economic disadvantage less than or equal to 39.6%.

Low Income Students - According to Jerald (2001), “low income students were defined as those eligible for federal free or reduced-price lunch program” (p. 2).

Economically Advantaged Students - Economically advantaged is the term applied to those whose socioeconomic status is associated with wealth. While some studies define all students above the poverty line as “economically advantaged,” (Abalos, 1986), for the purpose of this literature review, the “economically advantaged” will be applied to students from wealthy households, as defined by HHS standards.

Economically Disadvantaged Students - North Carolina Report Card data presents student achievement data within a variety of categories. Economically disadvantaged is the term applied to those North Carolina students qualifying for free or reduced-price lunch.

Non-economically Disadvantaged Students - Students not qualifying for free or reduced-price lunch are termed non-economically disadvantaged (NED). Students may not qualify for federal lunch assistance based upon lack of financial need or failure to submit a completed application. The term non-economically disadvantaged is used to describe those students with a socioeconomic condition that exceeds economically disadvantaged students. The term includes students from middle and upper socioeconomic classes. The term is utilized in technical papers regarding Title I and Title II programs, state departments of instruction, and studies within the current literature.

Teacher Quality - In his study of the impact teacher licensure on sixth grade achievement, Lenker (2006) concludes that no single source in the current literature base completely defines the notion of teacher quality. Teacher quality has therefore been assessed and described in a variety of ways. This study will utilize “experience and stability” (Phillips & Chin, 2003, p. 9) as a proxy for teacher quality. Experience is identified as the total number of years in education. Additional data indicating quality will include: (a) highly qualified status, (b) acquisition of advanced degrees, and (c) National Board Certification status.

Mediating Variables - Intervening or process variables that influence the strength of the impact of socioeconomic status on resulting student achievement are termed as mediating. While it is recognized that socioeconomic status impacts student achievement, the mediation model suggests that other variables exist that influence the impact impoverishment has on student achievement.

Exogenous Variables - Variables that may mediate the relationship between poverty and student achievement, but are outside of school control, are identified as exogenous. These are home and community factors such as parent education level, access to adequate health care, and neighborhood peer group. Flood (2003) and King (2005) suggest that family and community variables account for 24% of the influence on student achievement.

Endogenous Variables - Variables suggested in the literature as potential mediators of student achievement that are within the category of school characteristics are identified as endogenous. These are school structure variables and teacher quality variables. Flood (2003) and King (2005) suggest that school structure variables account for 26% of the influence on student achievement while teacher quality accounts for approximately 44% of the influence on student achievement.

High and Low Achievement - Using North Carolina's average percentage of students passing both reading and mathematics (NC End-of-Grade testing), a dividing point will be determined for each academic year to differentiate between high and low achieving schools. Schools that exceed North Carolina's average percentage of students passing both reading and mathematics will be coded as high achieving. Schools that are at or below North Carolina's average will be coded as low achieving.

Methods of Research

Using Academic Search Premier, LexisNexis Academic, Proquest Research Library, and Web of Science, a series of journals and research findings were analyzed. The keyword searches included the following descriptors: (a) low-income; (b) poverty; (c) homelessness; (d) disaggregated achievement data; (e) generational poverty; (f)

situational poverty; (g) socioeconomic influences; (h) middle class; and (i) family influence. In selecting research studies and articles to review, the author assessed the connection to the research questions and in order to determine whether a relationship exists between selected school factors and student achievement. Using a quantitative approach, the author examined the relationship between selected school factors and achievement within the context of socioeconomic variations. Descriptive statistics were calculated on all variables and utilized to assess patterns and relationships between the selected school factors and achievement. To answer the five research questions, free or reduced lunch data, End-of-Grade achievement data, and teacher quality data were collected through a search of existing databases available through the North Carolina Department of Public Instruction. The method used to collect the relevant information was an archival study of the pertinent data utilizing a descriptive research design. The collected data were organized into tables by grade span and year for each variable. The tables were designed to identify patterns and relationships among the selected teacher quality variables for schools of varying levels of socioeconomic depression and varying levels of student achievement.

Organization of the Study

This study utilizes a five chapter structure. Chapter 1 has presented the background information and general introduction to the study. In their presentation of the role of the literature review in education-based dissertations, Boote and Beile (2005) argue that, “A substantive, thorough, sophisticated literature review is a precondition for doing substantive, thorough, sophisticated research” (p. 3). Chapter 2 follows the Boote and Beile (2005) framework and presents a comprehensive review of the literature

related to poverty and student achievement within the context of the current K-12 American educational system. Mediating factors are categorized as exogenous or endogenous as they relate to the scope of control for school administrators. For example, while the literature review presents information about neighborhood peer groups (exogenous) for context and purposes of comprehensiveness, chapter 2 ends with a focus on endogenous factors that lead to the study. Chapter 3 presents the research design and methodology that frame the study. Chapter 4 reports the findings and presents an analysis of the data collected from the study. Finally, Chapter 5 summarizes the study, provides conclusions, and identifies the major implications for administrators in organizing and operating high-poverty schools. Chapter 5 also presents recommendations for future research on the topic.

CHAPTER 2: REVIEW OF THE LITERATURE

Poverty may well be America's most serious and costly social problem. Each year millions of Americans live in poverty, and hundreds of billions of public and private dollars are spent annually on efforts to assist the poor. Poverty is also causally interwoven with other costly social problems such as crime, drug and alcohol abuse, homelessness, out-of-wedlock births, poor educational achievement, and domestic violence (Rodgers, 2000, p. 3).

Introduction

In order to understand the complex nature of poverty and its impact on student achievement, a thorough review of the literature was conducted. This chapter will present and synthesize the current research and opinion on this topic. While Chapter 1 introduced the background to the topic, Chapter 2 presents the major research findings in the historic and current literature on the topic of poverty and the factors mediating student achievement. In discussing the centrality of the literature review in dissertation and research preparation, Boote and Beile (2005) suggest that a review of literature should be comprehensive. With the Boote and Beile (2005) framework in mind, chapter 2 summarizes a comprehensive presentation of the factors and characteristics mediating impoverished student achievement.

The first section of Chapter 2 is organized into the following categories: (a) economic poverty in the U.S. and abroad, (b) federal education policy, and (c) economically disadvantaged student achievement results. The second section presents the factors that impact achievement as suggested in the current literature. The factors are organized into the following categories: (a) home and neighborhood factors, (b)

school-based factors largely outside of local administrator control, and (c) school-based factors within local administrator control or influence. Relative to the leadership of the school-level administrator, the first two sets of factors are described as exogenous. Home and neighborhood factors such as parent education level, attitudes about school, and access to economic resources are generally outside of the direct control of school-level leaders. Likewise, certain school-based factors are outside of the direct control of school-level administrators such as school size, district allocations for technology and infrastructure and large capital outlay projects resulting in new construction. These factors are essentially the result of public policy, community demographics and state or district level decisions.

The primary focus of chapter 2 is on the factors that meet the following criteria: (1) factors identified in the literature as having the most significant effect on student achievement and (2) factors that are controlled or directly influenced by school-level leadership. Issues of teacher quality, years of experience, highly qualified status, certification/ licensure, and advanced degree status are identified in the literature as the school-based factors having the most significant impact on student achievement (Bell, 2001; Darling-Hammond, 1991; Darling-Hammond et al., 2005; Early et al., 2006; Guin, 2004; Ingersol, 1999; Jepsen & Rivkin, 2002; Nettles & Herrington, 2007; Peske & Haycock, 2006; Prince, 2002; Rivkin et al., 2005). The literature suggests that issues of teacher quality are endogenous factors mediating student achievement in that they are directly influenced by school-level administrators through recruitment, selection, hiring, and retention practices (Eilers, & Camacho, 2007; Heck & Hallinger, 2005; Kaplan, & Owings, 2001, 2002; Mangin, 2007; Marks & Nance, 2007; Orr et al., 2008; Printy,

2008; Reitzug et al., 2008; Robinson et al., 2008; Sarros & Sarros, 2007; Wahlstrom & Louis, 2008). Therefore, the factors of teacher quality and student achievement frame the resulting study.

Economic Poverty in the US and Abroad

According to the American Heritage College Dictionary, poverty is a "...lack of basic material goods" (1997 Ed., p. 1,072). In terms of economic deficits, the U.S. Social Security Administration first set the federal poverty level in 1963 based upon the concept that families in the 1950's spent 1/3 of their income on food (United States Department of Health and Human Services [USDHHS], 2005). While some have regarded the 1950s calculation as neither modern nor realistic (Gershoff, 2003), the U.S. Department of Health and Human Services has used the calculation to identify the current federal poverty level for a family of four to be an annual income of \$19,350.00 (USDHHS, 2005). In that food accounts for less than 1/3 of family expenses today, and transportation, childcare services, and housing have grown beyond the original criteria, the National Center for Children in Poverty suggest that doubling the \$19,350.00 figure would more accurately account for the provision of the basic material needs for a family of four (Gershoff, 2003). While there is a lack of consensus among economists regarding the definition and measurement of poverty (Blackburn, 1994), general data in this study will be based upon the economic standard of poverty established by the U.S. Department of Health and Human Services unless otherwise noted.

Rates of Family Poverty in the US Compared to Other Industrialized Nations

While official statistics indicate that 12.9 million children or 17.6% of children in the United States live in poverty (USCB, 2004), the National Center for Children in

Poverty sets the number at 27 million, or nearly 40% of U.S. children living in poverty (Gershoff, 2003). Both sources of data highlight the widespread reach poverty has on the children of the United States. In the most recent study of poverty rates among industrialized countries, the United States ranked the highest in childhood poverty (McLoyd, 1998). The use of international poverty comparisons or income comparisons has been cautioned by several authors and economists due to the lack of consistency in classifications and definitions in poverty-related studies. Their argument has highlighted the difficulty in making comparisons based solely on income without regard to other goods and social services provided in non-cash form (Blackburn, 1994; Smeeding, Ward, Castles, & Lee, 2000). International studies compare American school performances with other countries that offer supplementary social services such as universal preschool and universal child health care (Fitzsimon, 2007). Notwithstanding this persuasive caution, the international comparison to other industrialized nations illustrates the scope of poverty's impact on children of the United States. Figure 1 demonstrates that while the United States reported a child poverty rate of 20.4% in the mid-1980s, Canada, the United Kingdom, France, Germany and Sweden reported significantly lower rates (McLoyd, 1998; Payne, 2005).

Rates of Childhood Poverty by Ethnicity in the United States

From 1988 through 2007, the Economic Policy Institute (EPI) has detailed the impact of federal economics on the American standards of living through its biennial publications. In order to present the economic state of the nation, *The State of Working America 2006/2007* examines: (a) income data, (b) tax rates, (c) wages, (d) unemployment rate, and (e) poverty. In their 2007 publication, Mishel, Bernstein, and

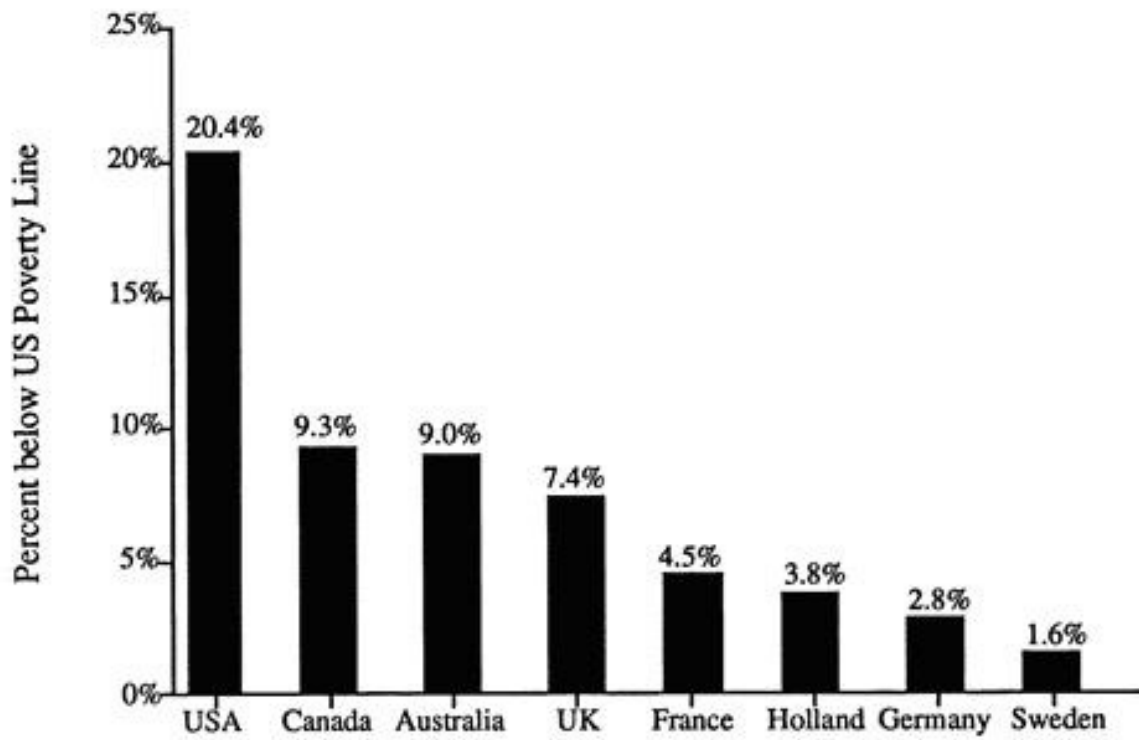


Figure 1. Child poverty rates in selected Western industrialized countries in the mid-1980s (McLoyd, 1998, p. 186).

Allegretto, suggest several key trends important to those considering the impact of poverty on children including: (a) recent increases in the rate of childhood poverty, (b) significant gaps in poverty rates by ethnicity, and (c) a widening disparity between American children and children of other industrialized nations in terms of effective federal efforts to reduce childhood poverty through tax and transfer policies (Mishel et al., 2007).

A disaggregation of poverty data indicates that poverty rates significantly vary by ethnicity within the United States. Using Census statistics, disaggregated data reveals that 17.6% of all children in the United States are below the poverty line; however, there exists a greater representation of minorities classified as being poor. While 14.3% of Caucasian children in the United States are poor, 34.5% of African American children, 28.3% of Hispanic children, and 31.9% of Native American children are categorized as living in poverty. Asian American children are the only minority group above the national average, with 12.5% classified as living in poverty (USCB, 2004). Table 1 details the changes in poverty rates from 1979 to 2005 specifically for American children. Analyzing the rates of impoverished children under the age of 18 and under the age of 6 demonstrates a recent increase in childhood poverty from 2000 to 2004 (Mishel et al., 2007).

More broadly, an analysis of overall family poverty statistics from 1959 to 2005 reveals a similar trend. While the rate of poverty for all families has dropped from 18.5% in 1959 to 9.9% in 2005, the historic gap among white, black, and Hispanic families, as identified by the ethnicity of the family head of household, remains significant. Table 2 depicts the historic poverty variations by the ethnicity of family heads of household. The

Table 1

Percent of Children in Poverty, by Race, 1979-2005

Year	Total	White	Black	Hispanic
Children under 18	16.4%	11.8%	41.2%	28.0%
1979	19.6	14.8	43.7	36.2
1989	20.8	16.2	41.9	40.0
1995	16.2	13.1	31.2	28.4
2000	17.6	14.4	34.5	28.3
2005				
Percentage-point changes				
1979-89	3.2	3.0	2.5	8.2
1989-2000	-3.4	-1.7	-12.5	-7.8
1989-95	1.2	1.4	-1.8	3.8
1995-2000	-4.6	-3.1	-10.7	-11.6
2000-05	1.4	1.3	3.3	-0.1
Children under 6				
1979	18.1%	13.3%	43.6%	29.2%
1989	22.5	16.9	49.8	38.8
1995	24.1	18.6	49.2	42.8
2000	17.2	14.1	32.9	28.9
2003*	20.1	16.6	39.4	32.3
Percentage-point changes				
1979-89	4.4	3.6	6.2	9.6
1989-2000	-5.3	-2.8	-16.9	-9.9
1989-95	1.6	1.7	-0.6	4.0
1995-2000	-6.9	-4.5	-16.3	-13.9
2000-03*	2.9	2.5	6.5	3.4

Note. *Data for 2004 unavailable. Source: U.S. Census Bureau. Mishel, Lawrence, Jared Bernstein, and Sylvia Allegretto, *The State of Working America 2006/2007*. An Economic Policy Institute Book. Ithaca, NY: ILR Press, an imprint of Cornell University Press, 2007.

Table 2

Family Poverty, by Race/Ethnicity of Family Head, 1959-2005

Year	All	White	Black	Hispanic
1959	18.5%	15.2%	n.a.	n.a.
1967	11.4	9.1	33.9%	n.a.
1973	8.8	6.6	28.1	19.8%
1979	9.2	6.9	27.8	200.3
1989	10.3	7.8	27.8	23.4
1995	10.8	8.5	26.4	27.0
2000	8.7	7.1	19.3	19.2
2005	9.9	8.0	22.1	19.7
Percentage-point changes				
1959-73	-9.7	-8.6	n.a.	n.a.
1973-79	0.4	0.3	-0.3	0.5
1979-89	1.1	0.9	0.0	3.1
1989-2000	-1.6	-0.7	-8.5	-4.2
1989-95	0.5	0.7	-1.4	3.6
1995-2000	-2.1	-1.4	-7.1	-7.8
2000-05	1.2	0.9	2.8	0.5

Note. Source: U.S. Census Bureau. Mishel, Lawrence, Jared Bernstein, and Sylvia Allegretto, *The State of Working America 2006/2007*. An Economic Policy Institute Book. Ithaca, NY: ILR Press, an imprint of Cornell University Press, 2007.

most recent statistics reveal that 8.0% of white families are impoverished as compared to 22.1% and 19.7% of black and Hispanic families respectively (Mishel et al., 2007). The variations in poverty levels by race and ethnicity have had public policy implications as seen in the next section.

Child Poverty Rates Before and After Government Intervention

While this literature review does not offer an exhaustive analysis of economic policies impacting the issue of poverty and student achievement, a comparison of governmental efforts to reduce childhood poverty through tax policy and transfers gives context to the issue and provides a transition to the discussion of the federal role in poverty and education that follows. Although it has had questionable effectiveness, the government has implemented tax and transfer policies to reduce childhood poverty rates (Acs & Loprest, 2004). Without some form of policy set to assist the economically disadvantaged, market incomes alone would not provide a livable wage. Table 3 illustrates the efforts of the United States as compared to other industrialized nations to provide economic intervention for the impoverished population. The comparison demonstrates a substantial difference in the post-intervention impact of tax and transfer policies for the impoverished population of other industrialized nations as compared to the United States. After governmental intervention, one-fifth of all American children were living in poverty in 2000 (Corak, 2005; Mishel et al., 2007).

In research conducted by the United Nations International Children's Emergency Fund (UNICEF), the impact of governmental economic assistance in sixteen industrialized countries was evaluated. Before intervention, the United States rate of

Table 3

Child Poverty Rates Before and After Taxes and Transfers, 2000

Country	Before Intervention	After Intervention	Percentage Point Changes
Denmark	11.8%	2.4%	-9.4
Finland	18.1	2.8	-15.3
Norway	15.5	3.4	-12.1
Sweden	18.0	4.2	-13.8
Switzerland	7.8	6.8	-1.0
France	27.7	7.5	-20.2
Belgium	16.7	7.7	-9.0
Netherlands	11.1	9.8	-1.3
Germany	18.2	10.2	-8.0
Austria	17.7	10.2	-7.5
Canada	22.8	14.9	-7.9
United Kingdom	25.4	15.4	-10.0
Portugal	16.4	15.6	-0.8
Ireland	24.9	15.7	-9.2
New Zeland	27.9	16.3	-11.6
United States	26.6	21.9	-4.7

Note. Corak, Miles. 2005. Principles and Practicalities in Measuring Child Poverty for the Rich Countries. Innocenti Research Centre.

child poverty for 2000 was 26.6%. The rate of childhood poverty dropped to 21.9% after interventions including tax incentives, refunds, and transfers. Of the sixteen nations studied, the United States had the highest post-intervention rate of childhood poverty. While on average the childhood rate of poverty in the sixteen studied countries fell by half, or 10.4 percentage points after intervention, the rate of childhood poverty in the United States only fell by 4.7 percentage points after intervention (Corak, 2005).

Federal Involvement

In terms of both social and education policy, the existence of a sizable impoverished population has specific implications for the federal government. In the face of sizable achievement gaps between student subgroups, federal education policy has evolved and placed the onus on school leaders to institute practices to address the achievement problems of the economically disadvantaged (America 2000: Excellence in Education, 1991; Goals 2000: Educate American Act of 1994, 1994; Miller, 1993; NCLB, 2002; Welner, 2005). Pairing federal finances with sanctions for failure to meet goals is the current reality created through the most recent incarnation of federal education policy (NCLB, 2002). The Elementary and Secondary Education Act (ESEA), known as *No Child Left Behind*, has intensified the federal government's involvement in public schools with the mandate to achieve 100% proficiency by 2013-14 for all state operated schools receiving federal financing (NCLB, 2002; Welner, 2005).

No Child Left Behind evolved out of the standards-based movement from the 1980s and the efforts of *America 2000* and *Goals 2000* in the 1990s through the introduction of: (a) voluntary testing, (b) national goals, and (c) accountability standards for state educational systems (Miller, 1993). NCLB required Title I schools to have

students demonstrate a greater proficiency on state academic standards over a period of years. By the 2013-14 school year, all student subgroups, including the economically disadvantaged, must demonstrate proficiency (NCLB, 2002). Additionally, teacher-quality standards were added to ensure that student were taught by *highly qualified* educators. Schools not meeting the standards of NCLB face a series of consequences. While some of the language and sanctions of NCLB are relatively new, it is the most recent federal effort to address the educational needs of all students. The academic proficiency of all subgroup populations of 40 or more students now stand alone for public consideration and governmental consequence for schools not meeting the standard (Superfine, 2005; Viadero, 2007). The next section presents the academic challenges of the economically disadvantaged as viewed through testing and achievement data.

Nationally-Normed Achievement Results and Students in Poverty

The link between poverty and low academic achievement has been well established by a variety of researchers. Through a series of studies, researchers have presented clear documentation that students in poverty perform at academic levels that are significantly lower than their middle class counterparts on all major measures of student achievement (Bell, 2001; Brooks-Gunn & Duncan, 1997; Campbell & Ramey, 1994; Cunningham, 2003; Gershoff, 2003; Gould & Gould, 2003; Huston, McLoyd, & Coll, 1994; Lyman & Villani, 2002; Mackner et al., 2003; Scales, Roehlkepartain, Neal, Kielsmeier, & Benson, 2006). Regardless of the level of focus, researchers have determined that economically disadvantaged students demonstrate an achievement profile that is significantly depressed (Barnett, Hustedt, Robin, & Schulman, 2004; Lee &

Burkam, 2002). For example, in their study *Inequality at the Starting Gate*, Lee and Burkam (2002) determined that at the earliest levels of education, pre-school aged children in the lowest socioeconomic quintile have average cognitive scores that are 60% lower than children in the highest socioeconomic quintile. Four year old children just below the poverty line are 18 months behind in academic development as compared to non-poor four year olds (Layzer, in press).

The National Center for Education Statistics demonstrates a similar discrepancy among children of various socioeconomic backgrounds. Presented as a *readiness gap*, a linear relationship exists between academic ability scores and family income. As income increases, reading, math, and general knowledge increase and move closer to optimal development for a child entering kindergarten (Barnett et al., 2004). By third grade, the discrepancy in language acquisition and vocabulary development is stark. Snow (2005) asserts that the working vocabulary of a low socioeconomic child with undereducated parents is approximately 4,000 words as compared to approximately 12,000 words for children in middle-income homes with well-educated parents. Achievement gaps such as those presented in this section have framed the challenge for educators in effectively educating impoverished children.

While persistent gaps in achievement exist, historic achievement data from the National Center for Children in Poverty and the National Center for Educational Statistics suggests improvements in standardized test scores from all groups (Landry, 2005). While some researchers propose that improved standardized achievement data is a result of more rigorous teacher preparation programs, increased teacher qualifications, and a resulting increase in teacher quality in classrooms (Whitebook,

2003), others studies have found that teacher credentialing and training programs have no consistent link to improved outcomes for impoverished children (Early et al., 2006). For example, in their study of early childhood readiness programs, Early et al. (2006) evaluated state-funded programs in eleven states and assessed academic and social skills outcomes for 2,800 students. Although they concluded that teacher training programs and credentialing standards are important, they did not determine a consistent association with increased achievement data. While increases in overall test results are incontestable, some researchers have concluded that the increases are more superficial than meaningful (Koretz, 2005; Linn, Graue, & Sanders, 1990; Shepard, 1990).

There is evidence in most states that performance on state-generated measures is increasing for most subgroup populations. Some have linked increases in state-level accountability measures to: (a) the use of old norms; (b) the repeated use of testing items and forms over multiple years; (c) the selection or exclusion of certain subgroups from the state accountability model; and (d) the instructional concentration by teachers on specifically tested question types and skills. These factors support the use of nationally-normed tests to determine whether or not gains in test scores are a function of increased comprehension and understanding or greater familiarity with the test (Koretz, 2005; Linn et al., 1990; Shepard, 1990). In an analysis of state test score gains in Texas in the 1990s, Haney (2000) suggests that direct teacher coaching and greater familiarity with test style and format led inevitably to increased achievement scores. This pattern of rising and falling test scores with the introduction of a new test has been termed the *saw tooth* phenomenon based on the pattern of steady increases after the

implementation of a testing program followed by a decrease when the test is changed (Linn, 2000, p. 7). By using the National Assessment of Educational Progress (NAEP) results, researchers can analyze data that is nationally representative and thereby reduce concerns that state instructional units may form tests generated to portray an inflated achievement profile for students. Several studies of achievement data of economically disadvantaged students as compared to other students have included analyses of the National Report Card through NAEP results (McGraw, Lubienski, & Strutchens, 2006; Vanderhart, 2006).

The NAEP for 2005 illustrates the gap that exists between students eligible for free or reduced lunch and those who are ineligible. Table 4 depicts the wide disparity. Measuring the difference in students at or above a basic mathematics level, the data shows a 23 percentage point deficit for fourth grade students eligible for free or reduced lunch as compared to their non-eligible counterparts. The eighth grade mathematics data shows a 28 percentage point deficit for those eligible for free or reduced lunch as compared to their non-eligible counterparts. A similar deficit is seen in the area of reading. Measuring the difference in students at or above a “basic” reading level, the data shows a 31 percentage point deficit for fourth grade students and a 24 percentage point deficit for eighth grade students when comparing poor and non-poor students (National Center for Education Statistics [NCES], 2005). NAEP and other nationally-normed assessments clearly demonstrate the achievement gap between poor students and others. With a well-documented relationship between race and poverty, (Ainsworth-Darnell & Downey, 1998; Caldas, 1993; Caldas & Bankston, 1997; McGraw et al., 2006; NCES, 2005; Roscigno & Ainsworth-Darnell, 1999), the work of several

Table 4

NAEP Results for Students Receiving Free or Reduced Lunch Versus Full Pay Students, 2005

Students	Average Scale Score	Below Basic	Standard Error	At or above Basic	Standard Error	At or above Proficient	Standard Error	At Advanced	Standard Error
<i>4th Grade</i>									
<i>Mathematics</i>									
Free/Reduced Lunch	225	33	(0.3)	67%	(0.3)	19%	(0.2)	1%	(0.1)
Not Eligible	248	10	(0.2)	90%	(0.2)	49%	(0.3)	8%	(0.2)
<i>8th Grade</i>									
<i>Mathematics</i>									
Free/Reduced Lunch	262	49	(0.4)	51%	(0.4)	13%	(0.2)	1%	(0.1)
Not Eligible	288	21	(0.2)	79%	(0.2)	39%	(0.3)	8%	(0.2)
<i>4th Grade</i>									
<i>Reading</i>									
Free/Reduced Lunch	203	54	(0.4)	46%	(0.4)	16%	(0.3)	2%	(0.1)
Not Eligible	230	23	(0.2)	77%	(0.2)	42%	(0.3)	11%	(0.2)
<i>8th Grade</i>									
<i>Reading</i>									
Free/Reduced Lunch	247	43	(0.4)	57%	(0.4)	15%	(0.3)	1%	(0.1)
Not Eligible	270	19	(0.3)	81%	(0.3)	39%	(0.2)	4%	(0.1)

Note. Compiled from NAEP results available for 2005 at <http://nces.ed.gov/datatools/>.

researchers has focused on controlling for other factors in order to determine the impact of poverty on achievement without regard to race or other factors. Using federal free/reduced lunch status as an indicator of poverty, research on the influence of socioeconomic status has shown that it has the primary effect on achievement even while controlling other input factors (Caldas, 1993; Caldas & Bankston, 1997; Rumberger & Willms, 1992). Poverty's impact on achievement is also evident in high school graduation rates. In their longitudinal study of 15,362 high school sophomores, Ingels, Burns, Chen, Cataldi, and Charleston (2005) determined that 99% of all sophomores anticipate earning a high school diploma and nearly 75% anticipate earning a college degree. The ambition to graduate was consistent across subgroups. However, that data show a disproportionately low rate of graduation for impoverished students and a near perfect linear relationship between a school's overall rate of poverty and the school's dropout rate (Neild, Balfanz, & Herzog, 2007). Balfanz and Legters (2004) determined that 15% or 2,000 American high schools are responsible for nearly half of the nation's dropouts.

The primary characteristic found in common with the 2,000 high schools is a high rate of poverty. Those students failing to meet graduation requirements are characterized by a similar set of demographic factors, family factors, adult responsibilities or educational experiences (Gleason & Dynarski, 2002; Rumberger, 2004). Impoverishment is the primary demographic factor that is highly correlated to dropout status. Other demographic factors include: (a) students who have limited English proficiency; (b) students with emotional or learning disabilities; (c) families that change schools often; and (d) students who are older than the majority of the students

in their grade level. Family factors predicting dropout status include: (a) a home supervised by a single parent; (b) a parent or parents who did not finish high school; and (c) an older sibling who did not finish high school (Gleason & Dynarski, 2002; Rumberger, 2004).

The National Dropout Prevention Center (2007) presents similar dropout characteristics. The report *Dropout Risk Factors and Exemplary Programs* identifies twenty-five significant risk factors across two domains: (a) the individual domain; and (b) the family domain. In addition to those previously mentioned, early adult responsibilities also pose a risk for impoverished students. Teenage parenthood and a high number of work hours are linked to a greater likelihood of dropping out. Discussed in further detail in later sections, researchers also identify a set of school experiences common to those who drop out including: (a) low grades; (b) retention; (c) high absenteeism; (d) poor classroom behavior; (e) less participation in school activities; and (f) poor relationships with teachers (Hammond, Linton, Smink, & Drew, 2007; Neild et al., 2007).

Studies of nationally-normed test results present a significant separation between the academic outcomes for impoverished students as compared to others (Hill & Michael, 2001; Hill & Sandfort, 1995; Land & Legters, 2002). Additionally, studies show that the dropout rate in impoverished schools or impoverished communities is higher than middle class communities (Rosenthal, 1998; Rumberger, 2004). Although these studies demonstrate that a low socioeconomic status is a significant encumbrance to adequate academic performance, the overall literature does not imply that all other factors are inconsequential. While it is suggested that a student's individual socioeconomic status is the primary indicator of his achievement (Caldas, 1993; Caldas

& Bankston, 1997; Rumberger & Willms, 1992), a large body of research has given consideration to the impact of the societal and school factors on the achievement outcomes for impoverished students. Described in greater detail in the following sections, societal and school-based characteristics may be mediating factors that have an impact on achievement.

Exogenous Variables: Societal and Home Factors

The complexity of the term *poverty* includes factors beyond those that are purely economic. While schools rely on free and reduced lunch statistics as a proxy for poverty, there is widespread recognition that mediating factors exist that impact the degree of damage impoverishment has on the educational achievement and attainment of students. Financial resources are typically the sole indicator of poverty for the purposes of research and statistics (Hill & Sandfort, 1995; USCB, 2004) While these factors are recognized as exogenous in relation to the scope of control for school-level administrators, the literature presents a complex set of societal, home, and school factors that influence the impact poverty has on achievement (Dicks, 1979; Evans, 2004; Gershoff, 2003; Gould & Gould, 2003; Hill & Sandfort, 1995, 1997; Huston et al., 1994; Mayer, 1997; Scales et al., 2006; Smith, Brooks-Gunn, Klebanov, 1997). This section will consider societal and home mediating factors including: (a) health and non-economic factors, (b) the duration of poverty, (c) the timing of poverty, (d) generational and situational poverty and (e) neighborhood socioeconomic impact on impoverished children. Imbedded in the presentation of the literature are issues of race, ethnicity, and public policy. Additionally, some consideration is given to popular literature currently impacting schools and policy makers.

Non-Economic Factors and Health Considerations

The literature is replete with evidence suggesting that a variety of non-economic factors impact impoverished children including: (a) social-emotional development (Gershoff, 2003), (b) cognitive development (Hill & Sandfort, 1995; Smith et al., 1997), (c) low birth weight (Duncan, Brooks-Gunn, & Klebanov, 1994), (d) poor nutrition (Huston et al., 1994), (e) poor vision (Gould & Gould, 2003), and (f) general health considerations for impoverished children including implications for greater rates of heart and respiratory disease. The work by Halfon and Newacheck (1993) utilized the 1988 National Health Interview Survey on Child Health. Halfon and Newacheck analyzed data on rates of asthma for poor and “non-poor” children. The data indicated that 4.3% of all children under 17 years old had asthma, with poor children (4.8%) showing a slightly greater rate of asthma than non-poor children (4.2%). More telling were the rates of physician office visits and hospitalization. While poor children visited a physician for routine matters 40% fewer times than non-poor children, poor children were hospitalized 40% more often than their non-poor counterparts. While medical and health policy is beyond the scope of this study, this is a link between health and educational issues (Halfon & Newacheck, 2003).

The Impact of the Timing and Duration of Poverty on Student Achievement

One factor impacting student achievement relates to the variations in the timing and duration of impoverishment. An aspect of the topic that warrants attention is the distinction between achievement and ability. The reviewed research studies generally described ability as “the more stable trait” that is governed by environment and genetics. Achievement is the actual expression of ability, motivation, and opportunity.

This is an important distinction in that some research suggests that the timing and duration of impoverishment impact cognitive ability and achievement results differently (Guo, 1998). While these traits are impacted differently, one common and unifying theme found throughout the reviewed studies is that long-term exposure to poverty is detrimental to both ability and achievement (Brooks-Gunn & Duncan, 1997; Guo, 1998; McLoyd, 1998).

The Case that Early Childhood Poverty has Greater Impact

Data from the National Longitudinal Survey of Youth (NLSY) and the Children of NLSY (NLSY-C) have been analyzed to assess the cognitive and educational outcomes of impoverished children at various points in their development. All of the reviewed studies agree on the substantial influence of long-term poverty on achievement and ability. Interestingly, the reviewed research studies diverge in their findings as it relates to the impact on achievement based upon the timing of impoverishment. One set of researchers identifies the early years (0-6 years) as the most critical in cognitive development. They suggest that there is the greatest potential for academic harm when impoverishment coincides early childhood (Entwisle & Alexander, 1989; Guo, 1998). Their studies concluded that the early portion of childhood was most critical in terms of ability and future achievement. Duncan and Brooks-Gunn (1997) conducted a meta-analysis of multiple studies in order to assess the cognitive outcomes of impoverished children over time. They too concluded that poverty in early childhood negatively impacts cognitive outcomes more so than poverty in adolescence. However, they did suggest a weakness in that their data was not longitudinal.

The Case that Later Childhood Poverty has Greater Impact

Other researchers took a different view of the effect of timing suggesting that later adolescent poverty has a more severe impact on achievement (Mickelson, 1989; 1990; Ogbu, 1986). Drawing upon a psychological framework, they emphasized the impact of disillusionment, disenfranchisement, and exclusion on motivation and ultimately achievement and attainment. They argue that the three-year old lacks the reasoning ability to generate a self-defeating view point about impoverishment and hope. The impoverished adolescent both realizes the condition and is able to form negative view points generally associated with low achievement (Haveman, Wolfe & Spaulding, 1991). The empirical basis for these assertions comes from Haveman et al.'s (1991) examination of the twenty-year longitudinal data from the Panel Study of Income Dynamics (PSID). By constructing three measures of poverty at ages 4 to 7, 8 to 11, and 12 to 15, they found that in terms of achievement "the effect of the last measure on late poverty was especially pronounced" (p. 264).

Addressing the Early Effects versus Late Effects Debate

To address the *early effects* versus *late effects* divergence, Guo (1988) differentiates between achievement and ability. She hypothesizes that early poverty more dramatically influences cognitive ability and adolescent poverty more drastically influences achievement. To test her hypothesis, Guo used the NLSY Survey. While recognizing the controversy in methods of measuring achievement and ability, Gou acknowledges that no test measures these traits absolutely or in isolation. However, drawing upon tests of cognitive ability and achievement she constructed a framework by which she made conclusions about the impact of poverty on the two traits. A zero-order

correlation between cognitive outcomes and cumulative poverty in the early childhood and adolescence was generated using the following five tests: (a) the Reading Recognition Assessment of the Peabody Individual Achievement Test; (b) The Reading Comprehension Assessment of the Peabody Individual Achievement Test; (c) The Mathematics Assessment of the Peabody Individual Achievement Test; (d) The Peabody Picture Vocabulary Test- Revised; and (e) the Memory for Digit Span Assessment.

The first three tests used by Guo were aimed at measuring achievement while the last two tests measured cognitive ability. Data from the tests supported Guo's hypothesis. This was in contrast to an earlier study by Duncan et al. (1994) in which researchers assessed the impact of the timing of impoverishment by looking at three categories of poor children: (a) individuals impoverished during early and late childhood; (b) individuals impoverished in early childhood but not late childhood; and (c) individuals impoverished only in late childhood. Also using the PSID results, this study did not produce findings that demonstrated any significant differences in early childhood poverty versus late childhood poverty in terms of achievement. However, in 1997, the same researchers reanalyzed the PSID and included the NLSY, the NLSY-C, the National Survey of Families and Households (NSFH), the Nation Health and Nutrition Examination Survey (NHANES) and the Infant Health and Development Program (IHDP). Like Guo's study, Duncan et al. concluded that children living in long-term poverty suffer the most in terms of achievement. They also found that children experiencing poverty in their early years have lower rates of school completions than do children who experience only late adolescent poverty. These results do not mirror those

studies that contend that late childhood poverty has a more detrimental impact on achievement and school completion. While findings about poverty and duration have been consistent (Brooks-Gunn & Duncan, 1994, 1997; Guo, 1998; Haveman et al., 1991; Mickelson, 1989; 1990; McLoyd, 1998; Ogbu, 1986), the inconsistent findings regarding the timing of poverty and achievement suggest a need for additional research.

Generational and Situational Poverty

For some children, poverty exists generation after generation within one family. For others, poverty develops due to critical life situations such as the death of the primary money earner, or the divorce of the parents. Generally the effects of situational poverty are considered to be less severe as compared to generational poverty. While the timing of poverty and the impact on achievement remains a point of debate, researchers express the following broad agreement on the results of generational or long-term poverty: (a) long-term poverty contributes to greater academic difficulties than short term poverty regardless of timing; (b) children who are impoverished for the totality of their childhood face significant social and emotional problems; and (c) children in generational poverty have a greater likelihood of not completing high school (Barr & Parrett, 2001; Brooks-Gunn & Duncan, 1997; Knapp & Shields, 1990; Payne, 2005; Richardson, Casanova, Placier & Guilfoyle, 1989; Reed & Sauter, 1990).

Neighborhood Population SES Impact on Individual Student Achievement

Some researchers have concentrated their efforts on identifying other contextual issues impacting the achievement of impoverished students other than individual SES. One of the contextual issues researched has been the impact of socioeconomic status of the school population and neighborhood population on the impoverished student's

individual academic achievement (Ainsworth-Darnell & Downey, 1998; Caldas & Bankston, 1997; Roscigno & Ainsworth-Darnell, 1999; Roscigno, Tomaskovic-Devey, & Crowley, 2006). Overall, the studies conducted regarding the impact of school and neighborhood population SES have demonstrated widespread agreement. Multiple research studies have concluded that the socioeconomic status of an impoverished student's peer group has a substantial impact on the individual's academic achievement. Although not more dominant than the impact of teacher quality, the influence of the socioeconomic status of the school population and the neighborhood population impacts the individual to a level that is only slightly less than his own socioeconomic status (Caldas, 1993; Caldas & Bankston, 1997; Ensminger, Lamkin, & Jacobsen, 1996; Roscigno et al., 2006; Rumberger & Willms, 1992).

Ensminger et al. (1996) also investigated the effects of population SES on individual achievement, but focused on neighborhoods instead of school populations. In their longitudinal study, they analyzed a cohort of African-American children from 1966 to 1993. The children they followed lived in 202 tracts in the Chicago metropolitan region. They analyzed achievement and attainment data from the cohort. They found that neighborhood SES was not as strong as individual family SES in impacting individual achievement. These results are consistent with other findings presented in this paper regarding the achievement of impoverished students. Ensminger et al. (1996) noted findings that were similar to the Caldas and Bankston (1999) findings. That is, they found that achievement and attainment increased for impoverished students when neighborhood SES had either: (a) higher levels of white collar workers; or (b) when neighborhood conditions included individuals of an SES higher than federal

poverty guidelines. One unresolved finding within the Ensminger study is that male achievement is more impacted by neighborhood SES than female achievement. One possible but untested explanation is that females are less likely to participate in neighborhood activities or to leave the home. Females are therefore less influenced by neighborhood conditions than their male counterparts.

Another unresolved difference in neighborhood effect relates to poor whites as compared to poor African-Americans. Brooks-Gunn et al. (1993) used the Panel Study of Income Dynamics (PSID) to determine that neighborhood SES had an impact on student achievement similar to the results found in the Ensminger et al. (1996) and Caldas and Bankston (1997) studies. However, with her sample of 1,132 African-Americans and 1,214 whites, she found that the poor white population was more positively influenced by higher neighborhood SES than was the African American population. This issue was also found in the Connell et al. (1995) study. Each of these studies, while controlling for other variables (i.e. individual SES, race, parent education level, etc.), has produced results indicating that the socioeconomic status of peer groups has an impact on the academic achievement of individuals both above and below the poverty line. The researchers have proposed a variety of psychological reasons for the influence of the population on the individual student including: (a) peer pressure (Falk & Ichino, 2006); (b) role-modeling; (c) exposure; and (d) the role of peer group attitude transferability (Battistich, Solomon, Kim, Watson, & Schaps, 1995). Others have suggested that external resource allocation explains the variation in student achievement for a poor student in a high-poverty school versus a poor student in a low-poverty school (Roscigno et al., 2006). While more information is needed

regarding the cause-and-effect nature of this finding, the fact that overall population SES impacts student achievement has implications for educators and policy makers as decisions are made to enhance the education of impoverished students.

Debate with the Popular Literature

A final set of considerations relating to home and societal factors are proposed by author and former educator Ruby Payne. Recent publications by Payne have had an impact on the K-12 educational system through staff development efforts across the nation. Payne focuses on teacher expectations of economically disadvantaged students and on teaching methods for high poverty students in American schools (Dudley-Marling, 2007; Newman, 2004). Payne's notions regarding the instruction of economically disadvantaged students have been the focus of practitioners and the basis for several research studies (Johnston, 2001; Keller, 2006; King-Weaver, 2004; Magee, 2005; Vickers, 2006). Payne's (2005) model is based on the following concepts: (a) emotional resources, (b) accessing mental resources, (c) spiritual resources, (d) physical resources, (e) support systems, (f) relationship/role models, and (g) knowledge of the hidden rules.

Dr. Joseph Newman (2004) suggests that Payne's work has attracted attention because it seems credible to teachers in that they identify with the experiences Payne describes. While the literature is replete with references to Payne's work, critics propose that it is an oversimplification of the complexities of poverty and is based upon stereotypes, personal insights, and anecdotes rather than empirical research (Dudley-Marling, 2007; Gorski, 2005; Tough, 2007). Payne and her supporters defend the

research-basis of the work by highlighting publications and investigations conducted by the Center for the Study of Economic Diversity from 2002 to 2007.

In ten published studies, the Center for the Study of Economic Diversity presents results demonstrating statistically significant differences in the achievement of student groups instructed under the Payne model as compared to students instructed without the treatment. The studies present analyses of covariance using standardized test scores as dependent variables for schools in Arkansas, Kansas, Tennessee, Wisconsin, New York, Indiana, Virginia, and Florida for academic years 2003-04 through 2005-06 ("Research," 2007). With the passage of *No Child Left Behind* in 2002 schools were required to address subgroup disparities through research-based strategies (Tough, 2007). Giving credence to Payne's supporters, the U.S. Department of Education (USDE) recognizes Payne's work as research-based as evidenced by approved state plans that utilize her framework to address poverty issues (United States Department of Education, 2007). While the empirical nature of her work is debated, her assertions are found throughout the literature and therefore warrant some review. Payne presents the concept that when certain non-economic factors are absent in an impoverished child's life, the impact on achievement equals or exceeds the impact of financial deficits.

Payne is not alone in proposing resource deficits extending beyond the economic definition. Others have also focused on resource deficits or characteristics that are often present in low-income homes such as a single parent household structure. While Payne's suppositions are based primarily on her experiences as an educator, the literature presents a focus on family and home factors more grounded in actual research. For example, a variety of validated researchers have investigated the

influence of family beliefs, values, and attitudes on a range of childhood issues (Pinderhaus, Dodge, Bates, Pettit, & Zelli, 2000; Roxburgh, Stephens, Toltzis & Adkins, 2001; Zady & Portes, 2001). Others have focused on parental level of education and the resulting impact on the achievement of students (Milne & Plourde, 2006) and issues of parental participation in school, parental availability for homework assistance and supervision, and the amount of television viewed in the home (Barton, 2003). Payne's ideas, while persuasive in many instances, are not clearly research-based. Those critical of Payne acknowledge her role in raising the consciousness of educators to poverty-related issues, but question the premise of her thesis and the validity of her work (Bohn, 2007; Dudley-Marling, 2007; Gorski, 2005). Bohn (2007) has suggested that Payne's status and prominent position in the popular literature and on the staff development agendas of many schools is due to a lack of alternatives in the field of continuing professional development related to students facing impoverishment. The studies presented as evidence of the research basis of Payne's assertions have been conducted by the Center for the Study of Economic Diversity (CSED). The CSED is linked to Payne's corporation Aha! Process. Additionally, Payne has been criticized for her "stereotyping and classism" and for disregarding the "sociopolitical context of schooling" (Gorski, 2005, p. 2). Some urge caution with an over reliance on Payne's work and suggest that without a clear basis in empirical research, her concepts are mere conjecture (Gorski, 2005).

Summary

Deficiencies and characteristics associated with homes, parents, and neighborhoods of impoverished students are often cited in the literature and used to

explain why impoverished students under perform their non-poor counterparts (Giroux & Myrsiades, 2001; Noguera & Akom, 2000). Home and societal factors impacting the achievement of impoverished students are wide-ranging. The literature presents ample evidence that home factors influence the attainment and achievement outcomes for students. While many factors or exposures occur before students enter school or outside of school hours, the impact of those factors is manifest in educational outcomes. As presented in this section, some of the home factors considered in the literature include: (a) social-emotional and cognitive developmental delays resulting from the home environment (Gershoff, 2003); (b) health factors such as initial birth weight (Duncan et al., 1994), neonatal and childhood nutrition (Huston et al., 1994), and access to adequate health care (Halfon & Newacheck, 1993); (c) the timing and duration of impoverishment within a student's educational pathway (Barr & Parrett, 2001; Brooks-Gunn & Duncan, 1997); (d) neighborhood influences with considerations for the socioeconomic status of the overall population (Ainsworth-Darnell & Downey, 1998; Roscigno et al., 2006); (e) the influence of family beliefs, values, and attitudes (Pinderhaus et al., 2000; Roxburgh et al., 2001; Zady & Portes, 2001); (f) parent availability, amount of television viewing, parent participation in education, and assistance with homework (Barton, 2003); and (g) mother's levels of education and the impact of relationships within the home (Milne & Plourde, 2006). While these factors are outside of the scope of control for school-level leaders, a variety of exogenous variables are presented within the volumes of literature regarding impoverished student achievement. While persuasive and potentially important for educators and public

policy makers, the next section transitions to those school characteristics and factors on which the resulting study is based.

School-Based Factors

A variety of correlates and school-based moderators of impoverished student achievement are suggested in the literature (Archibald, 2006; Breaoen, 2007; Imants & Zoelen, 1995; Jacobs & Kritsonis, 2007; Romero & Lee, 2007). Identifying those mediating factors has taken greater importance for school leaders in light of *No Child Left Behind* Act of 2001 (2002). The federally mandated accountability for school performance most directly impacts those schools receiving Title I funding. With 67% of American elementary schools receiving Title I funds, many educators are faced with the task of closing the achievement gap between the economically disadvantaged and their non-disadvantaged peers.

This section focuses on school-based factors or inequalities suggested in the literature as having an impact on achievement for economically disadvantaged students. Unlike the factors presented in the previous section, these are divided into exogenous and endogenous school-related variables. The first factors are largely outside of the control of school-level administrators. These variables relate to the impact of a high poverty population on the academic achievement of economically disadvantaged students. Other school factors within this category include variables such as student and teacher attendance, school and class size, and access to technology. While not completely uninfluenced by school-level administrators, issues of school boundaries, grade configuration, and funding for technology are more a result of

community demographics, the ability of the tax base to provide adequate funding, and state or district policy.

The final sections focus on those factors classified as endogenous in relation to the influence of school-level administrators. The review of the literature found widespread agreement that teacher quality is the primary school variable mediating student achievement (Bell, 2001; Darling-Hammond, 1991; Darling-Hammond, 2000; Darling-Hammond et al., 2005; Early et al., 2006; Guin, 2004; Holtzman, Gatlin, & Heilig, 2005; Ingersol, 1999; Jepsen & Rivkin, 2002; Marzano, 2003; Nettles & Herrington, 2007; Nye et al., 2004; Peske & Haycock, 2006; Prince, 2002; Rivkin & Hanushek, 2005; Wenglinsky, 2000; Wright et al., 1997). The literature also suggests that teacher quality is an endogenous variable in that it is directly influenced by school-level administrators through recruitment, selection, hiring, and retention practices (Eilers, & Camacho, 2007; Heck, & Hallinger, 2005; Kaplan, & Owings, 2001, 2002; Mangin, 2007; Marks & Nance, 2007; Orr et al., 2008; Printy, 2008; Reitzug et al., 2008; Robinson et al., 2008; Sarros & Sarros, 2007; Wahlstrom & Louis, 2008). These variables form the basis of the study and are related to teacher quality, including differential contact for economically disadvantaged and non-economically disadvantaged students with skilled, high-qualified, licensed and experienced teachers.

Impoverished Students in High Poverty Schools

The impact of population SES on individual achievement is of particular importance when an impoverished student has a high number of peers that are also impoverished. Roscigno et al. (2006) investigated this issue using hierarchical linear and hierarchical logistic modeling techniques to analyze data in order to test their argument

that poor students are low academic performers when they have a high percentage of poor students in their school peer group. They contend that impoverished students in high poverty schools perform lower than impoverished students in low poverty schools due to peer group influences and school generated inequalities (Roscigno, et al., 2006). Roscigno et al. (2006) used the National Educational Longitudinal Survey (NELS) and the Common Core of Data (CCD) to analyze the impact of impoverished students in high poverty schools.

National Education Longitudinal Survey (NELS) data takes three views of 25,000 (initial) students. Using a nationally representative data set in 1988, twenty-five eighth graders in 1,000 schools were randomly sampled. Follow-up studies were conducted in 1990 and 1992. The longitudinal nature of the data was used to predict student achievement (dependent variable) based upon family and school attributes (independent variables). Data was collected through random sampling for eighth graders with follow-up studies at tenth and twelfth grade. The tenth grade data was collected in order to assess the results prior to students dropping out of school. Regression imputation with random error components was utilized to substitute missing items in order to avoid an artificial reduction in variation by way of general mean substitution. By the end of the second study, achievement data for 16,903 students in 1185 schools was analyzed. Math and reading tests designed by Educational Testing Services were utilized (mean = 51.03; SD = 10.11). A national testing model was selected to increase the ability to generalize the results (Roscigno et al., 2006).

The third wave of the NELS study measured attainment (twelfth grade graduation) and dropout rates for students. The dropout rates for inner city, rural, and

suburban students were 8.4%, 6.1%, and 5.0% respectively. Using race as a descriptor, the dropout rate for white students was 4% as compared to Asian students with the lowest dropout rate at 2.9%. Black students had a dropout rate of 8.2% while Hispanic students and Native American students registered dropout rates of 9.4% and 13% respectively. Family variables, income, and parent education were assessed. Parents responded to a 15-income category ordinal scale and a 7-educational level category ordinal scale. Family structure was measured as single/step parent family versus traditional two parent family (referent). Other measured factors included: household conduciveness to learning, cultural capital, parental involvement, and per pupil expenditure (National Center for Education Statistics, 1992; Roscigno et al., 2006).

While some high poverty/inner city schools have higher per pupil expenditures as compared to suburban schools (Roscigno et al., 2006), actual instructional expenditures are lower due to higher demands for safety and security measures. The NELS study demonstrated that in terms of real instructional resources, inner city and rural schools have parallel resource disadvantages which result in lower achievement scores (1.92 and 2.71 standardized points lower in math/reading for inner city and rural schools; $p < .001$) (Ainsworth-Darnell & Downey, 1998; Roscigno & Ainsworth-Darnell, 1999; Roscigno et al., 2006). A final disadvantage for the impoverished student in a high poverty population was outlined by the 2005 study by Rumberger and Palardy entitled: *Does Segregation Still Matter? The Impact of Student Composition on Academic Achievement in High School*. They concluded by suggesting that high poverty schools are organized and operated differently than other schools.

Rumberger and Palardy suggest issues of (a) low teacher expectations, (b) fewer rigorous course offerings, (c) a lack of technological infrastructure, and (d) an abundance of novice teachers. Likewise, Judge, Puckett, and Bell (2006) present findings that suggest access to technology is significantly less in high poverty schools. Defining *digital equity* as a “social justice goal, ensuring that all students have access to... technologies for learning regardless of socioeconomic status...” (p. 52), Judge, Puckett, and Bell acknowledge improving conditions related to technological infrastructure in high poverty schools. However, equitable technology access has yet to fully be achieved and high poverty schools are: (a) less connected to the Internet, (b) have technology that is one to two years behind comparable middle class schools, and (c) have technology that is three to four years behind comparable upper class schools.

School Population SES Impact on Individual Student Achievement

While assessing the impact of peer groups within public schools, Caldas (1993) suggested that it may be one of the primary input and process factors impacting impoverished student achievement. While Ensminger et al. (1996) focused on the neighborhood peer group instead of the school peer group, those researching the various types of peer group influences have agreed that the socioeconomic status of the peer group, school population or neighborhood population, impacts the individual to a level that is only slightly less than his own socioeconomic status (Caldas, 1993; Caldas & Bankston, 1997; Ensminger et al., 1996; Roscigno et al., 2006; Rumberger & Willms, 1992). Several research studies that have investigated this important finding have been documented by the Journal of Educational Research.

The study by Caldas and Bankston (1997) investigated the relationship between the socioeconomic status of peers and individual academic achievement by analyzing data from the Louisiana Graduation Exit Examination administered to tenth graders. They controlled a variety of other *sociodemographic* factors, including individual SES, and concluded that the effect of “schoolmates’ family social status on achievement is significant and substantial, and only slightly smaller than an individual’s own family background status” (Caldas & Bankston, 1997, p. 275). More importantly, they found that when impoverished students attended school with students of a higher socioeconomic status, their academic achievement improved. These findings were supported in their later study (1999) when they endeavored to examine the impact of district-level factors on individual academic achievement. Interestingly, they did not find that the district-level characteristics were as influential as school-level characteristics. However, they did conclude that “variations in academic performance among schools are connected closely to family situations (SES) that prevail in those schools” (Caldas & Bankston, 1999, p. 97). Archibald (2006) confirmed the earlier studies by determining that overall school-level poverty has a strong, statistically significant, negative effect on individual student achievement. Her study highlights qualitative research suggesting exposure to peers with higher vocabulary as one reason why overall school level poverty has an impact. The findings give rise to the notion that concentrations of poverty impact opportunities to learn.

Student and Teacher Attendance

The literature is replete with evidence that economic disadvantage and low academic performance are linked (Leroy & Symes, 2001; Pellino, 2004; Scales et al.,

2006). While Evans (2004) presents the argument that a variety of home-based factors result in less cognitive stimulation and lowered academic achievement for impoverished children, school characteristics may contribute significantly to closing the achievement gaps between higher and lower-income students (Scales et al., 2006). One school characteristic, instructional attention, is determined by how often and in what frequency a student has interactions with the teacher and the curriculum. Student and teacher interactions are governed by attendance rates, school size and class size. Utilizing data from the National Center for Education Statistics (NCES), the National Center for Children in Poverty reports a positive correlation between absenteeism and poverty (Breaoen, 2007). Contrasting the economically disadvantaged and the non-economically disadvantaged, children from low-income households are four times more likely to be chronically absent from school. Defining chronic absenteeism as missing 18 days or more, the study linked poverty, absenteeism, and significantly reduced academic performance (Breaoen, 2007; Romero & Lee, 2007). With the relationship between absenteeism and achievement established (Haslinger, Kelly, & O'Lare, 1996), impoverished students present a greater challenge related to absenteeism by having: (a) increasingly more absences as they progress through grade levels; (b) higher rates of failure associated with their absences; and (c) lower rates of academic attainment due to their discontinuous school attendance (Nichols, 2003).

Teacher absenteeism also presents itself as negatively impacting student achievement (Imants & Zoelen, 1995; Jacobs & Kritsonis, 2007; Woods & Montango, 1997). In their report and exploration of the literature related to low-performing schools, Corallo and McDonald (2001), present teacher attendance as one of several

characteristics of low-achieving schools, many of which are often impoverished. Along with low expectations for student achievement and high rates of teacher turnover, high teacher absenteeism compounds the problem of poverty according to researchers (Corallo & McDonald, 2001; Day & Elliot, 2005). According to Day and Elliot (2005), high teacher absenteeism is a result of: (a) a lack of commitment; (b) a low sense of teacher efficacy; and (c) a low sense of job satisfaction. While researchers have investigated a variety of diverse factors related to teacher absenteeism, researchers tend to agree that schools with low student achievement and high rates of student poverty correspond to a high rate of teacher absenteeism (Corallo & McDonald, 2001; Day & Elliot, 2005; Pitkoff, 1993; Scott, 1995).

School and Class Size Factors

In their research on the economies of school size, Andrews, Duncombe, and Yinger (2002), find some evidence that midsized schools, defined as 300 to 500 elementary students and 600 to 900 secondary students, are more likely to be conducive to learning. Williams (1990) suggested a lower capacity for instructional effectiveness with elementary schools at an optimal range of 300 to 400 students and secondary schools at an optimal range of 400 to 800 students. Cotton's (1996) synthesis of 103 research studies on the affective and social effects of school size asserted that a capacity of 400 to 500 students was appropriate for all levels. An inverse relationship between school size and student achievement suggests that more moderately sized schools may be better able to meet the needs of impoverished students (Archibald, 2006). As compared to their larger counterparts, moderate school

and class sizes are believed to be associated with: (a) higher student motivation; (b) higher staff motivation; and (c) higher parent involvement (Archibald, 2006).

While determining school size is not generally within the discretion of the principal, some researchers argue that district and state leaders should consider school size in that students within smaller schools and smaller classes have a greater level of connection to their teachers resulting in motivation due to a heightened sense of belonging (Cotton, 1996; Stockard & Mayberry, 1992). Moderately sized schools of 600 to 900 students have academic benefits for students across the socioeconomic spectrum (Lee & Smith, 1997). Murphy, Beck, Crawford, Lodges and McGaughy (2001) assert that smaller school size and smaller class size have the greatest academic benefit for minority students, students with special needs, and low-income students.

More recently, Chatterji's (2006) analysis of the Early Childhood Longitudinal Study (ECLS) of 2,296 students in 184 schools concluded that class size has a statistically significant impact on academic success in reading at the first grade level for economically disadvantaged students. While some economically disadvantaged students succeed and others fail, Chatterji (2006) found that lower class size had an additive effect on reading achievement for first graders. Having more time with the teacher has a positive effect on a variety of students, but the impact is more pronounced with economically disadvantaged students (Chatterji, 2006; Rathbun, West, & Hausken, 2004). These findings are consistent with a variety of important studies linking lower student to teacher ratios with increased achievement (Glass & Smith, 1978; Molnar, Smith, & Zahorik, 1999; Mosteller, 1995; Nye, 2000).

The connection between lower class size and increased achievement has been documented primarily through studies of programs targeted at class size reductions for kindergarten through third grade (Glass & Smith, 1978; Kurecka & Claus, 2000). The seminal, meta-analytic study from Glass and Smith (1978) established the benefit of student achievement when class sizes move below 20 students. The more contemporary *Project Student /Teacher Achievement Ratio* (STAR) from Tennessee is a longitudinal study that also reveals the positive impact of class size reduction (Mosteller, 1995). The three-phase, randomized-controlled study began in 1985 with a cohort of 6,325 kindergarten students. With students assigned to small (13 to 17 students) classes and regular (22 to 25 students) classes in kindergarten through third grade, compelling evidence was provided that smaller classes do produce significant improvements in learning and cognitive development even after students returned to regular class sizes in subsequent years. In later phases of the study, the specific impact on impoverished schools was a focus. The study concluded that: (a) smaller class sizes were associated with academic gains to the greatest degree in settings of no more than 18 students; (b) experiencing reduced class size was most beneficial when sustained for grade kindergarten through third grade; and (c) minority and economically disadvantaged students demonstrated even greater academic gains when assigned to small classes as compared to Caucasian and non-economically disadvantaged students (Mosteller, 1985).

Additionally, Nye, Hedges, and Konstantopoulos (2001) conducted an additional follow-up study of Project STAR of original cohort members in the high school. Findings suggested that the benefit of small primary class sizes held through high school and

remained more pronounced for minority students in terms of overall gains. In the decade following STAR, state programs such as Wisconsin's *Student Achievement Guarantee in Education* (SAGE) and California's *Class Size Reduction* (CSR) program demonstrated similar results with class sizes of 15 students and 20 students respectively (Molnar et al., 1999). While the follow-up study of Project STAR determined that gains for students held over time (Nye et al., 2001), California's CSR follow-up study was determined to be inconclusive due to the assortment of other statewide improvement initiatives (Bohrnstedt & Stecher, 2002).

Other evaluated programs producing inconclusive findings or findings of no significant difference in class sizes include: (a) Michigan's Saginaw City School District's class size reduction effort in first and second grade (Kurecka & Claus, 2000); (b) Kentucky's Jefferson County one-year reduction in class size at third grade effort (Munoz, 2001); and (c) North Carolina, Wake County School's class size reduction effort in first, second and third grade (Speas, 2003). While these programs produced results inconsistent with the more robust and successful Project STAR, proponents of small class size claim that program design flaws and other factors resulted in inconclusive results and results demonstrating no significant difference for students in small classes as compared to students in regular size classes. For example, the California program may have been implemented too rapidly and without an appropriate control group. California CSR also had an unintended and negative impact of the quality of the teaching force. The program required a 46% increase in the number of teachers in grade kindergarten through third grade resulting in an increase in the number of teachers without appropriate credentials (Bohrnstedt & Stecher, 2002).

Small class size proponents effectively argue that the lack of impact for the Kentucky CSR effort is due to the short term nature of the program. With only one year of implementation, the intervention was not considered to be significant enough to produce change (Munoz, 2001). Finally, the North Carolina program did not meet the state mandated expectation of 18 students in most classrooms and inexperienced teachers were often placed in classrooms that were opened as result of CSR efforts (Speas, 2003). While some suggest that school improvement efforts should remain focused on teacher quality and issues of credentials rather than class size (West & Woessmann, 2003), the preponderance of studies establish the positive impact of class size reduction on student achievement (Chatterji, 2006; Glass & Smith, 1978; Molnar et al., 1999; Mosteller, 1995; Nye, 2000; Nye et al., 2004; Rathbun et al., 2004).

Endogenous Factors

Principal's Impact on Student Achievement

Although the degree of principals' impact is debated, the school principal's role in improving schools and student achievement results is the focal point of numerous recent journal articles and research studies (Elmore, 2003; Griffith, 1999; Hallinger & Snidvongs, 2008; Leithwood & Jantzi, 1999; Marzano, McNulty, & Waters, 2005; Nettles & Herrington, 2007; Opdenakker, 2007; Rammer, 2007). Leitner (1994) and Hallinger and Heck (1996) describe the principal as having an indirect effect on student achievement and suggest that a principal's impact on achievement is mediated through teacher interactions. Others find that the principal has a somewhat more direct impact on student achievement with an effect size for leadership and student achievement as high as .50 (Waters, Marzano, & McNulty, 2004). The principal's impact on student

achievement is mediated through teacher interactions. The principal impacts teacher interactions through teacher selection, evaluation and retention (Eilers & Camacho, 2007; Heck & Hallinger, 2005; Kaplan & Owings, 2001, 2002; Mangin, 2007; Marks & Nance, 2007; Orr et al., 2008; Printy, 2008; Reitzug et al., 2008; Robinson et al., 2008; Sarros & Sarros, 2007; Wahlstrom & Louis, 2008). In addition to the impact a principal has through the hiring process, the literature presents lists of leadership characteristics or behaviors that may impact achievement. For example, Waters et al. (2004) identify 21 key areas of responsibility of successful principals. Their meta-analytical study concludes that improving the interrelated administrative leadership abilities of a principal by a single standard deviation results in significant increase in student achievement. They report a 10 percentile point improvement for the school led by a principal who increases his leadership abilities by one standard deviation. The 21 leadership responsibilities are wide-ranging and require that “effective leaders not only know what to do, but, how, when, and why to do it” (p. 49). The principal’s years of experience in education or tenure at a particular school have implications for the 21 leadership responsibilities such as (a) understanding and establishing a school culture, (b) being an advocate for the school, (c) leading new innovations, (d) establishing effective lines of communications with stakeholders, and (e) being aware of the situations and intricacies operating within the school.

A collection of research studies have evaluated the different principal behaviors in schools with varied socioeconomic backgrounds (Butler, 1997; Evans & Teddlie, 1995; Leitner, 1994; Mendez-Morse, 1991; Nettles & Herrington, 2007; Wagstaff, Melton, Lasless, & Combs, 1998). The research suggests some differences in principal

behaviors and characteristics or perceived principal behaviors and characteristics in schools based upon socioeconomic status. For example, Firestone and Wilson's (1989) study of socioeconomic status and administrative behaviors found a greater control and less collaboration with teachers from principals in high poverty schools as compared to principals in low poverty schools. Similarly, Leitner's (1994) study of 27 elementary schools considered relationships among student achievement results, socioeconomic status, and the administration's instructional management style. Principals of high poverty schools were found to be (a) less interactive with the management of the overall instructional program, (b) more directive in style, and (c) less collaborative with stakeholders. In considering the principal's impact on high-poverty schools, Mendez-Morse (1991) also found a distinction between principals in high and low poverty schools. She identified the primary difference as one of management in high poverty schools as compared to leadership in more affluent schools. In summarizing the leadership behaviors of principals in high poverty, high achieving schools, it was found that principal leadership style tended to be less managerial than those principals in low performing schools (Mendez-Morse, 1991).

With widespread agreement in the literature that principals have an impact on achievement in high poverty schools, the hiring, selection and retention of teachers at high poverty schools has taken on greater attention. While teacher experience is suggested as a mediating factor of student achievement, principal experience is also explored. For example, Archer (2002) reported that half of the 1,100 principals in the New York Public School System had less than five years of experience as a principal, a trend repeated in other large cities in America. With practitioners suggesting that it

takes three to five years for a principal to become acclimated to her position or school (Holloway, 2001) and three to five years for comprehensive education reform to significantly improve achievement (Balfanz & Maclver, 2000), the years of experience for principals in high poverty schools is a point of concern for district-level leaders. Researchers report that high poverty schools are more likely to be staffed by less experienced teachers (Betts, Reuben, & Daneberg, 2000; Jerald, 2002; Lankford, Loeb, & Wyckoff, 2002; Prince, 2002) and less experienced principals (Balfanz & Maclver, 2000; Lashway, 2003; Papa, Lankford, & Wyckoff, 2002). For example, Papa et al. (2002) investigated low-performing schools in New York and determined that they were led by less experienced principals or principals that were degreed from less competitive institutions as compared to more affluent schools. While years of experience at the school and total years of experience in education for principals of high poverty schools is addressed in the literature, the final focus of this review is on the aspects of teacher quality that are claimed to have the most significant impact on the achievement of disadvantaged students (Flood, 2003; King, 2005).

Teacher Quality

As previously stated, the federal *No Child Left Behind* Act of 2001(2002) and the North Carolina ABCs school accountability efforts require that all student subgroup populations meet 100% proficiency by 2013-14 as measured by the state testing program. Additionally, NCLB requires that all teachers be highly qualified (HQ). The highly qualified deadline was set for the 2005-06 academic year. Although the specific requirements vary by state, teachers deemed highly qualified are those who have (a) a bachelor's degree, (b) full state licensure, and (c) proven they are knowledgeable about

the subject to which they are hired to teach. Although there are alternative avenues by which competency may be demonstrated, knowledge or competency regarding the given subject area is often established by passing a subject area licensure test. Additionally, states have required reporting concerning efforts toward meeting the federal highly qualified teacher requirements including (a) determining the extent to which students have highly qualified teachers, (b) adopting implementation plans to ensure all teachers are highly qualified, and (c) publicly reporting the plans to meet the requirement and the progress toward meeting the requirements. Based upon highly qualified mandates and the requirement to meet the needs of all students, the issue of teacher quality has taken on greater importance and has been identified as a significant factor mediating the achievement of impoverished students (Rivkin et al., 2005).

Teacher quality has received attention in both the popular media and the legitimate base of the research literature (Cook, 2003; Darling-Hammond, 2000; Jerald & Ingersoll, 2002; Lankford et al., 2002; Lenker, 2006; Marzano, 2003; Wenglinsky, 2002). Media attention has specifically targeted concerns for issues of equity and teacher quality within high minority or high poverty schools (Ingersoll, 1999; Jerald & Ingersoll, 2002). Within this context of teacher quality in high poverty schools, publications such as the Educational Testing Service's (2002), *A National Priority: Americans Speak on Teacher Quality*, present the argument that teacher quality is more a matter of the ability to develop and design effective instruction rather than one of pure content knowledge. Likewise, researchers have presented the notion that while teacher mastery of the content is important, mastery of effective lesson preparation, classroom management, and an understanding of student learning is a more

appropriate measure of teacher quality than content knowledge (Darling-Hammond, 2002; Haselkorn, 2001). Again, the teacher quality debate is not a question of whether or not teachers matter, but rather a set of viewpoints ranging from those who contend that teacher certification has little statistical relevance to teacher quality to those who contend that there is a strong link (Stronge, 2002; Walsh, 2001). *No Child Left Behind* Act of 2001 (2002) takes this debate regarding teacher quality and frames it as an issue of certification and experience and some argue that it enhances teacher quality through legislative requirements for local educational agencies to adhere to stringent licensure guidelines (George, 2004; Rotherman & Mead, 2003)

Most studies agree that within the broad context of teacher quality, high quality teachers have a significant impact on impoverished students (Hanushek, Kain, & Rivkin, 1998; Laczko-Kerr & Berliner, 2002; Sanders & Rivers, 1996; Wayne & Young, 2003). For example, the research studies of Sanders and Rivers (1996) suggests that being taught by high quality teachers for three consecutive years may results in an increase in standardized test scores of approximately 50%. Disagreement develops within the literature when the particular aspects of teacher quality are assessed such as: (a) advanced degree status; (b) National Board Certification; (c) years of experience; and (d) highly qualified status as defined by NCLB. For example, Darling-Hammond (1999) conducted extensive quantitative analyses of data using a 50-state survey of policies, results from the Schools and Staffing Survey (SASS), and National Assessment of Educational Progress (NAEP). While Darling-Hammond's (1999) review of NAEP data from the 1992 and 1994 assessments demonstrates a modest correlation between advanced degree attainment and higher student achievement, Clotfelter, Ladd, and

Vigdor (2006) assert that having an advanced degree has no impact on student achievement. Further, they claim a negative correlation to advanced degree attainment for teachers and student achievement in certain cases. They determined that beginning teachers who entered the classroom with a master's degree or earned a master's degree within the first five years of teaching were as effective as teachers without a master's degree. Teachers earning an advanced degree after five years in practice were determined to be less effective than teachers without a master's degree.

A similar lack of consensus exists within the analysis of National Board Certification. A variety of researchers present compelling data confirming the benefit to students taught by teachers with national certification (Bond, Smith, Baker & Hattie, 2000; Cavalluzzo, 2004; Stone, 2002). In the four year study by Vandervoort, Amrein-Beardsley and Berliner (2004), it was concluded that national certification for teachers is highly correlated to increased student achievement. During the four year study of national certification and Stanford Achievement Test scores of students, achievement scores were found to be significantly higher during three of the four years. During another year of the study, Stanford Achievement scores for students taught by National Board Certified teachers were still higher than other students, but results were not statistically significant at the $p < .05$ level. Their data notwithstanding, Clotfelter et al.'s (2006) and Goldhaber and Anthony's (2005) studies of the impact of teacher credentialing on student achievement confirms a different view of national certification for teachers. While some student achievement gains were noted, their studies did not produce evidence that national certification had significant benefits to students.

Standard state certification/licensure and the highly qualified designation developed under NCLB have generated debate within the literature similar to the issues of advanced degree status and national certification. Teacher quality is difficult to quantify without using specific measurable features such as standard state-level certification. Again, while consensus exists within the literature regarding the positive impact of quality teachers, the specific measurable aspects of *quality* produce debate (Darling-Hammond, 2002; Darling-Hammond et al., 2005; Goldhaber & Brewer, 2000; Hanushek, Kain, & Rivkin, 2001; Laczko-Kerr & Berliner, 2002; Wayne & Young, 2003). While some argue that students taught by certified teachers have no measurable advantage over students taught by uncertified teachers (Goldhaber & Brewer, 2000), other researchers present evidence that students taught by certified teachers significantly outperform students taught by uncertified teachers (Darling-Hammond et al., 2005; Ingersol, 1999). Researchers on both sides of the debate raise questions about the methodologies and conclusions of those with opposing results. For example, Goldhaber and Brewer (2000) use their analysis of NELS data to conclude that teacher certification does not impact student achievement. Darling-Hammond, Berry, and Thoreson (2001) oppose these findings on the basis of faulty methodological grounding. Likewise, Laczko-Kerr and Berliner's (2002) studies conclude that certification does have a positive impact on achievement while Imai (2002) calls into question the validity of the study, again on the basis of flawed methodology.

Regardless of the mixed research findings and lack of consensus on specific aspects of teacher quality, there remains wide-spread agreement that of the school factors and characteristics impacting students, the teacher's impact in the classroom is

most closely associated with student achievement (Goldhaber & Brewer, 2000; Nye et al., 2004; Rivkin et al., 2005). Darling-Hammond's (1999) meta-analytic examination identifies the variables alleged to indicate teacher quality including (a) academic ability, (b) years of education, (c) years of teaching experience, (d) subject matter knowledge, (e) knowledge of teaching and learning, (f) certification status, and (g) teaching behaviors in the classroom. While her meta-analysis revealed varied results for the identified teacher quality variables, she did find a significantly negative correlation between achievement and inexperienced teachers and a significantly positive correlation between achievement and certification. *No Child Left Behind Act of 2001* (2002) has created an impetus to focus on teacher quality issues for the economically disadvantaged subgroup in that it requires that there be no discrepancy in rates of teacher experience level, qualifications, or out-of-field status for impoverished students compared to others (Imber & Geel, 2004).

Increasing teacher demands in disadvantaged schools have often resulted in high poverty and minority students being taught by less experienced teachers or out-of-field teachers (Darling-Hammond et al., 2005; Ingersoll, 1999; Jepsen & Rivkin, 2002; Jerald, 2002; Peske & Haycock, 2006; Prince, 2002). Data from the National Center for Education Statistics (2000) shows that as compared to students of middle to high socioeconomic status, impoverished students are nearly two times as likely to be taught by teachers with three or fewer years of experience. Jerald and Ingersoll (2002) also found discrepancies in teacher quality for impoverished students. Investigating teacher degrees and preparation programs, their study demonstrated more than one third of the classes in high poverty secondary schools were taught by teachers lacking even a

minor degree in the given subject area, a significantly higher percentage of out-of-field teachers as compared to low poverty schools.

Major research findings in studies of public schools of California and New York also confirmed that students in high poverty schools were taught by less qualified teachers in terms of (a) years of experience, (b) degree status, and (c) licensure status (Betts et al., 2000; Lankford et al., 2002). In their effort to establish a common set of indicators to assess educational quality, Mayer, Mullens, Moore, and Ralph (2000) identified 13 indicator variables based upon the current literature on school quality. In terms of teacher quality, they too concluded that there were inequities for impoverished students. Specifically, they concluded that impoverished students were twice as likely to attend schools led by teachers with fewer credentials and less experience as compared to other students.

Another factor of concern within higher poverty schools is teacher mobility and attrition (Elfers, Plecki, & Knapp, 2006; Guin, 2004; Hanushek et al., 2001; Lankford et al., 2002). While schools with teaching openings report difficulties finding qualified candidates, Ingersoll (2001) suggests that the issue is not actually a lack of qualified candidates but rather high percentages of teachers moving from one school to another (7.2%) or exiting the profession (6%). Teachers leaving high poverty schools have been the focus of several recent studies. In Scafidi, Sjoquist, and Stinebrickner's (2007) study of race, poverty, and teacher mobility in Georgia schools, it was determined that new teachers left the profession at significantly higher rates for schools that had (a) low test scores, (b) high percentages of minority students, or (c) high percentages of impoverished students. Elfers et al. (2006) conducted a five year, 20 district

investigation of the same issue in Washington. Investigating reasons teachers were leaving schools, they found agreement with other national studies in the stated reasons for teachers deciding to leave a school: (a) little support from colleagues or administrators; (b) student disinterest in the subject material and student misbehavior; (c) salary; (d) a lack of classroom autonomy; (e) unreasonable assignments; (f) insufficient professional development opportunities; and (g) insufficient time. Additionally, they found that the overall rate of poverty within the student body influenced attrition for all teachers and had an even greater impact on new teachers, a concept supported by other researchers (Elfers et al., 2006; Guin, 2004; Hanushek et al., 2001; Lankford et al., 2002).

Summary

While they may neither understand nor recognize their plight, 17.6% of children in the United States must deal with the consequences and outcomes of living in poverty (USCB, 2004). This literature review focused on a set of questions in order to investigate issues related to poverty and achievement. While the scope of this investigation was broad, the main issues presented were: (a) the current economic definition of poverty in the United States; (b) the rate of impoverished American households as compared to other industrialized nations; (c) the rate of poverty in the United States by ethnicity; (d) the non-economic resource deficits impacting impoverished students; (e) the impact of impoverishment on standardized test scores as demonstrated by nationally-normed assessments; (f) the effect of the home factors on the academic achievement of impoverished students; and (g) the impact of school characteristics on the academic achievement of impoverished students.

By using the economic standard of poverty as a starting point, the various texts, research studies and journal articles demonstrate the complexity of poverty. The multi-faceted nature of poverty was revealed through the analysis of the non-economic resource deficits that also impact the impoverished student. The information related to non-economic deficits and poverty is persuasive but lacks the empirical basis needed to establish itself as truly research-based (Dudley-Marling, 2007; Gorski, 2005; Tough, 2007). Nonetheless, the work establishes that poverty is not measured by a single variable and is quite broad in impacting the various dimensions of an individual (Johnston, 2001; Keller, 2006; King-Weaver, 2004; Magee, 2005; Vickers, 2006). Numerous studies presented the link between poverty and low academic achievement. Through the literature review, virtually all the studies established that students in poverty perform at academic levels that are significantly lower than their middle class counterparts on all major measures of student achievement (Bell, 2001; Brooks-Gunn & Duncan, 1997; Campbell & Ramey, 1994; Cunningham, 2003; Gershoff, 2003; Gould & Gould, 2003; Huston, McLoyd, & Coll, 1994; Lyman & Villani, 2002; Mackner, Black & Starr, 2003).

The NAEP results dramatically demonstrated achievement gaps based upon individual socioeconomic status with children in poverty being at the lower end of the distribution of scores (Ainsworth-Darnell & Downey, 1998; Caldas & Banskston, 1997; Roscigno & Ainsworth-Darnell, 1999; Roscigno et al., 2006). Looking more deeply into the question of achievement and the impoverished student, the notion of peer group effect was studied. Multiple research studies concluded that the SES of an impoverished student's peer group substantially impacts the individual's academic

achievement. The peer group includes other students at school and other children in the neighborhood population. Of the aspects impacting achievement, the SES of the individual was determined to be the primary factor while the SES of the surrounding population was found to be a strong secondary factor (Caldas, 1993; Caldas & Bankston, 1997; Ensminger et al., 1996; Roscigno et al., 2006; Rumberger & Willms, 1992). Using the NELS and CCD results, researchers determined that the most detrimental effects were for impoverished students in high poverty schools. Identifying the peer group as a factor, researchers suggested that school generated inequalities were also a factor (Roscigno, et al., 2006).

There are some areas of consensus within the final topic, variations in achievement due to the timing and duration of impoverishment. The research indicates that achievement levels decrease for longer durations of impoverishment (Brooks-Gunn & Duncan, 1994, 1997; Guo, 1998; Haveman et al., 1991; McLoyd, 1998; Mickelson, 1989; 1990; Ogbu, 1986). Even more detrimental to achievement is generational poverty. However, the research regarding the impact of situational poverty did not demonstrate the same level of consensus. One set of researchers identify the early years as the most critical in cognitive development (Entwisle & Alexander, 1989; Guo, 1998). Other researchers took a different view of the effect of timing suggesting that later adolescent poverty has a more severe impact on achievement (Mickelson, 1989; 1990; Ogbu, 1986). Guo attempts to bridge the two schools of thought by distinguishing between achievement and cognitive ability and hypothesizing that early poverty impacts the development of cognitive ability to a greater degree while late childhood poverty impacts achievement and completion to a greater degree.

It is suggested that school factors may mediate achievement to a greater degree than home factors (Rumberger & Palardy, 2005). Teacher quality is cited as having the primary impact on student achievement (Bell, 2001; Darling-Hammond, 1991; Darling-Hammond et al., 2005; Early et al. 2006; Guin, 2004; Ingersol, 1999; Jepsen & Rivkin, 2002; Nettles & Herrington, 2007; Peske & Haycock, 2006; Prince, 2002; Rivkin & Hanushek, 2005). However, there are unresolved differences noted in the literature as to the specific impact of teacher certification, advanced degree status, and years of experiences. For example, while some argue that teacher certification does not impact student achievement (Goldhaber & Brewer, 2000), other researchers present evidence that teacher certification does matter (Darling-Hammond et al., 2005; Ingersol, 1999) and raise questions about the methodologies and analyses that lead to conclusions asserting that teacher certification is unrelated to student achievement.

Some researchers have been more definitive in their assessment of the impact of school factors. For example, Flood (2003) and King (2005) assert that teacher quality is the factor most responsible for student achievement. Their presentation of research is comparable to the categorization of variables in this review of the literature. Citing the research findings from 900 Texas school districts conducted by Dr. Ron Ferguson, it was determined that family and community accounts for 24% of the influence on student achievement. School structures such as class size, school size, and resource allocations account for approximately 26% and approximately 44% of the influence on student achievement is determined by teacher quality (Flood, 2003; King 2005). These findings are somewhat consistent with the division of popular opinion regarding who is responsible for closing the achievement gap. In a Phi Delta Kappa/Gallup *Poll of*

Public's Attitudes Toward the Public Schools, the majority of respondents, 57%, believed that schools were responsible for closing the gap (Rose & Gallup, 2006).

With unresolved questions raised in the literature about the impact of the specific teacher quality components, the next chapter translates the school-based, teacher quality factors from the literature review into operational terms through which the study will be carried out. While the exogenous variables presented in chapter 2 are important for a contextual framework for understanding poverty and student achievement, the study will focus on the following teacher quality variables: (a) years of experience, (b) highly qualified status, (c) advanced degree status and (d) national certification. Given that there is disagreement in the literature related to selected aspects of teacher quality, these study variables were selected on the basis of both data source availability and the recurrent use of these variables in the federal and state reporting process for educational statistics. While recognizing years of experience, highly qualified status, advanced degree status and national certification as proxies for teacher quality, these factors are readily available, accessible, and reported to the public through the North Carolina Education Research Data Center, the North Carolina Report Card, the North Carolina Working Conditions Survey, the Education Statistics Access System (ESAS) and the Public School Forum of North Carolina. Teacher Quality data is reported from Local Education Agencies (LEAs) to the public and others within this framework. For example, NCLB requires LEAs to notify parents annually of their right to request information on the following teacher quality factors: (a) licensing for grade level and subject, (b) emergency or provisional status of the teaching license, and (c) undergraduate major and graduate degrees. Additionally, LEAs are required to notify

parents if students have a teacher for four weeks that is not highly qualified under NCLB (NCLB, 2002).

The unresolved questions raised in the literature regarding teacher quality components are the basis for the resulting studying in Chapter 3. The study presented in Chapter 3 will focus on the following specific aspects of teacher quality: (a) years of experience, (b) highly qualified status, (c) advanced degree status and (d) national certification.

CHAPTER 3: METHODOLOGY

Introduction

The previous chapters outlined the relevant research pertaining to the topic of poverty and student achievement as impacted by teacher quality. This chapter describes the methodology and procedures used to conduct the research. It includes a review of the research questions, a description of the sample, the procedures for collecting the data, and the methods of analysis.

Following an extensive literature review on the topic, the purpose of this study was to determine whether or not a relationship exists between selected teacher quality variables and student achievement within the context of socioeconomic status. The study generated summary data for certain teacher quality variables within and across a poverty/achievement framework. Descriptive, nonparametric statistics were utilized to analyze the results and identify patterns for schools based on poverty levels and student achievement. Schools used for the study were categorized according to their levels of poverty and student achievement. For each school in the study, the level of teacher experience, advanced degree status, highly qualified status, and national certification was recorded. The schools in the study were then coded as high or low for each of the four teacher quality variables based on their position above or below the average for each data set. The high or low classification for each of variable satisfies the parameters of statistical analysis through the Fisher's Exact Test.

Research Questions

This research study compares selected aspects of teacher quality within high-poverty, high-achieving schools and high-poverty, low-achieving schools. Using North

Carolina public elementary and middle schools, variations in teacher quality were examined for academic years 2006-07, 2007-08 and 2008-09. The research questions in this study focus on one aspect of a school's impact on achievement, teacher quality.

The questions that guided the study were:

1. Is there a relationship between teacher experience (in years) and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?
2. Is there a relationship between advanced degree status and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?
3. Is there a relationship between highly qualified (HQ) status and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?
4. Is there a relationship between National Board Certification and achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina?

Research Design

Gravetter and Wallnau (2006) suggest that problems of research design often result in a failure to reveal any obvious patterns at the conclusion of a study.

Depending on the nature of the available data, it is suggested that a descriptive approach allows the researcher to summarize and organize data within identifiable patterns, if any patterns actually exist. Descriptive research involves describing and interpreting conditions related to a sample or population with the acknowledged

limitation being that the findings are limited to the sample or population studied.

Although there are numerous research design options within quantitative research, this study will utilize a descriptive approach in order to accomplish what Glatthorn and Joyner (2005) call a “search for relationships” (p. 40). This study was designed to identify patterns within the poverty/achievement framework using a descriptive approach and a statistical analysis of the four research questions by conducting the Fisher’s Exact Test of significance in order to determine if the variations among selected teacher quality variables in high poverty schools were greater than those expected by chance.

For the purposes of this study, data archived in a variety of North Carolina databases was accessed, collected, and cataloged for the 2006-07, 2007-08 and 2008-09 academic years. Using a quantitative, descriptive approach, the data were categorized in tables to better identify patterns across years and grade spans. This approach is consistent with Bickman, Rog, and Hendrick (1998) who characterize descriptive research as the collection, reorganization and tabulation of data that describes an event. According to Johnson and Christensen (2004), the descriptive research process does not yield cause and effect relationships but rather a depiction of the patterns and relationships that exist among the selected variables.

The nature of the available data sets for socioeconomic status, teacher quality, and student achievement presents limitations in terms of a traditional quantitative experimental design. Random assignment and use of control groups are not feasible within this study which is often true for experimental design in the education setting. With limits to the researcher’s ability to manipulate or control the stimulus or

independent variables, a descriptive approach or quasi-experimental design is appropriate (Glatthorn & Joyner, 2005). Additionally, the data does not follow a normal distribution and thus requires the use of non-parametric techniques. Based upon these limitations, a descriptive approach was taken to compare and describe patterns rather than establish cause and effect relationships. The descriptive approach is often used and is effective for data sets that don't rely on a fixed distribution. This approach has specifically been used in educational research related to achievement data sets (Lunenburg & Irby, 2008) and is recognized as being an effective tool for revealing patterns and associations among selected variables (Gravetter & Wallnau, 2006; White, 2002).

Data Sources

Existing North Carolina data sources were used to gather the selected teacher quality variables, school poverty data, and achievement data for North Carolina public elementary and middle schools with state valid End-of-Grade test data (2006-07, 2007-08, and 2008-09). The existing data sources are: (a) the North Carolina Education Research Data Center, (b) the Educational Statistics Access System, (c) the North Carolina Report Card, (d) the North Carolina Student Accounting Section of the Department of Public Instruction, and (e) the Education Statistics Access System (ESAS).

The North Carolina Education Research Data Center (NCERDC)

Accessible at <http://www.childandfamilypolicy.duke.edu/>, the NCERDC is a gateway to several educational databases. NCERDC stores and organizes data from the North Carolina Department of Public Instruction (NCDPI) and the National Center for

Education Statistics (NCES) and comes under the auspices of the Center for Child and Family Policy (CCFP) established by Duke University in 1999. The data are not directly accessible electronically but are available to institutions of higher learning, researchers, grant writers and doctoral students following an application process and review. The NCERDC provides district-level, school-level, classroom-level, teacher-level, and student-level data. The extensive sets of databases are coded in order to ensure compliance with the Family Educational Rights and Privacy Act (FERPA). For those schools included in the upper and lower quartiles of the study, data from the NCERDC was collected at the school-level regarding personnel licensure and National Board Certification.

The North Carolina Report Card (NCRC)

North Carolina Report Card is publically accessible at <http://www.ncreportcards.org/src/> and provides data regarding student achievement and attendance, class size, school safety, teacher quality, and school technology. The data are organized by academic year, district and school. Produced annually since 2001, the NCRC data from 2006-07, 2007-08, and 2008-09 for student achievement and teacher quality was extracted for the schools within the study.

The Education Statistics Access System (ESAS)

Accessible at http://beyond2020.dpi.state.nc.us/wds80_1/, ESAS is a data extraction tool for educational statistics provided to the NC Department of Public Instruction by local education authorities. ESAS provides educational data that is organized and grouped into the following categories: (a) students, (b) personnel, and (c) finances. The extractions from ESAS provide custom reports regarding various aspects

of public education and allow data to be arranged by nesting and crossing different data types. Reports regarding personnel statistics and enrollment were generated for this study by selecting the desired variables.

Operational Accounting Section of the NC Department of Public Instruction (OAS)

The final data source for the study is the Operational Accounting Section of the NC Department of Public Instruction (OAS). While ensuring compliance with the Family Educational Rights and Privacy Act (FERPA), the OAS will provide the three databases for free/reduced lunch status for each North Carolina school for 2006-07, 2007-08, and 2008-09. That data will be collected by the North Carolina Child Nutrition Service from each LEA in North Carolina. This important component is required for categorizing schools within the study and determining high and low poverty status of schools.

The Population and Data Collection

The unit of analysis for this study included data from public elementary and middle schools in the state of North Carolina. Using the available state-wide reporting systems, the data was collected and organized for analysis. North Carolina elementary and middle school data from the 2006-07, 2007-08 and 2008-09 academic years was the focus of the study. At the time of the study, the selected years represented the most recent data with complete student performance results. The data collected was from four primary sources: (a) the North Carolina Education Research Data Center; (b) the North Carolina Report Card; (c) the Education Statistics Access System and (d) the Operational Accounting Section of the North Carolina Department of Public Instruction.

The North Carolina Education Research Data Center yields data on the following factors related to the review of the literature: (a) personnel licensure and (b) National

Board Certification statistics. The North Carolina Report Card yields data on the following factors related to the review of the literature: (a) teacher years of experience, (b) National Board Certification Statistics, (c) teachers with advanced degrees and (d) highly qualified status. The Education Statistics Access System (ESAS) was utilized for interactive data extraction from the North Carolina education databases for personnel statistics. Customizable and downloadable reports were available online from ESAS.

The final component required for analysis was the percentage of economically disadvantaged students at each school. The data collected was from existing data sources. The 2006-07, 2007-08 and 2008-09 data for free/reduced lunch status, the proxy for poverty in this study, was made available by the Operational Accounting Section of the NC Department of Public Instruction (OAS).

Student Achievement Data the North Carolina End-of-Grade Test

Student achievement in this study was measured by student performance on the North Carolina End-of-Grade Tests of Reading and Mathematics. These tests are designed to measure student performance on the goals, objectives, and grade-level competencies outlined in the state-mandated curriculum, the North Carolina Standard Course of Study.

The North Carolina End-of-Grade Reading Comprehension Tests measure the goals and objectives of the North Carolina English Language Arts Standard Course of Study, also known as the content standards. Students at the end of grades three through eight are assessed through a multiple choice test format in which they read authentic selections and answer questions directly related to the selections. Reading passages are level appropriate and represent passages aimed at a variety of purposes

(i.e. reading to perform a task, reading to gain information, and reading for literary purposes). While reading comprehension is directly assessed, knowledge of vocabulary is indirectly assessed through application and understanding of vocabulary within the reading selections and the multiple choice questions.

The North Carolina End-of-Grade Mathematics Tests measure the goals and objectives of the North Carolina Mathematics Standard Course of Study. Utilizing a multiple choice format, the competency goals and objectives of the mathematics curriculum are assessed. Students at the end of grades three through eight are assessed through a standardized test of five mathematical stands: (1) number and operations; (2) measurement; (3) geometry; (4) data analysis and probability; and (5) algebra. The mathematics test is divided into a two sections, calculator active and calculator inactive.

The End-of-Grade Tests of Reading and Mathematics provide developmental scale scores that correspond to one of four achievement levels. According to the North Carolina Department of Public Instruction (2010), the number of questions answered correctly on an End-of-Grade test is a raw score. Raw scores are converted to developmental scale scores as a way to depict growth over multiple years. The scale score ranges increase as students move to higher grade levels. Scale scores correspond to achievement levels, which are predetermined performances standards for the given grade level's expectations. Students performing at Achievement Level I do not have sufficient mastery of knowledge and skills in the tested area to be successful at the next grade level. Students performing at Achievement Level II demonstrate inconsistent mastery of knowledge and skills in the tested area and are minimally

prepared to be successful at the next grade level. Students at Achievement Level III consistently demonstrate mastery of grade level subject matter in the tested area and are well prepared for the next grade level. Finally, students performing at Achievement Level IV perform in a superior manner clearly beyond that required to be proficient at grade level work.

The achievement data collected from the Accountability Services Division of the North Carolina Department of Public Instruction was for public school students enrolled in grades three through eight. While the NC End-of-Grade mathematics test has remained unchanged over the three year span of this study, effective 2007-08, the NC End-of-Grade reading test was renormed and based on a new curriculum. While this would pose a challenge if the purpose of the study was to analyze growth from one year to the next, it was determined that by utilizing the percentage of students who passed both reading and mathematics, patterns within the specified years and overall trends across the years would be identifiable. Although there was a depression in the percentage of students passing reading for 2007-08, the renorming and rescaling of the test was applied to all North Carolina End-of-Grade test takers thereby allowing the researcher to continue to identify patterns and trends for the suggested mediators of student achievement. By using the state average percentage of students passing both reading and mathematics as the dividing point between high and low achievement, the impact of the change in the 2007-08 reading test was be limited. The achievement data was available and collected from electronic sources.

Poverty/Achievement Four-Quadrant Framework

The Poverty/Achievement framework used for this study is a four quadrant grid that organizes two dimensions of student data: poverty and student achievement. The first dimension, poverty, describes an aspect of student demographics that is outside of the scope of control of schools. The percentage of students eligible for the free or reduced-price lunch program provides a proxy measure for the concentrations within schools of low-income students for this study. This proxy is widely used in poverty research within the primary and secondary educational settings and is used as the primary indicator of poverty for federal Title I purposes (NCLB, 2002). The second dimension, achievement, describes the performance of students in third grade through eighth grade on the North Carolina End-of-Grade tests of reading and mathematics. This performance indicator is a composite score of both reading and mathematics and is utilized in standard reporting models from the North Carolina Department of Public Instruction (NCDPI, 2010). The Poverty/Achievement framework was constructed to analyze the relationship between poverty and student achievement. The basic structure of the Poverty/Achievement framework is an adaptation of the Rigor/Relevance framework. While the Rigor/Relevance framework focuses on aspects of taxonomy and application (Daggett, 2005; Jones, Shannon, & Weigel, 2009), the basic structure of the framework lends itself to this study. The Rigor/Relevance framework was created to offer a straightforward structure by which standards and student achievement could be examined. Developed by the staff at the International Center for Leadership, the Rigor/Relevance framework was specifically designed to be versatile and to bridge

multiple education-related variables, student performance in particular (Daggett, 2005; Daggett & Gendron, 2010; Daggett & McNulty, 2010; Jones, 2008; Jones et al., 2009).

The relationship between poverty and achievement was analyzed using descriptive statistics. The student achievement data for each of the elementary and middle schools was obtained from the North Carolina Education Research Data Center. For the purpose of this study and categorization, a high achieving school is defined as a school exceeding the state average of students passing both the reading and mathematics NC End-of-Grade tests. The average percentage of students passing both tests is, as a convention, the basis for deeming a school as *high achieving* for those schools above the state average or *low achieving* for those schools at or below the state average. The composite achievement score allows for the categorization of schools in one of the quadrants within the poverty/achievement framework as seen in Figure 2.

Data Analysis and Group Formation

The purpose of the study was to use the selected teacher quality variables and compare high economically disadvantaged North Carolina elementary and middle schools within the context of End-of-Grade performance outcomes for reading and mathematics (i.e. percentage of students passing both reading and mathematics). The variables that were assessed included: (a) years of experience, (b) advanced degree status, (c) highly qualified status and (d) National Board Certification status.

High and Low Poverty Schools

The literature suggests utilizing free and reduced lunch (FRL) status as a proxy for poverty (Jerald, 2001; NCLB, 2002). 2006-07, 2007-08 and 2008-09 FRL data was

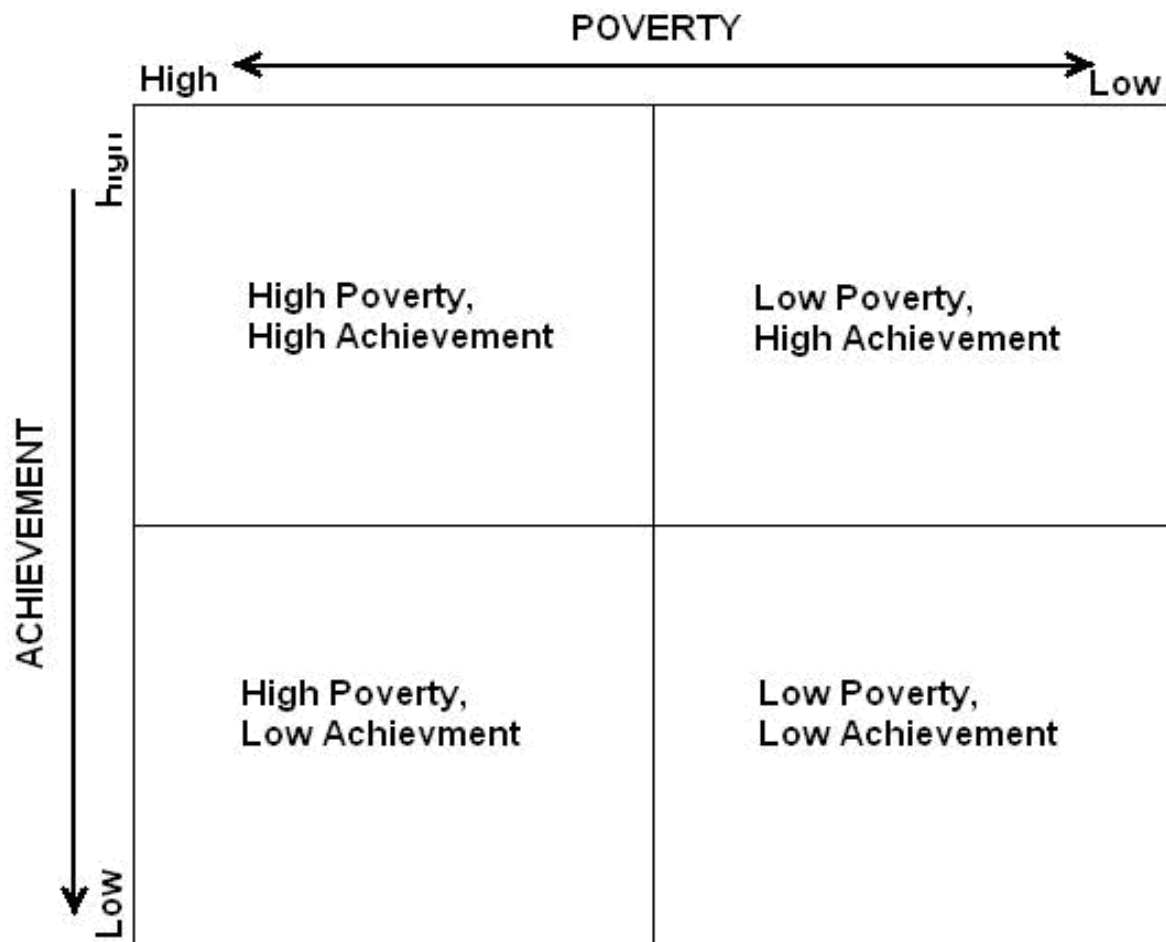


Figure 2. Poverty versus achievement, four quadrant model.

utilized for this study. The criteria for selection of schools included any elementary or middle school with grade spans including third, fourth, fifth, sixth, seventh or eighth grade, but excluding schools with ninth, tenth, eleventh, or twelfth grade. Consistent with Stevens' (2005) methods to overcome small sample size problems in research design, schools with special populations were excluded from the study if they had small sample sizes (i.e. five or fewer students). Schools excluded from the study were classified as hospital schools, and alternative schools reporting no End-of-Grade test results.

Schools fitting the grade span criteria were rank ordered according to the percentage of students qualifying for free or reduced lunch status. Schools were divided into quartiles. The interquartile range (25% to 75%) was eliminated from the study in order to focus on the upper quartile (coded high poverty) and the lower quartiles (coded low poverty). The schools in the upper and low quartile were coded as high achieving or low achieving. While the focus of the study was high poverty, high achieving schools and high poverty, low achieving schools, some data for low poverty schools was also reported for comparative purposes. Based on these criteria, data was collected for a cumulative total of 2,752 schools and categorized based on poverty status.

High and Low Achieving Schools

In order to utilize the poverty/achievement framework, schools were categorized as high or low achieving based on End-of-Grade test scores for reading comprehension and mathematics for grades three through eight. For each year of the study, an average percentage of students passing both reading and mathematics was

determined. For the three years of the study, the average percentages of students passing both tests were 63.9, 50.9, and 63.9 for 2006-07, 2007-08, and 2008-09 respectively. Schools exceeding the state average percentage of students passing both reading and mathematics for each year were coded as high achieving. Schools at or below the state average were coded as low achieving for the purposes of classification. Table 5 represents the state averages and the dividing points for classifying high and low achievement for the academic years 2006-07, 2007-08 and 2008-09 that were utilized in the resulting study.

High and Low Levels of Teacher Experience

The study investigated the relationship among teacher quality factors for schools of varying levels of poverty and achievement. Student achievement was measured by the 2006-07, 2007-08 and 2008-09 NC End-of-Grade tests of reading and mathematics for third through eighth grade. The methodology for this study was structured around a four quadrant framework for coding and categorizing school factors using descriptive statistics. Using a four quadrant grid with two indicators, poverty and achievement, the schools were classified as: (a) high poverty, high achievement; (b) high poverty, low achievement; (c) low poverty, high achievement; or (d) low poverty, low achievement. Using state averages for each year of the study, schools were coded as high or low for each of the teacher quality variables: (a) years of experience; (b) advanced degree status; (c) highly qualified status; and (d) national certification.

Three of the selected teacher quality variables, advanced degree status, highly qualified status and national board status, are reported for schools as a single average and lend themselves to simple coding, high versus low, based on the average within the

Table 5

North Carolina Average Percentage of Students Passing Both Reading and Mathematics (NC EOG), 2006-2009

Academic Year	All Students	E.D. Students	N.E.D. Students
2006-07	63.9	48.5	77.2
2007-08	50.9	33.3	66.9
2008-09	63.9	48.3	78.4

Note. North Carolina Department of Public Instruction, Division of Testing and Accountability, "Performance of All Schools," 2006-07, 2007-08, 2008-00. E.D. is an abbreviation consistent with NC Report Card reporting. It represents students who are economically disadvantaged. N.E.D. represents students who are not economically disadvantaged.

data set. Years of experience for North Carolina teachers is reported in three categories (0 to 3 years, 4 to 10 years, and 11 or more years). Consistent with a series of studies investigating the impact of novice teachers versus experienced teachers (Borko & Livingston, 1990; Chase & Simon, 1973; Chi & Glaser, 1981; Hattie, 2002; Swanson, O'Connor, & Cooney, 1990), the researcher selected to view teacher experience in terms of novice versus experienced teachers and thus equated 0 to 3 years to low experience and the combined categories of 4 to 10 years and 11 years or more as high experience.

High and Low Levels of Advanced Degree Status

From research question two, advanced degree status is analyzed in the study in relation to poverty and student achievement. Data pulled from February or March of each academic year most accurately reflects the advanced degree status of each school. Advanced degree data from the licensure and salary certification files for teachers is reported as any degree above a bachelor's, including master's, advanced, or doctoral degrees. The advanced degree data file only reports degrees for classroom teachers, those employees defined by the North Carolina Department of Public Instruction as having positions within object codes 121, 123, 124, or 128. For the purpose of this study and consistent with standard reporting models, only teachers with advanced degrees within the field of education are included in this calculation (NCDPI, 2010). Data for teachers with non-education advanced degrees was not considered for this study. Also, for classroom teachers with multiple licenses, the license area with the highest degree held was reported and used for this study. For each of the three years of the study, an average was determined. For example, for the average percentage of

teachers with advanced degrees was determined to be 25.6, 25.9 and 26.5 for 2006-07, 2007-08, and 2008-09 respectively. For each of the years within the study, schools that were above the state average were coded as having high levels of advanced degrees and those at or below state averages were coded as having low levels of advanced degrees.

High and Low Levels of Highly Qualified Teachers

From research question three, highly qualified status is the third teacher quality variable analyzed in this study. According to No Child Left Behind (2002), all teachers of core academic subjects must be highly qualified. Core academic subjects are defined as English, reading, language arts, mathematics, science, foreign languages, civics and government, economics, arts, history and geography. Highly qualified elementary teachers are those that have an approved license for the core academic subjects taught. These teachers must also demonstrate subject knowledge and teaching skills in reading/language arts, writing, and mathematics as evidenced by a passing score on a specified teacher exam. Teachers deemed to be highly qualified at the secondary level must have a secondary license in their assigned teaching area and a passing score in the teacher exam of their academic area. A teacher's undergraduate major, related coursework, graduate degree, and national certification can impact a teacher's designation as being highly qualified. For the purpose of this study, an average was determined for each of the three years in regards to highly qualified status. For the years 2006-07, 2007-08, and 2008-09, the average percentage of highly qualified teachers in all schools was 97.6, 98.7, and 98.5 respectively. Schools that were above the state average were coded as having high levels of highly qualified

teachers and those at or below state averages were coded as having low levels of highly qualified teachers.

High and Low Levels of National Board Certification

The final research question pertains to National Board Certification status. The data used to analyze this research question is from the National Board for Professional Teaching Standards. National Board Certification is a voluntary system to assess and certify teachers using a portfolio of evidence including student work samples, lesson plans, videos submissions, and reflective writing. For this study, the average percentage of teachers with National Board Certification was determined for 2006-07, 2007-08 and 2008-09 to be 9.8, 10.7, and 11.6 respectively. Individual schools for each year were compared to the state average. Schools that were above the state average were coded as having high levels of national certification and those at or below state averages were coded as having low levels of national certification.

Table 6 summarizes the dividing points used for coding purposes for: (a) teacher years of experience, (b) teachers with advanced degrees, (c) highly qualified status and (d) National Board Certification status.

Using the Poverty/Achievement framework as the initial structure for coding, the identified variables were coded for each school and each year followed by an analysis of the characteristics from within and across quadrants for emergent themes and common characteristics for schools of high or low poverty and high or low achievement. The resulting product allowed for discussion of: (a) years of experience, (b) advanced degree status, (c) highly qualified status and (d) National Board Certification status within the context of poverty and student achievement.

Table 6

Average Percentages of 4 Teacher Quality Variables Reported for North Carolina Public Schools, 2006-2009

Teacher Quality Variable	2006-07	2007-08	2008-09
Years of Experience	76.7%	77.3%	78.1%
Advanced Degree Status	25.6%	25.9%	26.5%
Highly Qualified Status	97.6%	98.7%	98.5%
National Board Certification	9.8%	10.7%	11.6%

Note. North Carolina Department of Public Instruction, 2006-07, 2007-08, 2008-09.

Descriptive statistics, cross tabulations, and Fisher's Exact test were used to analyze the data. The statistical software PASW Statistics 18 (Release 18.0.0 Jul 30, 2009) was used to calculate the data and to determine if the observed variations differed from what was expected by chance for high poverty schools. The Fisher's Exact Test was performed to examine the four teacher quality variables within the two by two framework for each of the three years of study. The Fisher's Exact Test calculates the probability of outcomes for a two by two contingency table under the assumption of independence of rows and columns and conditional on the marginal totals (Upton, 1992). Twelve two by two contingency tables were constructed to express the relationships among the variables. For the purpose of this study, the level of significance was set at the .05 level.

CHAPTER 4: RESULTS

Introduction

The purpose of this study was to examine the relationship between teacher quality and student achievement in high poverty schools. The previous chapters outlined the background to the study, discussed the relevant literature, and outlined the methodology. Chapter 4 presents the results of the study and includes: (a) a description of the data collection; (b) general results; and (c) the findings from the 12 contingency tables and Fisher's Exact Tests organized by the four research questions.

Data Collection and Coding

The following categories of coding were required to complete the study: (1) coding the frequency of selected teacher quality variables in each school as high or low as compared to state averages; (2) coding each school as high poverty or low poverty based on rank ordering all schools and dividing them into four quartiles; and (3) coding each school as high achieving or low achieving based on state averages. Using the median of each year's data set for 2006-07, 2007-08, and 2008-09, the four teacher quality variables (years of experience, advanced degree status, highly qualified status and National Board Certification status) were divided and coded as high or low based on their comparison to state averages. All North Carolina public elementary and middle schools with validated End-of-Grade test data were rank ordered by level of poverty as indicated by the percent of students qualifying for free or reduced lunch. Dividing the school listing by quartiles, the interquartile range was initially eliminated to isolate the high and low poverty schools. Based on this division, the high poverty designation was assigned to schools at or above 75.22%, 75.30%, and 77.10% impoverishment for

2006-07, 2007-08, and 2008-09 respectively. The low poverty designation was assigned to schools at or below 40.05%, 40.10%, and 42.50% impoverishment for 2006-07, 2007-08, and 2008-09 respectively. By removing the interquartile range, a total of 2,752 schools were selected (N = 910, 2006-07; N = 916, 2007-08; N = 926, 2008-09). Table 7 summarizes the distribution and coding of the collected data.

General Results

In the completion of data coding, the first consistent pattern identified by the researcher was in the distribution of high and low achieving schools based on poverty status. Consistent with much of the literature (Donahue et al., 2001; Jones & Chant, 2009; Land & Legters, 2002; Leroy & Symes, 2001; Lutkus & Weiner, 2003; Mackner, Black & Starr, 2003; Pellino, 2004), the study verified the link between poverty and diminished student achievement with only 105 (7.6%) of the identified high poverty schools being coded as high achieving and the remaining 1,271 (92.4%) of high poverty schools coded as low achieving. Conversely, of the low poverty schools in the study, 1,262 (91.7%) were high achieving and 114 (8.3%) were low achieving.

The pattern of high poverty schools primarily falling below state achievement averages and low poverty schools primarily achieving above state averages was consistent for 2006-07, 2007-08, and 2008-09. At its highest rate of occurrence, schools that were both high poverty and high achieving represented 9.9% of the population in 2008-09. At its lowest rate of occurrence, schools that were both high poverty and high achieving represented 4.8% of the population in 2007-08. Table 8 shows the frequency and distribution of schools based on poverty and achievement for the three years of the study. The relatively small sample sizes for high poverty, high

Table 7

Coding and Distribution

Academic Year	Schools	High Poverty	Low Poverty
2006-07	910	455	455
High Achieving	446	37	409
Low Achieving	464	418	46
2007-08	916	458	458
High Achieving	443	22	422
Low Achieving	473	436	36
2008-09	926	463	463
High Achieving	477	46	431
Low Achieving	449	417	32

Note. North Carolina Department of Public Instruction, Division of Testing and Accountability, "Performance of All Schools," 2006-07, 2007-08, 2008-09; Free and Reduced Lunch status, Operational Accounting Section.

Table 8

Coding and Distribution/Poverty and Achievement Framework, 2006-09

Coding Status	Year Frequency			Summary
	2006-07	2007-08	2008-09	
High POV, High ACH	37 (4.1%)	22 (2.4%)	46 (5.0%)	105 (3.8%)
High POV, Low ACH	418 (45.9%)	436 (47.6%)	417 (45.0%)	1271 (46.2%)
Low POV, High ACH	409 (44.9%)	422 (46.1%)	431 (46.5%)	1262 (45.9%)
Low POV, Low ACH	46 (5.1%)	36 (3.9%)	32 (3.5%)	114 (4.1%)

Note. POV = Poverty; ACH = Achievement.

achieving schools further validates the use of Fisher's Exact Test of significance in that the test allows for small cell frequencies and is appropriate for distributions that do not represent a normal curve (Upton, 1992).

By rank ordering the schools according to level of poverty and defining the upper quartile as high poverty and lower quartile as low poverty, the occurrences of high poverty schools and low poverty schools were equivalent. However, the pattern of high poverty schools being predominantly low achieving and low poverty schools being predominantly high achieving held true over the three academic years (2006-07, 2007-08, and 2008-09). For those schools selected in the study, a high achieving school was, on average, 12 times more likely to also be a low poverty school than it was to be a high poverty school. A low achieving school was, on average, 11 times more likely to also be a high poverty school than it was to be low poverty school. Further analysis demonstrated that teacher quality variables followed a similar pattern with low poverty schools having better than average representations of experienced teachers, advanced degree status teacher, highly qualified teachers, and National Board certified teachers.

The three year average for all of the selected schools, low and high poverty combined, was 23.3% (teachers with 0 to 3 years of experience), 28.5% (teachers with 4 to 10 years of experience), and 48.2% (teachers with 11 or more years of experience). Disaggregating the data by school level of poverty demonstrated that novice teachers (0 to 3 years of experience) comprised a greater percentage of the teaching population in high poverty schools (26.4%) than in low poverty schools (20.1%). Likewise, those teachers classified with the most experience (11 or more years of experience) comprised a greater percentage of the teaching population in low poverty schools

(49.1%) than in high poverty schools (46.1%). Teachers in the middle category varied slightly by poverty level with high poverty schools having 27.3% and low poverty schools having 30.1% of their respective teaching populations comprised of teachers with 4 to 10 years experience.

Teachers with advanced degrees made up 25.6% of the teaching population for all schools within the study. Again, those classified as high poverty schools tended to have teaching populations with fewer teachers having the more desirable teacher quality, in this case an advanced degree. While 28.7% of the teachers in low poverty schools had advanced degrees, only 22.9% of the teachers in high poverty schools had advanced degrees. Unlike years of experience, the percentage of advanced degree teachers did not vary significantly when disaggregating the data by poverty and achievement. Low poverty schools ranged from 28.7% for high achieving schools and 28.4% for low achieving schools in terms of the percentage of teachers with advanced degrees. Similarly, for advanced degree status, high poverty schools ranged from 23.5% for high achieving schools and 22.8% for low achieving schools. For this teacher quality variable, the variance was found between levels of poverty rather than levels of achievement. This will be discussed further in the analysis of research question two.

The highly qualified teacher average was 97.6% for all schools over the selected time span. The three year trend demonstrated increases in the overall percentage of highly qualified teachers with more pronounced variations between low poverty, high achieving schools (98.7%) and low poverty, low achieving schools (90.1%) than their high poverty counterparts. However, the pattern again holds that high poverty schools have an overall average below low poverty schools. While the combined low poverty

schools average (97.9%) of highly qualified teachers is only slightly above the overall average (97.6%), high poverty schools were found to be slightly below the highly qualified average with 96.2%. Specific differences based on both poverty and achievement will be discussed in the analysis of research question three.

Lastly, National Board Certification has been achieved by 9.8% of the teachers from the schools within the study. A disparity exists between high and low poverty schools in terms of this teacher quality variable. While 12.7% of the teachers in low poverty schools held National Board Certification, only 6.6% of their counterparts have the same distinction in high poverty schools. Elaborated further in the analysis of research question four, disparities also existed when disaggregating the data by poverty and achievement with high achieving schools having higher populations of National Board Certified teachers for both categories of poverty.

Research Question Findings

To complete the study, the researcher collected and organized approximately 21,000 data points in an electronic database. The researcher began by rank ordering the schools according to level of poverty. The upper quartile of schools was coded as high poverty. The lower quartile of schools was coded as low poverty. Data from schools in the interquartile range were eliminated from the study. For each of the North Carolina elementary and middle schools included in the study, six data points were collected: (a) poverty level; (b) achievement level; (c) teacher years of experience; (d) teacher advanced degree status; (e) highly qualified status; and (f) national board status. Each numeric data point was converted to categorical data (e.g. for 2006-07, any school with more than 25.6% of its teachers with advanced degrees, the school was

coded as high). Predictive Analytics Software (PASW) version 18.0 for Windows was used to examine each of the four research questions. With four teacher quality variables for three years, 12 two by two contingency tables were constructed and analyzed in order to determine if the observed variations in teacher quality differed from what was expected by chance for high poverty schools. The results for each of the four research questions follow.

Research Question One

Is there a relationship between teacher experience (in years) and student achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina? Data from 1,376 high poverty schools were collected for three academic years (2006-07, N=455; 2007-08, N=458; 2008-09, N=463) (see Table 9).

The mean minimum level of poverty, as measured by free/reduced lunch status, was found to be 75.88%. Three two by two contingency tables were constructed in order to conduct a series of Fisher's Exact tests. Tables 10, 11, and 12 present the results of the cross tabulation and the Fisher's Exact Tests for 2006-07, 2007-08, and 2008-09 respectively.

For the 2006-07 academic year, 8.1% (N=37) of the high poverty schools were high achieving. The majority of the high poverty schools, 91.9% (N=418), were low achieving. For the 37 high poverty, high achieving schools, 56.8% (N=21) had high teaching experience while 43.2% (N=16) had low teaching experience. While the majority of the high achieving schools also had a high level of teaching experience,

Table 9

Thresholds for High and Low Poverty Designations

Year	Low/No Poverty		Cases		High Poverty	
	N	Max. FRL	N	Min. FRL	N	Min. FRL
2006-07	455	40.05%	455	75.22%	455	75.22%
2007-08	458	40.10%	458	75.30%	458	75.30%
2008-09	463	42.50%	463	77.10%	463	77.10%

Note. FRL = % of student qualifying from free or reduced lunch (a proxy for poverty).

Table 10

Question 1: Occurrences of High and Low Achievement by Teacher Experience for High Poverty Schools, 2006-07

Cross Tabulation

Achievement	Experience		Total
	No	Yes	
High	16	21	37
Low	253	165	418
Total	269	186	455

Table 11

Question 1: Occurrences of High and Low Achievement by Teacher Experience for High Poverty Schools, 2007-08

Cross Tabulation

Achievement	Experience		Total
	No	Yes	
High	6	16	22
Low	269	168	437
Total	275	184	459

Table 12

Question 1: Occurrences of High and Low Achievement by Teacher Experience for High Poverty Schools, 2008-09

Cross Tabulation

Achievement	Experience		Total
	No	Yes	
High	10	36	46
Low	242	175	417
Total	252	211	463

those schools coded as low achieving were more heavily populated by novice teachers. For the 418 high poverty, low achieving schools, 39.5% (N=165) had high teaching experience while 60.5% (N=253) had low teaching experience. A Fisher's Exact Test was conducted to examine the relationship between student achievement and teaching experience. A statistically significant relationship existed between student achievement and teaching experience, $\chi^2 (1, n=455) = 4.021, p=.05$ (see Table 10).

The 2007-08 academic year data analysis of years of experience and student achievement revealed overall patterns similar to the data from the 2006-07 academic year. For the second year of data, 4.8% (N=22) of the high poverty schools were high achieving. The majority of the high poverty schools, 95.2% (N=437), were low achieving. The 22 high poverty, high achieving schools, 72.7% (N=16) had high teaching experience while 27.2% (N=6) had low teaching experience. While the majority of the high achieving schools also had a high level of teaching experience, those schools coded as low achieving were more heavily populated by novice teachers. For the 437 high poverty, low achieving schools, 38.4% (N=168) had high teaching experience while 61.6% (N=269) had low teaching experience. For the 2007-08 data, a Fisher's Exact test was conducted and results indicated a significant relationship between teacher years of experience and student achievement for high poverty schools, $\chi^2 (1, n=459), = 10.250, p=.003$ (see Table 11). While the Fisher's Exact test indicated a significant result, it must be noted that the high poverty, low achieving cell size is small (N=6), but still within the operational parameters for the test.

For 2008-09, 9.9% (N=46) of the high poverty schools were high achieving. The majority of the high poverty schools, 90.1% (N=417), were low achieving, a pattern

consistent across the three years of the study. For the 46 high poverty, high achieving schools, 78.3% (N=36) had high teaching experience while 21.7% (N=10) had low teaching experience. While the majority of the high achieving schools also had a high level of teaching experience, those schools coded as low achieving were again more heavily populated by novice teachers. For the 417 high poverty, low achieving schools, 42.0% (N=175) had high teaching experience while 58.0% (N=242) had low teaching experience. For the 2008-09 data, a Fisher's Exact was conducted to examine the relationship between student achievement and teaching experience. A statistically significant relationship existed between teacher years of experience and student achievement for high poverty schools, $\chi^2 (1, n=463) = 22.003, p=.000$ (see Table 12). As with the prior year, it must be noted that the high poverty, low achieving cell size is small (N=10); however, this size is within the parameters for the Fisher's Exact test.

In summary, teacher quality as defined by years of experience was determined to have a significant association with student achievement in high poverty schools. For the three year summary, descriptive statistics revealed a variation in novice teacher populations between high and low poverty schools with low poverty schools having 20.9% novice (0 to 3 years) teachers and high poverty schools having 26.4% novice teachers. Disaggregating the data further by poverty and student achievement revealed a consistent pattern of high achieving schools having lower percentages of novice teachers. For example, for high poverty schools, 26.8% (N=) of the teachers in low achieving schools were novice teachers while 20.8% of the teachers in high achieving schools were novice teachers. Further statistical analysis following the development of the contingency tables showed actual statistical significance in relation to question one.

Of the four tested variables, years of experience is the only variable in which the Fisher's Exact test indicated a significant association between the teacher quality variable and student achievement for high poverty schools (2006-07, $p=0.050$; 2007-08, $p=0.003$; 2008-09, $p=0.000$) for all years.

Research Question Two

Is there a relationship between advanced degree status and student achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina? The 1,376 high poverty schools in the study were staffed by 45,381 teachers. Of those teachers, 22.9% (N=10,397) had earned an advanced degree. While a significant variation was noted between high and low poverty schools with 28.7% of the teachers in low poverty schools having advanced degrees, there was little variation when comparing high poverty schools by student achievement. In high poverty, high achieving schools 23.5% of the teachers had earned advanced degrees compared to 22.8% of the teachers in high poverty, low achieving schools.

For the 37 high poverty, high achieving schools, 35.1% (N=13) had teachers with a high level of advanced degrees while 64.9% (N=24) had a low level of teachers with advanced degrees for 2006-07. The 418 high poverty, low achieving schools, 34.7% (N=145) had a high level of teachers with advanced degrees while 65.3% (N=273) had a low level of teachers with advanced degrees. In order to examine the relationship between student achievement and advanced degree status for high poverty schools, a Fisher's Exact Test was conducted for the 2006-07 data. The test did not reveal that a statistically significant relationship existed between student achievement and advanced

Table 13

*Question 2: Occurrences of High and Low Achievement by Advanced Degree Status
for High Poverty Schools, 2006-07*

Cross Tabulation

Achievement	Advance Degree Status		Total
	No	Yes	
High	24	13	37
Low	273	145	418
Total	297	158	455

degree status, $\chi^2 (1, n=455) = 0.003, p=1.000$ (see Table 13). With regard to advanced degree status, the observed variations did not differ from what was expected by chance for high poverty schools.

The 2007-08 data also indicated a lack of statistical significance in terms of the differences in advanced degree status and student achievement for high poverty schools. For the relatively small number of high poverty, high achieving schools (N=22), 36.4% (N=8) had teachers with a high level of advanced degrees while 63.5% (N=14) had a low level of teachers with advanced degrees. For the 437 high poverty, low achieving schools, 32.3% (N=141) had a high level of teachers with advanced degrees while 67.7% (N=296) had a low level of teachers with advanced degrees. A Fisher's Exact Test was conducted to examine the relationship between student achievement and advanced degree status for high poverty schools. The 2007-08 results of the Fisher's Exact Test did reveal that a statistically significant relationship did not exist between student achievement and advanced degree status, $\chi^2 (1, n=459) = 0.160, p=0.650$ (see Table 14).

The 2008-09 data completed the set and mirrored the trend established in the prior two academic years. For the 46 high poverty, high achieving schools identified in 2008-09, 47.8% (N=22) had teachers with a high level of advanced degrees while 52.2% (N=24) had a low level of teachers with advanced degrees. For the 417 high poverty, low achieving schools, 34.1% (N=142) had a high level of teachers with advanced degrees while 65.9% (N=275) had a low level of teachers with advanced degrees. In order to examine the relationship between student achievement and advanced degree status for high poverty schools, a Fisher's Exact Test was conducted

Table 14

*Question 2: Occurrences of High and Low Achievement by Advanced Degree Status
for High Poverty Schools, 2007-08*

Cross Tabulation

Achievement	Advance Degree Status		Total
	No	Yes	
High	14	8	22
Low	296	141	437
Total	310	149	459

for the final year of study. The Fisher's Exact Test results for 2008-09 revealed a statistically significant relationship did not exist between student achievement and advanced degree status, $\chi^2 (1, n=463) = 3.436, p=0.074$ (see Table 15).

In summary, consistent across the three years, the statistical analysis of the collected data did not indicate that a significant association existed between advanced degree status and student achievement for this sample. For each year, schools coded as being high poverty, high achieving actually had slightly more frequent observations of low levels of advanced degree teaching populations. While variance in the level of advanced degree status was noted for high poverty schools (22.9%) and low poverty schools (28.7%), within the same level of poverty (high or low), substantial differences did not exist between the percentages of high and low achieving schools. For example, for low poverty schools, the difference between high and low achieving schools was only 0.34%. For high poverty schools, the difference between high and low achieving schools was only 0.65%. In terms of statistical significance, the Fisher's Exact Test consistently demonstrated a lack of significance between the advanced teacher degree status and student achievement over the three years of study.

Research Question Three

Is there a relationship between highly qualified (HQ) status and student achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina? Federal No Child Left Behind Act of 2001 (2002) legislation defines a highly qualified teacher as one who has obtained a full state teacher certification or has passed the state teacher licensing examination and holds a license to teach in the state; holds a minimum of a bachelor's

Table 15

*Question 2: Occurrences of High and Low Achievement by Advanced Degree Status
for High Poverty Schools, 2008-09*

Cross Tabulation

Achievement	Advance Degree Status		Total
	No	Yes	
High	24	22	46
Low	275	142	417
Total	299	164	463

degree; and has demonstrated subject area competence in each of the academic subjects in which the teacher teaches. Research question three attempted to determine if high and low levels of highly qualified teachers could be associated with student achievement in high poverty schools.

For 2006-07, 37, or 8.1% of the high poverty schools were categorized as high achieving and 418, or 92.0% were categorized as low achieving. For both categories, the occurrences of high levels of highly qualified teachers outnumbered the occurrences of low levels of highly qualified teachers. Of the high poverty, high achieving schools, 89.2% (N=33) had high levels of highly qualified teachers and the remaining 10.8% (N=4) had low levels of highly qualified teachers. Of the high poverty, low achieving schools, 66.2% (N=277) had high levels of highly qualified teachers and the remaining 33.7% (N=141) had low levels of highly qualified teachers. A Fisher's Exact Test was conducted to examine the relationship between student achievement and highly qualified status. A statistically significant relationship existed between student achievement and highly qualified status, $\chi^2 (1, n=455) = 8.225, p=.003$ (see Table 16). The 2006-07 data represents the only year of the three years within the study to reveal a significant relationship between highly qualified status and student achievement for high poverty schools. The observer has noted that while the data remains calculable through the use of the Fisher's Exact Test, the cell size for high poverty, high achieving, low highly qualified status is very low at N=4 making the data unbalanced. While a Chi-Square test could not be used if a cell had an expectancy less than five, the Fisher's

Table 16

*Question 3: Occurrences of High and Low Achievement by Highly Qualified Status
for High Poverty Schools, 2006-07*

Cross Tabulation

Achievement	Highly Qualified Status		Total
	No	Yes	
High	4	33	37
Low	141	277	418
Total	145	310	455

Exact Test does allow for the calculation with cell sizes under five (Morgan, 2010; Upton, 1992).

For the 2007-08 academic year, 22 (4.8%) of the high poverty schools were categorized as high achieving and 437 (95.2%) were categorized as low achieving. For both categories, the occurrences of high levels of highly qualified teachers outnumbered the occurrences of low levels of highly qualified teachers. Of the high poverty, high achieving schools, 81.8% (N=18) had high levels of highly qualified teachers and the remaining 18.2% (N=4) had low levels of highly qualified teachers. Of the high poverty, low achieving schools, 71.6% (N=313) had high levels of highly qualified teachers and the remaining 28.4% (N=124) had low levels of highly qualified teachers. A Fisher's Exact Test was conducted to examine the relationship between student achievement and highly qualified status for high poverty schools. The 2007-08 results of the Fisher's Exact Test revealed that a statistically significant relationship did not exist between student achievement and highly qualified status, $\chi^2 (1, n=459) = 1.082, p=0.464$ (see Table 17). As with the 2006-07 data, the observer has noted that while the 2007-08 data remains calculable through the use of the Fisher's Exact Test, the cell size for high poverty, high achieving, low highly qualified status very low (N=4) resulting in the data being unbalanced.

For the 2008-09 academic year, 46 (10.0%) of the high poverty schools were categorized as high achieving and 417 (90.0%) were categorized as low achieving. For both categories, the occurrences of high levels of highly qualified teachers outnumbered the occurrences of low levels of qualified teachers. Of the high poverty, high achieving

Table 17

*Question 3: Occurrences of High and Low Achievement by Highly Qualified Status
for High Poverty Schools, 2007-08*

Cross Tabulation

Achievement	Highly Qualified Status		Total
	No	Yes	
High	4	18	22
Low	124	313	437
Total	128	331	459

schools, 84.8% (N=39) had high levels of highly qualified teachers and the remaining 15.2% (N=7) had low levels of highly qualified teachers. Of the high poverty, low achieving schools, 74.8% (N=312) had high levels of highly qualified teachers and the remaining 25.2% (N=105) had low levels of highly qualified teachers. In order to examine the relationship between student achievement and highly qualified status for high poverty schools, a Fisher's Exact Test was conducted for the final year of study. The Fisher's Exact Test results for 2008-09 revealed that a statistically significant relationship did not exist between student achievement and highly qualified status, $\chi^2 (1, n=463) = 2.242, p=0.150$ (see Table 18).

In summary, the analysis of highly qualified status as it relates to student achievement produced mixed results. After conducting three separate Fisher's Exact Tests, the 2006-07 data were the only year to yield results indicating that a significant difference existed between the selected teacher quality variable and student achievement for high poverty schools. However, across all 12 contingency tables constructed for this study, the 2006-07 data for highly qualified analysis resulted in the smallest cell size (N=4) and the most significant unbalance in the data. While this size doesn't violate the assumptions of the Fisher's Exact Test, the observer recognizes that this small frequency makes the results less reliable than if the frequencies were larger. For 2007-08 and 2008-09, the analysis of highly qualified data in high poverty schools did not demonstrate a significant relationship between the two variables. The observances of high and low highly qualified teachers across high poverty schools were not demonstrated to be greater than expected by chance.

Table 18

*Question 3: Occurrences of High and Low Achievement by Highly Qualified Status
for High Poverty Schools, 2008-09*

Cross Tabulation

Achievement	Highly Qualified Status		Total
	No	Yes	
High	7	39	46
Low	105	312	417
Total	112	351	463

Research Question Four

Is there a relationship between National Board Certification and student achievement in high poverty schools over a three-year span (2006-07, 2007-08, 2008-09) for elementary and middle school levels in North Carolina? For 2006-07, the results of the cross tabulation revealed the tendency for high poverty schools to have lower levels of National Board Certified teachers. The majority of the schools (N=352) were coded as having low levels of National Board Certified teacher representation as compared to the 103 schools with high levels of National Board Certified teacher representation. This trend continued for the three years of the study. For 2006-07, of the 37 high poverty, high achieving schools, 59.5% (N=22) had low levels of National Board Certified teacher representation while the remaining 40.5% (N=15) had high levels of National Board Certified teacher representation. For the 418 low achieving schools, the percentage difference was greater with 78.9% (N=330) having low levels of National Board Certified teacher representation and 21.1% (N=88) having high levels of National Board Certified teacher representation. The researcher conducted a Fisher's Exact Test to examine the relationship between student achievement and National Board Certification for high poverty schools. A statistically significant relationship existed between student achievement and National Board Certification, $\chi^2 (1, n=455) = 7.371, p= 0.012$ (see Table 19).

The 2007-08 data continued to reveal the pattern of fewer National Board Certified teachers working in high poverty schools. The 2007-08 data set had a smaller representation of high poverty schools that were also high achieving. While 2006-07 and 2008-09 had 37 and 46 schools that were classified as high achieving respectively,

Table 19

Question 4: Occurrences of High and Low Achievement by National Board Certification Status for High Poverty Schools, 2006-07

Cross Tabulation

Achievement	National Board Certification Status		Total
	No	Yes	
High	22	15	37
Low	330	88	418
Total	352	103	455

2007-08 only had 22 high achieving schools. Of those 22 high poverty, high achieving schools, 77.3% (N=17) had low levels of National Board Certified teacher representation while the remaining 22.7% (N=5) had high levels of National Board Certified teacher representation. For the 437 low achieving schools, the percentage difference was similar with 77.8% (N=340) having low levels of National Board Certified teacher representation and 22.2% (N=97) having high levels of National Board Certified teacher representation. For 2007-08, the researcher conducted a Fisher's Exact Test to examine the relationship between student achievement and National Board Certification for high poverty schools. Unlike the prior year, the 2007-08 results of the Fisher's Exact Test revealed that a statistically significant relationship did not exist between student achievement and National Board Certification status, $\chi^2 (1, n=459) = 0.003, p=1.000$ (see Table 20).

The 2008-09 data for National Board Certification and the distribution of teachers across the two levels of poverty and achievement closely resembled the 2006-07 data. With the highest representation of high poverty schools that were also high achieving, the 2008-09 data set revealed a significant association between national certification and student achievement. Based on the cross tabulation, of the 46 high poverty, high achieving schools, 54.3% (N=25) had low levels of National Board Certification representation while 45.7% (N=21) had high levels of National Board Certification representation. This data revealed the most balanced levels of high and low representations of National Board Certified teachers over the three years of study. For the 417 low achieving schools, the percentage difference was much greater with 78.2% (N=326) having low levels of National Board representation and 21.8% (N=91) having

Table 20

Question 4: Occurrences of High and Low Achievement by National Board Certification Status for High Poverty Schools, 2007-08

Cross Tabulation

Achievement	National Board Certification Status		Total
	No	Yes	
High	17	5	22
Low	340	97	437
Total	357	102	459

high levels of National Board representation. For the final year of the study, the Fisher's Exact Test was used to examine the relationship between student achievement and National Board Certification for high poverty schools. The 2008-09 results of the Fisher's Exact Test revealed that a statistically significant relationship did not exist between student achievement and National Board Certification status, $\chi^2 (1, n=463) = 12.829, p=0.001$ (see Table 21).

In summary, the three years of data for National Board Certification produced mixed results with two years (2006-07 and 2008-09) indicating a significant association between the teacher quality variable and student achievement and one year (2007-08) indicating that there was not a significant association for high poverty schools. The three year summary data showed a disparity between high and low poverty schools in terms of National Board Certified teachers. Again, the trend of low poverty schools having higher representations of experience, advanced degrees, and highly qualified teachers as compared to high poverty schools was true for National Board Certification. While 6.6% of the teachers in high poverty schools held the national certification, low poverty schools had nearly twice the representation with 12.7% of the teachers being National Board Certified. Adding the student achievement layer to the analysis, high achieving schools for both levels of poverty demonstrated higher rates of National Board Certification than their low achieving counterparts. For example, for high poverty schools, those coded as high achieving had a National Board Certification rate of 10.5% as compared to 6.2% for low achieving schools. Similarly, for low poverty schools, those coded as high achieving had a National Board Certification rate of 13.0% as compared to 9.3% for low achieving schools.

Table 21

Question 4: Occurrences of High and Low Achievement by National Board Certification

Status for High Poverty Schools, 2008-09

Cross Tabulation

Achievement	National Board Certification Status		Total
	No	Yes	
High	25	21	46
Low	326	91	417
Total	351	112	463

Summary

Chapter 4 included a detailed accounting of the data collection, general results and the specific findings regarding teacher quality and student achievement in high poverty schools organized around the four research questions. The researcher utilized the Predictive Analytics Software (PASW) version 18.0 for Windows for statistical analysis of the four research questions. Having constructed a two by two contingency table for each variable and year of the study, Fisher's Exact Tests were used to determine if the observed variations in teacher quality differed from what was expected by chance for high poverty schools. The results presented revealed that for this sample, there was a significant association between years of experience and student achievement for high poverty schools. There was not a significant association between advanced degree status and student achievement. The results for both highly qualified status and national certification were mixed. In terms of its association with achievement in high poverty schools, National Board Certification was found to be significant in two of the years of study, but not significant for one year. Highly qualified status was found to be significant for only one year of the study. A detailed discussion of the findings and recommendations are presented in the following chapter.

CHAPTER 5: SUMMARY and DISCUSSION

Chapter 1 stated that the purpose of this study was to determine if the mediating teacher quality variables identified in the literature have a relationship to student achievement in high poverty schools. Chapter 2 presented a review of the literature related to poverty, teacher quality and the relationship to student achievement. The methods, research questions, and procedures to conduct the study were described in Chapter 3. Chapter 4 included the outcomes and data analysis resulting from the study. Chapter 5 restates the research problem and summarizes the data and the procedures utilized for the study. This final chapter also includes a discussion of the findings and their implications for future practice and research.

Statement of the Problem

The current literature documents an almost universal agreement with the notion that students from high-poverty environments have wide achievement disparities as compared to their middle-class counterparts (Donahue et al., 2001; Jones & Chant, 2009; Land & Legters, 2002; Leroy & Symes, 2001; Lutkus & Weiner, 2003; Mackner et al., 2003; Pellino, 2004). However, few studies explain the range of achievement differences within the economically disadvantaged subgroup population and often portray this achievement gap as a performance disparity between Caucasian students and minority students (McCall et al., 2006).

The observed relationship between socioeconomic status (independent variable) and student achievement (dependent variable) has been illustrated in volumes of empirical research. In summary, student achievement generally rises when socioeconomic status increases and falls when socioeconomic status decreases (Bell,

2001; Brooks-Gunn & Duncan, 1997; Campbell et al., 2000; Cavanagh, 2007; Cunningham, 2003; Gershoff, 2003; Gould & Gould, 2003; Lyman & Villani, 2002; Mackner et al., 2003; Stewart, 2007; Viadero, 2007). This study was designed to investigate selected teacher quality variables to determine if they served as mediators of the relationship between socioeconomic status and student achievement. Mediating variables serve to further clarify the relationship between independent and dependent variables. While a whole host of variables outside of school control or influence exist (i.e. neighborhood peer group effects, parent education level, and home structures for supporting academics), the impact of the following specific aspects of teacher quality were studied: (a) years of experience, (b) highly qualified status, (c) advanced degree status and (d) national certification.

Review of the Methodology

Data were collected from the North Carolina Public schools that use the North Carolina End-of-Grade tests in grades 3 -8 for the 2006-07, 2007-08, and 2008-09 school years. Existing data sources were used to gather the selected teacher quality variables, school poverty data, and achievement data for North Carolina public elementary and middle schools with state valid End-of-Grade test data. The sources were: (a) the North Carolina Education Research Data Center, (b) the Educational Statistics Access System, (c) the North Carolina Report Card, (d) the North Carolina Student Accounting Section of the Department of Public Instruction, and (e) the Education Statistics Access System (ESAS).

Schools for each year of the study were rank ordered according to their level of poverty as measured by participation in the free or reduced lunch program. Data from

the interquartile range was removed leaving high poverty and low poverty schools. Schools used for the study were categorized according to their levels of poverty and student achievement. Free or reduced lunch status was used as a proxy for poverty.

Student achievement in this study was measured by student performance on the North Carolina End-of-Grade Tests of Reading and Mathematics. For the purpose of this study and categorization, a high achieving school was defined as a school exceeding the state average of students passing both the reading and mathematics NC End-of-Grade tests. The average percentage of students passing both tests is, as a convention, the basis for deeming a school as *high achieving* for those schools above the state average or *low achieving* for those schools at or below the state average. The composite achievement score allowed for the categorization of schools in one of the quadrants within the poverty/achievement framework.

For each school in the study, the level of teacher experience, advanced degree status, highly qualified status, and national certification was recorded. The schools in the study were then coded as high or low for each of the four teacher quality variables based on their position above or below the average for each data set. The high or low classification for each of variables satisfies the parameters of statistical analysis through the Fisher's Exact Test.

Descriptive statistics, cross tabulations, and the Fisher's Exact test were used to analyze the data. The statistical software PASW Statistics 18 (Release 18.0.0 Jul 30, 2009) was used to calculate the data and to determine if the observed variations differed from what was expected by chance for high poverty schools. The Fisher's Exact Test was performed to examine the four teacher quality variables within the two

by two framework for each of the three years of study. The Fisher's Exact Test calculates the probability of outcomes for a two by two contingency table under the assumption of independence of rows and columns and conditional on the marginal totals (Upton, 1992). Twelve two by two contingency tables were constructed to express the relationships among the variables. For the purpose of this study, the level of significance was set at the .05 level. A statistical analysis of the four research questions was achieved by conducting the Fisher's Exact Test of significance in order to determine if the variations among selected teacher quality variables in high poverty schools were greater than those expected by chance.

Summary of Results

Distribution of High and Low Achieving Schools

The results indicate that the distribution of schools is unbalanced in terms of the proportion of high poverty schools that are high achieving versus low achieving. Consistently, this study demonstrated that those schools coded as high poverty were most likely also low achieving. Those schools coded as low poverty were mostly likely also high achieving. This finding and distribution of high and low achieving schools is consistent with much of the literature (Donahue et al., 2001; Jones & Chant, 2009; Land & Legters, 2002; Leroy & Symes, 2001; Lutkus & Weiner, 2003; Mackner et al., 2003; Pellino, 2004). For example, the researcher found that only 7.6% (n=105) of the identified high poverty schools were high achieving. The remaining 92.4% (n=1271) of high poverty schools were low achieving. Conversely, of the low poverty schools in the study, 91.7% (n= 1262) were high achieving while 8.3% (n=114) were low achieving. Based on this study, a high achieving school was 12 times more likely to also be a low

poverty school than it was to be a high poverty school. A low achieving school was, on average, 11 times more likely to also be a high poverty school than it was to be low poverty school.

Teacher Quality: Years of Experience

The North Carolina Department of Public Instruction categorizes experience for reporting purposes as 0 to 3 years, 4 to 10 years, and 11 or more years. For the three years of the study, teacher experience for the selected schools was 23.3% (teachers with 0 to 3 years of experience), 28.5% (teachers with 4 to 10 years of experience), and 48.2% (teachers with 11 or more years of experience). Disaggregating the data by school level of poverty demonstrated that novice teachers (0 to 3 years of experience) comprised a greater percentage of the teaching population in high poverty schools (26.4%) than in low poverty schools (20.1%). Teachers classified with the most experience (11 or more years of experience) comprised a greater percentage of the teaching population in low poverty schools (49.1%) than in high poverty schools (46.1%). Teachers in the middle category varied slightly by poverty level with high poverty schools having 27.3% and low poverty schools having 30.1% of their respective teaching populations with 4 to 10 years experience.

The results of this study showed that teacher experience was determined to have a significant association with student achievement in high poverty schools. The data revealed a variation in novice teacher populations between high and low poverty schools with low poverty schools having 20.9% novice (0 to 3 years) teachers and high poverty schools having 26.4% novice teachers. Disaggregating further by poverty and achievement revealed a consistent pattern of high achieving schools having lower

percentages of novice teachers. For example, for high poverty schools, 26.8% of the teachers in low achieving schools were novice teachers while 20.8% of the teachers in high achieving schools were novice teachers.

For each year of the study, a Fisher's Exact Test was conducted to statistically examine the relationship between student achievement and teaching experience. For 2006-07, a statistically significant relationship existed between student achievement and teaching experience, $\chi^2 (1, n=455) = 4.021, p=.05$. A statistically significant relationship was also indicated for the 2007-08 data, $\chi^2 (1, n=459) = 10.250, p=.003$, and the 2008-09 data, $\chi^2 (1, n=463) = 22.003, p=.000$. This represents the only teacher quality variable of the four tested that indicated a statistically significant relationship for each year of the study.

Teacher Quality: Advanced Degree Status

For the academic years 2006-07, 2007-08, and 2008-09, the results showed that teachers with advanced degrees made up 25.6% of the teaching population. High poverty schools had lower concentrations of teachers with advanced degrees (22.9%) than did low poverty schools (28.7%). Unlike years of experience, the percentage of advanced degree teachers did not vary significantly when disaggregating the data by poverty and achievement. Low poverty schools ranged from 28.7% for high achieving schools and 28.4% for low achieving schools in terms of the percentage of teachers with advanced degrees. Similarly, for advanced degree status, high poverty schools ranged from 23.5% for high achieving schools and 22.8% for low achieving schools.

The 1,376 high poverty schools in the study were staffed by 45,381 teachers. Of those teachers, 22.9% (N=10,397) had earned an advanced degree. While a significant

variation was noted between high and low poverty schools with 28.7% of the teachers in low poverty schools having advanced degrees, there was little variation when comparing high poverty schools by achievement. Consistent across the three years, the observed variations did not differ from what was expected by chance for high poverty schools. For 2006-07, the Fisher's Exact revealed that a statistically significant relationship did not exist between student achievement and advanced degree status, $\chi^2(1, n=455) = 0.003, p=1.000$. Likewise, for 2007-08 and 2008-09, the Fisher's Exact Test did not indicate that a statistically significant relationship existed between student achievement and advanced degree status, with 2007-08, $\chi^2(1, n=459) = 0.160, p=0.650$ and 2008-09, $\chi^2(1, n=463) = 3.436, p=0.074$.

Teacher Quality: Highly Qualified Teachers

Federal No Child Left Behind (2001) legislation defines a highly qualified teacher as one who has obtained a full state teacher certification or has passed the state teacher licensing examination and holds a license to teach in the state; holds a minimum of a bachelor's degree; and has demonstrated subject area competence in each of the academic subjects in which the teacher teaches. Of the four selected teacher quality variables in this study, the Highly Qualified designation was applicable to the highest percentage of all teachers (97.6%). The three year trend demonstrated increases in the overall percentage of highly qualified teachers with more pronounced variations between low poverty, high achieving schools (98.7%) and low poverty, low achieving schools (90.1%) than their high poverty counterparts. As with the other teacher quality variables, the pattern again holds that high poverty schools have an overall average below low poverty schools, with 96.2% of the teachers being highly

qualified in high poverty schools and 97.9% of the teachers being highly qualified in low poverty schools.

The statistical analysis of highly qualified status as it relates to student achievement produced mixed results. After conducting three separate Fisher's Exact Tests, 2006-07 was the only year to yield results indicating a significant association between the selected teacher quality variable and student achievement for high poverty schools, $\chi^2 (1, n=455) = 8.225, p=.003$. For 2007-08 and 2008-09, the analysis of highly qualified data in high poverty schools did not demonstrate a significant relationship between the two variables. The observances of high and low highly qualified teachers across high poverty schools were not demonstrated to be greater than expected by chance with 2007-08, $\chi^2 (1, n=459) = 1.082, p=0.464$, and 2008-09, $\chi^2 (1, n=463) = 2.242, p=0.150$.

Teacher Quality: National Board Certification

Results indicate that National Board Certification has been achieved by 9.8% of the teachers from the schools within the study. The trend of low poverty schools having higher representations of experience, advanced degrees, and highly qualified teachers as compared to high poverty schools was true for national certification. Consistent with the other selected variables, a disparity exists between high and low poverty schools with 12.7% of the teachers in low poverty schools attaining national certification and 6.6% of the teachers in high poverty schools attaining national certification. Disparities also existed when disaggregating the data by poverty and achievement with high achieving schools having higher populations of National Board Certified teachers for both categories of poverty.

The three years of data for National Board Certification produced mixed results with two years indicating a significant association between the teacher quality variable and student achievement and one year indicating that there was not a significant association for high poverty schools. The Fisher's Exact test determined that for 2006-07, a statistically significant relationship existed between student achievement and National Board Certification, $\chi^2 (1, n=455) = 7.371, p= 0.012$. While the 2007-08 data failed to reveal a significant relationship, $\chi^2 (1, n=459) = 0.003, p=1.000$, the 2008-09 data did indicate a statistically significant relationship existed between student achievement and National Board Certification, $\chi^2 (1, n=455) = 7.371, p= 0.012$.

Discussion

In terms of both social and education policy regarding the study of poverty in schools, the existence of an impoverished student population has specific implications for school leaders. In the face of sizable achievement gaps between student subgroups, federal education policy has evolved and placed the onus on school leaders to institute practices to address the achievement problems of the economically disadvantaged (America, 2000: Excellence in Education Act, 1991; Goals 2000: Educate America Act of 1994, 1994; Miller, 1993; NCLB, 2002; Welner, 2005). With sanctions for failure to meet goals for those schools receiving federal assistance, the economically disadvantaged subgroup population is a mandated focus of concern under both *No Child Left Behind* (NCLB, 2002) and the current *Blueprint for Reform* (USDE, 2010). Indeed, with a mandate to achieve 100% proficiency for all student subgroup populations by 2013-14 for all state operated schools receiving federal financing (NCLB, 2002; Welner, 2005), the focus on teacher quality is both relevant and timely. Federal

mandates require state departments of instruction to report efforts toward meeting the federal highly qualified teacher requirements including: (a) determining the extent to which students have highly qualified teachers, (b) adopting implementation plans to ensure all teachers are highly qualified, and (c) publicly reporting the plans to meet the requirements and the progress toward meeting the requirements. Based upon highly qualified mandates and the requirement to meet the needs of all students, the issue of teacher quality has taken on greater importance and has been identified as a significant factor mediating the achievement of impoverished students (Rivkin et al., 2005).

Although prodigious amounts of research exist linking teacher quality and student achievement (Darling-Hammond, 2002; Goldhaber & Brewer 2000; Hanushek, Kain, & Rivkin, 1998; Haselkorn, 2001; Laczko-Kerr & Berliner, 2002; Nye et al., 2004; Sanders & Rivers, 1996; Wayne & Young, 2003), debate about specific teacher quality variables gave rise to this study of experience, advanced degree status, highly qualified status, and National Board Certification for North Carolina. With teacher quality receiving attention in both the popular media and the empirical research base (Cook, 2003; Darling-Hammond, 2000; Jerald & Ingersol, 2002; Lankford et al., 2002; Lenker, 2006; Marzano, 2003; Wenglinsky, 2002), this study endeavored to determine the statistical significance of specific teacher quality variables.

Within the context of teacher quality in high poverty schools, results from this study indicated that certain aspects of teacher quality are linked to student achievement. An acknowledged limitation of the study is that it cannot be generalized beyond the population of study. That limitation notwithstanding, the clearest results from the study suggested that teachers with more experience are linked to greater

levels of student achievement within high poverty schools. With three years of data demonstrating a statistically significant relationship, these results begin to suggest that high student performance returns may be directly attributable to direct experience more so than the other selected variables (i.e. advanced degree status, National Board Certification, and highly qualified status).

Perhaps the most counterintuitive finding within the study relates to advanced degree status. While Darling-Hammond's (1999) review of NAEP data from the 1992 and 1994 assessments revealed a modest correlation between advanced degree attainment and higher student achievement for all students with no regard to poverty status, this study was unable to establish that same link for high poverty schools. In fact, advanced degree status represents the only variable of the four studied with no data set demonstrating a statistically significant link to student achievement. With most of those degrees being at the master's level, the researcher concludes that further research should be conducted to disaggregate by type of degree and the connection to the teaching assignment. For example, while advanced degree status for each teacher is reported, the nature of the advanced degree is not considered in this study. While a teacher may teach middle school mathematics, his or her advanced degree may be a master's degree in educational leadership and have little connection to his or her specific content area. This does not suggest that advanced degrees for teachers have no connection to achievement, only that in the three years of data for high poverty schools, the statistical link could not be established. Attainment of a master's level degree may have more connection to already effective teachers furthering their own learning. This implication for future research will be discussed in a later section.

From the study, the impact of highly qualified status on student achievement was mixed with one year demonstrating a significant relationship to student achievement and two years failing to demonstrate a distribution beyond what would be expected by chance. While highly qualified status is a federally developed concept, actual quantification of this variable varies state by state. Of the variables within this study, teachers were overwhelmingly *highly qualified*, by definition. For the years 2006-07, 2007-08, and 2008-09, the average percentage of highly qualified teachers in all schools was 97.6, 98.7, and 98.5 respectively. Based on a consistent lack of significance across the three years of the study and the almost universally high percentages of *highly qualified* teachers, it seems unlikely that student achievement can be attributed to the highly qualified status.

With two of the three years of the study demonstrating a significant association between National Board Certification and student achievement for high poverty schools, this aspect of teacher quality has implications for future practice. However, these results cannot distinguish whether the process simply identifies teachers who are already more effective or if there is a causal relationship between going through the process and ultimate effectiveness. Again, this has implications for future researchers. Clearly, high poverty schools within this study have fewer National Board Certified teachers which raise equity concerns for students. The results of the study also have implications for how districts distribute National Board Certified teachers among schools and within schools.

State Implications for Practice

The findings presented in this study have certain implications for future practice at the state and district levels. The complexities of educational research and policy development make it difficult to always reach consensus and determine a clear link between empirical research and policy development. While the findings presented in this study are limited specifically to the studied population (North Carolina public schools), several policy implications have become apparent for both state and district policymakers.

First, the North Carolina accountability model is a disincentive for experienced teachers to work in high poverty, low performing schools. With sanctions for Title I schools failing to meet accountability standards, experienced teachers have no external motivators encouraging them to move to our more challenging schools. This leaves more novice teachers to occupy the openings in high poverty schools. The North Carolina accountability program employs the use of recognitions for schools meeting certain levels of performance and growth. While the growth component more fairly accounts for a student's academic starting point and ending point, the performance component focuses solely on the percentage of students proficient in a given area with no regard to their incoming levels of performance. For North Carolina, the performance component translates into specific recognitions (i.e. School of Excellence and School of Distinction). Adjusting and deemphasizing the recognition model for performance should allow experienced teachers and others to transfer to high poverty schools without the fear of school labeling.

Additionally, while Adequate Yearly Progress (AYP) is a federal NCLB measure with the original intent of creating consistency in standards across the country, changes to state accountability plans have made AYP inconsistent from state to state. State amendments to AYP have created a variety of different targets for subgroups and statistical methods that have been accepted in AYP calculations. For example, while some states set a specific percentage for subgroup designation (i.e. 10% of the school population), in North Carolina a school must have 40 students in a subgroup for the subgroup to be considered as part of the testing model. Larger schools are at a disadvantage when using this calculation as they are more likely to have more students in any given subgroup. Amendments to the state accountability plan should be submitted to address the flaws in the system including the double counting of students in selected subgroups, the reliance on overall proficiency (performance) instead of growth in determining AYP, and the arbitrary standard for determining a subgroup (i.e. 40 students). This recommendation may perhaps remove some of the stigma and disincentive for experienced teachers to move to more challenging schools.

Second, North Carolina provides a statewide salary schedule for teachers. The current salary structure considers degree status, years of experience, and National Board Certification status. While there are some incentives for teachers working in high poverty schools (i.e. federal loan forgiveness for teachers in Title 1 schools and reduced number of required years of service, by one year, for NC Teaching Fellows loan forgiveness), there is no compensatory advantage in terms of the state pay scale for teachers to accept the challenge of working in high poverty, low performing schools. In order to encourage highly effective and experienced teachers to move to more

challenging school environments, salary supplements or bonuses at the state or district level should be considered.

District Implications for Practice

The findings presented in this study also have implications for future practice and policy at the district level. First, the statistically significant relationship between experience and student achievement suggested that the distribution of teachers with experience should be an area of focus for school leaders. School leaders should work to minimize the levels of novice teachers in high poverty schools. This has implications for district transfer policies, initial hiring practices, and programs aimed at the retention of experienced teachers. For example, the district may need to revert to a restrictive transfer policy in which initially licensed or probationary status teachers are not eligible for transfer to a high poverty school and experienced teachers are not eligible to transfer from high poverty schools unless the transfer is offset by some other transfer. Within high poverty schools, non-traditional scheduling practices could maximize the impact of experienced teachers. Administrators should team teachers with experience as one consideration. For example, in forming two middle school teacher teams within a grade level, instead of simply using curricular areas as the basis for team formation, the school administrator should seek to distribute as evenly as possible the teachers by experience.

Second, if exposure to more experienced teachers is of a benefit to high poverty students, districts should explore ways to make instructional time in the classroom more consistent. The need for consistent instructional time with experienced teachers has implications for both student and teacher attendance and staff development models.

For example, districts that use staff development models that pull teachers from the classroom may need to investigate alternative models such as web-based training, afterschool training models, or summer training opportunities to both minimize the time with a potentially uncertified substitute and maximize the time with an experienced teacher.

Third, the placement of National Board Certified teachers should be done with high poverty school needs as a consideration. Instead of concentrating National Board Certified teachers in a few schools, district leaders would need to explore methods by which a more equitable distribution could be achieved. Like the issue of experience, this has implications for district transfer policies, initial hiring practices, and programs aimed at the retention of nationally certified teachers. Additionally, school leaders and policy makers should seek ways to support the national certification process for teachers in high poverty schools.

Fourth, the findings of this study suggested that achievement gaps as seen through the context of high and low poverty populations is impacted by teacher experience. Local district policy should find measures to encourage experienced and highly effective teachers to transfer to high poverty schools within the district. Again, this recommendation has implications for both the voluntary and forced transfer policies of the district and would require the district to make it more attractive through compensation and improved working conditions for experienced teachers to move to high poverty schools. Additionally, district and school personnel responsible for hiring should institute recruitment efforts that target the hiring of teachers based on specific school needs in terms of teacher quality.

Fifth, with the acknowledged challenges of high poverty schools in the literature and through this study, efforts should be made to create learning environments that minimize the concentrations of high poverty students in one school or classroom. On the school level, this would require administrators to review the distribution of students across classrooms. At the district level, the recommendation would result in some effort to address overall school populations with high levels of economically disadvantaged students. While racial integration was required over three decades ago, some effort to provide a level of economic integration appears necessary in order to address some of the acknowledged challenges of having high concentrations of high poverty, at-risk student populations.

Implications for Future Research

The results of this research study create a series of implications for future researchers. While this study did not produce statistically significant results connecting advanced degree status and student achievement, further research would need to be conducted to determine the actual impact of advanced degrees in-field versus those that are out-of-field. For example, in this study, the advanced degree data was collected on the basis of the teacher pay scale. If a teacher had a valid master's degree for which he or she was paid, the teacher was considered to hold an advanced degree. In reality, some teachers who are paid on the master's degree level may in fact have a degree that does not specifically inform their instructional practice. Additional research should be conducted to determine the specific impact of advanced degrees that are within the academic discipline of the teacher. Also, some attention should be given to the timing of advanced degree attainment. That is, a future researcher should

disaggregate the advanced degrees by the period during which the teacher earned it. For example, an area of focus would be a teacher earning an advanced degree prior to teaching versus a career status teacher going back to school to earn an advanced degree.

This study did not assess the cumulative effect of teacher quality. Instead, each of the four variables was treated as a discrete variable. Further study is recommended on methods to improve student achievement in high poverty schools through studies that select variables different from those selected for this study. Further research should be conducted to both include other factors such as standardized test scores of the teachers and the strength of the teacher preparation program and consider teacher quality more holistically.

As to the specific impact of National Board Certification, additional study is required to determine whether the rigorous process by which teachers earn National Board Certification creates more effective teachers or if more effective teachers simply pursue the additional certification. As with the case of advanced degree attainment, attention should be given to the period during which the teacher earned the additional certification and statistical analysis conducted on the causal relationship between National Board Certification and teacher effectiveness.

Another area of further study relates to the impact of high poverty or challenging student populations on teacher experience. For example, there are no findings in this study to explain the different levels of teacher experience. Whether high poverty schools are less attractive in terms of a working environment for experienced teachers or the exposure to high poverty or at-risk students lessens the likelihood of future

service for teachers (i.e. shortened longevity), additional study is needed to specifically determine why teaching populations in high poverty schools tend to be less experienced.

Finally, in order to generalize beyond the selected population, future researchers would need to conduct more encompassing studies that would include numerous geographic samples beyond one state. This study utilized data from three academic years. The researcher recommends a more longitudinal approach of five or more years. A variety of population sizes and diverse demographic factors would be recommended in order to capture the impact of the selected variables on the wider population. Additionally, while this study focused on North Carolina statewide data, additional research should be conducted to determine if differences exist by region or setting (i.e. rural populations versus urban populations) for high poverty schools with respect to teacher quality and the impact on student achievement.

Summary

Chapter 5 included a restatement of the problem, a review of the study's methodology, a discussion of the results, and the implications for practice and future research. Of the four selected teacher quality variables, only teacher years of experience was determined to have a statistically significant relationship with student achievement for all three years of the study. While advanced degree status was not found to have a significant association with student achievement in high poverty schools, both National Board Certification and highly qualified status produced mixed results over the three years of the study. The results of this study promote a need to focus on implementing procedures and strategies that will address factors that impact

student achievement in high poverty schools. The implications for practice include the examination of policies by school leaders that place teachers of varying levels of quality in high poverty settings, school level policies that determine class demographics and scheduling, and practices that may effectively address student achievement in high poverty schools. In that there are many potentially mediating factors of student achievement, additional variables need to be examined in future longitudinal research studies.

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APPENDIX: INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board Office
11-09 Binky Medical Sciences Building • 600 Mays Boulevard • Greenville, NC 27834
Office 252-744-2914 • Fax 252-744-2284 • www.ecu.edu/irb

Date: June 3, 2010

Principal Investigator: Christopher Barnes
Dept./Ctr./Institute: 169 Bayview Drive
Mailstop or Address: Jacksonville, NC 28546

RE: Exempt Certification *WZ*
UMCIRB# 10-0296
Funding Source: unfunded

Title: "Teacher Quality Factors Mediating Achievement for Impoverished Students"

Dear Christopher Barnes:

On 6.2.10, the University & Medical Center Institutional Review Board (UMCIRB) determined that your research meets ECU requirements and federal exemption criterion #4 which includes research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. *Note: 1) This information must be existing on the date this IRB application is submitted. 2) The data collection tool may not have an identifier or code that links data to the source of the information.*

It is your responsibility to ensure that this research is conducted in the manner reported in your Internal Processing Form and Protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB Office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification Request at least 30 days before the end of the five year period.

Sincerely,

Chairperson, University & Medical Center Institutional Review Board

Cc: Dr. James McDowelle