TEACHER RETENTION AND THE IMPACT OF NORTH CAROLINA'S NEW DEFINITION OF A LOW-PERFORMING SCHOOL

Janice Marie Giles

A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Education in the School of Education.

Chapel Hill
2018

Approved by:

Brian Gibbs

Charles Aiken

Thurston Domina

Fenwick English

Susan Wynn

ABSTRACT

Janice Marie Giles: Teacher Retention and the Impact of North Carolina's New Definition of a Low-performing School
(Under the direction of Brian C. Gibbs)

Teachers are a resource, and equitable resource allocation must include the equitable distribution of teachers across all schools. Previous research has found that high poverty and minority students are more likely to be taught by inexperienced and unqualified teachers, and teachers frequently leave schools serving these students for schools with fewer disadvantaged students (Boyd, Lankford, Loeb, & Wyckoff, 2005; Goldring, Taie, & Riddles, 2014; Hanushek, Kain, & Rivkin, 2004; Ingersoll, 2004; Loeb, Darling-Hammond, & Luczak, 2005). Further, previous research indicates that the challenges these schools face retaining effective teachers is due to poor working conditions, not teachers' discontent with their students (Boyd et al., 2011; Johnson, Kraft, & Papay, 2012; Ladd, 2011). These findings establish a need to investigate how current polices may have contributed to the disparities in teacher retention rates. The purpose of this study was to examine the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions.

This study used a quantitative causal-comparative design and analyzed secondary administrative data files from the North Carolina Department of Public Instruction as well as survey data from the North Carolina Teacher Working Conditions Survey. Data analysis was conducted using descriptive statistics and multiple regression analysis. The results showed that newly designated low-performing schools had lower average teacher retention rates and lower average North Carolina Teacher Working Conditions Survey results than other schools in the

state. Multiple regression analysis found that the relationship between the state's new definition of a low-performing school and teacher retention rates was not statistically significant, and the relationship between the state's new definition of a low-performing school and teacher working condition survey results was statistically significant. Findings indicate that the state's new definition a low-performing school negatively impacted teacher working conditions at newly designated low-performing schools and suggest that these schools will need to improve teacher working conditions in order to raise teacher retention rates to the state average.

To my family.

ACKNOWLEDGEMENTS

I am grateful for all the support and encouragement I received from my family, friends, and colleagues throughout this process. I especially want to thank my husband, Will, for his patience and willingness to support my career aspirations. Thank you for the countless nights you were home with Eli and Easton while I was at class and for all the times you took them out on adventures so I had a quiet place to write. Eli and Easton, you bring so much joy to my life. The desire to have more time to spend enjoying life with my family has been my motivation to push through and finish this dissertation. I want to thank my parents for all the opportunities they gave me that have led me to this point and for instilling a strong work ethic (which I would not have been able to complete this process without).

I appreciate the help and reassurance I received from my advisor, Dr. Brian Gibbs. Thank you to the each of the members of my dissertation committee for the feedback and support you provided. The guidance I received from Dr. Thad Domina with my data analysis was especially invaluable.

I am also thankful for the flexibility provided by Chatham County Schools and Northwood High School that allowed me to continue to serve as a school administrator while caring for my sons and pursuing my doctorate. A shout-out to the administrative team, faculty, and staff at Northwood. The work we do each day does make a difference!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

EPIC	Education Policy Initiative at Carolina
NCDPI	North Carolina Department of Public Instruction
NCLB	No Child Left Behind Act of 2001
NTC	New Teacher Center
NCTWC	North Carolina Teacher Working Conditions Survey

CHAPTER 1: INTRODUCTION

Background

Despite the federal mandate under the No Child Left Behind Act of 2001 (NCLB) that all students would meet or exceed a proficient level of academic achievement, many students continue to fall short of this goal. Achievement gaps on state assessments persist between high- and low-poverty students, and between minority and nonminority students (Lee & Reeves, 2012). An effective teacher in every classroom is critical to ensuring each student receives an excellent and equitable education (McCaffrey, Koretz, Lockwood, & Hamilton, 2004; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004). Gaps in student achievement coincide with disparities in the distribution of effective teachers (Adamson & Darling-Hammond, 2012; Lankford, Loeb, & Wyckoff, 2002; Loeb, Darling-Hammond, & Luczak, 2005; Williams, Adrien, Murthy, & Pietryka, 2016). The most disadvantaged students often lack access to the high-quality instruction that effective teachers provide (Adamson & Darling-Hammond, 2012; Lankford et al., 2002; Loeb et al., 2005; Williams et al., 2016). Policymakers, researchers, and practitioners must be concerned with the causes of these disparities if they aspire to provide each student an excellent and equitable education. One factor impacting the distribution of effective teachers is teacher retention (Adamson & Darling-Hammond, 2012; Lankford et al., 2002; Loeb et al., 2005; Williams et al., 2016).

There has been considerable research examining why teachers stay or leave and the impact these decisions have on schools and students (Borman & Dowling, 2008; Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Feng & Sass, 2016; Hanushek, Kain, & Rivkin,

2004; Ingersoll, 2001). There are two primary areas of interest that drive the study of teacher retention: how turnover impacts the distribution of teacher quality across schools and districts and student achievement (Johnson, Berg, & Donaldson, 2005). Researchers studying teacher retention have identified a wide range of factors known to influence teachers' decisions to remain in their schools, transfer to new ones, or leave the profession altogether (Borman & Dowling, 2008; Boyd et al., 2008; Feng & Sass, 2016; Hanushek et al., 2004; Ingersoll, 2001). Teacher working conditions are one major factor that have been found to impact teacher retention (Borman & Dowling, 2008; Loeb et al., 2005).

Ingersoll (2001) defines teacher turnover as "the departure of teachers from their teaching jobs" (p. 500). Turnover broadly encompasses both attrition and mobility. In general, teacher attrition is the loss of a teacher from the profession, and teacher mobility is the relocation of a teacher from one school to another. Teacher turnover can be examined at the school, district, state, and national levels. For this study, teacher turnover was examined at the school level. Distinguishing the difference between attrition and mobility is particularly important in examining the policy implications surrounding why large numbers of teachers leave their jobs to teach in other schools as opposed to leaving the teaching profession all together (Johnson et al., 2005).

A growing body of research has found that schools serving high poverty and minority students tend to have high teacher turnover (Goldring, Taie, & Riddles, 2014; Hanushek et al., 2004; Ingersoll, 2004; Loeb et al., 2005). Specifically, a number of studies have documented the trend of teachers leaving schools serving high poverty and minority students for schools with fewer disadvantaged students (Boyd, Lankford, Loeb, & Wyckoff, 2005; Hanushek et al., 2004). Examining how education policies have impacted teacher retention at these schools and

identifying solutions that have increased teacher retention at these schools can inform the design of future policies that have the potential to reduce the disparities in the equitable distribution of teachers.

One current statewide education policy that warrants further examination is North Carolina's new definition of a low-performing school. In 2015, North Carolina House Bill 97 changed the definition of a low-performing school in North Carolina. It rewrote North Carolina General Statute 115C-105.37 to define low-performing schools as "those that receive a school performance grade of D or F and a school growth score of "met expected growth" or "not met expected growth" as defined by G.S. 115C-83.15" ("Current operations and capital improvements appropriations act of 2015," 2015).[1] Previously, low-performing schools were defined as "those in which there is a failure to meet the minimum growth standards, as defined by the State Board, and a majority of students are performing below grade level" ("Current operations and capital improvements appropriations act of 2015," 2015). This change in definition resulted in an increased number of schools designated as low performing. Based on scores from the 2014–2015 school year, 581 public schools were identified as low-performing schools for the 2015–2016 school year, as compared to 367 schools for 2014–2015 school year based on scores from the 2013–2014 school year (Granados, 2015). For many of these schools, their School Performance Grade and School Growth Score did not decrease from the 2013–2014 school year to the 2014–2015 school year; yet, they were designated as low performing because of the inclusion of schools that "met expected growth" in the new definition of a low-performing

[1] For specific information on how school performance grades and school growth scores are calculated, refer to the *School Performance Grades Accountability Brief*. Available at: http://www.ncpublicschools.org/docs/accountability/reporting/acctperformgrades15.pdf

school. Many of the schools identified as low-performing schools are high poverty schools serving primarily minority students (Hiu, 2015; North Carolina Department of Public Instruction, 2015b).

Statement of the Problem

Teacher quality is known to impact student achievement (McCaffrey et al., 2004; Rivkin et al., 2005; Rockoff, 2004). Multiple studies have found that teachers are the most influential school-based factor impacting student learning (McCaffrey et al., 2004; Rivkin et al., 2005; Rockoff, 2004). To this end, teachers are a resource, and equitable resource allocation must include the equitable distribution of teachers across all schools. High poverty and minority students should have access to similar quality teachers as low poverty and nonminority students. However, high poverty and minority students are more likely to be taught by inexperienced and unqualified teachers, and teachers frequently leave schools serving high poverty and minority students for schools with fewer disadvantaged students. Research indicates that the challenges these schools face retaining effective teachers is due to poor working conditions, not teachers' discontent with their students (Boyd et al., 2011; Johnson, Kraft, & Papay, 2012; Ladd, 2011). It follows that researchers should examine how policies have influenced teacher retention and teacher working conditions at schools serving high poverty and minority students. Loeb and Miller (2006) noted, "States have passed bundles of laws that reach into every aspect of the teacher workforce" (p. ii), but found there were few that had been systematically evaluated. They argued that evaluating current policies is critical to designing and implementing effective policies in the future.

Research by Clotfelter, Ladd, Vigdor, and Diaz (2004) indicated that North Carolina's previous definition of a low-performing school decreased teacher retention in schools designated

as such (p. 258). In 2015, the North Carolina General Assembly changed how low-performing schools are defined in North Carolina. The new definition includes schools that "met expected growth." This change in definition resulted in a 58.3% increase in the number of schools designated as low-performing schools. Schools serving high poverty and minority students were most likely to be identified as low-performing schools. Based on scores from the 2014–2015 school year, 42% of high-poverty schools received D's or F's, compared with only 3.6% of all other schools (North Carolina Department of Public Instruction, 2015b). The impact of North Carolina's new definition of a low-performing school on teacher retention is not known, and further research is warranted to better understand the effects of this new policy.

Purpose of the Study

The purpose of this quantitative causal-comparative study was to examine the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. Specifically, this study investigated newly designated North Carolina public schools that would not have met the criteria of a low-performing school under the state's previous definition. Quantitative analysis addressed the relationship between the low-performing school label (independent variable) and both teacher retention and teacher working conditions in North Carolina public schools (dependent variables).

Research Questions

The primary research question this study addressed was: How has North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower teacher retention rates compared to past years and compared to other North Carolina public schools for the same

year. The secondary research question this study addressed was: How has North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower ratings on the North Carolina Teacher Working Conditions Survey (NCTWC) compared to past years and compared to other North Carolina public schools for the same year.

Significance of the Research

Effective teachers are an important determinant in the quality of student learning. Given the known disparities in access to high quality teachers, researchers must consider how policies have impacted the ability of schools serving high poverty and minority students to retain teachers. This study aimed to examine how North Carolina's new definition of a low-performing school impacted low-performing schools' ability to retain teachers. The field of educational leadership would benefit from additional knowledge indicating how a low performing school designation impacts teacher retention and teacher working conditions. This knowledge will inform the design and implementation of future educational polices intended to reduce the disparities in the equitable distribution of teachers.

Conceptual Framework

The conceptual framework for this study is shown in Figure 1. The primary relationship of interest is between the low-performing school label (independent variable) and teacher retention (dependent variable). This relationship is mediated by the teacher working conditions of school leadership and teacher job satisfaction. The foundation of this framework is rooted in job satisfaction theory developed by Herzberg, Mausner, and Snyderman (1959/1993). Their findings suggest that job satisfaction is due largely to motivation factors including the sense of

achievement and status provided by one's job, while hygiene factors, including administrative practices and working conditions, prevent dissatisfaction (pp. 113-114). In the context of this study, the low-performing school label impacts motivation, whereas school leadership impacts hygiene. Specifically, it is theorized that the stigma associated with a low-performing school designation reduces the amount of satisfaction that one can draw from the status provided by one's job, and overall job satisfaction is mediated by the role school leadership plays in influencing the amount of dissatisfaction with the job environment.

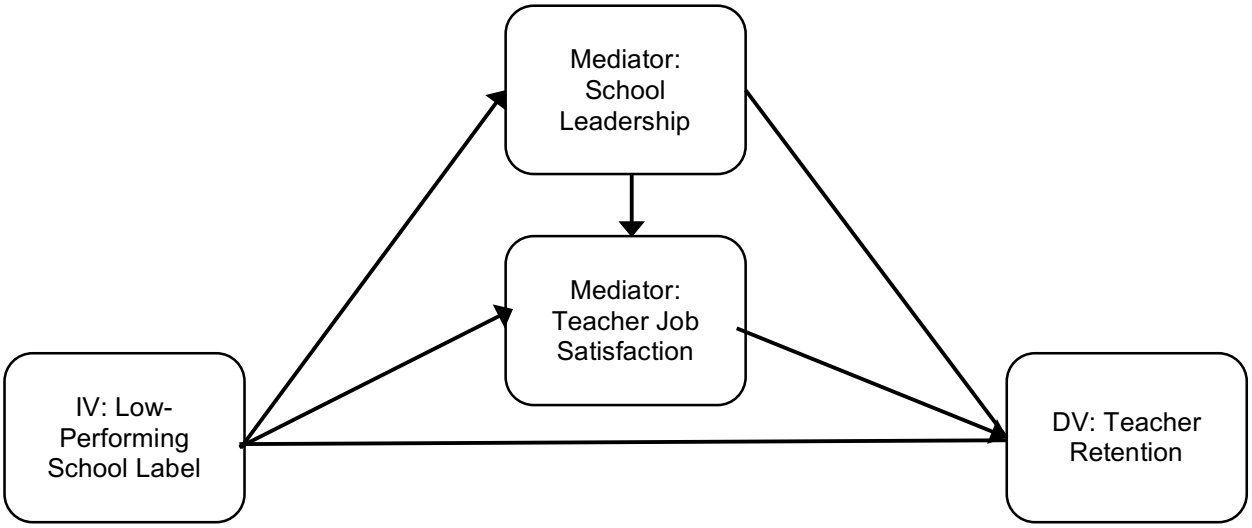

Figure 1. Conceptual framework.

Research conducted by Clotfelter et al. (2004) suggests that the low-performing school label impacts teacher retention. They found that labeling schools as low-performing increased the probability of departure by 25% for experienced teachers in schools designated as low-performing schools. Further, research conducted by Tickle, Chang, and Kim (2011) found that the school leadership variable of administrative support mediated the effect of teaching experience, student behavior, and teachers' satisfaction with their salary in regard to teachers' job satisfaction and intent to continue teaching. This study examined the effect of the new low-performing school label on teacher retention and teacher working conditions.

Methodology

This study used a quantitative causal-comparative design. The sample included all North Carolina public schools, excluding public charter schools. The treatment group included the 202 schools that were newly designated as low-performing schools during the 2015–2016 school year that would not have met the criteria of a low-performing school under the state's previous definition. The control group included the other 2,276 North Carolina public schools that were not impacted by the state's new definition of a low-performing school. This study analyzed secondary data files from the North Carolina Department of Public Instruction (NCDPI) as well as survey data from the NCTWC. Data analysis using descriptive and inferential statistics was conducted using Stata data analysis and statistical software in order to answer the primary and secondary research questions.

Assumptions and Limitations

There are several assumptions and limitations of this study. First, this study assumed that a change in the school's reputation due to the addition of the low-performing school designation will impact a teacher's decision to stay or leave his or her current school. Second, this study assumed all other factors were equal and the schools in the sample have not had any significant changes other than the addition of the low-performing school designation.

One limitation was the use of secondary data. The validity was limited by the accuracy of the data sets. A potential limitation to external validity was a relatively small sample size for the treatment group that will make the results difficult to generalize broadly. The sample for the treatment group contained 202 schools. This study only included data from educators in North Carolina and the generalizability of the findings is restricted to settings that are similar to the state examined. A potential limitation to internal validity was the data may have been impacted

by other variables apart from being designated as a low-performing school. This limitation was addressed in the analysis by controlling for other variables that may have impacted the teacher retention rate. Control variables included school type, grade range, locale classification, percent of economically disadvantaged students, and percent of students by race/ethnicity.

Definition of Terms

The following terms and definitions will be used throughout this study:

Administrative Support: The extent to which principals and other school leaders make teachers' work easier and help them to improve their teaching (Boyd et al., 2011).

Effective Teacher: One who receives a rating of at least "proficient" on each of the Teacher Evaluation Standards 1 – 5 and receives a rating of at least "Meets Expected Growth" on Standard 6 of the Teacher Evaluation Instrument (North Carolina Department of Public Instruction, 2015a).

High-Poverty School: A public school where more than 75% of the students are eligible for free or reduced-price lunch (Kena et al., 2016).

Low-Performing School: (1) Current definition: Schools that receive a school performance grade of D or F and a school growth score of "met expected growth" or "not met expected growth" as defined by G.S. 115C-83.15. (2) Previous definition: Schools in which there is a failure to meet the minimum growth standards, as defined by the State Board, and a majority of students are performing below grade level. (Current Operations and Capital Improvements Appropriations Act of 2015, 2015).

North Carolina Teacher Working Conditions Survey: A biennial survey that assesses whether educators across North Carolina report having the resources and supports necessary to ensure effective teaching (New Teacher Center, 2015).

School Leadership Practices: The practices school leadership employs in order to create trusting, supportive environments, and address teacher concerns.

Teacher Attrition: The loss of a teacher from the profession.

Teacher Mobility: The relocation of a teacher from one school to another.

Teacher Retention: When a teacher remains in the profession. Teacher retention at the school level is when a teacher remains teaching in the same school from one year to the next.

Teacher Turnover: The departure of teachers from their teaching jobs (Ingersoll, 2001).

Summary

An effective teacher in every classroom is critical to ensuring each student receives an excellent and equitable education (McCaffrey et al., 2004; Rivkin et al., 2005; Rockoff, 2004). Teacher retention impacts the distribution of effective teachers across schools (Adamson & Darling-Hammond, 2012; Lankford et al., 2002; Loeb et al., 2005; Williams et al., 2016). The purpose of this study was to examine the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. This study was restricted to the newly designated public schools in North Carolina that would not have been designated as low-performing schools under the state's previous definition. The primary research question was: How has North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower teacher retention rates compared to past years and compared to other North Carolina public schools for the same year. The secondary research question was: How has North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's

previous definition? The hypothesis was that newly designated low-performing schools will have lower ratings on the NCTWC compared to past years and compared to other North Carolina public schools for the same year.

CHAPTER 2: LITERATURE REVIEW

Introduction

The purpose of this study was to examine the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. This study was restricted to the newly designated public schools in North Carolina that would not have been designated as low-performing schools under the state's previous definition. This chapter examines the literature relevant to understanding the relationship between teacher retention and student achievement as well as how educational policies impact teacher retention in schools serving high poverty and minority students. The first section will examine background information on teacher retention including trends, influential factors, and the impact on schools and students. The second section will review findings from past research evaluating the impact of school accountability policies and teacher compensation policies on teacher retention at schools serving high poverty and minority students. The third section will examine the role school-based administrators play in retaining effective teachers and how they mediate the policies examined in the previous section. The fourth section will synthesize and interpret the findings. The chapter will conclude with a brief summary of the research literature reviewed.

Teacher Retention

Trends in Teacher Retention

A number of studies have found that teacher turnover is higher in schools serving high poverty and minority students than schools with fewer disadvantaged students. (Goldring et al., 2014; Hanushek et al., 2004; Ingersoll, 2004; Loeb et al., 2005). Nationally, approximately 16%

of public school teachers leave their schools each year, with approximately 8% leaving to teach at another school and the additional 8% leaving the teaching profession (Goldring et al., 2014, p. 6). When examining school characteristics, the mobility rate increased as the percentage of students approved for free or reduced price lunches increased (Goldring et al., 2014). The mobility rate at schools with 75% or more of the students approved for free or reduced price lunches was twice as high as the mobility rate at schools with 34% or less of the students approved for free or reduced price lunches (Goldring et al., 2014, p. 8). A higher turnover rate in high poverty schools as compared to more affluent schools has led to the examination of why teachers are leaving high poverty schools at higher rates and how this turnover has impacted the equitable distribution of teachers across schools.

According to the *2016–2017 State of the Teaching Profession in North Carolina* report, the state's attrition rate was 8.65%, the mobility rate was 4.80%, and the overall turnover rate was 13.45% for the 2016–2017 school year (North Carolina Department of Public Instruction, 2018). The teacher turnover rates in North Carolina for the past five years are listed in Table 1.

Table 1

North Carolina Teacher Turnover Rates

School Year	Total Teachers	Total Turnover	Turnover Rate
2012–2013	95,028	13,616	14.33%
2013–2014	96,010	13,557	14.12%
2014–2015	96,081	14,255	14.84%
2015–2016	95,549	12,799	13.40%
2016–2017	94,792	12,750	13.45%

Source: http://www.dpi.state.nc.us/educatoreffectiveness/surveys/leaving/ (2018)

Factors That Influence Teacher Retention

A wide range of factors have been found to influence teachers' decisions to stay or leave their current teaching positions. These factors include both teacher factors (teacher

demographics, teacher characteristics, and salary) as well as environmental factors (school characteristics, governance, and working conditions) (Liu, 2007). Examining characteristics surrounding schools with both high and low turnover rates can inform policymakers with knowledge relevant to improving retention in schools serving high poverty and minority students. Salary and working conditions have frequently been identified as primary factors impacting teacher retention (Hanushek & Rivkin, 2007; Johnson, Kraft, & Papay, 2012; Loeb et al., 2005).

Understanding the reasons teachers leave schools serving high poverty and minority students is central to designing and implementing polices to increase teacher retention. There are two theories surrounding why schools serving high poverty and minority students have relatively high teacher turnover rates. One theory is that teachers leave due to the characteristics of the students. The second is that they leave due to the working conditions, independent of the characteristics of the students.

The theory that student characteristics influence teacher retention implies that working conditions are dependent on student characteristics. Clotfelter et al. (2004) theorized that teachers will weigh both salaries and working conditions in their decisions on where to teach. They reasoned that most teachers prefer "easy-to-teach" students, and predicted that, given the same salary, teachers prefer positions with fewer disadvantaged students. They noted, “More advantaged students are likely to be easier to teach because they are more likely than disadvantaged students to come to school ready to learn, to have access to more educational resources such as books and computers at home, to be motivated to continue on to further education, and to achieve at high levels” (p. 252). Examining the relationship between working

conditions and salary in teachers' decisions, Hanushek et al. (2004) found that teacher mobility was more strongly related to student characteristics than salary.

In contrast, more recent studies support the theory that teachers leave schools serving high poverty and minority students at higher rates due to differences in working conditions that stretch beyond student composition. Johnson et al. (2012) found evidence that independent of schools' student demographic characteristics, teachers' work context is an important predictor of their job satisfaction and intentions to continue teaching at their current school. In a statewide study analyzing school working conditions with demographic and student achievement data in Massachusetts, researchers found that teachers were more likely to transfer from schools with less supportive working environments and that collegial relationships, principal leadership, and school culture were the elements that had the greatest impact (p. 24). Results from studies in New York City (Boyd et al., 2011) and North Carolina (Ladd, 2011) also found similar patterns. Linking the reasons teachers leave schools serving high poverty and minority students to changeable working conditions rather than student characteristics implies that a policy solution to reducing teacher turnover exists. It also raises the question of what current polices have contributed to the disparities in teacher turnover rates.

Impact of Teacher Retention on Schools and Students

Teacher retention impacts schools instructionally, organizationally, and financially (Johnson, et al., 2005). First, access to an effective teacher is critical to students' academic achievement. Second, a stable workforce provides continuity. Third, time and resources must be devoted to recruiting and hiring new teachers.

Teacher quality is known to have a significant impact on student achievement. Multiple studies have found that teachers are the most influential school-based factor impacting student

learning (McCaffrey et al., 2004; Rivkin et al., 2005; Rockoff, 2004). To this end, teachers are a resource, and equitable resource allocation must include the equitable distribution of teachers across schools. When examining how teacher turnover impacts teacher distribution, the primary concerns are determining who is leaving and what characteristic surround schools with both high and low retention.

Schools can benefit from some turnover. An example of this phenomena is when a teacher leaves and is replaced by a more effective teacher or when new teachers bring innovative ideas. However, high turnover may be a sign of organizational problems and negatively impact student learning (Mobley, 1982; Price 1977). West and Chingos (2008) theorized that the optimal pattern for teacher turnover "may be high attrition rates among the least effective teachers and low attrition rates among the most effective teachers" (p. 3). Goldhaber's (2010) findings suggested that policymakers should focus on improving the quality of the teacher workforce in order to improve student achievement. Schools serving high poverty and minority students are more sensitive to the effects of turnover because they often have a difficult time recruiting teachers (Betts, Rueben, & Dannenberg, 2000).

While the need for effective teachers is obvious, determining the impact of who stays, leaves, or moves has been a challenge for researchers. Researchers have used education, experience, and more recently teacher performance data, composed primarily of teacher evaluation data and students' standard test scores, to determine the quality of teachers. While there is no evidence that higher salaries result in more effective teachers, research has found that salaries are more likely to be positively related to student achievement than negatively (Hanushek & Rivkin, 2004, p. 17).

The U.S. Department of Education's Excellent Educators for All Initiative required each state to submit an updated plan describing the steps it will take to meet the Elementary and Secondary Education Act's requirement to "ensure that poor and minority children are not taught at higher rates than other children by inexperienced, unqualified, or out-of-field teachers" (Williams, Adrien, Murthy, & Pietryka, 2016, p. 1). A majority of states have reported that low income students are taught by inexperienced and less qualified teachers at higher rates than higher income students (Williams et al., 2016). This discrepancy is supported by several research studies (Betts et al., 2000; Clotfelter, Ladd, Vigdor, & Wheeler, 2007; Lankford, Loeb, & Wyckoff, 2002). States identified conditions, insufficient educator preparation and human capital management systems as the root causes of equity gaps in access to excellent educators. Students in high poverty schools should have access to similar quality teachers as students in schools serving more advantaged students.

Schools serving high poverty and minority students often have more challenging working conditions and lower salaries than schools with fewer disadvantaged students. A number of studies have documented the trend of teachers leaving schools serving high poverty and minority students for schools with fewer disadvantaged students (Boyd et al., 2005; Hanushek et al., 2004). Clotfelter, et al. (2007) noted that teachers tend to "trade up" to more affluent schools (p. 1363). Policymakers must consider the mobility of teachers schools serving high poverty and minority students to schools with fewer disadvantaged students. Hanushek (2007) noted "it seems clear that policies that aim to close the gap must find ways to upgrade the quality of the teachers available to disadvantaged and minority students and to create incentives for these teachers to stay in these more challenging schools" (p. 597).

When examining how educational polices have impacted teacher retention at schools serving high poverty and minority students, policymakers must consider both intended outcomes and unintended consequences. Marshall and Gerstl-Pepin (2005) pointed out that "polices often create effects that are quite the opposite of their original intentions" (p. 254). They referenced the concept of the *policy web* to explain the interconnected nature of polices at the district, state, and federal level.

Policies Impacting Teacher Retention

While the United States Constitution gives states power to govern education, federal education policies have had a considerable impact on education in the United States. They are usually broad and lack specific regulations regarding how the policies should be implemented. The interpretation of the goals and aims of federal policy along with the state conditions shape the creation of state and local policies. One federal policy can lead to the passage of hundreds of different state and local policies. The variance in the design and implementation these policies can lead to drastically different outcomes in the practice of a federal policy across the country. As McLaughlin (2005) noted, "What actually happens as a result of a policy depends on how policy is interpreted and transformed at each point in the process, and finally on the response of the individual at the end of the line" (p. 60). In the case of education policy, school-based administrators and teachers are most often the individuals "at the end of the line" affecting policy outcomes.

Educational policy can be analyzed using a framework of competing values. The values of choice, efficiency, equity, and excellence are often in conflict with each other. Polices that pursue multiple values often face unintended consequences (Marshall & Gerstl-Peppin, 2005). Federal education policies are frequently grounded in the Bill of Right's equal protection clause

and address weaknesses and inequities found in states' education policies (Marshall & Gerstl-Peppin, 2005). A key federal education policy that has impacted schools serving high poverty and minority students is the Elementary and Secondary Education Act (ESEA) of 1965, and its reauthorization through the No Child Left Behind (NCLB) Act of 2001. No Child Left Behind aimed to improve test scores and access to qualified teachers in order to raise academic achievement for all students and close the achievement gaps between high- and low- poverty students, and between minority and nonminority students (Darling-Hammond, 2007). The passage of NCLB has shaped numerous policies at the state and local level including school accountability policies and teacher compensation policies. Many of these policies have directly and indirectly impacted teacher retention and the distribution of teachers at schools serving high poverty and minority students.

This literature review will examine two broad categories of state and local policies that have impacted teacher retention at schools serving high poverty and minority students: school accountability policies and teacher compensation policies. The policies' impact on both teacher retention rates and the equitable distribution of teachers will be examined.

School Accountability Policies

The passage of NCLB began an era of labeling "low-performing" and "failing" schools. Many of these schools were high poverty schools with high populations of racial and ethnic minority students. Harris (2007) found that low-poverty schools were 22 times more likely to be high performing than high-poverty schools (p. 386). Further, he found that low-poverty, low-minority schools were 89 times more likely to be high performing than high poverty, high-minority schools (p. 387). No Child Left Behind (2002) required states to have a single, statewide accountability system that used sanctions and rewards to hold districts and schools

accountable for student achievement. A review of school accountability report cards found 14 states had an A-F rating system for schools (Thomsen, 2013). Publically identifying a school as low-performing or failing attached a stigma to the school that policymakers hoped schools would strive to remove. It was assumed that schools would work harder to improve student achievement in order to remove the label. While the negative stigma of being identified as a low-performing or failing school may motivate some teachers to improve, it may motivate others to leave the school (Mintrop, 2004).

Hanushek et al. (2004) found that at all levels of experience, higher average student achievement significantly reduced the probability that a teacher would transfer within or leave Texas public schools. They found that within urban districts in Texas, teachers transferred to schools with fewer academically and economically disadvantaged students. The probability of teachers transferring to another school in the district was 1.7% higher in schools with average test scores in the bottom quartile as compared to schools in the top quartile (Hanushek, et al., 2004).

Clotfelter et al. (2004) examined the extent to which North Carolina's school-based accountability system, the ABCs program, affected the desirability of one type of school relative to another. Specifically, they were interested in whether schools serving low-performing students experienced additional challenges recruiting and retaining high-quality teachers as a result of the ABCs program. The ABCs program labeled schools as "low performing" if less than 50% of their students were at grade level and they did not meet their school-specific growth standard (Clotfelter et al., 2004). They found that the low performing designation increased the probability of departure for an experienced teacher by approximately 25% (p. 262). The study also examined teacher quality as measured by experience and the competitiveness of the

undergraduate college the teacher attended. They did not find evidence that the accountability system adversely affected the quality of teachers in low-performing schools.

Boyd, et al. (2005) found that highly qualified teachers in New York City were more likely to transfer to another school or leave teaching when teaching in low-performing schools. They also examined the distance from new teachers' prior homes to their initial job, and found that teachers who were not residents of New York City when they applied for certification were approximately five times more likely to transfer to another district after their first year. Their findings indicate that some of the higher turnover in low-performing schools may be due to teachers' preferences to work near their homes rather than preferences to avoid low-performing schools.

Allensworth, Ponisciak, and Mazzeo (2009) studied teacher mobility in Chicago Public Schools. They found that teacher retention in elementary schools declined as percentage of students meeting or exceeding state standards fell below 60%. The retention rate was 25% lower in schools where 30% or less of the students met or exceeded state standards as compared to schools where 90% or more of the students met or exceeded state standards (Allensworth et al., 2009). They found that teachers at low-achieving schools were more likely to transfer to another school in the district than teachers at higher-achieving schools, but they were only slightly more likely to leave the district altogether. On average, teachers transferred to schools that were similar to the ones they left (Allensworth et al., 2009). Looking at the relationship between poverty and achievement they found that all the schools with the lowest retention rates had 50% or more of the students qualify for free or reduced lunch and most of the schools with the lowest retention rates had less than 30% of the students meet or exceed state standards. The study was not able to examine the effectiveness of the teachers.

Feng, Figlio, and Sass (2010) examined how Florida's new school accountability program affected teachers' mobility decisions. They were specifically interested in the extent to which increased accountability pressure affected teachers' decisions to leave struggling schools. They found that schools that received lower grades under the new accountability system had higher turnover than those that did not experience a change, and the effects were strongest in schools that received an "F". As compared to teachers in schools that did not receive a lower grade under the new accountability system, teachers in schools who receive a grade of "F" were "over 40 percent more likely to leave their school" and were "nearly 70 percent more likely to move to another school in the same district" (Feng et al., 2010, p. 22). They referred to this experience as "downward accountability shock." When using students' average achievement gains to analyze the quality of the teachers that stayed and left, they found that while the average quality of teachers that stayed improved at downward shocked schools, that the average quality of teachers that left improved more than the teachers that stayed. Their results indicate that while increased accountability pressure may have led to improvements in teacher quality as measured by students' average achievement gains, it also increased the likelihood of high-quality teachers leaving struggling schools. Feng et al. (2010) proposed a policy solution of offering the most effective teachers increased incentives to remain in the school.

At the national level, Reback, Rockoff, and Schwartz (2014) examined the impact of accountability pressure on teachers since the implementation of state accountability systems required by the NCBL Act. They analyzed a nationally representative sample from the 2003–2004 Schools and Staffing Survey for teachers who were working in high-stakes grades/subjects. They found that teachers in schools with moderate or low probabilities of making Adequate Yearly Progress (AYP) were less likely to plan to teach until retirement than teachers in schools

with high probabilities of making AYP. Similarly, Grissom, Nicholson-Crotty, and Harrington (2014) analyzed the 1994–2008 Schools and Staffing Survey data to examine teachers' perceptions of their work environments and related job attitudes, including satisfaction and commitment to remain in teaching. In contrast to findings by Reback, et al. (2014), they found little evidence that NCLB affected teachers' job satisfaction or commitment to remain teaching when comparing states with and without prior accountability systems or when further assessing this difference across high- and low-poverty schools.

Furthering the knowledge of both of these studies, Sun, Saultz, and Ye (2016) analyzed nationally representative samples from both the Schools and Staffing Surveys and Teacher Follow-Up Surveys from 1993–2009 to examine the effects of the NCLB on voluntary and involuntary teacher attrition and mobility. They examined how the effects of NCLB differed for teachers in tested subjects and grades and for teachers in disadvantaged schools that served a larger proportion of minority or poor students. Their findings suggested that NCLB accountability did not change the average national rate of voluntary teacher attrition or mobility. Examining the impact on disadvantaged schools, they estimated that NCLB increased involuntary teacher mobility in 2004–2005 and had no influence on voluntary teacher attrition or mobility.

Teacher Compensation Policies

Nationally there have been numerous federal, state and local policies related to teacher compensation. These policies include salary schedules and incentive pay plans. Carefully crafted teacher compensation policies have the potential to increase retention of effective teachers at high poverty schools. Clotfelter, Glennie, Ladd and Vigdor (2008) suggested, "One obvious policy tool to deal with the quality and distribution of teachers would be to increase teachers'

monetary compensation, perhaps in a targeted way" (p. 1353). Researchers have found that teacher compensation policies have had differing impacts on teacher retention. Some have been designed to address teacher retention issues, while others have had unanticipated effects on teacher retention. Overall, research has shown that variations in salary influence teacher retention. This section will examine how salary schedules and incentive pay plans have impacted teacher retention at high poverty schools.

Salary schedules. The use of salary schedules to determine teacher compensation is widespread. Podgursky (2006) found that 96% of school districts reported having a salary schedule for teachers (p. 11). Salary schedules can impact mobility of teachers within and across districts. Increases in salaries have been found to decrease teacher turnover. A study on new teacher retention in California found that the probability of elementary teacher turnover decreased by 17% with a salary increase of $4,400 (Reed, Ruben, & Barbour, 2006).

Most salary schedules are applied uniformly across all schools in a district. Almost all base pay solely on years of experience and level of education; they do not differentiate based on field, performance, or working conditions. This structure can pose recruitment and retention challenges to high poverty schools that often have more challenging working conditions than more affluent schools. Teachers in districts with uniform district-wide salary schedules may be reluctant to remain teaching at high poverty schools if they can transfer to another school in the district with students that are less challenging to educate and earn the same salary (Ladd, 2009). Podgursky (2006) argued that rigid salary schedules contribute to equity gaps in the experience and education of teachers at high poverty schools (p. 3). Similarly, Goldhaber (2010) noted that "not all teaching jobs are alike" and argued that the single-salary schedule could be improved to account for differing working conditions (p. 1).

When salaries are standardized across all schools in a district, teachers often transfer from high poverty schools to more affluent schools. In Texas public schools, Hanushek and Rivkin (2007) noted, "For those teachers who move, the type of students changes far more than their salaries do" (p. 76). They found that on average teachers transferred to schools where the number of students eligible for free or reduced-price lunch was 6% lower, while the change in salary was less than 1% (p. 76).

Salaries vary across districts, and districts serving high poverty students often have lower salaries than districts serving more affluent students. Adamson and Darling-Hammond (2012) found considerable variation in teachers' salaries across districts; even those within the same county or labor market. Wage disparities between the highest salary districts and lowest salary districts in a labor market were found to be as large as a 2:1 ratio (p. 25). Districts paying lower salaries have been found to face challenges recruiting and retaining experienced and qualified teachers. Results from the 2012–2013 Teacher Follow-up Survey revealed that both attrition and mobility decreased as teachers' salaries increased (Goldring et al., 2014).

Hanushek et al. (2004) found that Texas public schools serving academically disadvantaged students had difficulty retaining teachers. They examined the salary differentials that would be required to offset differences in working conditions. Their results indicated that salaries had a greater impact on mobility between districts than attrition from the profession (p. 347). They also found a difference related to males and females. In fact, they found that in male teachers with three to five years of experience that a 10% increase in salary would reduce the probability of switching districts by 3.4%, and the probability for females was only 1.1% (p. 374).

Using data from new teachers in Wisconsin, Imazeki (2005) found that salary increases were most effective in reducing transfers in female teachers when salaries were increased relative to nearby districts (p. 432). She suggested that wage increases of 20% could reduce attrition in urban districts to levels similar to an average district (p. 448). Additionally, she cautioned policymakers that "wage increases across all districts, that do not change relative wages, could have little direct effect on female transfer attrition rates" (p. 432).

Adamson and Darling-Hammond (2012) found that a 1% increase in average adjusted teacher salaries was associated with a 4% reduction in turnover in California. Further, they found that the lowest-salary districts had nearly twice as many low income students, teachers without a permanent credential, teachers with lower education, and teachers with fewer than three years of experience. They also found that class sizes were nearly 20% larger in the lowest-salary districts compared to the highest-salary districts (p. 22). Similarly, the highest-poverty districts had higher turnover, more teachers without credentials, and teachers with less education and experience as compared to the lowest-poverty districts (Adamson & Darling-Hammond, 2012, p. 24). An analysis of teacher salaries in Nassau County in New York found that the highest salaries were paid in suburban districts with very low percentages of high poverty students (Adamson & Darling-Hammond, 2012, p. 26).

Incentive pay plans. Incentive pay plans for teachers are often designed to improve teacher retention, student achievement, or both. They include retention bonuses and performance bonuses. Some policies have been implemented across all schools in a state or district and others have been limited to schools with less desirable working conditions.

The use of teacher retention bonuses is widespread with thirty-five states reported to have used incentive pay to increase teacher retention (Wheeler & Glennie, 2007, p. 2). However, only

five states were found to have targeted bonuses to high-need schools (Wheeler & Glennie, 2007, p. 2). The use of retention bonuses is based on the theory that high turnover in high-needs schools can be mitigated by a relatively small financial incentive (Springer, Swan, & Rodriguez, 2016). Barnard (1938/1968) noted that "when the burdens involved are numerous or heavy, the offsetting positive advantages must be either numerous or powerful" (as cited in Shafritz, Ott, & Jang, 2011, p. 97). He suggested that increasing wages was one way to increase positive inducements; however, he also noted the limitations of material inducements. Barnard included several classes of inducements: material inducements, personal non-material opportunities, desirable physical conditions, and ideal benefactions (as cited in Shafritz, Ott, & Jang, 2011, p. 98). Some districts have used pure retention bonuses, those that are awarded solely for returning to a teaching position in the school or district, while others are tied to performance. Springer et al. (2016) suggested using retention bonuses tied to teacher effectiveness as a policy solution for improving the quality of teachers serving disadvantaged students (p. 216). They noted, "Because teachers across the effectiveness spectrum leave high-poverty, high-minority schools regularly on their own volition and are generally replaced by less experienced and effective teachers, bonuses that retain the teachers at the higher end of the effectiveness distribution can have substantial impacts on the quality of a school's faculty" (p. 216).

Clotfelter, et al. (2008) examined a program in North Carolina that awarded an annual bonus of $1,800 to certified math, science and special education teachers working in public secondary schools with either high-poverty rates or low test scores. The program created within-school variation in teacher salaries to reduce transfers of hard to staff subject area teachers to schools serving more affluent or higher achieving students. They found that bonus payments reduced the mean turnover rates of the targeted teachers by 17% (p. 1352). The bonuses

represented approximately 4% of a teacher's base salary on average (p. 1355). The program provided bonuses for all teachers certified in math, science or special education at an eligible school regardless of performance.

In 2013, Tennessee implemented a retention bonus program in its Priority Schools (the lowest performing 5% of schools). The program provided a $5,000 bonus to teachers rated "Significantly Above Expectation" (Level 5) during the 2012–2013 school year that remained teaching at a Priority School during the 2013–2014 school year. Springer et al. (2016) found that the rate of retention increased approximately 20% for Level 5 teachers of tested subjects and grades in Priority Schools. By targeting the bonuses to teachers rated "Significantly Above Expectation" the program was able increase low performing schools' retention of the states' most effective teachers.

Performance bonuses for public school teachers have been used in a variety of ways. Polices have included bonuses based on student achievement and teacher evaluation ratings. Berry (2009) found that many incentive pay plans have begun using a comprehensive approach to determining teacher effectiveness. He noted that "many school districts that have tried to enact performance pay using standardized tests as measures of teaching effectiveness have struggled to do so reliably and accurately" (p. 14). Some incentives were earned on an individual basis while all teachers in a school based on school wide results received others. Using a nationally representative sample from the 2003–2004 Schools and Staffing Survey, findings suggest that higher poverty districts were somewhat more likely to implement performance pay (Springer et al., 2009, p. 9). The U.S. Department of Education established the Teacher Incentive Fund to provide grants to high-need schools to develop and implement performance-based teacher compensations systems that used gains in students' academic achievement, classroom

evaluations, and provided teachers incentives to take on additional responsibilities and leadership roles (U.S. Department of Education, 2016). The program has funded funded 131 projects serving over 2,000 schools in 36 states (U.S. Department of Education, 2016).

In an evaluation of Texas' Governor's Educator Excellence Grant (GEEG) Program, Springer et al. (2009) found that the program had a significant impact on teacher turnover. The probability of turnover decreased for both beginning and experienced teachers as the size of the GEEG bonus award increased. The GEEG Program was implemented in high poverty, high performing Texas public schools. It provided performance bonuses for teachers based on performance indicators determined at the district level. Similarly, Taylor and Springer (2009) found that teacher-designed incentive pay plans in the GEEG program did not appear to induce significant changes in teacher productivity, but they did have a significant impact on teacher turnover (p. 5). They found that the probability of turnover decreased for teachers that received a bonus and increased for teachers that did not receive a bonus (p. 30).

Springer and Winters (2009) examined New York City's School-Wide Performance Bonus Program and its impact on student outcomes and the school learning environment. The program provided bonuses of $2,417 on average to schools for each full-time union member at qualifying schools that met their proficiency targets. After the first year, Springer and Winters (2009) found that the program had little impact on student proficiency or school environment. Initial findings in an evaluation by Marsh et al. (2011) indicated that there were no statistically significant differences in participating teachers' survey response about their opinions on mobility (p. xxvi). A subsequent study by Goodman and Turner (2011), found that the program did not reduce mobility of teachers out of or within the city (p. 16).

North Carolina's ABCs accountability program provided $1,500 bonuses to teachers in schools designated as "exemplary" (Ladd & Zelli, 2002). Ladd and Zelli (2002) found that the program made schools designated as low performing "even less attractive than in the absence of the program because teachers have a greater chance of receiving financial bonuses and positive recognition as professionals at other schools" (p. 523). Qualitative data from principals of schools that were designated as low performing indicated that they had difficulty recruiting and retaining high-quality staff members (p. 523). Ladd and Zelli predicted that the program would cause disparities in schools serving disadvantaged and low-performing students and reduce their ability to retain effective teachers (p. 523). Their predictions are consistent with studies that found that teacher turnover increased for teachers who did not receive a bonus (Springer et al., 2009, p. 105). It can be theorized that bonuses for gains in student performance may increase turnover at high poverty schools where teachers are less likely to receive a bonus.

The Role of School-Based Administrators in Teacher Retention

Researchers have theorized that while both teacher factors and environmental factors influence teachers' job satisfaction and intent to continue teaching, that this relationship is mediated by school-based administrators. Burkhauser (2017) noted, "A growing body of research suggests that teachers' perceptions of their school working conditions greatly influence their decisions to leave their schools. A related body of research suggests that principals may be in the best position to influence school working conditions" (p. 12). The working condition of administrative support has been the primary variable examined. Boyd et al. (2011) defined administrative support as "the extent to which principals and other school leaders make teachers' work easier and help them to improve their teaching" (p. 307). The role of school-based administrators in teacher retention has been of particular interest in the study of retention at

schools serving high poverty and minority students schools due to the challenging working conditions that often characterize these schools.

Previous research has identified a relationship between administrative support and teacher retention. Ingersoll and Smith (2003) analyzed nationally representative samples from both the Schools and Staffing Surveys and Teacher Follow-Up Surveys, and found that poor administrative support along with low salaries and student discipline problems were the primary reasons for dissatisfaction in beginning teachers that left their teaching jobs. Similarly, in examining predictors of high rates of school-level turnover, Loeb et al. (2005) found that poor working conditions, low salaries, and student characteristics impacted teacher retention in California schools with high turnover. They found that the impacts of the schools' racial compositions and proportions of low-income students on teacher turnover were substantially reduced when taking working conditions and salaries into account. Ladd (2009) also found that when controlling for student demographic data, teacher working conditions were predictive of teacher turnover in North Carolina, and identified the quality of school leadership as a primary factor influencing working conditions.

Boyd et al. (2011) analyzed survey responses from first-year teachers in New York City who left or considered leaving. They found that administrative support was most frequently identified as the most important aspect of their job influencing teachers' decisions to leave teaching. Administrative support was the only working condition to significantly predict teacher retention decisions after controlling for school poverty rates (Boyd et al., 2011). Expanding on this research, Tickle, Chang, and Kim (2011) analyzed 2003–2004 Schools and Staffing Survey data to examine how administrative support affected teachers' job satisfaction and intent to continue teaching. They identified administrative support as the most significant predictor of

teachers' job satisfaction, and teachers' job satisfaction as the most significant predictor of teachers' intent to stay in teaching. Notably, they found that administrative support mediated the effect of teaching experience, student behavior, and teachers' satisfaction with their salary on teachers' job satisfaction and intent to continue teaching. Their findings suggested that improving teachers' perceptions of administrative support would improve teacher retention.

Grissom (2011) examined the effects of principals on teacher satisfaction and turnover in high poverty and high minority schools using 2003–2004 Schools and Staffing Survey data and 2004–2005 Teacher Follow-Up Survey data. His findings suggested that both teacher satisfaction and teacher turnover may be impacted more by the quality of the principal in these traditionally hard-to-staff schools than in an average school. He found evidence that a 1.5 standard deviation increase in principal effectiveness would offset the turnover differential between hard-to-staff schools and other school. Notably, he also found that principals with higher teacher ratings were disproportionally located in schools serving more affluent students and less racial and ethnic minority students. Branch, Hanushek, and Rivkin (2012) examined how principal quality, as measured by student learning gains, impacted teacher turnover in Texas. They found that teacher turnover was highest in schools with the least effective principals, irrespective of the proportion of high poverty students. They also investigated whether high quality principals were more effective in retaining effective teachers and moving out ineffective teachers. They found evidence that the best principals were able to move out a greater proportion of ineffective teachers.

Johnson et al. (2012) found that principal leadership was one of three factors found to predict teachers job satisfaction and turnover. Their findings indicated that social factors of working conditions, including collegial relationships, principal leadership, and school culture,

had a greater impact on job satisfaction than organizational factors. They noted that teachers were "three times more likely to plan to transfer from schools with particularly poor conditions of work than are teachers whose work environment is of average quality (p. 30). They found that teachers in high poverty and high minority schools reported having a less supportive working environment. Controlling for student demographics, they found that differences in the working conditions accounted for the largest proportion of the variance in teachers' job satisfaction.

Synthesis

The purpose of this literature review is to examine what recent educational policies have impacted teacher retention at schools serving high poverty and minority students, and in what ways. The research literature reviewed also examines how school-based administrators in these schools mediate these policies. Upon reviewing factors that have been found to impact teacher retention, both working conditions and salary were identified as primary factors influencing teachers' decisions to stay or leave their current positions. Based on their relationship with these factors, school accountability policies and teacher compensation policies were selected to research. The findings suggest that both school accountability policies and teacher compensation policies have impacted teacher retention at schools serving high poverty and minority students. The effects have varied based on the policies' design and implementation. Policies designed to improve teacher retention at schools serving high poverty and minority students have had some success, while other policies have had negative, unintended outcomes. Some school-based administrators have been effective in mediating these policies through creating supportive work environments. This section will synthesize and interpret the findings.

School Accountability Polices

While school accountability polices intend to identify and close achievement gaps, in many ways they have further disadvantaged the students they aimed to help. Many of the accountability polices negatively impacted teacher working conditions and the effect has been more pronounced at schools serving high poverty and minority students. Given that these schools often have lower student achievement scores than schools with fewer disadvantage students, they are more likely to be faced with sanctions due to poor student achievement. Additionally, the systems' rewards often seem out-of-reach to teachers. Faced with increasing accountability pressure, teachers often choose to leave schools serving high poverty and minority students. Turnover of ineffective teachers can benefit schools if they are able to fill the vacancy with a more effective teacher. Additionally, there is no guarantee that ineffective teachers are not just shuffled around and rehired by other schools (Allensworth et al., 2009). The research is inconclusive on how turnover in low-performing schools has impacted the schools' overall teacher quality. Policymakers must examine how accountability systems disproportionally penalize schools serving high poverty and minority students, and understand how these effects influence teacher job satisfaction and retention.

Teacher Compensation Policies

The research supports the claim that salaries influence teacher retention. The current structure of salary schedules has done little to prevent teachers from transferring from schools serving high poverty and minority students to other schools within the same district. It has been established that teachers in schools serving high poverty and minority students often encounter more challenging working conditions than teachers in schools serving fewer disadvantaged students, and that teachers are more likely to leave schools with poor working conditions.

Policymakers must offset the "burdens" often faced by teachers in schools serving high poverty and minority students in order to stem the migration of teachers to schools serving fewer disadvantaged students. When pay is standardized across all schools in a district, there is little incentive to continue teaching at a school with poor working conditions. Ferguson (1991) noted, "equal salaries will not attract equally qualified teachers to dissimilar school districts" (p. 489). Disparities in salaries across districts have also disproportionally impacted schools serving high poverty and minority students. Districts serving large numbers of high poverty and minority students will likely continue to lose teachers to districts serving fewer disadvantaged students if they cannot offer comparable salaries. Given the disparities that often exist in salary schedules across districts, incentive pay in districts serving high poverty and minority students may not be enough to supplement the base pay to make it comparable to districts serving fewer disadvantaged students (Adamson & Darling-Hammond, 2012). Equitable salary schedules within and across districts are a policy solution to reduce turnover in high poverty schools. The research suggests salary schedules could be used as a policy tool to improve teacher retention at schools serving high poverty and minority students if they were redesigned to account for the differing working conditions across schools in a district.

Hanushek (2007) argued against the use of salary schedules based on education and experience, and cautioned against using across-the-board raises to improve retention in schools serving high poverty and minority students since there is no evidence that these actions improve the quality of teachers. He advocated that policies should be designed to retain high-quality teachers, not solely to reduce turnover. He proposed moving to a system that emphasizes performance. The research examined indicates that the impact of incentive pay plans on retention at schools serving high poverty and minority students varies with the design and implementation

of the plan. Incentive pay plans were based on a variety of performance measures including teacher evaluations and proficiency and growth on student's standardized test scores. Some were earned by all teachers in a school based on meeting schoolwide goals, while others were earned on an individual basis. Goldhaber (2010) reasoned that while incentive pay plans can be used as a policy tool to more fairly distribute teachers across schools, retain effective teachers, and increase student achievement, "Teachers' jobs are complex and multidimensional, and we know very little about how to objectively and accurately quantify their productivity" (p. 2). He cautioned against implementing incentives that may cause unintended effects. Similarly, Gibbons (1998) noted that "it is no use creating strong incentives for the wrong actions" (p. 119) Ladd and Zelli (2002) applied this theory to incentive pay within school accountability programs and proposed limiting financial incentives based solely on the results of state tests. Goodman and Turner (2010) argued the importance the design of teacher performance pay played in achieving intended outcomes. Policies that provided retention bonuses for effective teachers on an individual basis were most successful in retaining effective teachers in schools serving high poverty and minority students.

The Role of School-Based Administrators

Ingersoll and Smith (2003) noted, "The management and organization of schools play a significant role in the genesis of school staffing problems but can also play a significant role in their solution" (p. 33). Researchers studying the relationship between teacher mobility and teacher perceptions of their working conditions found that ratings of school leadership were significantly associated to teachers' job satisfaction and their intent to continue teaching (Boyd et al., 2011; Johnson et al., 2012; Ladd, 2011). In the case of policy implementation, school-based administrators are often the ones driving the practice of federal and state polices within their

schools. The Rand Change Agent Study found that "implementation dominates outcome" (as cited in McLaughlin, 2005, p. 60). School-based administrators play an important role in mediating the effects of federal, state, and local policies.

Working conditions separate from those directly resulting from student composition influence teacher retention (Boyd et al., 2011). School-based administrators can have a large role in shaping the schools' climate and culture. These social factors impact teachers' job satisfaction. Johnson et al. (2012) noted, "It is surely important to have safe facilities, adequate resources, and sufficient time for preparation, but if teachers are to achieve success with their students—particularly low-income and high minority students who rely most on the school for their learning—they also must be able to count on their colleagues, their principal, and the organizational culture of the school to make success possible" (p. 27).

Policymakers must consider how policies impact working conditions if they want to retain talented, effective teachers in high-poverty, hard-to-staff schools (Simon & Johnson, 2013). Johnson et al. (2012) noted, "If schools are to attract and retain the best possible teachers to work with the students who need them most, those schools cannot be workplaces of deprivation, disorder, and isolation, for neither teachers nor students will succeed there" (p. 30). Principals who have been successful in retaining effective teachers have been able to reduce negative policy outcomes and improve teachers' job satisfaction. These findings raise the question of whether the time and effort spent on mitigating the impact of these policies could have been spent improving student learning. Leadership focused on teaching and learning has been found to have the greatest influence on student achievement (Robinson, Lloyd, and Rowe, 2008).

Summary

While numerous federal, state, and local educational policies have been implemented in the last decade, few have been formally evaluated to determine their impact on America's schools and students. The research literature reviewed in this section has provided some guidance on which policies have been effective in retaining effective teachers in schools serving high poverty and minority students. Effective school-based administrators are able to mediate policy outcomes in order to maximize the benefits and minimize the burdens. Schools serving high poverty and minority students that have been fortunate enough to have effective school-based administrators have been more successful in retaining effective teachers. There is a need for additional research to determine how educational policies impact teacher retention. This study aimed to examine the impact of North Carolina's new definition of a low-performing school on teacher retention in order to inform the design and implementation of future educational polices intended to reduce the disparities in the distribution of effective teachers.

CHAPTER 3: METHODOLOGY

Introduction

The purpose of this study was to examine the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. This study was restricted to the newly designated public schools in North Carolina that would not have been designated as low-performing schools under the state's previous definition. The primary research question was: How has North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower teacher retention rates compared to past years and compared to other North Carolina public schools for the same year. The secondary research question was: How has North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower ratings on the North Carolina Teacher Working Conditions Survey (NCTWC) compared to past years and compared to other North Carolina public schools for the same year.

This chapter outlines the methods of this study. The first section will identify the research design and its connection to the research questions. The second section will identify the population and sample. The third section will describe procedures for gaining access to the data

set and a description of the data being examined. The fourth section will describe the data analysis plan. The chapter will conclude with a brief summary of the methods.

Research Design

This study used a quantitative causal-comparative design. The design allowed the researcher to examine the relationship between the low-performing school label (independent variable) and teacher retention and teacher working conditions in North Carolina public schools (dependent variables). The analysis controlled for other variables apart from being designated as a low-performing school that may have impacted the teacher retention rate. Control variables included school type, grade range, locale classification, percent of economically disadvantaged students, and percent of students by race/ethnicity. Causal-comparative research does not definitively prove the independent variable caused the change in the dependent variable; however, the results demonstrate whether a relationship exists between the independent and dependent variables (Brewer & Kuhn, 2010). This study analyzed secondary administrative and survey data collected by the North Carolina Department of Public Instruction (NCDPI) and New Teacher Center (NTC). Once the data were obtained, the data were analyzed using descriptive and inferential statistics. Following the analysis, the researcher interpreted the results and reported the findings.

Population and Sample

The underlying population of interest was North Carolina public schools, excluding public charter schools. The measurement period for this study included the 2013–2014, 2014–2015, 2015–2016, and 2016–2017 school years. During the measurement period, there were 2,478 North Carolina public schools, excluding public charter schools. Based on scores from the 2014–2015 school year, 547 North Carolina public schools, excluding public charter schools,

were designated as low-performing schools during the 2015–2016 school year. There were 202 newly designated schools that would not have met the criteria of a low-performing school under the state's previous definition. The sample was separated into treatment and control groups. The treatment group included the 202 schools that were newly designated as low-performing schools during the 2015–2016 school year that would not have met the criteria of a low-performing school under the state's previous definition (New LPS). The control group included the other 2,276 North Carolina public schools that were not impacted by the state's new definition of a low-performing school. The control group was separated into two groups. The first group included the 1,495 schools that were never designated as low-performing schools during the measurement window (Never LPS). The second group included the 781 schools that were designated as low-performing schools at least once during the measurement window, but were not newly designated as low-performing schools during the 2015–2016 school year due to meeting the criteria of a low-performing school under the state's new definition (Old LPS).

Data Collection and Measures

This study analyzed secondary data files from NCDPI as well as survey data from the NCTWC. The sample included all North Carolina public schools, excluding public charter schools, that were open between the 2013–2014 and the 2016–2017 school years. The data were accessed from NCDPI and the NTC via the Education Policy Initiative at Carolina (EPIC). A memorandum of agreement was submitted with NCDPI through EPIC in order to obtain the data. EPIC maintains a statewide longitudinal database with rigorous validity checks. Approval from the Institutional Review Board of the University of North Carolina at Chapel Hill was obtained prior to accessing the data. Data for this study were collated by EPIC and put on a secure server for this study.

Figure 2 outlines the timeline of when each dependent variable was collected in relation to when schools in the treatment group were designated as low-performing schools based on the state's new definition. Low-performing schools were designated each fall based on the scores from the previous school year. Schools were first designated as low-performing under the new definition during the 2015–2016 school year. For the purposes of this study, the teacher retention rates for each school correspond to the low-performing school designation that was received the prior school year as well as the control variables from the prior school year. Specifically, for the first year in the measurement period, the analysis compared the teacher retention rates for the 2013–2014 school year to the whether a low-performing school designation was earned in the 2012–2013 school year and controlled for school type, grade range, locale classification, percent of economically disadvantaged students, and percent of students by race/ethnicity based on data from the 2012–2013 school year. The teacher working conditions survey results for each school correspond to the low-performing school designation that was received the same school year as well as the control variables from the same school year.

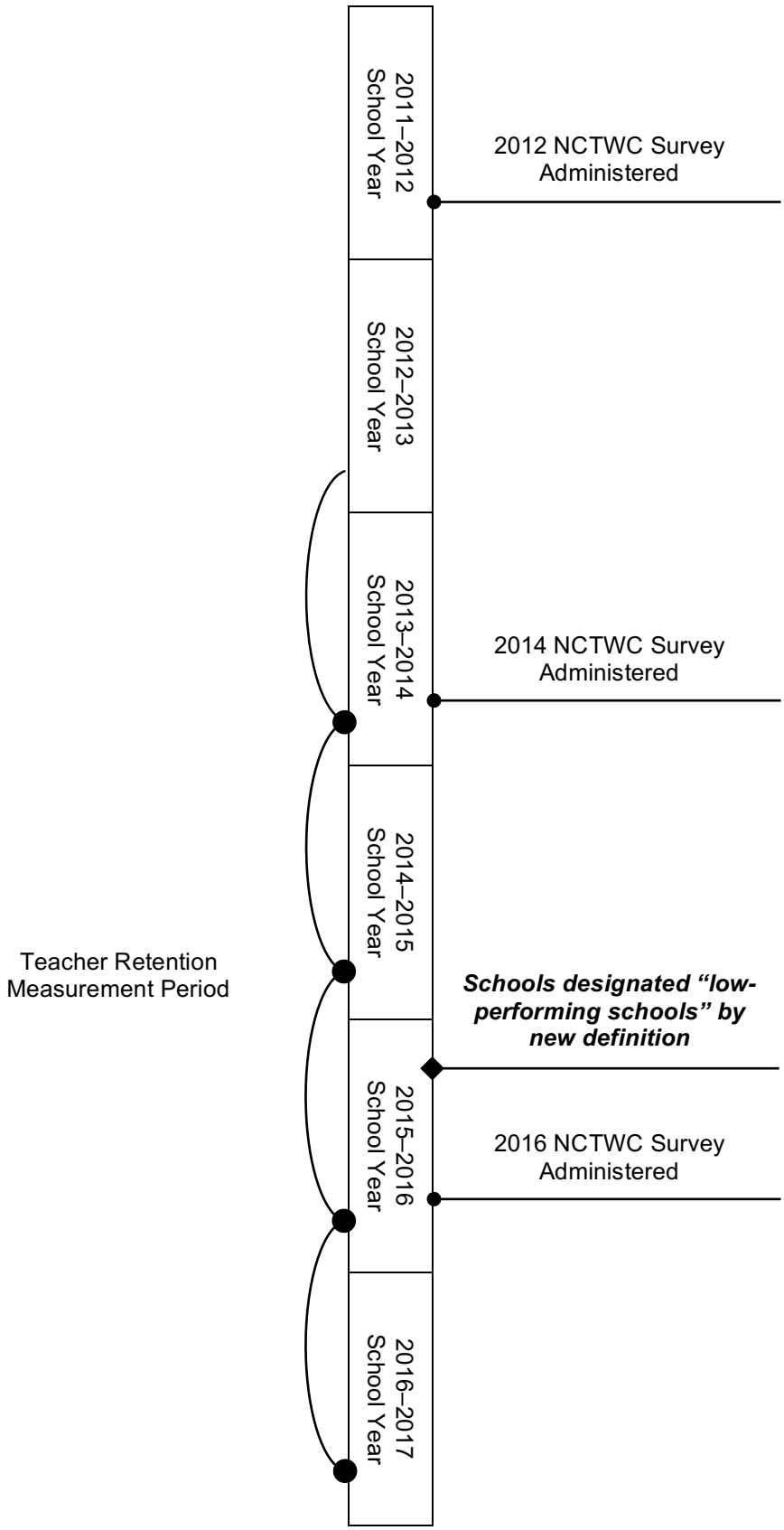

Figure 2. Timeline of data measures.

North Carolina Department of Public Instruction Data Files

This study used the following NCPDI data files from the 2011–2012 through 2016–2017 school years: certified payroll data files to identify those paid as teachers and the schools in which they worked, teacher turnover data, school accountability data, and student and school demographic data. This section will further describe the NCPDI data files examined.

Certified payroll data files from the NCDPI payroll database were obtained for the 2012–2013 through 2016–2017 school years. The files were used to calculate teacher retention rates, the primary dependent variable, at individual schools for the 2013–2014, 2014–2015, 2015–2016, and 2016–2017 school years. To determine retention at the school level, each teacher's unique identifier was queried against all employee budget codes in the previous year's payroll data file. If a teacher's unique identifier was found to be employed in the school as a teacher for both April of the current year and April of the previous year, the teacher was classified as retained at the school level. A measurement period of April to April was used because NCDPI indicated that the April data files were the most accurate representation of the school year (North Carolina Department of Public Instruction, n.d.). The data were aggregated at the school level in order to determine the teacher retention rates for each school during each of the four school years in the measurement period.

Teacher turnover data files were obtained for the 2013–2014 through 2016–2017 school years. The files included the school teacher turnover rates published each year by NCDPI on the North Carolina School Report Cards. The files were used to calculate a second measure of school teacher retention rates. The teacher retention rates for each school during each of the four school years in the measurement period were calculated by subtracting the school-level teacher turnover rate from 100%. The North Carolina Department of Public Instruction calculated the school-level

turnover rates by comparing the number of teachers employed during April of one year to the number of teachers not employed as a classroom teacher in the same school system during April of the following year (North Carolina Department of Public Instruction, n.d.). This measure of school teacher retention rates differed from the first measure because teachers that transferred to another school in the same district were counted as if they were retained at the same school. This second measure of school teacher retention rates was used for comparison with publically available data.

School accountability data files were obtained for the 2011–2012 through 2014–2015 school years. The files were used to identify schools designated as low-performing schools, the independent variable. For the 2012–2013, 2013–2014, and 2014–2015 school years, schools were designated as low-performing schools based on the state's previous definition which included those that received growth score of "not met expected growth" and had less than 50 percent of students scoring at or above Achievement Level III on End-of-Grade and End-of-Course tests. For the 2015–2016 school year, schools were designated as low-performing schools based on the state's new definition which included those that received a school performance grade of D or F and a school growth score of "met expected growth" or "not met expected growth."

Student and school demographic data were obtained for the 2012–2013 through 2015–2016 school years. The files were used to categorize schools in order to control for other variables that may impact the change in teacher retention rate. For school type there were four categories: alternative, magnet, regular, and other. Other included hospital, special education, and vocational. For grade range there were four categories: elementary, middle, high and other. Other included schools with elementary and middle school grades, schools with middle and high

school grades, and schools with elementary, middle, and high school grades. For locale classification there were two categories: rural and urban. Locale classifications were based on standard urban and rural definitions developed by the U.S. Census Bureau. For percent of economically disadvantaged students were are four categories: 0%–25%, 25%–50%, 50%–75%, and 75%–100%. The percent of economically disadvantaged students classification was based on the percentage of students qualifying for free and reduced priced lunches. For students' race/ethnicity there were four categories: Black, Hispanic, white and other. Other included Asian, Indian, Pacific Islander, and two or more races. A summary of the control variables is listed in Figure 3.

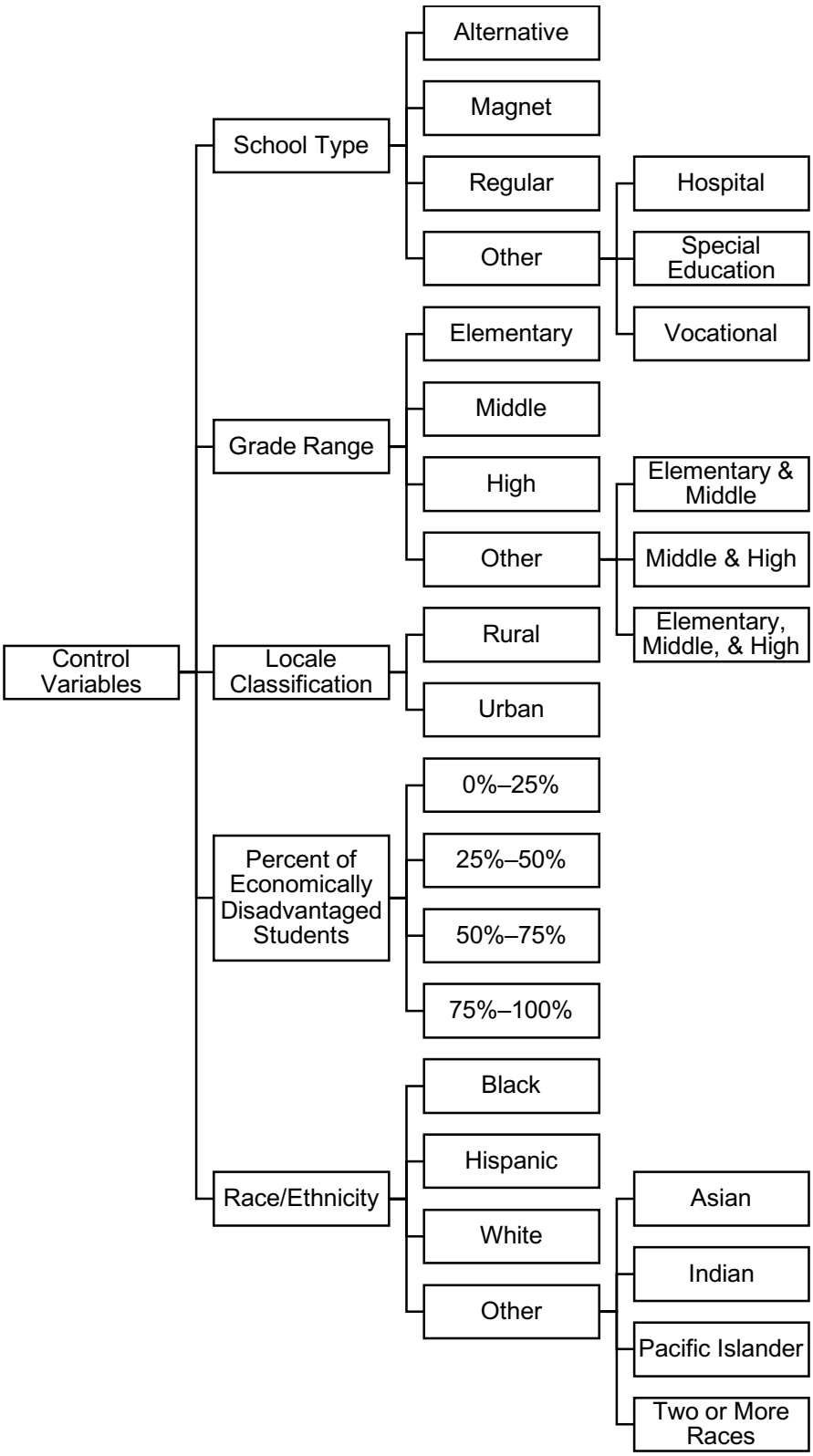

Figure 3. Summary of control variables.

North Carolina Teacher Working Conditions Survey Data

This study used NCTWC data from the 2012, 2014, and 2016 administrations. The survey was administered in March of each year. The data set included responses from 87,562 teachers for the 2102 administration, 83,208 teachers for the 2014 administration, and 89,380 teachers for the 2016 administration. Survey data was aggregated at the school level. The survey data was used to measure teacher working conditions, the secondary dependent variable. Two measures of teacher working conditions were examined: school leadership and overall teacher job satisfaction. This section will further describe the NCTWC survey instrument and data files examined.

The North Carolina Teacher Working Conditions Survey (NCTWC) is a biennial survey given to all school-based licensed educators in North Carolina. The survey responses are anonymous. The only demographic information collected about participants is their job role and years of experience. The survey uses the NTC Teaching, Empowering, Leading and Learning (TELL) survey instrument. The instrument was developed in 2002 by the North Carolina Professional Teaching Standards Commission. This instrument has been found to be statistically valid and reliable through both external and internal analyses (New Teacher Center, 2014). The external validity analysis used the Rasch rating scale to examine the item-measure correlations, item fit, rating scale functioning, unidimensionality and generalizability of the instrument (New Teacher Center, 2014). The external reliability analysis used both the Rasch model and Cronbach's alpha. The analysis found that the instrument is capable of producing consistent results across participant groups (New Teacher Center, 2014). The instrument measures educator's perceptions across eight teaching and learning condition constructs: Time, Facilities and Resources, Community Support and Involvement, Managing Student Conduct, Teacher

Leadership, School Leadership, Professional Development, and Instructional Practices and Support.

School leadership was measured with the items from question 7.1 on the NCTWC. The items within this question were correlated to the School Leadership construct and examined the "Ability of school leadership to create trusting, supportive environments and address teacher concerns" (New Teacher Center, 2014, p. 2). Question 7.1 states, "Please rate how strongly you agree or disagree with the following statements about leadership in your school."

a. "There is an atmosphere of trust and mutual respect in this school."
b. "Teachers feel comfortable raising issues and concerns that are important to them."
c. "The school leadership consistently supports teachers."
d. "Teachers are held to high professional standards for delivering instruction."
e. "The school leadership facilitates using data to improve student learning."
f. "Teacher performance is assessed objectively."
g. "Teachers receive feedback that can help them improve teaching."
h. "The procedures for teacher evaluation are consistent."
i. "The school improvement team provides effective leadership at this school."
j. "The faculty are recognized for accomplishments."

Each item was measured using an ordered response scale. The possible answers are as follows: strongly disagree, disagree, agree, and strongly agree. Survey responses were converted to a numerical scale, in which a 1 represented strongly disagree and a 4 represented strongly agree. The responses for the ten items within question 7.1 were then averaged into an overall composite score.

Overall teacher job satisfaction was measured with question 10.6 on the NCTWC. This item is an overall indicator of teaching conditions and is correlated to all eight of the constructs. Question 10.6 states "Overall, my school is a good place to work and learn." The question was measured using an ordered response scale. The possible answers are as follows: strongly disagree, disagree, agree, and strongly agree. Survey responses were converted to a numerical scale, in which a 1 represented strongly disagree and a 4 represented strongly agree.

Analysis

Quantitative data were cleaned and screened by EPIC. Stata data analysis and statistical software was used to conduct the data analysis. Descriptive and inferential statistics were used to analyze the data in order to answer the primary and secondary research questions. This study used a significance level, α, of 0.05. This section will outline the statistical procedures that were used.

Descriptive Statistics

Descriptive statistics were calculated for the research variables. The descriptive analysis included the means and standard deviations of the measures. The purpose of the descriptive analysis was to describe the basic features of the data in this study.

Inferential Statistics

Further analysis was conducted using multiple regression to examine the relationship between the independent and dependent variables in order to answer the primary and secondary research questions. The analysis examined whether North Carolina's new definition of a low-performing school impacted teacher retention, teacher job satisfaction, or both in newly designated schools that did not meet the criteria for low-performing under the state's previous definition. The analysis controlled for other variables that may have impacted the teacher

retention rate. The multiple regression was conducted using panel data analysis with both fixed effects and random effects models in order to determine the impact of the independent variables over time. The fixed effects models controlled for time-invariant variables that were not measured, but affected the dependent variables. The random effects models estimated the effects of additional control variables whose values did not change across time. Figure 4 outlines the conceptual model for the analysis of the primary research question. Figure 5 outlines the conceptual model for the analysis of the secondary research question.

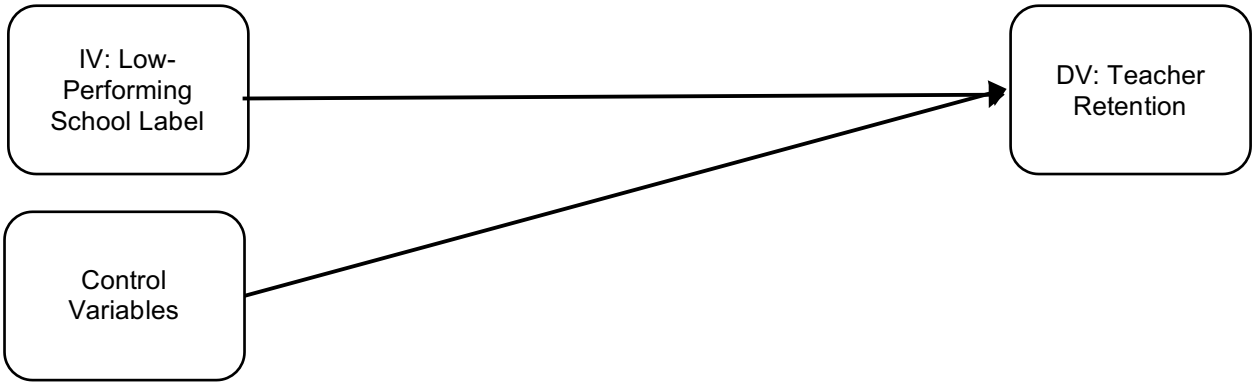

Figure 4. Conceptual model for the analysis of the primary research question.

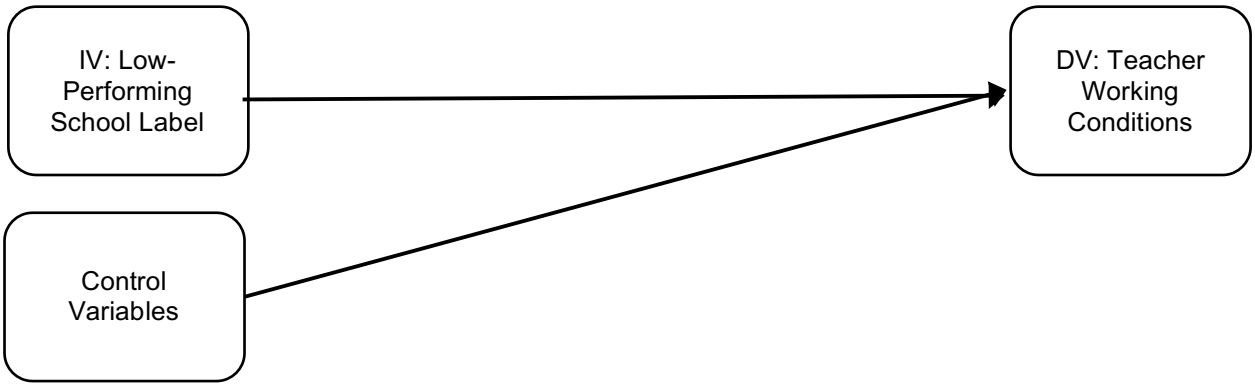

Figure 5. Conceptual model for analysis of the secondary research question.

Summary

This study used a quantitative causal-comparative design. The sample included 2,478 North Carolina public schools. The treatment group included the 202 schools that were newly

designated as low-performing schools during the 2015–2016 school year that would not have met the criteria of a low-performing school under the state's previous definition. The control group included the other 2,276 North Carolina public schools that were not impacted by the state's new definition of a low-performing school. This study analyzed secondary administrative data files from NCDPI as well as survey data from the NCTWC. Data analysis using descriptive and inferential statistics was conducted using Stata data analysis and statistical software in order to answer the primary and secondary research questions.

CHAPTER 4: RESULTS

Introduction

The purpose of this study was to examine the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. This study was restricted to the newly designated public schools in North Carolina that would not have been designated as low-performing schools under the state's previous definition. The primary research question was: How has North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower teacher retention rates compared to past years and compared to other North Carolina public schools for the same year. The secondary research question was: How has North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower ratings on the North Carolina Teacher Working Conditions Survey (NCTWC) compared to past years and compared to other North Carolina public schools for the same year.

This chapter presents the results of the analysis conducted. The first section will present descriptive statistics on the dependent and control variables. The second section will present the results of the multiple regression analysis. The chapter will conclude with a brief summary of the results.

Descriptive Statistics

For the purposes of this study, the schools in the sample were divided into two control groups and one treatment group. The first control group included schools that were never designated as low-performing schools during the measurement window (Never LPS). The second control group included schools that were designated as low-performing schools at least once during the measurement window, but were not newly designated as low-performing schools during the 2015–2016 school year due to meeting the criteria of a low-performing school under the state's new definition (Old LPS). The treatment group included schools that were newly designated as low-performing schools during the 2015–2016 school year that would not have met the criteria of a low-performing school under the state's previous definition (New LPS). Descriptive statistics were used to provide a summary of the dependent and control variables by subgroup and year. The dependent variables were teacher retention and teacher working conditions. The control variables included school type, grade range, locale classification, percent of economically disadvantaged students, and percent of students by race/ethnicity.

Dependent Variables

Teacher retention. Two measures of school-level teacher retention rates were analyzed. The first measure, referred to as the calculated rate, was calculated using certified payroll data files from the NCDPI payroll database. The second measure, referred to as the NCDPI rate, used publically available rates published each year by NCDPI on the North Carolina School Report Cards. The difference between the two measures is the calculated rate only counted teachers that remained in the same school as retained, while the NCDPI rate also counted teachers that transferred to another school in the same district as retained.

The average percent of teachers retained by year using the calculated teacher retention rates is listed in Table 2 and displayed graphically in Figure 6. Across the state, the average percent of teachers retained varied less than one percent from year to year. The largest decrease was from the 2013–2014 school year to the 2014–2015 school year. For all four years in the measurement period, the Never LPS group had the highest average percent of teachers retained. Further, the New LPS group had the lowest average percent of teachers retained for three of the four years in the measurement period. The four-year average for schools in the New LPS group was 6.23% lower than the schools in the Never LPS group and 1.38% lower than the schools in the Old LPS group. The New LPS group deviates from the pattern shown by both control groups. For the 2015–2016 school year, the year after schools were designated as low-performing using the new definition of a low-performing school, the average percent of teachers retained increased in both the Never LPS and Old LPS groups (control groups) and decreased in the New LPS group.

Table 2

Average Percent of Teachers Retained, Calculated Rates

	2013–2014	2014–2015	2015–2016	2016–2017	4-year Average
All	78.77(2,418)	78.42(2,424)	79.26 (2,425)	79.66 (2,427)	79.03
Never LPS	80.77 (1,442)	80.55 (1,446)	81.36 (1,449)	81.68 (1,456)	81.09
Old LPS	75.79 (776)	75.52(777)	76.49 (775)	77.15 (773)	76.24
New LPS	75.88 (200)	74.23 (201)	74.78 (201)	74.56 (198)	74.86

Note. The sample size is in parentheses.

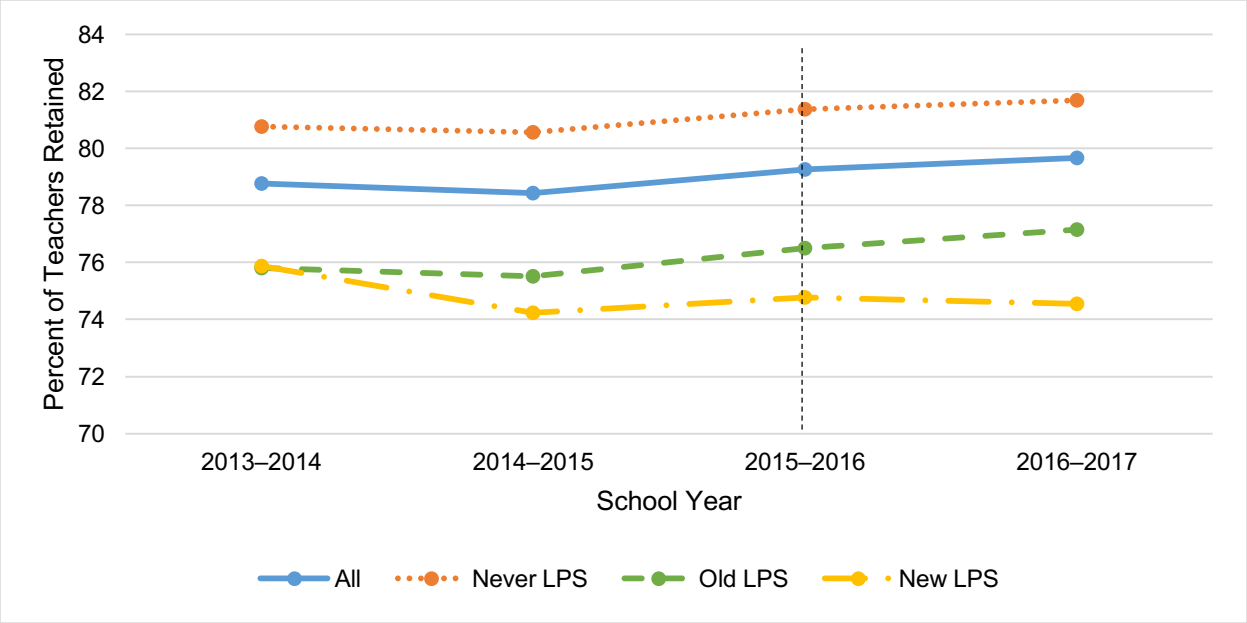

Figure 6. Average percent of teachers retained using calculated rates. The dashed vertical line indicates the year schools were first designated as low-performing using the new definition of a low-performing school.

The average percent of teachers retained by year using the NCDPI teacher retention rates is listed in Table 3 and displayed graphically in Figure 7. Across the state, the average percent of teachers retained varied less than one percent from year to year. The largest decrease was from the 2013–2014 school year to the 2014–2015 school year. For all four years in the measurement period, the Never LPS group had the highest average percent of teachers retained. Further, the New LPS group had the lowest average percent of teachers retained for three of the four years in the measurement period. The four-year average for schools in the New LPS group was 4.17% lower than the schools in the Never LPS group and 0.53% lower than the schools in the Old LPS group. The New LPS group deviates from the pattern shown by both control groups. For the 2014–2015 school year, the year before schools were designated as low-performing using the new definition of a low-performing school, the average percent of teachers retained in the New LPS group decreased at over four times the Never LPS rate and over five times the Old LPS rate. For the 2015–2016 school year, the year after schools were designated as low-performing using

the new definition of a low-performing school, the change in the average percent of teachers retained varied by less than 0.1%. between the Never LPS, Old LPS groups, and New LPS groups.

Table 3

Average Percent of Teachers Retained, NCDPI Rates

	2013–2014	2014–2015	2015–2016	2016–2017	4-year Average
All	85.83 (2,418)	85.28 (2,424)	85.82 (2,425)	86.32 (2,427)	85.81
Never LPS	87.34 (1,442)	86.90 (1,446)	87.29 (1,449)	87.76 (1,456)	87.32
Old LPS	83.41 (776)	83.03(777)	83.87 (775)	84.41 (773)	83.68
New LPS	84.33 (200)	82.30 (201)	82.71 (201)	83.26 (198)	83.15

Note. The sample size is in parentheses.

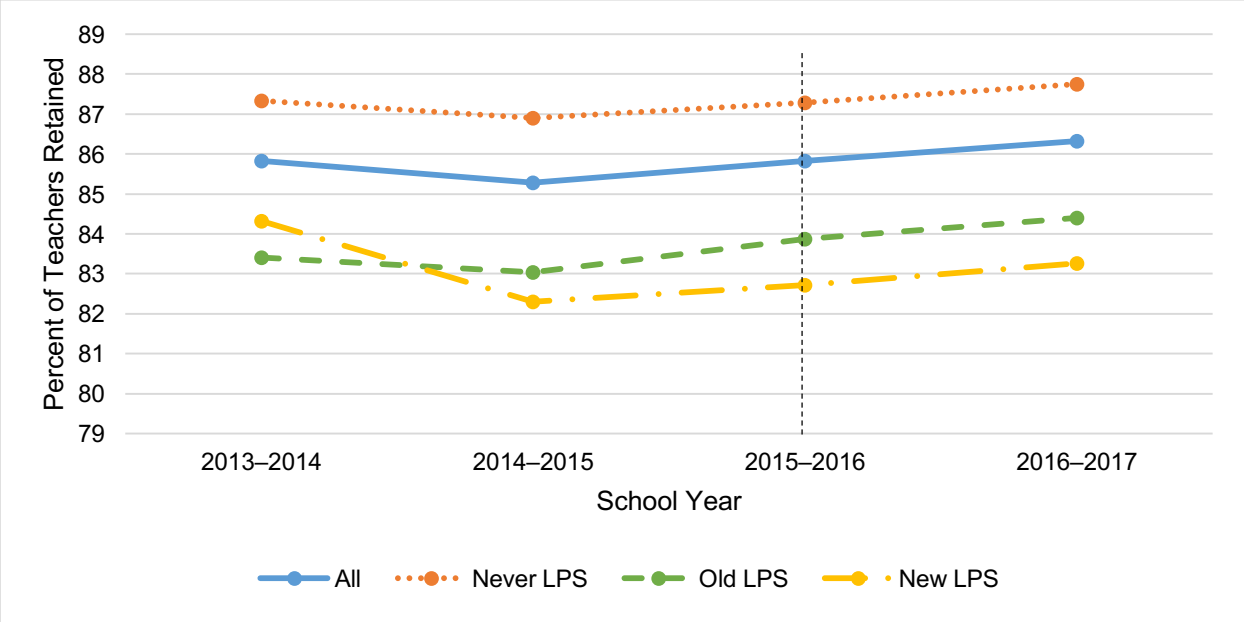

Figure 7. Average percent of teachers retained using NCDPI rates. The dashed vertical line indicates the year schools were first designated as low-performing using the new definition of a low-performing school.

Teacher working conditions. Measures of teacher working conditions included school leadership and overall teacher job satisfaction. School leadership and overall teacher job satisfaction were measured from questions 7.1 and 10.6 on the NCTWC, respectively. Survey

responses were converted to a numerical scale, in which a 1 represented strongly disagree and a 4 represented strongly agree. The descriptive statistics for the NCTWC results are listed by subgroup and year in Table 4 and displayed graphically in Figure 8 and Figure 9. Across the state, the average teacher working conditions measuring school leadership and overall teacher job satisfaction improved from 2012 to 2014 and 2014 to 2016; however, these measures showed relatively no change for schools in the New LPS group. For all four years in the measurement period, the Never LPS group had the highest average NCTWC results in both categories and the New LPS group had the lowest average NCTWC results in both categories. The three-year average for the school leadership composite for schools in the New LPS group was 4.72% lower than the schools in the Never LPS group and 0.66% lower than the schools in the Old LPS group. The three-year average for overall teacher job satisfaction for schools in the New LPS group was 7.67% lower than the schools in the Never LPS group and 2.59% lower than the schools in the Old LPS group. For the 2015–2016 school year, the year after schools were designated as low-performing using the new definition of a low-performing school, the school leadership composite was 5.30% lower for the schools in the New LPS group than the schools in the Never LPS group and 1.62% lower than the schools in the Old LPS group. Additionally, overall teacher job satisfaction was 9.34% lower for the schools in the New LPS group than the schools in the Never LPS group and 3.52% lower than the schools in the Old LPS group.

Table 4

Average NCTWC Results

	2012	2014	2016	3-year Average
All	(N = 2,415)	(N = 2,421)	(N = 2,424)	
School Leadership Composite, 7.1	3.10 (0.29)	3.11 (0.31)	3.16 (0.30)	3.13 (0.30)
Overall Teacher Job Satisfaction, Q10.6	3.16 (0.32)	3.18 (0.36)	3.23 (0.35)	3.19 (0.34)
Never LPS	(N = 1,445)	(N = 1,443)	(N = 1,453)	
School Leadership Composite, 7.1	3.15 (0.29)	3.16 (0.29)	3.21 (0.29)	3.18 (0.29)
Overall Teacher Job Satisfaction, Q10.6	3.22 (0.30)	3.26 (0.32)	3.32 (0.31)	3.26 (0.31)
Old LPS	(N = 771)	(N = 777)	(N = 773)	
School Leadership Composite, 7.1	3.04 (0.28)	3.03 (0.31)	3.09 (0.30)	3.05 (0.30)
Overall Teacher Job Satisfaction, Q10.6	3.08 (0.31)	3.07 (0.37)	3.12 (0.36)	3.09 (0.35)
New LPS	(N = 198)	(N = 201)	(N = 198)	
School Leadership Composite, 7.1	3.02 (0.31)	3.02 (0.30)	3.04 (0.31)	3.03 (0.31)
Overall Teacher Job Satisfaction, Q10.6	3.01 (0.37)	3.01 (0.37)	3.01 (0.37)	3.01 (0.37)

Note. The standard deviation is in parentheses.

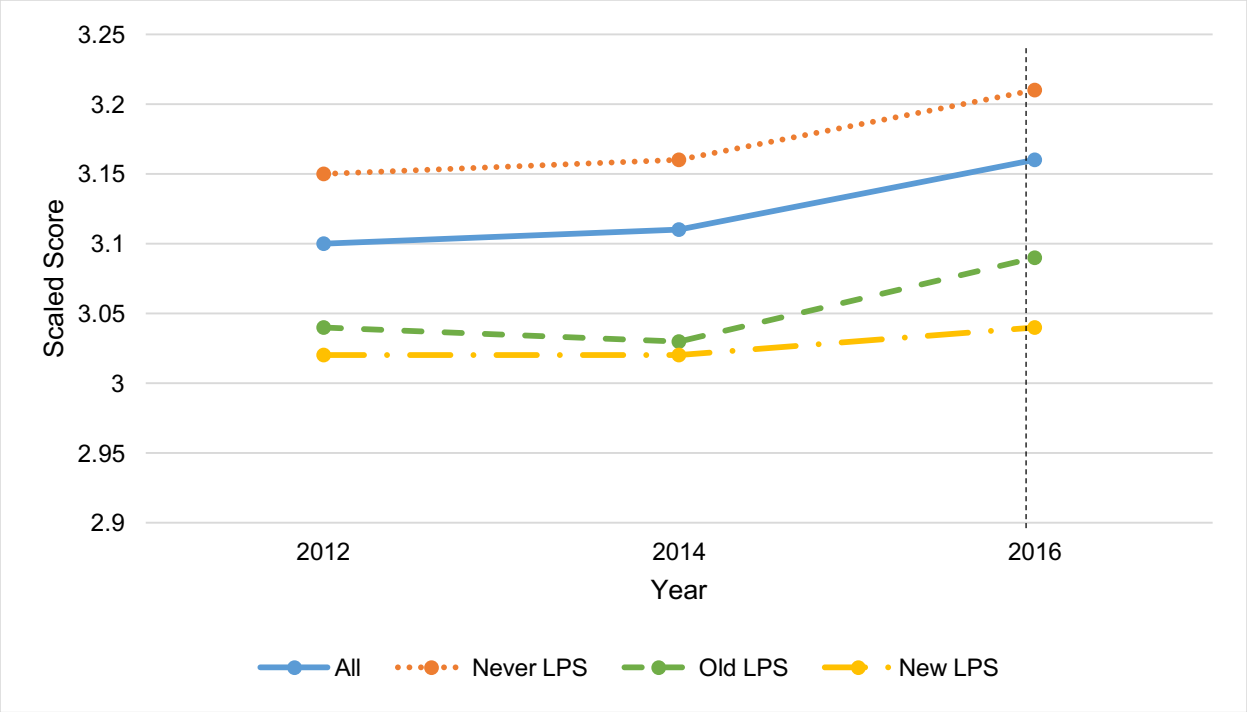

Figure 8. School Leadership Composite, Q7.1. The dashed vertical line indicates the year schools were first designated as low-performing using the new definition of a low-performing school.

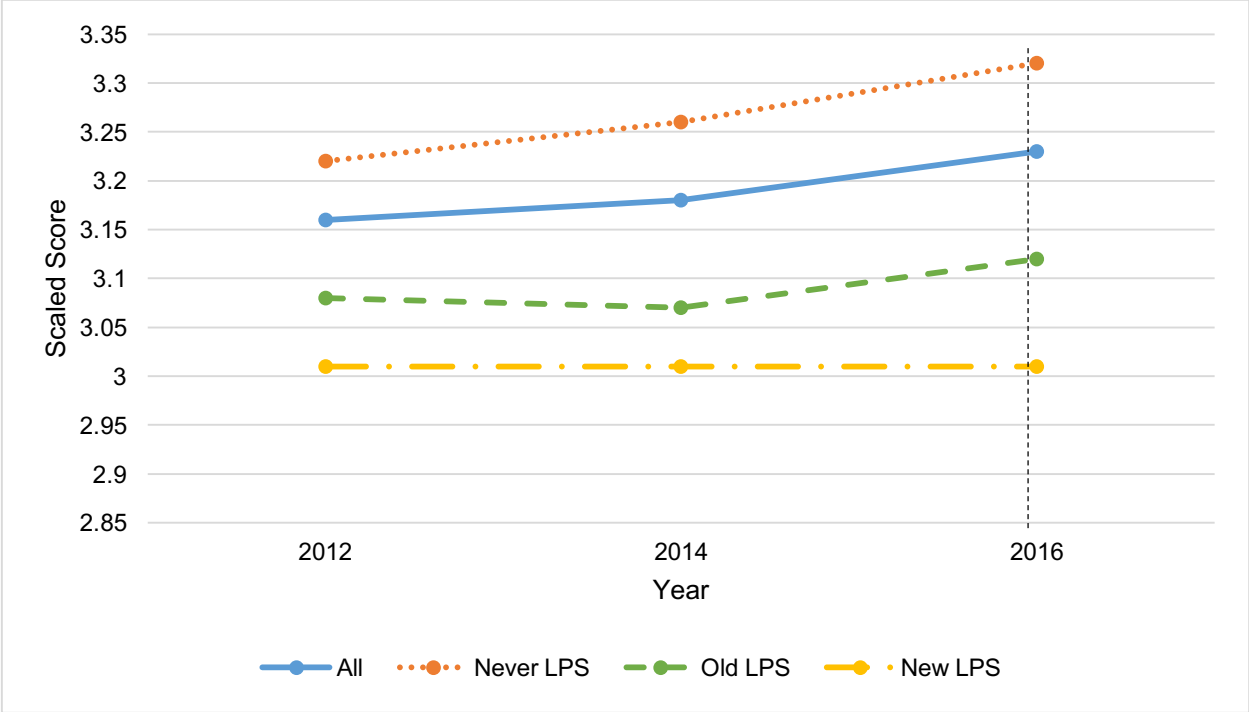

Figure 9. Overall Teacher Job Satisfaction, Q10.6. The dashed vertical line indicates the year schools were first designated as low-performing using the new definition of a low-performing school.

Control Variables

School type. School type as a percentage of the sample is listed by subgroup and year in Table 5. Overall, the distribution of schools by school type remained relatively constant across all groups for all four years in the measurement period. Over 90% of the schools in the state were classified as regular schools. Alternative, magnet, and other school types accounted for less than 10%. As compared to the state, magnet schools were underrepresented in the Old LPS group and were overrepresented in the New LPS group. The four-year average for the percent of magnet schools in the New LPS group was 1.20% higher than the schools in the Never LPS group and 2.03% higher than the schools in the Old LPS group. Alternative schools were not represented in the New LPS group because alternative schools participate in the North Carolina Alternative Schools' Accountability Model and do not receive School Performance Grades.

Table 5

School Type as a Percentage of the Sample

	2012–2013	2013–2014	2014–2015	2015–2016	4-year Average
All	(N = 2,420)	(N = 2,422)	(N = 2,423)	(N = 2,427)	
Alternative	3.10	3.01	2.97	2.97	3.01
Magnet	4.34	4.46	4.79	4.94	4.63
Regular	91.32	91.29	91.00	90.85	91.12
Other	1.24	1.24	1.24	1.24	1.24
Never LPS	(N = 1,444)	(N = 1,445)	(N = 1,448)	(N = 1,456)	
Alternative	2.49	2.42	2.35	2.34	2.40
Magnet	4.50	4.64	4.90	5.15	4.80
Regular	91.00	90.93	90.75	90.52	90.80
Other	2.01	2.01	2.00	1.99	2.00
Old LPS	(N = 776)	(N = 776)	(N = 774)	(N = 773)	
Alternative	5.03	4.90	4.91	4.92	4.94
Magnet	3.74	3.74	4.13	4.27	3.97
Regular	91.11	91.24	90.83	90.69	90.96
Other	0.13	0.13	0.13	0.13	0.13
New LPS	(N = 200)	(N = 201)	(N = 201)	(N = 198)	
Alternative	0.00	0.00	0.00	0.00	0.00
Magnet	5.50	5.97	6.47	6.06	6.00
Regular	94.50	94.03	93.53	93.94	94.00
Other	0.00	0.00	0.00	0.00	0.00

Grade range. Grade range as a percentage of the sample is listed by subgroup and year in Table 6. Overall, the distribution of schools by grade range remained relatively constant across all groups for all four years in the measurement period. Elementary schools accounted for just over half of the schools in the state, while middle and high schools accounted for approximately 20% each. Other configurations accounted for less than 10%. As compared to the state, middle schools were underrepresented in the Never LPS group, high schools were overrepresented in the Old LPS group, and elementary schools were overrepresented in the New LPS group. The four-year average for the percent of elementary schools in the New LPS group was 19.25% higher than the schools in the Never LPS group and 31.10% higher than the schools in the Old LPS

group. The four-year average for the percent of middle schools in the New LPS group was 2.73% higher than the schools in the Never LPS group and 2.81% lower than the schools in the Old LPS group. The four-year average for the percent of high schools in the New LPS group was 19.21% lower than the schools in the Never LPS group and 24.74% lower than schools in the Old LPS group.

Table 6

Grade Range as a Percentage of the Sample

	2012–2013	2013–2014	2014–2015	2015–2016	4-year Average
All	(N = 2,407)	(N = 2,419)	(N = 2,423)	(N = 2,427)	
Elementary	53.55	53.12	52.99	52.99	53.16
Middle	19.57	19.43	19.40	19.57	19.49
High	20.15	20.17	20.14	20.23	20.17
Other	6.73	7.28	7.47	7.21	7.17
Never LPS	(N = 1,432)	(N =1,441)	(N = 1,447)	(N = 1,456)	
Elementary	55.87	55.31	55.08	55.22	55.37
Middle	15.43	15.13	15.20	15.32	15.27
High	22.21	22.21	22.25	22.18	22.21
Other	6.49	7.36	7.46	7.28	7.15
Old LPS	(N = 775)	(N = 777)	(N = 775)	(N = 773)	
Elementary	43.61	43.50	43.61	43.34	43.52
Middle	20.77	20.85	20.65	20.96	20.81
High	27.74	27.67	27.61	27.94	27.74
Other	7.87	7.98	8.13	7.76	7.94
New LPS	(N = 200)	(N = 201)	(N = 201)	(N = 198)	
Elementary	75.50	74.63	74.13	74.24	74.62
Middle	17.50	18.41	17.91	18.18	18.00
High	3.00	2.99	2.99	3.03	3.00
Other	4.00	3.98	4.98	4.55	4.38

Locale classification. Locale classification as a percentage of the sample is listed by subgroup and year in Table 7. Overall, the distribution of schools by locale classification remained relatively constant across all groups for all four years in the measurement period. Rural schools accounted for just over half of the schools in the state. As compared to the state, rural

schools were overrepresented in the Old LPS group and urban schools were overrepresented in the New LPS group. The four-year average for the percent of urban schools in the New LPS group was 4.92% higher than the schools in the Never LPS group and 13.81% higher than schools in the Old LPS group.

Table 7

Locale Classification as Percentage of the Sample

	2012–2013	2013–2014	2014–2015	2015–2016	4-year Average
All	(N = 2,413)	(N = 2,425)	(N = 2,407)	(N = 2,415)	
Rural	52.05	51.96	52.14	51.76	51.98
Urban	47.95	48.04	47.86	48.24	48.02
Never LPS	(N = 1,437)	(N = 1,447)	(N = 1,433)	(N = 1,444)	
Rural	52.26	52.38	52.27	52.77	52.42
Urban	47.74	47.62	47.73	47.23	47.58
Old LPS	(N = 776)	(N = 777)	(N = 773)	(N = 773)	
Rural	61.21	61.13	61.45	61.45	61.31
Urban	38.79	38.87	38.55	38.55	38.69
New LPS	(N = 200)	(N = 201)	(N = 201)	(N = 198)	
Rural	47.50	47.76	47.76	46.97	47.50
Urban	52.50	52.24	52.24	53.03	52.50

Percent of economically disadvantaged students. The average percent of economically disadvantaged students is listed by subgroup and year in Table 8. The average percent of economically disadvantaged students remained constant from the 2013–2014 school year to the 2014–2015 school year, decreased from the 2014–2015 school year to the 2015–2016 school year, and remained constant from the 2015–2016 school year to the 2016–2017 school year. The average percent of schools with between 0%–25% economically disadvantaged students increased by 3.39% from the 2013–2014 school year to the 2016–2017 school year, while average percent of schools with between 75%–100% economically disadvantaged students decreased by 19.12% from the 2013–2014 school year to the 2016–2017 school year. The

schools in the New LPS group had the highest percent of economically disadvantaged students on average, while schools in the Never LPS group had the lowest percent of economically disadvantaged students on average. There were no schools in the New LPS group that had between 0%–25% economically disadvantaged students. The four-year average for the percent of schools whose percent of economically disadvantaged students was between 75%–100% in the New LPS group was 43.01% higher than the schools in the Never LPS group and 24.99% higher than the schools in the Old LPS group.

Table 8

Average Percent of Economically Disadvantaged Students

	2012–2013	2013–2014	2014–2015	2015–2016	4-year Average
All	(N = 2,369)	(N = 2,367)	(N = 2,393)	(N = 2,397)	
0%–25%	6.12	5.89	10.11	9.51	7.92
25%–50%	23.85	23.40	32.68	33.67	28.42
50%–75%	37.48	36.45	42.58	43.39	39.99
75%–100%	32.55	34.26	14.63	13.43	23.67
Never LPS	(N = 1,399)	(N = 1,404)	(N = 1,421)	(N = 1,430)	
0%–25%	10.22	9.90	16.47	15.45	13.04
25%–50%	33.88	33.48	40.61	41.54	37.41
50%–75%	35.95	35.90	34.48	34.97	35.32
75%–100%	19.94	20.73	8.44	8.04	14.24
Old LPS	(N = 770)	(N = 771)	(N = 771)	(N = 769)	
0%–25%	0.26	0.13	1.04	0.91	0.58
25%–50%	11.17	10.51	24.25	24.97	17.72
50%–75%	44.29	42.54	54.99	55.92	49.43
75%–100%	44.29	46.82	19.71	18.21	32.26
New LPS	(N = 200)	(N = 201)	(N = 201)	(N = 198)	
0%–25%	0.00	0.00	0.00	0.00	0.00
25%–50%	2.50	2.49	8.96	10.61	6.12
50%–75%	22.00	16.92	52.24	55.56	36.62
75%–100%	75.50	80.60	38.18	33.84	57.25

Percent of students by race/ethnicity. The average percent of students by race/ethnicity is listed by subgroup and year in Table 9. Overall, the distribution of schools by students'

race/ethnicity remained relatively constant across all groups for all four years in the measurement period. There was a slight increase in the percent of Hispanic students along with a slight decrease in the percent of white students. The four-year average across the state for the percent of students by race/ethnicity consisted of 50.56% white students, 26.75% black students, 15.09% Hispanic students, and 7.60% other students. The schools in the Never LPS group had the highest percent of non-white students on average, while schools in the New LPS group had the lowest percent of non-white students on average. The four-year average for the percent of non-white students in the New LPS group was 31.54% higher than the schools in the Never LPS group and 16.26% higher than the schools in the Old LPS group.

Table 9

Average Percent of Students by Race/Ethnicity

	2012–2013	2013–2014	2014–2015	2015–2016	4-year Average
All	(N = 2,411)	(N = 2,419)	(N = 2,420)	(N = 2,421)	
Black	26.95	26.81	26.66	26.59	26.75
Hispanic	14.14	14.58	15.42	16.20	15.09
White	51.53	50.93	50.36	49.41	50.56
Other	7.38	7.69	7.98	7.80	7.60
Never LPS	(N = 1,436)	(N = 1,441)	(N = 1,444)	(N = 1,450)	
Black	20.72	20.55	20.50	20.51	20.57
Hispanic	12.81	13.18	13.97	14.71	13.67
White	59.06	58.52	57.91	56.80	58.07
Other	7.41	7.75	7.63	7.98	7.69
Old LPS	(N = 775)	(N = 777)	(N = 775)	(N = 773)	
Black	33.88	33.82	33.55	33.45	33.67
Hispanic	15.31	15.85	16.75	17.61	16.38
White	43.83	43.07	42.54	41.66	42.79
Other	6.99	7.26	7.16	7.28	7.17
New LPS	(N = 200)	(N = 201)	(N = 201)	(N = 198)	
Black	44.83	44.61	44.35	44.33	44.53
Hispanic	19.15	19.70	20.77	21.59	20.30
White	27.30	26.93	26.33	25.53	26.53
Other	8.72	8.76	8.55	8.54	8.64

Multiple Regression Analysis

Primary Research Question

Three models were used during the multiple regression analysis in order to answer the primary research question. All three models analyzed retention using both the calculated rate and the NCDPI rate. Model 1 used a fixed effects model to analyze how North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition by comparing the teacher retention rates for newly designated low-performing schools before and after the policy change. This model controlled for the percent of economically disadvantaged students and student race/ethnicity. The coefficients for Model 1 are listed in Table 10. Using the calculated rate, the analysis shows that the teacher retention rate for schools in the New LPS group declined by 2.00% on average the year after they were designated as low-performing under the new definition as compared to the reference year (2013–2014); however, this change was not statistically significant.

Table 10

Regression Coefficients: Teacher Retention Model 1 (Fixed Effects, New LPS Schools)

	Coefficient (% Calculated Retained)	Coefficient (% NCDPI Retained)
Year		
2014–2015	-1.84*	-2.11*
2015–2016	-1.47	-1.78*
2016–2017	-2.00	-1.43
Percent of Economically Disadvantaged Students		
50%–75%	-4.63*	-3.58
75%–100%	-4.49	-2.64
Student Race/Ethnicity		
% Black	-0.01	-0.04
% Hispanic	0.33	0.20
% White	-0.07	-0.03
Constant	75.37*	86.03*
Number of Observations	800	800
Number of Groups	202	202

* $p < 0.05$

Model 2 used a random effects model to analyze how North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition by comparing the teacher retention rates for newly designated low-performing schools to other North Carolina public schools. A random effects model was used because it allowed the researcher to estimate the effects of additional control variables whose values do not change across time. This model controlled for school type, grade range, locale classification, the percent of economically disadvantaged students, and student race/ethnicity. The coefficients for Model 2 are listed in Table 11. Using the calculated rate, the analysis shows that the teacher retention rate for schools in the New LPS group declined by 1.17% on average the year after they were designated as low-performing as compared to schools in the Never LPS group, and this change was statistically significant.

Table 11

Regression Coefficients: Teacher Retention Model 2 (Random Effects, All Schools)

	Coefficient (% Calculated Retained)	Coefficient (% NCDPI Retained)
Low Performing School Label		
Old LPS	-1.04*	-0.76*
New LPS	-1.17*	-0.65
Year		
2014–2015	-0.10	-0.41*
2015–2016	0.46	-0.01
2016–2017	0.93*	0.53*
School Type		
Magnet	4.96*	3.64*
Regular	4.66*	2.78*
Other	6.69*	4.67*
Grade Range		
Middle	-2.24*	-2.71*
High	-0.07	-2.42*
Other	-1.33*	-0.92
Locale Classification		
Rural	0.26	-0.54*
Percent of Economically Disadvantaged Students		
25%–50%	0.48	0.27
50%–75%	0.04	0.16
75%–100%	-0.81	-0.46
Student Race/Ethnicity		
% Black	-0.70*	-0.11*
% Hispanic	-0.06*	-0.04*
% White	0.01	0.02
Constant	79.61*	87.30*
Number of Observations	9,495	9,495
Number of Groups	2,421	2,421

* $p < 0.05$

Model 3 used a fixed effects model to analyze how North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition by comparing the teacher retention rates for newly designated low-performing schools to other North Carolina public schools. This model controlled for the percent of economically disadvantaged students and

student race/ethnicity. The coefficients for Model 3 are listed in Table 12. Using the calculated rate, the analysis shows that the teacher retention rate for schools in the New LPS group declined by 1.00% on average the year after they were designated as low-performing as compared to schools in the Never LPS group; however, this change was not statistically significant.

Table 12

Regression Coefficients: Teacher Retention Model 3 (Fixed Effects, All Schools)

	Coefficient (% Calculated Retained)	Coefficient (% NCDPI Retained)
Low Performing School Label		
Old LPS	-0.28	-0.08
New LPS	-1.00	-0.40
Year		
2014–2015	-0.32	-0.63*
2015–2016	0.16	-0.35
2016–2017	0.55	0.08
Percent of Economically Disadvantaged Students		
25%–50%	-0.23	-0.22
50%–75%	-0.86	-0.60
75%–100%	-1.47	-1.25
Student Race/Ethnicity		
% Black	-0.09	-0.06
% Hispanic	0.02	0.07
% White	-0.02	0.00
Constant	82.77*	87.07*
Number of Observations	9,533	9,533
Number of Groups	2,422	2,422

* $p < 0.05$

Secondary Research Question

Three models were used during the multiple regression analysis in order to explore the secondary research question. Model 1 used a fixed effects model to analyze how North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's previous definition by comparing ratings on the NCTWC for newly designated low-performing

schools before and after the policy change. This model controlled for the percent of economically disadvantaged students and student race/ethnicity. The coefficients for Model 1 are listed in Table 13. The analysis shows that the school leadership composite for schools in the New LPS group increased by 0.03 on average the year after they were designated as low-performing as compared to the reference year (2012); however, this change was not statistically significant. Additionally, overall teacher job satisfaction for schools in the New LPS group decreased by 0.02 on average the year after they were designated as low-performing as compared to the reference year (2012); however, this change was not statistically significant.

Table 13

Regression Coefficients: Teacher Working Conditions as Measured by NCTWC Model 1 (Fixed Effects, New LPS Schools)

	Coefficient (School Leadership Composite, Q7.1)	Coefficient (Overall Teacher Job Satisfaction, Q10.6)
Year		
2014	-0.01	-0.01
2016	0.03	-0.02
Percent of Economically Disadvantaged Students		
50%–75%	-0.13	-0.14
75%–100%	-0.06	-0.13
Student Race/Ethnicity		
% Black	0.01	0.01
% Hispanic	0.01	0.01
% White	0.01	0.01
Constant	2.11*	2.14*
Number of Observations	597	597
Number of Groups	202	202

* $p < 0.05$

Model 2 used a random effects model to analyze how North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's previous definition by comparing

ratings on the North Carolina Teacher Working Conditions Survey for newly designated low-performing schools to other North Carolina public schools. A random effects model was used because it allowed the researcher to estimate the effects of additional control variables whose values do not change across time. This model controlled for school type, grade range, locale classification, the percent of economically disadvantaged students, and student race/ethnicity. The coefficients for Model 2 are listed in Table 14. The analysis shows that the school leadership composite for schools in the New LPS group decreased by 0.07 on average the year after they were designated as low-performing under the new definition as compared to schools in the Never LPS group, and this change was statistically significant. Additionally, overall teacher job satisfaction for schools in the New LPS group decreased by 0.12 on average the year after they were designated as low-performing as compared to schools in the Never LPS group, and this change was statistically significant.

Table 14

Regression Coefficients: Teacher Working Conditions as Measured by NCTWC Model 2 (Random Effects, All Schools)

	Coefficient (School Leadership Composite, Q7.1)	Coefficient (Overall Teacher Job Satisfaction, Q10.6)
Low Performing School Label		
Old LPS	-0.05*	-0.08*
New LPS	-0.07*	-0.12*
Year		
2014	0.02*	0.04*
2016	0.08*	0.09*
School Type		
Magnet	-0.10*	0.04
Regular	-0.09*	0.02
Other	-0.03	0.09
Grade Range		
Middle	-0.10*	-0.08*
High	-0.07*	-0.02
Other	-0.03	-0.02
Locale Classification		
Rural	0.04*	0.04*
Percent of Economically Disadvantaged Students		
25%–50%	0.03	-0.02
50%–75%	0.02	-0.04*
75%–100%	0.03	-0.06*
Student Race/Ethnicity		
% Black	0.00*	0.00*
% Hispanic	0.00*	0.00*
% White	0.00	0.00
Constant	3.27*	3.38*
Number of Observations	7,108	7,109
Number of Groups	2,434	2,434

* $p < 0.05$

Model 3 used a fixed effects model to analyze how North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's previous definition by comparing ratings on the North Carolina Teacher Working Conditions Survey for newly designated low-

performing schools to other North Carolina public schools. This model controlled for the percent of economically disadvantaged students and student race/ethnicity. The coefficients for Model 3 are listed in Table 15. The analysis shows that the school leadership composite for schools in the New LPS group decreased by 0.05 on average the year after they were designated as low-performing under the new definition as compared to schools in the Never LPS group, and this change was statistically significant. Additionally, overall teacher job satisfaction for schools in the New LPS group decreased by 0.09 on average the year after they were designated as low-performing as compared to schools in the Never LPS group, and this change was statistically significant.

Table 15

Regression Coefficients: Teacher Working Conditions as Measured by NCTWC Model 3 (Fixed Effects, All Schools)

	Coefficient (School Leadership Composite, Q7.1)	Coefficient (Overall Teacher Job Satisfaction, Q10.6)
Low Performing School Label		
Old LPS	-0.02*	-0.04*
New LPS	-0.05*	-0.09*
Year		
2014	0.01	0.04*
2016	0.07*	0.09*
Percent of Economically Disadvantaged Students		
25%–50%	0.05	0.02
50%–75%	0.04	-0.01
75%–100%	0.03	0.00
Student Race/Ethnicity		
% Black	0.00	0.00
% Hispanic	0.00	0.00
% White	0.00	0.00
Constant	3.04*	3.25*
Number of Observations	7,136	7,137
Number of Groups	2,437	2,437

* $p < 0.05$

Summary

Descriptive statistics were used to provide a summary of the dependent and control variables by subgroup and year. The dependent variables were teacher retention and teacher working conditions. Schools in the treatment group had lower average teacher retention rates after being designated low-performing schools using the new definition, and their average NCTWC results remained relatively constant. Over the same period of time the average teacher retention rates and average NCTWC results improved for schools in the control groups. Overall, the descriptive statistics showed that schools in the treatment group had lower average teacher retention rates and lower average NCTWC results than schools in the control groups. The control variables included school type, grade range, locale classification, percent of economically disadvantaged students, and percent of students by race/ethnicity. Overall, the distribution of control variables remained relatively constant across all state for all four years in the measurement period. The largest changes across the state included a decrease in the average percent of economically disadvantaged students from the 2014–2015 school year to the 2015–2016 school year as well as a slight increase in the average percent of Hispanic students along with a slight decrease in the average percent of white students across the measurement period. Disaggregation by subgroup revealed schools in the treatment group were more likely to be elementary schools, urban schools, and had higher average percentages of minority and economically disadvantaged students.

A total of six models were used during the multiple regression analysis in order to answer the primary and secondary research questions. Analysis of the primary research question using the calculated retention rate found that the decrease in the teacher retention rates for schools in the treatment group compared to past years and compared to other North Carolina public schools

for the same year was not statistically significant. Analysis of the secondary research question using the calculated retention rate found that the decrease in teacher working conditions for schools in the treatment group compared to past years was not statistically significant, and the decrease compared to other North Carolina public schools for the same year was statistically significant.

CHAPTER 5: DISCUSSION

Introduction

Effective teachers are an important determinant in the quality of student learning. Given the known disparities in access to high quality teachers, researchers must consider how policies have impacted the ability of schools serving high poverty and minority students to retain teachers. The purpose of this study was to examine the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. This study was restricted to the newly designated public schools in North Carolina that would not have been designated as low-performing schools under the state's previous definition.

The primary research question was: How has North Carolina's new definition of a low-performing school impacted teacher retention in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower teacher retention rates compared to past years and compared to other North Carolina public schools for the same year. Multiple regression analysis using the calculated retention rate found that the decrease in the teacher retention rates for schools in the treatment group compared to past years and compared to other North Carolina public schools for the same year was not statistically significant.

The secondary research question was: How has North Carolina's new definition of a low-performing school impacted teacher working conditions in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? The hypothesis was that newly designated low-performing schools will have lower ratings on the North Carolina

Teacher Working Conditions Survey (NCTWC) compared to past years and compared to other North Carolina public schools for the same year. Multiple regression analysis using the calculated retention rate found that the decrease in teacher working conditions for schools in the treatment group compared to past years was not statistically significant, and the decrease compared to other North Carolina public schools for the same year was statistically significant.

This chapter will interpret and describe the significance of the findings of this study. The first section will discuss the findings of this study. The second section will discuss the implications of the findings. The third section will discuss the limitations of this study. The fourth section will discuss recommendations for future research. The chapter will conclude with a brief summary of the key findings.

Interpretation of the Findings

While a significant relationship was not found between the new low-performing school designation and teacher retention, a significant relationship was found between the new low-performing school designation and teacher working conditions. These findings suggest that while the new low-performing school designation did reduce teacher working conditions it did not do so to the extent that teachers chose to leave their current positions.

Examining the descriptive statistics for the control variables reveals several findings surrounding the characteristics of the schools most likely to be impacted by the new definition of a low-performing school. Elementary schools were more likely to be designated as low-performing under the state's new definition. This effect is likely attributed to the way school performance grades are calculated. School Performance Grades are calculated using a combination of the School Achievement Score (weighted 80%) and the School Growth Score (weighted 20%). Based on scores from the 2014–2015 school year, 32.4% of elementary schools

received D's or F's, compared to only 13% of all high schools (North Carolina Department of Public Instruction, 2015b). High schools have several additional indicators that are used when calculating the School Achievement Score. This difference is likely the reason high schools are less likely to receive a School Performance Grade of a D or F and in turn less likely to be designated as a low-performing school under the state's new definition.

Schools serving high poverty and minority students were more likely to be designated as low-performing. This finding is consistent with past findings documented in the research literature. Also, the descriptive statistics reveal a shift from the previous definition in impacting more urban schools than rural schools. This shift is likely tied to the student composition of these schools. Specifically, further disaggregation of the descriptive statistics reveals that urban schools serve more high poverty and minority students.

The findings indicate that schools with low retention rates and low NCTWC results are often designated as low-performing schools. Schools in the treatment group had teacher retention rates and NCTWC results below the state average before and after being designated as low-performing schools under the state's new definition. This finding is consistent with past findings documented in the research literature.

Comparing the findings using the calculated teacher retention rates and the NCDPI retention rates reveals that the NDPI rate is not capturing the full extent of the challenges low-performing schools face retaining teachers. The differences between the calculated retention rates and the NCDPI retention rates imply that teachers at newly designated low-performing schools are transferring to other schools within the same district at higher rates than teachers at other North Carolina public schools. This study reports the findings of the analysis using both

rates, but contends that the calculated rate more accurately reflects the impact of North Carolina's new definition of a low-performing school on teacher retention.

Implications

While a causal relationship was not uncovered between North Carolina's new definition of a low-performing school and teacher retention, the newly designated low-performing schools did have lower teacher retention on average than other North Carolina public school. Coupled with the decrease in teacher working conditions, these newly designated low-performing schools will likely find it difficult to improve teacher retention. While the state identifies low-performing schools, it does not provide additional resources or support for identified schools. Each district is responsible for creating a plan for improving the School Performance Grade and School Growth Score. Knowing that access to an effective teacher is critical to students' academic achievement, districts must consider ways to recruit and retain effective teachers if they wish to improve low-performing schools.

Given that the research literature supports the relationship between teacher working conditions and teacher retention, the decrease in reported teacher working conditions at newly designated low-performing schools should raise concerns. Knowledge of the current disparities in teacher retention and teacher working conditions between newly designated low-performing schools and other schools in the state reveals two areas in need of improvement. Given the knowledge provided in the research literature surrounding the relationship between teacher effectiveness and student achievement, it is reasonable to assume that improving teacher retention will lead to improved student achievement. Further, the relationship established in the research literature between teacher working conditions and teacher retention suggests that improving teacher working conditions will improve teacher retention. Policies designed to

improve teacher working conditions at newly designated low-performing schools to the state average may in turn improve both teacher retention and student achievement. Unless the decline in teacher working conditions is addressed, the new low-performing school designation has the potential to negatively impact student achievement at designated schools. Policymakers along with district leaders should consider providing additional resources and support for newly designated low-performing schools that specifically target improvements in teacher working conditions.

Limitations of the Study

There were several limitations of the study that limit the validity and generalizability of the findings. One limitation was the use of secondary data. The validity is limited by the accuracy of the data sets. It is possible that there were errors in the NCDPI data as reported to NCDPI from the Local Education Agencies. Potential errors may include missing or incorrectly coded entries. The potential for error in determining teacher retention was reduced by using the April payroll data files that were more likely to be complete and free of coding errors. A potential limitation to external validity was a relatively small sample size for the treatment group that will make the results difficult to generalize broadly. The sample for the treatment group contained 202 schools, and only one year of teacher retention data following the policy change was available for analysis. This study only included data from educators in North Carolina and the generalizability of the findings is restricted to settings that are similar to the state examined. A potential limitation to internal validity was the data may have been impacted by other variables apart from being designated as a low-performing school. This limitation was addressed in the analysis by controlling for other variables that may have impacted the teacher retention

rate. Control variables included school type, grade range, locale classification, percent of economically disadvantaged students, and percent of students by race/ethnicity.

Recommendations for Further Research

Further research is necessary to more fully understand the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. Hopefully this research project is the first of many to investigate what impact North Carolina's new definition of a low-performing school has on teacher retention and teacher working conditions in the coming years. A limitation to the study was that only one year of teacher retention data following the policy change was available for analysis at the time this study was conducted. It would be beneficial to extend the measurement period to the 2017–2018 school year once additional teacher retention data becomes available. This would allow for further analysis to examine if there is a lagged effect on teacher retention.

The results of this study support findings from the research literature that there is a relationship between teacher working conditions and teacher retention. This study examined results from the NCTWC on the School Leadership construct and overall teacher job satisfaction. Additional research is needed to examine the relationship between teacher retention at newly designated low-performing schools and the other seven teaching and learning condition constructs on the NCTWC.

The results of this study raise two additional research questions that warrant further investigation. First, how has North Carolina's new definition of a low-performing school impacted interdistrict transfers in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? In examining the findings of this study, the differences between the calculated retention rates and the NCDPI retention rates imply that

teachers at newly designated low-performing schools are transferring to other schools within the same district at higher rates than teachers at other North Carolina public schools. Answering this question would extend the knowledge gained in this study through examining transfer rates and characteristics of the schools teachers are transferring to. Second, how has North Carolina's new definition of a low-performing school impacted the retention of effective teachers in newly designated schools that did not meet the criteria for low-performing under the state's previous definition? This study found that there was not a statistically significant difference in retention rates for schools in the treatment group compared to past years and compared to other North Carolina public schools for the same year. Answering this additional research question would extend the knowledge gained in this study through examining the effectiveness of the teachers retained at newly designated low-performing schools.

Conclusion

In 2015, North Carolina House Bill 97 changed the definition of a low-performing school in North Carolina. This study examined the impact of North Carolina's new definition of a low-performing school on teacher retention and teacher working conditions. Schools serving high poverty and minority students were more frequently designated as low-performing schools under the state's new definition than schools serving less disadvantaged students. The results showed that newly designated low-performing schools had lower average teacher retention rates and lower average NCTWC results than other schools in the state. Findings indicate that the state's new definition a low-performing school negatively impacted teacher working conditions at newly designated low-performing schools and suggest that these schools will need to improve teacher working conditions in order to raise teacher retention rates to the state average.

REFERENCES

Adamson, F., & Darling-Hammond, L. (2012). Funding disparities and the inequitable distribution of teachers: Evaluating sources and solutions. *Education Policy Analysis Archives*, *20*, 37. doi:10.14507/epaa.v20n37.2012

Allensworth, E., Ponisciak, S., & Mazzeo, C. (2009). *The schools teachers leave: Teacher mobility in Chicago Public Schools*. Chicago, IL: Consortium on Chicago School Research. Retrieved from https://consortium.uchicago.edu/sites/default/files/publications/CCSR_Teacher_Mobility.pdf

Berry, B. (2009). *Children of poverty deserve great teachers: One union's commitment to changing the status quo*. Raleigh, NC: Center for Teaching Quality. Retrieved from http://www.nea.org/assets/docs/HE/children_of_poverty_09.pdf

Betts, J. R., Reuben, K. S., Danenberg, A. (2000). *Equal resources, equal outcomes? The distribution of school resources and student achievement in California*. San Francisco, CA: Public Policy Institute of California. Retrieved from http://www.ppic.org/content/pubs/report/R_200JBR.pdf

Borman, G. D., & Dowling, N. M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of Educational Research, 78*(3), 367-409. doi:10.3102/0034654308321455

Boyd, D., Grossman, P., Ing, M., Lankford, H., Loeb, S., & Wyckoff, J. (2011). The influence of school administrators on teacher retention decisions. *American Educational Research Journal*, *48*(2), 303–333. doi:10.3102/0002831210380788.

Boyd, D., Grossman, P., Lankford, H., Loeb, S., & Wyckoff, J. (2008). *Who leaves? Teacher attrition and student achievement* (National Center for Analysis of Longitudinal Data in Education Research Working Paper No. 23). Washington, DC: CALDER. Retrieved from https://eric.ed.gov/?id=ED508275

Boyd, D., Lankford, H., Loeb, S., & Wyckoff, J. (2005). Explaining the short careers of high-achieving teachers in schools with low-performing students. *The American Economic Review*, *95*(2), 166-171. doi:10.1257/000282805774669628

Branch G.F. , Hanushek E.A. , Rivkin S.G. (2012). *Estimating the effect of leaders on public sector productivity: The case of school principals* (National Bureau of Economic Research Working Paper No. W17803). Cambridge, MA: NBER. Retrieved from http://www.nber.org/papers/w17803.pdf

Brewer, E. & Kuhn, J. (2010). Causal-comparative design. In N. J. Salkind (Ed.), *Encyclopedia of research design* (pp. 125-131). Thousand Oaks, CA: SAGE Publications Ltd. doi:10.4135/9781412961288.n42

Burkhauser, S. (2017). How much do school principals matter when it comes to teacher working conditions? *Educational Evaluation and Policy Analysis, 39*(1), 126-145. doi: 10.3102/0162373716668028

Clotfelter, C., Glennie, E., Ladd, H., & Vigdor, J. (2008). Would higher salaries keep teachers in high-poverty schools? Evidence from a policy intervention in North Carolina. *Journal of Public Economics*, *92*(5), 1352-1370. doi: 10.1016/j.jpubeco.2007.07.003

Clotfelter, C. T., Ladd, H. F., Vigdor, J. L., & Diaz, R. A. (2004). Do school accountability systems make it more difficult for low-performing schools to attract and retain high-quality teachers?. *Journal of Policy Analysis and Management*, *23*(2), 251-271. doi:10.1002/pam.20003

Clotfelter, C. T., Ladd, H. F., Vigdor, J. L., & Wheeler, J. (2007). High-poverty schools and the distribution of teachers and principals. *North Carolina Law Review, 85*(5), 1345-1379. Retrieved from http://heinonline.org.libproxy.lib.unc.edu/HOL/Page?handle=hein.journals/nclr85&collection=journals&id=1357

Current Operations and Capital Improvements Appropriations Act of 2015, N.C. S.L. 2015-241. (2015).

Darling-Hammond, L. (2007). Race, inequality and educational accountability: The irony of 'no child left behind'. *Race Ethnicity and Education*, *10*(3), 245-260. doi:10.1080/13613320701503207

Feng, L., Figlio, D. N., & Sass, T. R. (2010). *School accountability and teacher mobility* (National Center for Analysis of Longitudinal Data in Education Research Working Paper No. 47). Washington, DC: CALDER. Retrieved from http://files.eric.ed.gov/fulltext/ED510550.pdf

Feng, L., & Sass, T. R. (2017). Teacher quality and teacher mobility. *Education Finance and Policy, 12*(3), 396-418. doi: 10.1162/EDFP_a_00214

Ferguson, R. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation, 28,* 465-498. Retrieved from http://heinonline.org.libproxy.lib.unc.edu/HOL/Page?handle=hein.journals/hjl28&collection=journals&id=471

Goldhaber, D. (2010) *Teacher pay reforms: The political implications of recent research* (Center for Education Data and Research Working Paper No. 2010-4.0). Seattle, Washington: CEDR. Retrieved from http://www.cedr.us/papers/working/CEDR%20WP%202010-4_Teacher%20Pay%20Reforms%20(8-23-10).pdf

Goldring, R., Taie, S., & Riddles, M. (2014). *Teacher attrition and mobility: Results from the 2012–13 teacher follow-up survey.* Washington, DC: National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubs2014/2014077.pdf

Goodman, S., & Turner, L. (2010). *Teacher incentive pay and educational outcomes: Evidence from the NYC bonus program* (Program on Education Policy and Governance Working Papers Series No. 10-07). Cambridge, MA: PEPG. Retrieved from http://files.eric.ed.gov/fulltext/ED513540.pdf

Granados, A. (2015, November 22). North Carolina's low-performing school boom. *Education NC*. Retrieved from https://www.ednc.org/2015/11/22/north-carolinas-low-performing-school-boom/

Grissom, J. A., Nicholson-Crotty, S., & Harrington, J. R. (2014). Estimating the effects of no child left behind on teachers' work environments and job attitudes. *Educational Evaluation and Policy Analysis*, *36*(4), 417-436. doi:10.3102/0162373714533817

Hanushek, E. A. (2007). The single salary schedule and other issues of teacher pay. *Peabody Journal of Education*, *82*(4), 574-586. doi:10.1080/01619560701602975

Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (2004). Why public schools lose teachers. *Journal of Human Resources*, *39*(2), 326-354. doi: 10.2307/3559017

Hanushek, E. A., & Rivkin, S. G. (2004). How to improve the supply of high-quality teachers. *Brookings Papers on Education Policy, 2004*(1), 7-25. doi:10.1353/pep.2004.0001

Hanushek, E. A., & Rivkin, S. G. (2007). Pay, working conditions, and teacher quality. *The Future of Children*, *17*(1), 69-86. doi:10.1353/foc.2007.0002

Harris, D. (2007). High-Flying schools, student disadvantage, and the logic of NCLB. *American Journal of Education*, *113*(3), 367-394. doi:10.1086/512737

Herzberg, F., Mausner, B., & Snyderman, B. B. (1959/1993). *The motivation to work*. New Brunswick: Transaction publishers.

Hui, T. K. (2015, October 22). State change increases number of low-performing schools. The News and Observer. Retrieved from http://www.newsobserver.com/news/local/education/article41018970.html

Imazeki, J. (2005). Teacher salaries and teacher attrition. *Economics of Education Review*, *24*(4), 431-449. doi:10.1016/j.econedurev.2004.07.014

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, *38*(3), 499–534. doi:10.3102/00028312038003499

Ingersoll, R. M. (2004). *Why do high-poverty schools have difficulty staffing their classrooms with qualified teachers*?. Philadelphia, PA: Center for American Progress. Retrieved from https://www.americanprogress.org/wp-content/uploads/kf/ingersoll-final.pdf

Ingersoll, R. M., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational Leadership*, *60*(8), 30-34.

Johnson, S. M., Berg, J. H., & Donaldson, M. L. (2005). Who stays in teaching and why: A review of the literature on teacher retention. Cambridge, MA: Harvard Graduate School of Education. Retrieved from http://assets.aarp.org/www.aarp.org_/articles/NRTA/Harvard_report.pdf

Johnson, S. M., Kraft, M. A., & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record*, *114*(10), 1-39. Retrieved from http://www.tcrecord.org.libproxy.lib.unc.edu/library

Kena, G., Hussar, W., McFarland, J., de Brey, C., Musu-Gillette, L., Wang, X., . . . Dunlop Velez, E. (2016). *The condition of education 2016* (NCES 2016-144). Washington, DC: U.S. Department of Education, National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubsearch.

Ladd, H. (2009). *Teachers' perceptions of their working conditions: How predictive of policy relevant outcomes* (National Center for Analysis of Longitudinal Data in Education Research Working Paper No. 33). Washington, DC: CALDER. Retrieved from http://files.eric.ed.gov/fulltext/ED509680.pdf

Ladd, H. (2011). Teachers' perceptions of their working conditions: How predictive of planned and actual teacher movement? *Educational Evaluation and Policy Analysis*, *33*, 235–261.

Ladd, H. F., & Zelli, A. (2002). School-based accountability in North Carolina: The responses of school principals. *Educational Administration Quarterly*, *38*(4), 494-529. doi:10.1177/001316102237670

Lankford, H., Loeb, S., & Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational Evaluation and Policy Analysis, 24*(1), 37-62. doi:10.3102/01623737024001037

Lee, J., & Reeves, T. (2012). Revisiting the impact of NCLB high-stakes school accountability, capacity, and resources: State NAPE 1990—2009 reading and math achievement gaps and trends. *Educational Evaluation and Policy Analysis, 34*(2), 209-231. doi:10.3102/0162373711431604

Liu, X. S. (2007). The effect of teacher influence at school on first-year teacher attrition: A multilevel analysis of the schools and staffing survey for 1999-2000. *Educational Research and Evaluation*, *13*(1), 1-16. doi:10.1080/13803610600797615

Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How teaching conditions predict teacher turnover in California schools. *Peabody Journal of Education, 80*(3), 44-70. doi:10.1207/s15327930pje8003_4

Loeb, S., & Miller, L. C. (2006). *A review of state teacher policies: What are they, what are their effects, and what are their implications for school finance?*. Stanford, CA: Institute for Research on Education Policy & Practice. Retrieved from http://cepa.stanford.edu/sites/default/files/11-Loeb-Miller(3-07).pdf

Marsh, J. A., Springer, M.G., McCaffrey, D.F., Yuan, K., Epstein, S., Koppich, J., … Peng, A. (2011). *A big apple for educators: New York City's experiment with schoolwide performance bonuses: Final evaluation report*. Santa Monica, CA: RAND Corporation. Retrieved from http://www.rand.org/pubs/monographs/MG1114.html

Marshall, C., & Pepin, C. (2005). *Re-framing educational politics for social justice*. Boston: Pearson/Allyn and Bacon.

McCaffrey, D., Koretz, D., Lockwood, J. R., & Hamilton, L. (2004). *Evaluating value-added models for teacher accountability*. Santa Monica, CA: RAND. Retrieved from http://www.rand.org/pubs/monographs/MG158.html

McLaughlin, M. W. (2005). Listening and learning from the field: Tales of policy implementation and situated practice. In A. Liberman (Ed.), *The roots of educational change* (pp. 58-72). Netherlands: Springer. doi: 10.1007/1-4020-4451-8_4

Mintrop, H. (2004). *Schools on probation: How accountability works (and doesn't work)*. New York: Teachers College Press.

Mobley, W. (1982). *Employee turnover: Causes, consequences and control*. Reading, MA: Addison-Wesley.

New Teacher Center. (2014). *Design, validity and reliability*. Santa Cruz, CA: New Teacher Center. Retrieved from https://ncteachingconditions.org/uploads/File/NC%20val%20rel%20brief%20%205-14.pdf

New Teacher Center. (2015). *Student achievement and teacher attrition analysis*. Santa Cruz, CA: New Teacher Center. Retrieved from https://ncteachingconditions.org/uploads/File/NC%20std%20ach%20&%20teach%20retent%20brief%203-15%20(1).pdf

No Child Left Behind Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).

North Carolina Department of Public Instruction. (2015a). *North Carolina's state plan to ensure equitable access to excellent educators*. Retrieved from http://www.dpi.state.nc.us/docs/program-monitoring/titleIA/equity-plan/equity-final.pdf

North Carolina Department of Public Instruction. (2015b). *2014–15 Performance and growth of North Carolina public schools executive summary*. Retrieved from http://www.ncpublicschools.org/docs/accountability/reporting/exsumm15.pdf

North Carolina Department of Public Instruction (2018a). *2016-2017 State of the teaching profession in North Carolina* (Report #70). Report to the North Carolina General Assembly. Retrieved from http://www.dpi.state.nc.us/educatoreffectiveness/surveys/leaving/

North Carolina Department of Public Instruction (n.d.). *NC school report cards data sources and information guide, Personnel*. Retrieved from http://www.ncpublicschools.org/src/guide/personnel/

Podgursky, M. (2006). Teams versus bureaucracies: Personnel policy, wage-setting, and teacher quality in traditional public, charter, and private schools. *Education Working Paper Archive*. Retrieved from http://files.eric.ed.gov/fulltext/ED509018.pdf

Price, J. (1977). *The study of turnover*. Ames, IA: Iowa State University Press.

Reback, R., Rockoff, J., & Schwartz, H. (2014). Under pressure: Job security, resource allocation, and productivity in schools under no child left behind. *American Economic Journal-Economic Policy*, *6*(3), 207-241. doi:10.1257/pol.6.3.207

Reed, D., Rueben, K. S., & Barbour, E. (2006). *Retention of new teachers in California*. San Francisco, CA: Public Policy Institute of California. Retrieved from http://www.ppic.org/content/pubs/report/R_206DRR.pdf

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*, *73*(2), 417–458.

Robinson, V. M. J., Lloyd, C. A., & Rowe, K. J. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly, 44*(5), 635-674. doi:10.1177/0013161X08321509

Rockoff, J. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review*, *94*(2), 247–252.

Shafritz, J. M., Ott, J. S., & Jang, Y. S. (2015). *Classics of organization theory*. Cengage Learning.

Springer, M. G., Lewis, J. L., Podgursky, M. J., Ehlert, M. W., Taylor, L. L., Lopez, O. S., & Peng, A. (2009). *Governor's Educator Excellence Grant (GEEG) Program: Year Three Evaluation Report*. Nashville, TN: NCPI. Retrieved from https://my.vanderbilt.edu/performanceincentives/files/2012/10/GEEG_Year_3_Report_ES.pdf

Springer, M. G., Swain, W. A., & Rodriguez, L. A. (2016) Effective teacher retention bonuses: Evidence from Tennessee. *Educational Evaluation and Policy Analysis*, *38*(2), 199-221. doi:10.3102/0162373715609687

Springer, M. G., & Winters, M. G. (2009). *New York City's school-wide bonus pay program: Early evidence from a randomized trial* (National Center on Performance Incentives. Working Paper No. 2009-02). Nashville, TN: NCPI. Retrieved from https://my.vanderbilt.edu/performanceincentives/files/2012/10/200902_SpringerWinters_BonusPayProgram15.pdf

Sun, M., Saultz, A., & Ye, Y. (2016). Federal policy and the teacher labor market: Exploring the effects of NCLB school accountability on teacher turnover. *School Effectiveness and School Improvement*, 1-21. doi:10.1080/09243453.2016.1242506

Taylor, L. L., & Springer, M. G. (2009). *Optimal incentives for public sector workers: The case of teacher-designed incentive pay in Texas* (National Center on Performance Incentives. Working Paper No. 2009-05). Nashville, TN: NCPI. Retrieved from https://my.vanderbilt.edu/performanceincentives/files/2012/10/200905_TaylorSpringer_OptimalIncentive.pdf

Thomsen, J. (2013) *School accountability "report cards" rating system*. In 50-state comparison: State school accountability report cards. Retrieved from http://ecs.force.com/mbdata/mbquestRTL?Rep=AR02

Tickle, B. R., Chang, M., & Kim, S. (2011). Administrative support and its mediating effect on US public school teachers. *Teaching and Teacher Education, 27*(2), 342-349. doi:10.1016/j.tate.2010.09.002

U.S. Department of Education. (2016, December, 21). *Teacher incentive fund*. Retrieved from https://www2.ed.gov/programs/teacherincentive/index.html

West, M. & Chingos, M. (2008). *Teacher effectiveness, mobility, and attrition in Florida: A descriptive analysis* (National Center on Performance Incentives. Working Paper No. 2008-12). Nashville, TN: NCPI. Retrieved from https://my.vanderbilt.edu/performanceincentives/files/2012/10/200812_WestChingos_TeacherEffectivenessFL1.pdf

Wheeler, J., & Glennie, E. (2007). Can pay incentives improve recruitment and retention of teachers in America's hard-to-staff schools? A research summary. *Policy Matters*. Durham, NC: Center for Child and Family Public Policy at Duke University. Retrieved from http://files.eric.ed.gov/fulltext/ED499014.pdf

Williams, W., Adrien, R., Murthy, C., Pietryka, D. (2016). *Equitable access to excellent educators: An analysis of states' educator equity plans*. Rockville, MD: Westat. Retrieved from https://www2.ed.gov/programs/titleiparta/equitable/titleiiequityanalysis1031.pdf