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# The Influence of the Length of the Instructional Day on the Percentage of Proficient and Advanced Proficient Scores of the New Jersey Assessment of Skills and Knowledge for Grades 6, 7, and 8.

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The Influence of the Length of the Instructional Day  
on the Percentage of Proficient and Advanced Proficient Scores  
of the New Jersey Assessment of Skills and Knowledge for Grades 6, 7, and 8.

Christopher Michael Tully

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Submitted in partial fulfillment of the  
requirements for the degree of  
Doctor of Education

Seton Hall University

2017

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SETON HALL UNIVERSITY  
COLLEGE OF EDUCATION AND HUMAN SERVICES  
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APPROVAL FOR SUCCESSFUL DEFENSE

**Christopher Tully**, has successfully defended and made the required modifications to the text of the doctoral dissertation for the **Ed.D.** during this **Spring Semester 2017**.

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## **Abstract**

### **THE INFLUENCE OF THE LENGTH OF THE INSTRUCTIONAL DAY ON THE PERCENTAGE OF PROFICIENT AND ADVANCED PROFICIENT SCORES OF THE NEW JERSEY ASSESSMENT OF SKILLS AND KNOWLEDGE FOR GRADES 6, 7, AND 8.**

This study was relational, non-experimental, explanatory, and cross-sectional in nature, using quantitative methods to explain the influence of student, staff, and school independent variables on 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> grade student achievement in both Language Arts and Mathematics on the 2011 NJ ASK. The variable of interest was the length of the instructional day and controlled student, staff, and school variables. This study provides descriptive research on the relationship between the length of the instructional day and other predictor variables and student achievement. The study used approximately 200 schools for each grade level and subject area combination. The percentage of students eligible for free and reduced lunch (%FRL) was found to be the strongest predictor on the 2011 NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8 in this study. Student attendance was also found to be a statistically significant predictor of the percentage of students scoring Proficient and Advanced Proficient on the NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8. There is no statistically significant relationship between the length of the instructional day and the percentage of students Proficient and Advanced Proficient on the NJ ASK Language Arts and Mathematics scores for Grades 6, 7, and 8.

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I would also like to recognize Dr. Michael Osnato. I have known Dr. Osnato for many years through his mentoring work in my school district. He is a highly respected professor and experienced school administrative practitioner. He has always provided me with excellent advice and guidance.

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I would also like to thank fellow students that I have come in contact with during my time at Seton Hall. I would like to wish all of them continued success as they continue to reach their goals.

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## **Dedication**

I would like to dedicate this work to my parents, Gloria and Leo. They have been encouraging me to set goals, follow my dreams, and to never give up. It is that constant encouragement that has provided me with the motivation and dedication to become a lifelong learner and to pursue my doctorate.

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# CHAPTER I

## INTRODUCTION

### Background

Since the beginning of education in the United States, lawmakers and decision makers have been trying to close achievement gaps by adding more instructional time to the school day. There has been very little empirical evidence to support what might be the most popular of all school reforms that are constantly being recommended as the solution to increasing student achievement.

Proponents of adding instructional time to the school day often point out that our school day as we know it today was designed around agrarian work schedules. United States Secretary of Education Arne Duncan remarked in 2009, “Our school calendar is based upon the agrarian economy, and not too many of our kids are working the fields today.” Scholars have argued for many decades that time is a fundamental condition for learning. Differences in the amount of time that students receive instruction in core subjects are of substantial concern for policymakers and others seeking to improve instruction (Corey et al., 2012, p. 160).

Length of instructional day is just one of the many variables that must be studied when trying to find out what exactly is impacting student performance. There has been research that indicates that implementing longer instructional or school days is a poor use of funds that does not provide the desired impact on student achievement. Many researchers have found that it is the quality of time, not the quantity of time, that matters. Caldwell et al. (1982) summarized measures that reflect that certain aspects of the quality of allocated time, such as student engaged time and academic learning time, show the strongest relationship to achievement (p. 477).

Therefore, the focus of school reforms should be on improving the quality of the time and increasing student engagement during that time.

Bureaucrats continue to support lengthening the school and instructional day and believe that more time is needed to increase student achievement. This thought process is born from the production function theory. This theory states that more time in school will equal greater student achievement. Pigott et al. (2012) stated that the production function theory is commonly used to study the relationship between inputs and outputs. This study's input is the length of the instructional day and the outputs are the 2011 NJ ASK Language Arts and Mathematics scores for Grades 6, 7, and 8. Opponents believe that lengthening the school day is too costly and does not lead to increases in student performance.

Practical obstacles to the extension of the school year include substantial expense and stakeholder attachment to the current school year and summer schedule. The benefits of additional instructional days could diminish as school years are lengthened. Further, it is unknown how teachers would use additional instructional days if they are provided after annual testing is already finished. Simply extending the year well after assessments are given might mean that students and teachers spend more days filling (or killing) time before the end of the year. This would make improvements in learning unlikely, and presumably make students unhappy for no good reason. (Marcotte & Benjamin, p. 59)

Many additional costs are indirectly associated with adding more time to the instructional day. Some may argue that adding more time to the day actually has a negative effect of students dropping out. Fredrick and Walberg (1980, p. 193) continued by stating, "To the extent that additional time is used to make up partially for ineffective instruction or inability, it may even be

negatively correlated with achievement.” Additionally, there would be less time for extra-curricular activities and an increase in teacher burnout.

It is for these reasons that this study was necessary. This study investigated whether the length of the instructional day influenced student achievement on the 2011 NJ ASK Language Arts and Mathematics scores for Grades 6, 7, and 8. There have been several recent studies that investigate length of the school day at the elementary, middle, and high school level. This study builds and adds to those studies by investigating length of instructional time at the middle school level.

### **Statement of the Problem**

The literature on the influence of the length of the instructional day on student achievement has been limited. There has been limited quantitative research on the influence of the length of the instructional day on Grades 6, 7, and 8 New Jersey Assessment of Skills and Knowledge student achievement scores. Therefore, this quantitative study was conducted analyzing the length of the instructional day and what influence it has on Grades 6, 7, and 8 New Jersey Assessment of Skills and Knowledge student achievement scores.

### **Purpose of the Study**

The purpose of this study was to explain the influence of the length of the instructional day on Grades 6, 7, and 8 student achievement in Mathematics and Language Arts as measured by the results from the New Jersey Assessment of Skills and Knowledge (NJ ASK) 2010-2011. The study also examined the amount of variance in student test results accounted for by the length of the instructional day when controlling for other factors that influence achievement, including socioeconomic status. The results of this study can provide government and school officials with data that will allow them to construct better policies regarding the length of the



instructional day, better utilize district resources, and make necessary changes to the structure of the schools to maximize student achievement.

### **Research Questions**

**Research Question 1:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 2:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 3:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 4:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 5:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 6:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

### **Null Hypotheses**

**Null Hypothesis 1:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Language Arts scores of public schools within districts leveled A-J.

**Null Hypothesis 2:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Mathematics scores of public schools within districts leveled A-J.

**Null Hypothesis 3:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Language Arts scores of public schools within districts leveled A-J.

**Null Hypothesis 4:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Mathematics scores of public schools within districts leveled A-J.

**Null Hypothesis 5:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Language Arts scores of public schools within districts leveled A-J.

**Null Hypothesis 6:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Mathematics scores of public schools within districts leveled A-J.

### Independent Variables

The independent variables for this study are from the 2010-2011 school year and were downloaded from the State of New Jersey Department of Education's website. The independent variables include length of school day and variables categorized by student, staff, and school.

Table 1

#### *Student, Staff, and School Variables*

<b>Student</b>	<b>Staff</b>	<b>School</b>
Percentage of students with Limited English Proficiency	Staff Attendance	School Size
Percentage of students with Free or Reduced Lunch	Staff Mobility	Length of Instructional Day
Percentage of students with disabilities	Faculty and Administrators with a master's degree or higher	Length of the School Day
Student Attendance Rate		
Student Mobility		

### Significance of the Study

There have been several reforms that have been put in place over the last decade with the goal of increasing student achievement. Instructional time has been one of the major focuses of those reforms. Proponents of adding instructional time are assuming that adding instructional time to the school day will increase student achievement scores. The existing research on the topic of length of the instructional day has produced varied results. There have not been any studies to date that have examined the influence of the length of the instructional day on Grades 6, 7, and 8. Therefore, it is currently very difficult for school administrators to ascertain what the impact of increasing instructional time would have on student achievement. This study was focused on providing research using simultaneous regressions that measure exactly the influence of instructional time on student achievement.

There have recently been similar studies that measure the influence of the length of the school day on student achievement. This study adds to those studies while focusing specifically on length of the instructional day. The data in this study will provide educational administrators with the evidence needed to make decisions on the length of the instructional day. This means that schools can either lengthen or shorten the instructional day based on whether the results of the study show a strong positive or negative correlation to student achievement.

### **Limitations**

This study was not experimental, as it would be impractical to perform an experimental study on over 600 school districts. The research in this study can measure the influence of variables on other variables but cannot determine the cause. More specifically, correlational design studies cannot determine a cause or effect. Non-experimental studies have limitations, as it is very difficult to prove that the conditions were the same amongst all of the results. The data in this explanatory cross-sectional research are from one point in time. The NJ ASK tests themselves have limitations having to do with scoring, cluster scores, and test validity. The test results are reported at the cluster level for both students and districts. Therefore, the student achievement scores for both Language Arts and Math were compared against all variables separately.

### **Delimitations**

Data for this study were retrieved from the New Jersey Department of Education web site. The data exported from that web site included students in Grades 6, 7, and 8 and represented over 600 public schools in New Jersey. The public schools were organized by district factor groups (DFG) within the range of A-J. The achievement data used in this study

represented only math and language arts achievement data for Grades 6, 7, and 8 on the New Jersey Assessment of Skills and Knowledge (NJ ASK) for the 2010-2011 school year.

### **Definition of Terms**

**Achievement Gap** - Title I requires schools to close achievement gaps across several subgroups of students, assuring that each group meets the same benchmarks as they move toward meeting the federal Title I goal of 100% proficiency in language arts literacy, mathematics, and science by 2014.

**School Size (Total Enrollment)** – is the total number of students enrolled in a school as per the New Jersey Department of Education.

**DFG -- District Factor Grouping** is a system that provides a means of ranking schools by their socioeconomic status (%FRL). The grouping designation is based on information available from the census and includes the following: percent of people in the community with no high school diploma; percent with some college; occupations; income; unemployment; and poverty. There are eight groupings starting with A (the lowest socioeconomic level) and includes B, CD, DE, FG, GH, I and J (the highest). The groupings allow comparison of districts with similar profiles for purposes of state aid and assessment information.

**Faculty and Administrator Credentials** - These are percentages of faculty and administrative members in the school who hold a bachelor's, master's, or doctoral degree.

**Faculty Mobility Rate** - This represents the rate at which faculty members come and go during the school year. It is calculated by using the number of faculty who entered or left employment in the school after October 15 divided by the total number of faculty reported as of that same date.

**Length of Instructional Day** - This is the amount of time per day that a typical student is engaged in instructional activities under the supervision of a certified teacher.

**Length of School Day** - This is the amount of time a school is in session for a typical student on a normal school day.

**LEP** -- Limited English Proficient is defined in N.J.A.C. 6A:15-1.2 as pupils whose native language is other than English and who have difficulty speaking, reading, writing, or understanding the English language as measured by an English language proficiency test. Thus, they require bilingual or ESL programs in order to learn successfully in classrooms where the language of instruction is English.

**NJ ASK** – **New Jersey Assessment of Skills and Knowledge** is the state’s elementary and middle school assessment program covering Grades 3 through 8. NJ ASK is intended to provide information about student progress toward mastery of the skills specified by the CCCS in language arts literacy and math at each grade level, and science at Grades 4 and 8.

**NCLB** -- **No Child Left Behind Act of 2001** was signed into law on January 8, 2002. It reauthorizes the Elementary and Secondary Education Act of 1965 (ESEA), the main federal law regarding K-12 education. The four main pillars of NCLB are accountability, flexibility and local control, enhanced parental choice, and a focus on what works in the classroom. NCLB requires state governments and educational systems to help low-achieving students in high-poverty schools meet the same academic performance standards that apply to all students.

**Student Achievement** - For the purpose of this study, student achievement is defined by test scores. Each range of scores fits categories which are known as Proficient, Advanced Proficient, and Partially Proficient. Achievement is reached when students’ scaled New Jersey Ask scores fall in the Proficient or Advanced Proficient range.

**Student Attendance Rate** - These are the grade-level percentages of students on average who are present at school each day. They are calculated by dividing the sum of days present in each grade level by the sum of possible days present for all students in each grade. The school and state totals are calculated by the sum of days present in all applicable grade levels divided by the total possible days present for all students.

**Students with Disabilities** - This is the percentage of students with an Individualized Education Program (IEP), including speech, regardless of placement and programs. This is calculated by dividing the total number of students with IEPs by the total enrollment.

**Student Mobility Rate** - This is the percentage of students who both entered and left during the school year. The calculation is derived from the sum of students entering and leaving after the October enrollment count divided by the total enrollment.

### **Organization of the Study**

Chapter I frames the problem associated with the New Jersey Assessment of Skills and Knowledge Grades 6-8 Language Arts and Mathematics scores in relationship to the length of the instructional day. School administrators and bureaucrats believe lengthening the instructional day will increase student achievement on test scores. The study further investigates whether lengthening the instructional day is a valid reform in regard to increasing student achievement. Finally, the study determines the amount of variance in student test scores accounted for by the length of the instructional day when controlling for student, staff, and school variables.

Chapter II reviews the literature on the independent student, staff, and school variables. A literature review was also completed on the theoretical framework related with the length of instructional day and student achievement.

Chapter III outlines both the design methods and procedures for this study. The data collected for this study were retrieved from the school report card for the 2010-2011 school year from the New Jersey Department of Education web site.

Chapter IV includes the data and statistical findings of the study.

Chapter V provides both a statistical review and implications for practices and policies. This chapter includes detailed recommendations and suggestions for future research based on the research findings.



## **CHAPTER II**

### **REVIEW OF LITERATURE**

#### **Introduction**

The purpose for this study was to determine the strength and direction of the length of the instructional day and other variables found in the existing literature that influence student achievement and aggregated district student New Jersey Assessment of Skills and Knowledge scores of Grades 6-8 in Language Arts and Mathematics.

The main research question guided the review. The search terms used for the literature review included high-stakes testing, student variables, teacher variables, and school variables as listed on the 2011 NJ School Report Card.

This study used empirical and seminal literature to determine the relationship between the length of the instructional day and student achievement scores on the NJ ASK 2011 and further the research on the relationship between student, teacher, school variables, and student achievement. The aim of this study was to provide policymakers, school leaders, and researchers with additional evidence in regard to length of the school day as a predictor of student achievement.

#### **Literature Search Procedures**

The following online databases were accessed to research the literature for this section. The databases were Dissertations/Theses (SHU eRepository), Education Journals (ProQuest), ERIC (EBSCO) (A&I), ERIC (ED.gov), ERIC (Proquest), JSTOR, SAGE Journals Online, books, and reports.

The keywords used to search the databases in the research included extended school day, length of school day, length of instructional day, student achievement, socioeconomic status,

middle school, student mobility, faculty mobility, school size, teacher credentials, high-stakes testing, instructional day, faculty attendance, student attendance, LEP, and students with disabilities.

### **Methodological Issues**

Recently there have been some studies (Sammarone, 2014; deAngelis, 2014; & Plevier, 2016) that have compared length of school day to student achievement. Sammarone (2014) deAngelis (2014), and Plevier (2016) used the same variables of student achievement as this study. Sammarone (2014). deAngelis (2014), and Plevier (2016) all focused in the influence of the school day on student achievement. However, empirical research on the topic of length of instructional day is still limited.

### **Inclusion Criteria**

The following criteria were used in performing the research for this topic:

- Peer reviewed
- Published within the last 25 years
- Experimental, quasi-experimental, meta-analysis, and/or non-experimental studies
- Grades 6-8 related
- Dissertations
- Government works
- Seminal works
- Student achievement
- Scholarly books

## New Jersey School Report Card

The New Jersey Department of Education (NJDOE) produces annually a School Report Card. The NJ School Report Cards are used to provide a standard view of accountability data that compare schools and districts against each other. The Report Cards also show how a school or district is progressing towards meeting proficiency standards from No Child Left Behind (NCLB) rankings.

The School Report Card issued in May 2012 contains data for the 2010-2011 school year. Enrollment numbers were based on the October 15, 2010, NJSMART submission. The information in the Report Card is school-level data, except for the finance section, which contains district-level information. For charter schools, however, the finance section is school-level. The source of the information contained in the New Jersey School Report Card is the school district or the charter school unless otherwise indicated in this guide (NJDOE, 2012).

### Review of Literature Topics

Variables from the NJ School Report Card in this study were analyzed for influence on NJ ASK scores for Grades 6-8. The New Jersey Assessment of Skills and Knowledge (NJ ASK) had the following score ranges for both Language Arts and Mathematics:

Table 2

#### *NJ ASK Levels of Proficiency*

Level	Score
Partially Proficient	<200
Proficient	Between 200-250
Advanced Proficient	Between 25-300

**Grade 6**

The NJDOE reported the NJ ASK 6 was administered between May 03 and May 16, 2011. Of the 104,688 students enrolled, 103,242 students received valid scale scores in Language Arts Literacy, and 103,545 students received valid scale scores in Mathematics. In Language Arts Literacy, 59.4% of all students scored at the Proficient level, and 7.3% scored at the Advanced Proficient level. In Mathematics, 49.8% of all students scored at the Proficient level, and 27.6% scored at the Advanced Proficient level. The mean scale score in Language Arts Literacy was 209.5. The mean scale score in Mathematics was 225.1 (NJDOE, 2012).

**Grade 7**

According to the NJDOE, the NJ ASK 7 was administered between May 03 and May 06, 2011. Of the 104,778 students enrolled, 103,367 students received valid scale scores in Language Arts Literacy; and 103,575 students received valid scale scores in Mathematics, and 102,121 students received valid scale scores in Science. In Language Arts Literacy, 51.0% of all students scored at the Proficient level, and 12.3% scored at the Advanced Proficient level. In Mathematics, 41.4% of all students scored at the Proficient level, and 24.3% scored at the Advanced Proficient level. The mean scale score in Language Arts Literacy was 208.3. The mean scale score in Mathematics was 216.3 (NJDOE, 2012).

**Grade 8**

NJDOE also reported the NJ ASK 8 was administered between May 03 and May 06, 2011. Of the 104,506 students enrolled, 103,151 students received valid scale scores in Language Arts Literacy; and 103,208 students received valid scale scores in Mathematics. In Language Arts Literacy, 63.0% of all students scored at the Proficient level, and 19.1% scored at the Advanced Proficient level. In Mathematics, 41.1% of all students scored at the Proficient level,

and 29.3% scored at the Advanced Proficient level. The mean scale score in Language Arts Literacy was 223.4. The mean scale score in Mathematics was 222.5 (NJDOE, 2012).

### **High-Stakes Testing**

Popham (2014) contended that the traditional way we build and burnish our educational achievement tests may lead to using those tests inappropriately to evaluate schools and teachers (p. 48).

Popham (2014) stated the following:

As the years tumbled by, the evaluative use of student test performances has become more significant. For example, in the coming years, many American teachers will lose their jobs primarily because their students perform poorly on tests. The high-stakes decisions riding on student test scores have become higher still. (p. 49)

According to Koretz (2008), “Achievement testing is a very complex enterprise and, as a result, test scores are widely misunderstood and misused” (p. 1). Solorzano (2008) added to these statements and explained as follows:

Educational reform that ties student achievement to teacher financial incentives and to punitive policies if progress is not made, has been proposed. In effect, the stakes have been raised. Policies have been implemented to either reward or punish schools and student for test results.

Maddus and Russel (2010) explained that testing is seen as essential to developing a world-class educational system, motivating the unmotivated, lifting all students to world-class standards, increasing the nation’s productivity, and restoring global competitiveness (p. 21).

Maddus and Russel (2010) explained the negative effects of high-stakes testing are narrowing the curriculum, decreasing attention on non-tested subjects, changing preschool and

kindergarten curricula, narrow test preparation, corruption of test results, cheating, triaging “bubble” students, retaining students in grade, increased dropout rates, and increasing student stress and anxiety (p. 28). Maddus and Russel (2010) explicated all of these paradoxical negative consequences of high-stakes testing are chronic, predictable, and well documented over centuries and across continents (p. 28). Maddus and Russel (2010) concluded that the conundrum in this paradox is that the stakes attached to test results are the driving force of the reform policy. The stakes produce both the salutary effects and the unintended negative consequences (p. 28). Maddus and Russel (2010) explained that test results are an important factor that is driving school reform policies. These reform policies in turn are having a negative effect on our schools.

In a study on how high-stakes testing improves learning, Hout, Elliott, and Frueh, (2012), explained that all of these policies share a fundamental principle: They reward or sanction students, teachers, or schools based on how well students score on standardized tests (p. 34). Hout et al. (2012) explained as follows:

Research has shown that incentives can encourage teachers to “teach to the test” by narrowing their focus to the material most likely to appear on the test. As a result, their students’ scores may be artificially inflated because the score reflects their knowledge of only part of the material the students should know about the subject (p. 33).

The Hout et al. (2012) study examined research on 15 programs with a range of configurations to assess the effects when incentives are given to schools, teachers, and students (p. 34). When studying incentives for schools, Hout et al.’s (2012) research indicated an effect size of about 0.08 on student learning—equivalent to raising a student’s performance from the 50th to the 53rd percentile (p. 34). However, when studying incentives for teachers, Hout et al.

(2012) researchers found an average effect size of .04 standard deviations on the high-stakes test, which was not statistically significant (p. 35). Finally, when studying incentives for students, Hout et al. (2012) found the average effect size on student learning was 0.01 when measured by New York state tests (p. 35).

Hout et al. (2012) concluded given the immense amount of policy emphasis that incentives have received during the past three decades, the amount of improvement they have produced so far is strikingly small (p. 36). Hout et al. explained that over the many years that incentives have been offered, it has had little impact. This should inform policymakers to stop offering incentives as a way to increase achievement.

Nichols, Glass, and Berliner (2012) developed an Accountability Pressure Rating (APR) to capture the on-the-ground feeling of pressure. Nichols et al. (2012) explained as follows:

Our method for deriving APR values for our 251 study states was guided by the method of “comparative judgments” used for ordering complex and abstract psychological data (Torgerson, 1960). This approach seemed ideal for our purposes since our goal was to transform complex qualitative data (state level policy legislation enactment and implementation) into a quantitative indicator that can be used in subsequent analyses. (p. 5)

Nichols et al. (2012) used three steps in their study. The first step in the Nichols et al. (2012) study was to create state-level portfolios that included a range of legislative documentation, state-generated accountability reports, and newspaper articles documenting the range of ways policy changes both impacted and were viewed by the public (p. 5). In the next step, Nichols et al. (2012) asked 300 graduate students each to view two states’ portfolios and to make two judgments—which state exerted more pressure and by about how much (p. 5). In the

final step, Nichols et al. (2012) performed correlation and regression analyses to examine patterns in the relationships between their APR and fourth and eighth grade reading and math from the National Assessment for Educational Progress (NAEP).

Nichols et al. (2012) reported that there is no significant correlation between APR and student performance when divided into high and low socioeconomic status for either grade level (p. 16). Nichols et al. (2012) found that APR is consistently associated with percent of poverty levels as well as percent of students who are African American in the state. That is, states with a greater number of individuals living in poverty also tended to employ test-related practices that exerted greater amounts of pressure. The nation's poorest children, and the teachers who teach them, tend to feel more pressure when it comes to high-stakes tests than their more privileged contemporaries. (p. 24)

Nichols et al. (2012) reported overall that these correlations suggest that test-related pressure connects more strongly with increases in math performance than in reading (p. 24). Nichols et al. (2012) explained as follows:

Increased testing pressure is related to increases in achievement in math more consistently than in reading. Differences in the nature of the mathematics and reading curriculum, and/or differences in the ways one can prepare for assessments in these two areas may have something to do with the fact that state level pressure to perform well on high-stakes tests is more strongly and positively related to math achievement and negatively related to reading achievement. (p. 26)

Nichols et al. (2012) concluded that the overall pattern of correlations (math more strongly connected to pressure than reading), points to the likelihood that under pressure, teachers grow more efficient at training students for the test (p. 27). Nichols et al. provide



evidence that downward pressure on teachers only makes those teachers more efficient at teaching to the achievement tests.

## **Student Variables**

### **Student Attendance**

School attendance has been repeatedly linked to student achievement. Students with better attendance records are cited as having stronger test performance (Balfanz & Byrnes, 2006; Lamdin, 1996; Nichols, 2003). Gottfried (2010) conducted a study with a quasi-experimental design geared at estimating the causal impact of attendance on multiple measures of achievement, including GPA and standardized reading and math test performance (p. 435).

Having consistently low levels of attendance in early grade levels is also correlated with higher future academic risks, including non-promotion (Neild & Balfanz, 2006) and dropping out (Rumberger, 1995; Rumberger & Thomas, 2000). Economically, students who do not attend school as frequently (and thus have a higher correlated risk for non-promotion and dropping out as mentioned above) tend to face greater future financial hardships, such as unemployment (Alexander, Entwisle, & Horsey, 1997; Broadhurst, Patron, & May-Chahal, 2005; Kane, 2006). These studies provide evidence that attendance is important and is a predictor of students becoming at-risk students.

Caldas (1993) found that attendance was positively and significantly related to student performance in Louisiana's public elementary and secondary schools. Lamdin (1996) also relied on aggregate data to show that student attendance had a positive and significant relationship with academic performance. Gottfried (2010) noted the following:

. . . data [was accessed] from all elementary and middle schools in the Philadelphia School District between the academic years 1994/1995 through 2000/2001. Over this

time period, this amounts to 223 comprehensive, neighborhood elementary and middle schools, with approximately  $N = 86,000$  students in kindergarten through Grade 8. In total, there are  $N = 332,000$  student-year observations. (p. 439)

During the exploration of the baseline data Gottfried (2010) reported, coefficients on days present are positive and significant in all three equations (p. 446). The effect size for the standardized coefficient ranged from .24 to .34 (Gottfried, p. 446).

Gottfried (2010) then strengthened the results of the baseline data by adding a one-year lagged measure (p. 448). Gottfried (2010) found that these results provided a similar explanation as before—that there is empirical evidence that the relationship between attendance and GPA is positive and significant (p. 448).

Finally, Gottfried (2010) analyzed student neighborhood characteristics and found that students with higher school attendance attain higher educational outcomes in terms of both GPA and standardized testing (p. 459).

Gottfried (2010) concluded that the analysis demonstrated that not only does attendance matter in a given school year, but it matters across multiple measures of achievement and it matters early on (p. 459). Gottfried again underlined the importance of attendance on achievement. The author provided statistically significant evidence across multiple measures that confirm attendance matters.

Crone (1993) conducted a study on the influence of attendance on The Louisiana Educational Assessment Program (LEAP). LEAP is a criterion-referenced test given to Grades 3, 5, and 7 and also as the Graduation Exit Exam (GEE). Crone (1993) reported that the standardized regression coefficients indicate that attendance rates yielded the strongest independent relationship (p. 4). The relationship had an  $R^2$  of .66. Crone (1993) concluded that

considering the relationships of overall school attendance rates to other school variables, especially assessment data and dropouts, it appears that attendance is extremely important as an indicator of school effectiveness (p. 17). Crone provides another example of the importance of attendance on student achievement. Policymakers should focus on policies that improve attendance.

Roby (2003) conducted a study on the influence of schoolwide attendance on student achievement. The primary research question of Roby's (2003) study was to explore if there was a significant, positive relationship between student attendance and student achievement as measured by the Ohio Proficiency Tests (p. 4). The method used was the Pearson's *R* correlation statistic for Grades 4, 6, 9, and 12 in regard to test averages and student attendance. The data used were downloaded from the Ohio Department of Education web site. The total school sample size was 3,171. The school sample size for Grade 4 was 1, 946.

Results of the fourth-grade study indicate that student attendance accounts for 32% of the variance held in common with student achievement results as measured by all tests on the fourth-grade Ohio Proficiency Test. In other words, 32% of the variance is related to the same factors (Roby, 1993, pp. 6, 7).

The Roby (2003) study suggests there is a statistically significant relationship between student attendance and student achievement in Ohio at the fourth, six, ninth, and twelfth grade levels (p. 12). The author provides statistically significant evidence of the importance of attendance on student achievement. Roby confirms that policymakers should focus on improving student attendance.

Researchers with the Minneapolis public schools (Hinz et al., 2003) found that students who were absent 20% of the time scored 20 points lower than students who attended school

nearly every day. Parke and Kanyongo (2012) examined the mobility, attendance, and achievement data in a large northeastern urban school district (p. 163). Parke and Kanyongo (2012) had three research questions. The first question measured the prevalence of mobility and nonattendance in Grades 1-12. The study analyzed data from all 80 schools in the district. There were 53 schools. Data used for the Parke and Kanyongo (2012) study were obtained from the districts Real Time Information System. The data was from the 2004-2005 school year. The method used in the Parke and Kanyongo (2012) study for the first research question was a Chi-square analysis to identify significant relationships between grade level and attendance-mobility (p. 164). The Parke and Kanyongo (2012) study explained the following:

For elementary grades (1–5), the percentage of stable attenders was highest in Grade 1 (80%) and decreased as the grade level increased (47% at Grade 8). Conversely, the percentage of mobile attenders was lowest at Grade 1 (9%) and increased to 47% by Grade 8). (p. 165)

Parke and Kanyongo (2012) reported the relationship between grade level and attendance–mobility was significant,  $\chi^2(12, N = 11,796) = 1096.49, p < .001$ , and the effect size was moderate (.305) (p. 165). Parke and Kanyongo provided statistically significant evidence that attendance is a big factor on mobility. This means that improved attendance should lower mobility.

### **Student Mobility**

The Thomas B. Fordham Institute (2012) conducted a study on student mobility within the Ohio Public Schools. The Thomas B. Fordham Institute (2012) study reported on data from over 3,500 schools. The data were retrieved from The Ohio Department of Education’s Education Management Information System (EMIS). The Thomas B. Fordham Institute (2012)

study used the 2009-2010 and 2010-2011 school years. The Thomas B. Fordham Institute (2012) study explained:

Two indicators measure a district's or building's mobility: the two-year stability rate and the one-year churn rate.

- Stability rate – indicates the percentage of a school's students that stayed in a school from October 2009 to May 2011.
- Churn rate - indicates the incidence of mobility (the number of student admits plus withdrawals) relative to the enrollment size of a school over a single school year (October 2010 to May 2011, p. 2).

The Thomas B. Fordham Institute (2012) explained that a high stability rate means more students stay at the school over time, and a high churn rate means there is a greater flow of students moving into and out of the school (p. 3).

The Thomas B. Fordham Institute (2012) study found that there is a statistically significant relationship between more school moves and lower test scores (p. 38). The Thomas B. Fordham Institute confirms the importance of reducing student mobility to help improve student test scores. Focus should be on reducing student mobility.

Fong, Bae, and Huang (2010) researched student mobility in Arizona and focused on the English language learner population. The Fong et al. (2010) study also focused on other variables such as intra- and inter-district transfers, transfer rates, SES, race/ethnicity, and special education. Fong et al. (2010) defined mobility as having any one of the following conditions: transfer event, enrollment break, late entry. A transfer event is when a student makes a non-promotional change in schools during a school year. An enrollment break is when a student withdraws from one school and then enrolls in a new school after at least a 19 days break.

Finally, a late entry is when a student who is not in kindergarten enters school for the first time during a school year (Fong et al., p. 2). Fong et al. (2010) reported that English language learner students were more likely (7.2%) than other students (4.9%) to experience enrollment breaks, intradistrict transfers, and interdistrict transfers (p. 21). Fong et al. (2010) also found that students eligible for free or reduced-price lunch were more likely to experience an enrollment break, intradistrict transfer, or interdistrict transfer (35.9%), almost twice that of other students (18.7%) (p. 21). Fong et al. (2010) reported a stronger relationship of mobility and students eligible for free and reduced-price lunch with a correlation of 0.15 than between mobility and English learner students with a correlation of 0.04 (p. 21). The Fong et al. (2010) study found that mobility rates were lower among middle school students and higher among elementary and high school students (p. 5).

Fong associates students eligible for free and reduced-price lunch with high rates of mobility. The students with the higher mobility are at high risk of performing poorly on achievement tests.

A study conducted by Griggs (2012) examined if student mobility influenced student achievement. The data used by Griggs (2012) were from the Metropolitan Nashville Public Schools. Griggs (2012) explained that data for this analysis were compiled from the following MNPS administrative files for the academic years 1998-1999 through 2002-2003: achievement test scores in mathematics and reading in third through eighth grade, limited demographic information, daily attendance records, and disciplinary reports (p. 394).

In regard to how teachers adjust to mobile students, Griggs (2012) explicated mobile students represent unknown quantities who require evaluation that might take away from instructional time (p. 392). Griggs (2012) explained there is some evidence that mathematics is

more sensitive to curricular sequencing than literacy instruction (Kerbow, 1996); students who change schools are more likely to experience gaps or repetitions in their mathematics exposure (p. 392). Griggs (2012) found that the flexibility of literacy instruction may allow new students to integrate more readily into a curricular program.

Griggs (2012) conducted a regression analysis and the data set includes 150,848 observations of 61,084 students for reading and 151,323 observations of 61,182 students for mathematics (p. 394). The dependent variables were the reading and math scores on the Tennessee Comprehensive Assessment Program.

Griggs (2012) found that all estimates are negative, most are statistically significant, and the between-compulsory estimate used to evaluate the hypothesis is statistically and substantively significant in both reading and mathematics (p. 399). Griggs (2012) concluded, consequently, there is little evidence of a relative average benefit to changing schools when the family—rather than the school district—initiates the change (p. 399). Griggs (2012) also confirms that students with high mobility will perform lower on achievement tests than their peers with low mobility. This is most significant when the families are initiating the move. Therefore, steps should be taken to reduce student mobility.

### **Students with Disabilities**

Gronna, Jenkins, and Chin-Chance (1998) focused a study on the influence of students with disabilities on student achievement. The Gronna et al. (1998) study explained that some students have been exempted from standardized tests in the past (p. 482). Examples of students exempted from standardized tests provided by Gronna et al. (1998) included students with disabilities, students of limited English proficiency, and home-schooled students (p. 482).

Assessments of achievement are currently mandated for all students. Legislation requires the inclusion of all students, including students with disabilities, in all state assessments. Four federal statutes with specific provisions for individuals with disabilities have affected assessment procedures in schools: the Individuals with Disabilities Education Act of 1991 (IDEA), Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990 (ADA), and Goals 2000: Educate America Act of 1994 (Goals, 2000). IDEA guarantees students with disabilities access to a free and appropriate public education and educational services to meet their needs in the least restrictive environment. IDEA also mandates fair, objective assessment practices and due process procedures when parents and/or schools disagree with evaluation or placement recommendations.

Gronna et al. (1998) explicated, therefore, it would be discriminatory to exclude students with disabilities from statewide assessments. Gronna et al. (1998) developed four categories of students with disabilities. Those categories are SLD, EI, MIMR, or SLI. Gronna et al. (1998) defined SLD as follows:

Students evaluated by the state were generally assigned to this category on the basis of evidence of a severe discrepancy between academic achievement and intellectual functioning of at least 1.5 standard deviations that was not due to a visual, hearing, motor, or emotional impairment; mental retardation; economic disadvantage; or students with limited English proficiency (p. 485).

Gronna et al. (1998) defined EI as “students with evidence of a chronic emotional disorder that disrupted academic progress that was not related to other health factors, cultural differences, mental retardation, or specific learning disability” (p. 485). The category MIMR was defined by Gronna et al. (1998) as “students with up to three standard deviations below the



mean in communication skills, daily living (self-help) skills, social (interpersonal) skills, or motor skills” (p. 485). Finally, SLI was defined by Gronna et al. (1998) as “students with evidence of a problem in communication and/or comprehension that was not consistent with the students' other developmental or cognitive abilities” (p. 485).

Data used in Gronna et al.'s (1998) study came from the Hawaii Department of Education for the years 1992 through 1996; the state testing department assessed 62,252 third-grade, 59,964 sixth-grade, 55,477 eighth-grade, and 46,902 tenth-grade students without disabilities using the Stanford 8 (p. 486). A one-way analysis of variance (ANOVA) using a multiple-range post hoc Bonferroni procedure was used to compare the student group means among the SLD, EI, SLI, MIMR, and nondisabled categories (Gronna et al., 1998, p. 486). The elementary cohort consisting of third to sixth grade was based on the following students: nondisabled,  $n = 18,320$ ; SLD,  $n = 851$ ; EI,  $n = 85$ ; and MIMR,  $n = 49$ , for two cohorts from 1992 to 1995 and 1993 to 1996 (Gronna et al., 1998, p. 486). An ANOVA revealed statistically significant differences among the means of all categories in all grades, 3 through 10. The results for third grade are as follows: Total Reading,  $F(5, 53,074) = 1,256, p < .001$ , and Total Mathematics,  $F(5, 51,698) = 1,145, p < .001$ . (Gronna et al., 1998, p. 486). At third and sixth grade, post hoc Bonferroni procedures indicated significant differences between the nondisabled students and the disability categories (Gronna et al., 1998, p. 486). Gronna et al. concluded the following:

Closer inspection of these norms indicates that at all four grades tested, students who were categorized as MIMR, SLD, or EI did not perform on par with the national normative group. The local subgroup norms were lower at every tested grade level.  
(p. 489)

Gronna confirmed students with disabilities in specific categories perform lower than students with disabilities in other categories. Therefore, policymakers should focus on policy that will help students in categories such as MIMR, SLD, and/or EI.

Katsiyannis, Zhang, Ryan, and Jones (2007) reviewed how high-stakes testing affects students with disabilities and their schools. Federal laws and mandates like the No Child Left Behind (NCLB) Act of 2001 require that all students must be assessed. “States must develop or adopt tests to assess student performance and demonstrate AYP toward 100% proficiency by 2013-2014” (Katsiyannis et al., 2007, p. 160). NCLB requirements have had a direct effect on students with disabilities. Accountability has forced states to develop ways to support students with disabilities and meet the requirements of NCLB. Katsiyannis et al. (2007) explained that given the inappropriateness of requiring students with severe cognitive deficiencies to demonstrate proficiency in advanced subject matters (e.g., algebra), alternate assessments are sometimes used to demonstrate academic progress (p. 161). States have also developed exams that allow for grade level promotion of students. Katsiyannis et al. (2007) reported to date, six states use the results of high-stakes testing known as minimum competency exams (MCEs) to determine grade promotion or retention of students (p. 161). Testing of students with disabilities has the following negative consequences: (a) the challenge of students with disabilities to achieve “proficient levels,” (b) students with disabilities who fail make schools look less effective, and (c) students are stressed by taking tests and by not accessing or reaching state standards (Johnson et al., 2005). Katsiyannis explained that testing students with disabilities has negative consequences on the learning community as a whole.

Wu, Morgan, and Farkas (2014) conducted a study on *Does Minority Status Increase the Effect of Disability Status on Elementary Schoolchildren’s Academic Achievement?* The Wu et

al. (2014) study used data from the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K). “. . . final analytical sample included 6,446 children who had complete information on the predictors, and at least one reading and one mathematics score” (Wu et al., 2014, p. 367).

Wu et al. (2014) explained:

Altogether, the results indicated that reading and mathematics achievement were highly correlated both initially and over time; higher achievement in one domain in kindergarten had a statistically significant and positive effect on the subsequent growth in the other till at least fifth grade. (p. 370)

Wu et al. (2014) concluded that regardless of race/ethnicity, children with disabilities tended to start lower and grow at a slower pace in both reading and mathematics (p. 370). Wu et al. explain that students with disabilities have a lower starting place and grow at a slower pace than their peers. Their findings were statistically significant.

### **Students with Limited English Proficiency**

Menken (2006) examined how the pressures of high-stakes testing have resulted in changes to how English language learners receive instruction. More specifically, Menken (2006) explained that teachers are now teaching to the test. The recently reauthorized ESEA, entitled NCLB, builds upon prior legislation and focuses more heavily on accountability than ever before. It mandates that accountability requirements apply to *all* students, requiring a 95% participation rate in state assessments, and emphasizes the inclusion of ELL students as a “subgroup” that must make measurable academic progress for schools to continue to receive federal funds without sanctions. An overriding premise of NCLB is that all students must achieve the level of Proficient in state assessment systems by the 2013-2014 school year (Menken, 2006, p. 523).

The new Title I and Title III of the ESEA mandate two types of assessments for students who are ELLs: academic content and English language proficiency. In accordance with the new Title I, each state must now include “limited English proficient” students (also known as ELLs) into its academic assessment system and assess them in a valid and reliable manner.

Furthermore, each state education association must develop measureable achievement objectives to ensure that ELLs make “adequate yearly progress” in their development and attainment of English proficiency, while meeting same statewide academic standards in the content areas as those set for native English speakers (Menken, 2006, p. 523)

Menken (2006) found that teachers in New York and throughout the country are under pressure to “teach to the test.” Menken (2006) reported that school policies and practices are often in conflict due to the pressures of high-stakes testing. “Most schools have responded to testing pressures by focusing their efforts on English instruction” (Menken, 2006, p. 537). Menken confirms that test pressures have made schools focus on teaching English and teaching to the test for limited English proficient students.

Wright and Li (2008) examined the influence of NCLB on high-stakes math tests for English language learners. “High-stakes tests are commonly used in schools throughout the world to ensure students meet specific academic standards” (Wright & Li, 2008, p. 238). Wright and Li (2008) explained the reality is that the overwhelming majority of ELLs are tested in English on the same state tests as mainstream students with few, if any, accommodations (p. 238). Some states only provide tests in either English or Spanish. Therefore, ELLs who do not speak Spanish must take the English version of the test. Wright and Li (2008) explained:

Based on our findings, we argue the linguistic demands of the Math TAKS test are not reasonable for newcomer ELLs, and that these students did not have a reasonable opportunity to learn the requisite grade-level math content prior to the test. (p. 238)

Brown (2005) argued that math has “a language all its own” and thus constitutes a “third language” for ELLs to learn (p. 340). Abedi and Lord (2001) describe unfamiliar vocabulary and difficult syntax in language tests as the “language factor” which threatens the validity of the interpretations of ELL math test scores. Wright and Li (2008) explained that NCLB becomes a language policy as it fails to account for the language proficiency of newcomer ELLs and the time it takes ELLs to learn enough English in order to be able to meaningfully participate in the same state-wide tests as fluent English speakers. This research explains the importance of having basic linguistic skills in order for students to perform with their peers in math.

Wright and Choi (2006) explored the impact of language and high-stakes testing on elementary ELL students in Arizona. Wright and Choi (2006) reported that Arizona schools have experienced rapid growth among students classified as English language learners (ELLs) (p. 3). Educators in Arizona face the same pressures of NCLB, only it may be more prevalent due to the size of the ELL population. Arizona administers the Arizona Instrument to Measure Standards (AIMS) as the state’s test. There were 11,513 third grade students associated with the Wright and Choi (2006) study, which represented 74% of the state’s ELL third grade population. In addition to NCLB, Arizona also passed a law called Proposition 203. Wright and Choi (2006) explained that the law requires that ELL students be instructed in English-only sheltered (or structured) English immersion (SEI) classrooms (p. 3).

Based on the findings of Wright and Choi that high-stakes English-only testing, Proposition 203, and its mandates for English-only SEI instruction have not improved the

education of ELL students, there is a need for substantial changes to current policies and practices with regard to the education of ELL students in the state of Arizona.

This research explains the importance of developing both sheltered and English immersion programs to support limited English proficient students. Providing these programs will help increase student achievement among this student population.

### **Students' Socioeconomic Status**

Sirin (2005) examined socioeconomic status in a study titled *Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research*. Sirin (2005) expanded on previous research conducted on this topic by White (1982). Sirin (2005) explained:

White (1982) carried out the first meta-analytic study that reviewed the literature on this subject by focusing on studies published before 1980 examining the relation between SES and academic achievement and showed that the relation varies significantly with a number of factors such as the types of SES and academic achievement measures (p. 417).

Sirin (2005) pointed out the differences in how SES is being reported differently today from the way it was reported on during the 1970s. Sirin (2005) provided us with three changes in SES. The first change is the way researchers operationalize SES. The second change is societal change in regard to parental education and family structure. The third change is researchers focus on moderating factors such as variables like race, ethnicity, and grade level (p. 418). Sirin (2005) also explained traditional SES components, such as parental income, parental education, occupation, and home resources (p. 419). "School SES is usually measured on the basis of the proportion of students at each school who are eligible for reduced-price or free lunch programs at school during the school year" (Sirin, 2005, p. 419). Sirin (2005) reported that one in five children in the United States lives in poverty (p. 445). Socioeconomic status is not only

directly linked to academic achievement but also indirectly linked to it through multiple interacting systems, including students' racial and ethnic background, grade level, and school/neighborhood location (Brooks-Gunn & Duncan, 1997; Bronfenbrenner & Morris, 1998; Eccles, Lord, & Midgley, 1991; Lerner 1991).

Sirin (2005) found that of all the factors examined in the meta-analytic literature, family SES at the student level is one of the strongest correlates of academic performance. At the school level, the correlations were even stronger (p. 438). An additional finding by the Sirin (2005) study was that parents' location in the socioeconomic structure had a strong impact on students' academic achievement (p. 438). Sirin provided further evidence that socioeconomic status strongly correlates with student achievement.

Stull (2013) examined how family socioeconomic status and parent expectations impact a child's academic achievement. Historically, the primary model for analyzing inequalities in educational outcomes has been the status attainment model developed largely by sociologists at the University of Wisconsin in the 1960s (Sewell & Hauser, 1980). It has been made evident that high-quality early childhood development programs have proven to be successful in helping students overcome early problems (Magnuson et al., 2004; Hair et al., 2006). Also, in a study based on Hayes and Zaslow (1990), children attending classrooms in the United States with more highly trained staff exhibit a higher level of positive behavior and development. The Stull (2013) study reveals the importance of parent expectations on their children's academic achievement. "Analyzing a U.S. national cross-sectional data set of twelve-year-olds, almost 50% of whom were of African American descent, Davis-Kean (2005) found that the parent's SES related indirectly to children's academic achievement through the parents' educational expectations (Stull, 2013, p. 57).

Stull (2013) used data from the Early Childhood Longitudinal Study (ECLS), which is composed of two cohorts, one of students entering kindergarten (Kindergarten Cohort) and a second of children born in the calendar year 2000 (Birth Cohort). Over 22,000 students from 900 kindergarten programs were included in the Stull (2013) study.

Stull (2013) reported that parental involvement is a function of family SES. The Stull (2013) study also found that the child's family SES exerts both a direct and an indirect effect on achievement (p. 63). Stull (2013) concluded while it is not possible to raise a child's family SES, it is possible to understand how family SES affects school conditions and to use school conditions to compensate for differences in family SES (p. 63). This research also provides additional evidence that low socioeconomic status has a negative effect on student achievement.

Tienken (2012) reported during the 2009-2010 school year, 47.5 % of all K-12 public school students in the United States were eligible for free or reduced-price lunches compared to 38.3% during the 2000-2001 school year (National Center for Education Statistics, 2011, p. 105). "In no state does the group of students categorized as economically disadvantaged ever score higher than its middle class and wealthy peers on any state test, at any level" (Tienken, 2011). Socioeconomic status can be used to predict performance on state assessments. "Turnamian predicted Grade 6 results in Language Arts and Mathematics for 60% of the 423 school districts in New Jersey with elementary schools within 10 percentage points by using just three community demographic factors" (Tienken, 2012, p. 106). This research further explains the huge effect that poverty has on student achievement.

Cunningham and Sanzo (2002) conducted a study measuring the impact of high-stakes testing on lower socioeconomic status schools. Coleman (1966) was among the first to point out that SES was the best predictor of school success. "If the tests continue to be used as a form of



teacher evaluation, school assessment, and student rating, then they do a disservice to the administrators, teachers, students, and parents in schools that serve lower-income populations” (Cunningham & Sanzo, 2002, p. 65). Cunningham and Sanzo (2002) explained that the federal government has attempted to level access to technology and computers through a program called E-rate (p. 66). “Unfortunately, poorer schools have so many infrastructure problems and are in such desperate need of repairs and upgrades that their facilities cannot handle the powerful networks” (Zehr, 2000). Research has generally supported the premise that there is a direct relationship between family and school resources and student outcomes (McNeil, 2000). McNeil again pointed out the importance of poverty and its relationship to student achievement. Access to school resources has a direct effect on student outcomes and success.

Virginia uses a test called Standards of Learning (SOLs). Of the children in Virginia, 17.7% live in poverty. The Cunningham and Sanzo (2002) study conducted a correlation regression analysis of student test scores. The results reported a -.44 regression coefficient in English and -.64 for science based on 1999 data. This means that 41% and 64% of the variation in test scores can be explained by the differences in SES. Cunningham and Sanzo (2002) found that an inverse relationship exists between students receiving free and reduced-price lunches and the adjusted pass rates on the SOL tests. Cunningham and Sanzo (2002) concluded that a student’s SES is related to his or her achievement (p. 67). This research confirms once again that students with high FRL rates will achieve lower scores than their peers with low FRL rates.

### **Staff Variables**

#### **Faculty Attendance**

Hermann and Rockoff’s (2010) study, *Worker Absence and Productivity: Evidence from Teaching*, investigated the impact of absenteeism on productivity using detailed panel data on the

timing, duration, and causes of absences among teachers and the gains in academic achievement made by their students (p. 1). The study used data from the 1999-2000 school year to the 2008-2009 school year. The variables included both student math and English test scores, as well as, absences, suspensions, demographics, socioeconomics, special education, and English learner services. Herman and Rockoff (2010) obtained data on teachers' demographics, graduate education, and experience from payroll records (p. 8). The data collected on teachers provided records on the types of absences, frequency of absences, and duration of absences during the study. These data were used to determine the impact on student test scores. Herman and Rockoff used regression analysis to measure absences prior to the exam. Herman and Rockoff's (2010) study reported the following:

In both math and English, absences during the main exam period have significant negative impacts on achievement (-0.0244 and -0.0128) that are an order of magnitude greater than the estimated impact of absences in the pre-exam period (-0.0012 and -0.0006). (p. 21)

Herman and Rockoff's (2010) study found that the estimated difference in the impact of absence across the two groups of teachers is highly statistically significant in math and marginally significant in English ( $p$ -value 0.14) (p. 17). Herman and Rockoff's study illustrated the importance of teacher attendance in both math and English. The data indicate teacher absenteeism has a most negative impact on students in math.

Raegan Miller (2012) investigated faculty attendance in a study titled *Teacher Absence as a Leading Indicator of Student Achievement*. Miller (2012) explained this report used the Civil Rights Data Collection dataset<sup>10</sup> released in early 2012 to raise questions and drive debate about the subject of teacher absence (p. 1). Miller (2012) explicated the variance in teacher absences

using a regression model. The author did not provide  $p$  values but instead provided parameter estimates. Miller (2012) reported on average, 36% of teachers nationally were absent more than 10 days during the 2009-10 school year based on the 56,837 schools analyzed in the dataset (p. 2). Miller (2012) explained:

This report also supplies evidence that students in schools serving high proportions of African American or Latino students are disproportionately exposed to teacher absence. Holding constant the grade-level and whether a school is a charter, a school with its proportion of African American students in the 90th percentile has a teacher absence rate that is 3.5 percentage points higher than a school in the 10th percentile. The corresponding differential based on percentages of Latino students is 3.2 percentage points. A school's grade-level configuration provides some indication of its teachers' absence behavior. An average of 33.3 percent of teachers were absent more than 10 days in high schools. The corresponding figures for elementary and middle schools are 36.7 percent and 37.8 percent, respectively. (p. 2)

Miller provides evidence that the grade level configuration of a school can be a strong predictor of teacher absenteeism. Teachers have a lower percentage of absenteeism when teaching in a traditional 9-12 high school.

Tingle, Schoeneberger, Wang, Algozzine, and Kerr (2012) explored relationships between teacher absences and student achievement in a large urban school district in the southeastern United States (p. 367). Tingle, Schoeneberger, Wang, Algozzine, and Kerr used data from a large K-12 district. The district enrolled 135,638 students in kindergarten through 12th grade and 3,169 four-year-olds in its state- and federally-supported pre-kindergarten programs (p. 370). Tingle et al. (2012) reported the following:

The sample included information about 71,459 (36.3%) Grades 6-8 student records and 1499 (49.6%) teachers from 100 elementary schools; 64,928 (30.0%) Grades 6-8 student records and 717 (23.7%) teachers from 34 middle schools; and 60,368 (30.7%) Grades 9-12 student records and 806 (26.7%) teachers from 31 high schools. (p. 370)

Tingle et al. used both the end of course and end of year assessment scores as the dependent variables. Tingle et al. (2012) used Pearson correlation method to examine relationships between student achievement and teacher absences across school, academic subject, and type of absence levels (p. 372). Tingle et al. (2012) also used hierarchical linear modeling (HLM) to examine relationships between teacher absences and student achievement within and between schools with different levels of average teacher absences (p. 372).

Tingle et al. (2012) reported statistically significant differences,  $F(2,196752) = 2150.52$ ,  $p < .01$ , were evident (p. 373). Tingle et al. (2012) further reported the HLM results indicate that the teacher-level absence rate had a statistically significant negative relationship with student standardized mean academic achievement,  $t(163) = -2.64$ ,  $p = .01$  in Model A. The evidence means that teacher absence has a negative effect on student achievement.

### **Faculty Mobility**

Allensworth, Ponisciak, and Mazzeo (2009) explored faculty mobility in a study titled *The Schools Teachers Leave: Teacher Mobility in Chicago Public Schools* in 2009. Allensworth et al. (2009) examined the degree to which teacher mobility is problematic in Chicago Public Schools (CPS) and looked at the factors associated with high mobility rates, including teachers' background characteristics, school structure, students' characteristics, and workplace conditions (p. 1). Allensworth et al. (2009) data included 72,940 records of 24,848 unique teachers in 538 elementary schools, and 27,643 observations of 9,882 teachers in 118 high schools (p. 7). The

data used were from the 2002-2003 school year to the 2006-2007 school year. Allensworth et al. (2009) explained the following limitations of their study, as they did not have access to measures of teaching quality: data about pre-service preparation (e.g., traditional versus alternative certification); data about teacher salary; and data about whether they are teaching out-of-field (p. 7).

Allensworth et al. (2009) used a three-level hierarchical logistic regression models to examine the movement of teachers into and out of their schools (p. 35). The study reported that only 66% of teachers remain in their elementary schools where less than 30% of the students meet state standards. Also, 87% of teachers stay in their elementary schools when 90% or more of their students meet state standards. This indicates that low-performing schools can expect to have higher mobility rates than their higher achieving peers. Allensworth et al. (2009) explained as follows:

These numbers suggest a substantial problem with equity in CPS schools—those students that are most disadvantaged in terms of their academic achievement and social/economic background are the least likely to go to a school that has a stable teacher workforce. Furthermore, there are large differences in teacher mobility across schools within CPS—differences unequally felt in schools with low levels of student achievement, and particularly in schools that predominantly serve African American students and where nearly all students are low-income. (p. 25)

This research provides evidence the high teacher mobility occurs in schools with the highest rates of poverty and serve African American students. The study also provides evidence that high teacher mobility has an effect on student achievement.

Goldhaber, Gross, and Player (2010) conducted a study titled *Teacher Career Paths, Teacher Quality, and Persistence in the Classroom: Are Public Schools Keeping Their Best?* In 2010, Goldhaber et al. (2010) examined the mobility of early-career teachers of varying quality, measured using value-added estimates of teacher performance (p. 57). Goldhaber et al. (2010) explained the following:

Data are collected by the state of North Carolina for administrative purposes and include detailed information on schools, teachers, and students. These data include, for instance, school-level information on the percentages of free and reduced-lunch (%FRL) recipients; the percentage of African American students in schools; each school's average math performance; teacher-level information on race and ethnicity, gender, and measures of academic and professional credentials such as a teacher's degree attainment, the average SAT score at a teacher's undergraduate institution, pre-service licensure exam score, and a variable indicating whether the teacher has earned National Board of Professional Teaching Standards (NBPTS) certification; and student-level information on race and ethnicity, gender, FRL status, and performance on the end-of-grade state assessments in math. We combine the North Carolina schooling data with information retrieved from the Bureau of Labor Statistics on local labor market conditions and geographic information on the concentration of schools from the federal Common Core of Data. These data sources allow us to account for labor market and geographic contexts that might affect teacher mobility. The study used regression analysis and time hazard models to analyze the data. (p. 62).

In addition, Goldhaber et al. (2010) reported the following:

We find that teachers located in schools with relatively high concentrations of African American students are more likely to transfer (the odds increase 9 percent with each additional standard deviation) to new schools in the district. This result falls in line with previous analyses on teachers' mobility and the racial composition of schools (Hanushek, Kain, & Rivkin, 2004; Jackson, 2009). (p. 69)

Goldhaber et al. (2010) explained that on average the most effective teachers are the least likely to exit the North Carolina system (p. 73). Goldhaber et al. (2010) highlighted the fact that highly effective teachers are more likely to stay employed in teaching. Therefore, less effective teachers are more likely to leave teaching and increase teacher mobility.

Marinell and Coca (2013) provided a study titled *Who Stays and Who Leaves? Findings from a Three-Part Study of Teacher Turnover in NYC Middle Schools*. The study's main focus is on middle schools and mobility. The study utilized data from the New York Public Schools Human Resource data from 2000-2010. The study reported that 22% of elementary teachers left their school within one year of having entered, 46% left within three years, and 59% left within five years. Marinell and Coca (2013) reported in 2003 that 27% of teachers left their school within one year, compared with 17% in 2010. This decline may be related both to changes in working conditions and pay increases as well as the larger economy (p. vii).

Marinell and Coca (2013) stated that among the most experienced teachers, 44% left their school within three years, compared with 55% of the least experienced teachers (p. vii). Marinell and Coca (2013) summarized that teachers are more likely to consider leaving their school if they entered teaching through alternative routes or are teaching a new subject for the first time (p. viii).

Marinell and Coca (2013) reported that recent research on NYC schools suggests that teacher turnover has a negative impact on student achievement (p. 9). Marinell and Coca (2013) estimated that over 33% of the teachers who entered the New York City Public Schools between 2002 and 2009 have left the system. Marinell and Coca (2013) explained that rates of cumulative turnover are generally similar across many different types of teachers; however, teachers with less experience are more likely to leave their schools, as are those with the most and least advanced credentials (p. 17). Marinell and Coca (2013) reported teachers are more likely to stay in schools that are perceived to have strong principal leadership, high levels of order and teacher collegiality, and where teachers have some, but not too much, influence (p. 26). Marinell and Coca (2013) concluded the following:

It appears that less effective teachers are shuffling among low-performing schools, while more effective teachers are moving from low- to high-performing schools. This shuffling of low-performing teachers among low-performing schools may inhibit the schools' capacities to build coherent long-term instructional plans and enduring and collaborative relationships that help serve high-need student populations. (p. 39)

This research provides insight into the fact that less effective teachers are more mobile and work in the lowest performing schools. This has a direct effect on the school's ability to serve its students with the highest needs.

### **Faculty and Administrator Credentials**

Clotfelter, Ladd, and Vigdor (2010) focused on faculty credentials in a study titled *How and Why Do Teacher Credentials Matter for Student Achievement?* Clotfelter et al. (2010) explored a range of questions related to the relationship between teacher characteristics and credentials on the one hand and student achievement on the other (p. 2). Clotfelter et al. (2010)



explained the data we used were derived from administrative records maintained by the North Carolina Education Research Data Center, housed at Duke University (p 17). The reported results are based on the achievement of third, fourth, and fifth graders from 1994 through 2004. The study used regression analysis to analyze the data.

Clotfelter et al. (2010) maintained consistency with other studies (see, in particular, Hanushek, Kain, O'Brien, and Rivkin (2005) and Clotfelter, Ladd, and Vigdor, 2006), finding clear evidence that teachers with more experience are more effective than those with less experience (p. 27). Clotfelter et al. (2010) explained as follows:

These results for lateral entrants appear to be quite consistent with the more detailed investigation of pathways into teaching in New York State by Boyd et al.

(2006). That study found that teachers with reduced coursework prior to entry often exhibited smaller initial gains than other teachers, but that the differentials were small and disappeared as the cohort matured. (p. 27)

Clotfelter et al. (2010) reported for math the total effects of having the weak teacher range from  $-0.150$  to  $-0.206$  standard deviations and for reading from  $-0.081$  to  $-0.120$ . Second, the biggest differentials are associated with experience and licensure status (p. 30). Clotfelter et al. (2010) concluded that a variety of teacher credentials matter for student achievement and that the effects are particularly large for achievement in math. As a result, how teachers with differing qualifications are distributed among classrooms and schools matters. To the extent that the teachers with weaker credentials end up in classrooms with the more educationally disadvantaged children, schools would tend to widen, rather than reduce, the already large achievement gaps associated with the socioeconomic differences that students bring to the classroom. (p. 31)

The Clotfelter et al. (2010) study seemed to be in the minority when it comes to associating teacher credentials and student performance. This research explains that credentials matter most significantly in math. More specifically, it matters most when teaching students with high FRL.

Goldhaber and Brewer (1997) produced a study titled *Evaluating the Effect of Teacher Degree Level on Educational Performance*. Goldhaber and Brewer (1997) investigated if teacher credentials have an effect on student achievement. Goldhaber and Brewer (1997) data were derived from the first two waves of the National Educational Longitudinal Study of 1988 (NELS:88). NELS:88 is a nationally representative survey of about 24,000 eighth-grade students conducted in the spring of 1988 (p. 202). Regression analysis was used to analyze the data.

Goldhaber and Brewer (1997) reported the following:

We also find the percentage of teachers with at least an MA degree is statistically insignificant in all four subject areas (this is true in both the model estimated with only school-level variables and the models shown in Table 2, which include school, teacher, and class variables). (p. 205)

Goldhaber and Brewer (1997) further reported that the years of teaching experience variable is not statistically significant in any subject area, nor is it statistically significant whether the teacher has a master's degree. This implies that teachers with a master's degree are no more (or less) effective than those without advanced degrees, clearly a counterintuitive finding.

Goldhaber and Brewer (1997) concluded the following:

Because mathematics and science degrees were not found to influence student outcomes in English and history, we believe that these results suggest that it is the subject-specific

training rather than teacher ability that leads to these findings. This is important because it suggests that student achievement in technical subjects can be improved by requiring In-subject teaching. (p. 2008)

Goldhaber and Brewer provided evidence that credentials matter most for technical subject-specific courses. This means that focus should be to match subject-specific trained teachers for those types of subject to have a positive effect on student achievement.

Darling-Hammond, Berry, and Thoreson (2001) examined teacher credentials in a study titled *Does Teacher Certification Matter? Evaluating the Evidence* (Darling-Hammond et al., 2001). The study builds on previous work in the Goldhaber and Brewer (1997) study to further investigate the influence of teacher credentials on student achievement.

Goldhaber and Brewer (1997) found strong and consistent evidence that, as compared with students whose teachers are uncertified, students achieve higher levels in mathematics when they have teachers who hold standard certification in mathematics the same finding held to a lesser extent in science. (p. 57)

Goldhaber and Brewer (1997) further found that “contrary to conventional wisdom, mathematics and science [students] who have teachers with emergency credentials do no worse than students whose teachers have standard teaching credentials” (p. 57). Darling-Hammond et al. (2001) contend that there is a difference in student achievement when students are taught by teachers without standard teaching credentials.

Darling-Hammond et al. (2001) reference the same NELS data used by Goldhaber and Brewer (1997). Darling-Hammond et al. (2001) used analysis of variance to examine the data. Darling-Hammond et al. (2001) found, “As Tables 4 and 5 illustrate, students taught by the more experienced and more conventionally prepared group had significantly higher achievement than

those taught by the less experienced, less conventionally qualified group ( $p < .05$  in mathematics and  $p < .001$  in science)” (p. 65). Darling-Hammond et al. (2001) indicated that students achieved higher scores when being taught by teachers with the most experience and training.

### **School Variables**

#### **School Size**

School size has long been debated as to its effects on student achievement. There have been several studies that have compared school size to student achievement. Over the course of time, many smaller schools have been created with the thought that they will increase student achievement and leave the students feeling better connected with their peers. The premise is that increased feelings of being connected have been studied and proven by several researchers to increase achievement (Cotton, 1996; Lee & Smith, 1997; Leithwood & Jantzi, 2009, as cited in Carolan, 2012, p. 583). Other researchers have warned against having too low of a school size and that school sizes with populations of on average 400 work best. Weiss et al. stated, “No school or cohort size will optimize outcomes for all students” (2010, p. 173).

The empirical evidence on school size has long been the focus of several studies. In a 1989 study, Jewell (1989) concluded that large schools generally have lower student achievement and higher dropout rates compared to smaller schools with lower enrollment. Fowler and Walberg (1991) conducted a study that found school size to be a statistically significant predictor of student achievement. These findings would indicate that school size matters when it comes to student achievement. However, more research is needed to pinpoint and confirm the school sizes that work best.

### **Length of Instructional Day**

Caldwell, Huitt, and Graeber (1982) examined instructional time in a study titled *Time Spent in Learning: Implications from Research* in 1982. Caldwell et al. (1982) focused on research findings on time, more specifically the availability of time for instruction, that are most relevant to administrators and teachers.

The data used were obtained from data reported by Kemmerer (1979), Brady et al. (1977), Dishaw (1977), and Fisher et al. (1978). The data reported averaged and standard deviations for measurements of school time, engagement time, and academic learning time.

Caldwell et al. (1982) reported the following:

Students are engaged about 60 percent of the allocated time, spending about 72 minutes on task for reading/language arts and about 27 minutes on task for math. They are working successfully on relevant academic tasks for about half this time, about 36 minutes each day for reading/language arts and 14 minutes each day for math.

Caldwell et al. (1982) summarized measures that reflect certain aspects of the quality of allocated time, such as student engaged time and academic learning time, show the strongest relationship to achievement (p. 477). Caldwell et al (1982) emphasized the importance of engaged time that has the strongest effect on student achievement. The results point to the quality of the instructional time.

Fredrick and Walberg (1980) researched instructional time in a study titled *Learning as a Function of Time* in 1980. Their study grouped instructional time into four ranges. The ranges were years, days, hours, and minutes. The authors provided conflicting results when they concluded that “time devoted to school learning appears to be a modest predictor of

achievement” (Fredrick &Walberg, 1980, p. 193). Fredrick and Walberg (1980) continued by stating, “To the extent that additional time is used to make up partially for ineffective instruction or inability, it may even be negatively correlated with achievement.” Fredrick and Walberg add to the conflicting research available on this topic. The fact that the researchers’ findings were found to be modest and that other factors such as ineffective instruction also need to be accounted for when examining the effects of instructional times on achievement.

Corey, Phelps, Ball, Demonte, and Harrison (2012) conducted a study on how comprehensive school reforms affect instructional time in language arts and math (2012, p. 147). The vast majority of research in school time has focused on describing differences in school time and examining effects on a variety of valued outcomes. For example, studies have looked at the number of years of schooling and the association to various outcomes, including achievement (Hyman, Wright, & Reed, 1975; Rosenbaum, 1986), knowledge and IQ (Harnqvist, 1968, 1977), religiosity (Himmelfarb, 1977), and second language acquisition (Mclaughlin, 1977). These and many other studies have found positive effects of staying longer in school, but with some diminishing returns on some outcomes (Patall, Cooper, & Batts Allen, 2010).

The authors noted that scholars have argued for many decades that time is a fundamental condition for learning. Differences in the amount of time that students receive instruction in core subjects are of substantial concern for policymakers and others seeking to improve instruction. (Corey et al., 2012, p. 160)

Corey confirmed that just adding instructional time to the school day by itself will not improve achievement. It is the quality of the instructional time that will make a difference.

Marcotte and Benjamin (2010) conducted a study that compared schools in Maryland and Colorado that had shorter school years than average. They focused on how the schools

compared on the state assessments in years where there were more school cancellations due to snowfall.

Marcotte and Benjamin (2010) stated the following:

We estimate that an additional 10 days of instruction results in an increase in student performance on state math assessments of just under 0.2 standard deviations. To put that in perspective, the percentage of students passing math assessments falls by about one-third to one-half a percentage point for each day school is closed. (Marcotte & Benjamin, 2010, p. 55)

Practical obstacles to the extension of the school year include substantial expense and stakeholder attachment to the current school year and summer schedule. The benefits of additional instructional days could diminish as school years are lengthened. Further, it is unknown how teachers would use additional instructional days if they are provided after annual testing is already finished. Simply extending the year well after assessments are given might mean that students and teachers spend more days filling (or killing) time before the end of the year. This would make improvements in learning unlikely, and presumably make students unhappy for no good reason (Marcotte & Benjamin, p. 59).

This research indicates that adding quality instructional time will have an impact on achievement data. More specifically, Marcotte and Benjamin (2010) warned about just adding instructional time to any part of the school calendar. For example, the authors state that adding instructional time to the calendar after the state assessments will not be effective, as the motivation associated with the test would have expired.

Baker, Fabrega, Galindo, and Mishook (2004) conducted a study titled *Instructional Time and National Achievement: Cross-National Evidence* in 2004. The study's focus was on the influence of instructional time on achievement.

Baker et al. (2004) explained:

Presented here are analyses of three international datasets of instructional time across four curricular subjects. They are the Programme for International Student Assessment (PISA, 2000), the Third International Math and Science Survey (TIMSS, 1999), and the International Study of Civic Education (CIVICS, 1999), all of which are cross-national data collections and studies of achievement, schools, and family background (p. 315).

The datasets included the following: PISA 32 countries, 97,384 students, and 6,638 schools; TIMSS 38 countries, 180,696 students, and 6,515 schools; CIVICS 28 countries, 93,882 students, and 4,137 schools.

Baker et al. (2004) concluded that as a number of studies have shown, we find here that there is no significant relationship, at the cross-national level, between achievement test scores and the amount of instructional time (p. 322). Baker et al. (2004) recommend instructional time per se is a very simple resource that probably does not warrant much policy attention (p. 329).

Baker et al. provided evidence that adding instructional time by itself does not have a significant relationship between achievement and the amount of instructional time.

Miller (2006) conducted a study titled *How Teachers Spend Instructional Time in the Primary Grades and How this Influences Student Achievement* in 2006. Miller investigated how teachers spend reading instructional time in the primary grades and how it influences student achievement.



Miller (2006) used data from six Utah school districts. There were 5,395 students included in the data. Student achievement data were obtained from the Utah State Criterion-Referenced Test from the Utah State Office of Education. A series of independent *t*-tests were performed.

Miller (2006) concluded that increased instructional time spent on reading in grades 1 and 2 were both statistically significant and positive in its relationship to student achievement on Utah's CRT. Grade 3 was not significant in either direction. Miller provided evidence that increased instructional time in the specific subject of reading did have a statistically significant influence on student achievement in two grades. Miller focused on one subject area and did not account for the quality of the teachers. Additionally, the study did not account for student acquisition of phonetic skills which might be greatest during the years that were statistically significant.

### **Length of School Day**

Kolbe, Partidge, and O'Reilly (2012) produced a study titled *Time and Learning in Schools: A National Profile* in 2012. Kolbe et al. (2012) investigated the amounts of in-school time allocated to traditional public, private, and charter schools, and the ways in which schools use this time for key activities related to student learning and achievement (p. 2). The study focuses on the length of the school day and the length of the school year.

Data from the federal Schools and Staffing Survey (SASS), the only nationally representative data source available for identifying variations in time across schools, are used to measure and document in-school time among the nation's traditional public, private, and charter schools. The SASS does not collect data on student performance and, as a result, does not

support an exploration of the relationship between time and student learning (Kolbe et al., 2012, p. 2).

Kolbe et al. (2012) primarily used data from the 2007-2008 SASS report. Kolbe et al. started by explaining and comparing state policies and minimum thresholds. According to Kolbe et al. (2012), most states requiring a minimum number of instructional days per year set their threshold at 180 days; state minimums range from 160 days per year in Colorado to 186 days (for Grades K-11) in Kansas (p. 4).

Kolbe et al. (2012) stated that the days that students attend school occur during a nine to tenth month time period between early fall and early summer; about 86% of traditional public schools allocate their school days according to this traditional school calendar (p. 5). Kolbe et al. (2012) report that the length of the school day was somewhat shorter for elementary students—about 6 hours and 36 minutes—and longer for middle and secondary students, approximately 6 hours and 50 minutes (p. 5).

According to Kolbe et al. (2012), during the 2007-08 school year, only about 17% of traditional public schools reported having an extended school year (p. 6). Kolbe et al. (2012) also reported a little more than one-third of traditional public schools (36%) reported a school day of seven or more hours for the 2007-2008 school year (p. 7). Kolbe et al. (2012) explicated:

Among traditional public schools, about one-third (30%) of traditional public schools implemented an extended day model, while another 11% adopted an extended year. Just 6% of traditional public schools had both a longer school year and day. The same pattern holds for private schools; only 6% had both a longer day and year. Charter schools were more likely to simultaneously rely on multiple strategies to increase in-school time.

Nearly 15% of charters had a longer school year and day. (p. 10)

In regard to expanding the school calendar, schools with a 12-month school year may simply redistribute existing instructional hours over more months rather than actually increase the number of days or hours per day students attend school (Kolbe et al., 2012, p. 10).

Kolbe et al. (2012) stated that third graders in extended-day schools spent nearly one-half-hour more per week (32.4 minutes/week) on math instruction than students in schools with less than a 7-hour school day (p. 12).

Kolbe et al. (2012) concluded that this report shows, however, that meeting the goal of increasing in-school time for most students is still a long way off (p. 15). Kolbe et al. (2012) explained as follows:

Arguably, it may be the case that adding additional time to the school year or day should be a strategic initiative. Rather than increasing time in all schools, extra time may be targeted at boosting learning and achievement in schools that serve students most at-risk for academic failure and who, by and large, have fewer opportunities for enrichment outside of school (p. 15).

Kolbe examined adding time to the school year and its effect on achievement. The researchers found the strongest effect on achievement for students most at risk. The authors cite that the extra time makes up for the fewer enrichment opportunities outside of the school day. Their peers have more exposure to enrichment opportunities and therefore are in a better position to achieve at higher levels on achievement assessments.

The Virginia State Department of Education conducted a study titled *Instructional Time and Student Learning: A Study of the School Calendar and Instructional Time* in 1992. The Virginia Department of Education (1992) explained:

The purpose of a comprehensive study of the design of the school calendar in Virginia was to identify the quality and quantity of the allocated time and the amount of time spent and needed for student learning as factors determining the impact of instructional time on educational equality. (p. i)

The study broke down productive learning time down to allocated time, quality time, engaged time, and needed time. The Virginia Department of Education (1992) explained that educators attempt to effect an increase in allocated time by increasing the length of the school year or day, modifying the school calendar, and assigning students homework. However, research on the effect of a simple increase in allocated time alone on student achievement is inconclusive. (p.10).

The Virginia Department of Education (1992) reported that most studies report only short-term learning gains; consistently students at risk appear to benefit from increasing time allocated for instruction (p. 10). Higher grade at-risk students also benefit from increasing the time allocated for instruction. There was not a significant relationship between increasing allocated time and increased achievement for high and middle SES students. The authors explain that there are not enough data available to evaluate the benefit of summer school programs.

The Virginia Department of Education (1992) stated students who are frequently absent often encounter academic and social difficulties in school (p. 10). “Walberg (1988) suggests a point of diminishing return, when increases in instructional time will not produce increased learning” (Virginia Department of Education, 1992, p. 11). Summer vacations allow for students to forget and regress learning during that time. According to the Virginia Department of

Education (1999), recoument generally takes four to six weeks, and the beginning of the school year often is given to the review of previously learned material (p. 11).

Proponents of year-round schooling argue that this method of organizing the calendar reduces regression through elimination of the extended summer vacation. This claim has not been substantiated by evaluation studies. In fact, studies suggest that systems that alter the school calendar find students generally do no better or worse than students from systems with traditional calendar arrangements. (p. 11)

The Virginia Department of Education (1992) concluded by stating current research does not provide documented evidence that extending the school year or school day in isolation will result in significantly increasing student learning (p. 11). The Virginia Department of Education added to the research on adding time to the school year. The authors could not find evidence that extending the school year or day will improve achievement scores. Therefore, policymakers should not be focused on adding time to the school day or year.

Karweit (1985) examined length of school day in a study titled *Should We Lengthen the School Term?* in 1985. The study investigates the influence of length of school day on student achievement. The study focused in on two types of time: allocated and engaged time.

Karweit (1985) used data from the Beginning Teacher Evaluation Study or BTES. The data included six years of data samples. The total number of students included 139 second grade students and 122 fifth grade students in 21 classrooms. The study used regression analysis to analyze the data.

Karweit (1985) concluded that the engagement rate and allocated time accounted for 9 of these 29 significant effects. This information is important because most of the discussions about

improving learning time center on allocating more time or improving student attention. These data do not support this strategy (p. 12).

Karweit provided additional evidence that adding more time to the school day does not have a significant effect on improving achievement. The data informed policymakers once again not to focus on adding additional time to the school day or year with the only focus on raising achievement scores.

Aronson, Zimmerman, and Carlos (1999) collaborated on a study titled *Improving Student Achievement by Extending School: Is It Just a Matter of Time?* in 1999. The study investigated how extended time could be used in education and whether it had an influence on student achievement.

Aronson et al. (1999) focused on three types of time: allocated time, engaged time, and academic learning time. Allocated time is defined as the total amount of time students are required to be in school. Engaged time refers to when students are engaged in learning activities. Finally, academic learning time is defined as the time when learning actually occurs.

Aronson et al. (1999) found that only time utilized has an influence on achievement. Therefore, the authors recommend improving the use of existing time as a first step. Aronson et al. (1999) concluded as follows:

It appears that time is but one of several important variables in the complex equation that determines how much students learn in school. The research literature suggests that, while time is certainly a critical factor, by itself it has little direct impact on student performance. Simply adding time to the school year or day would not likely produce large scale gains in student achievement (p. 16).

Aronson et al. explained the importance of adding quality time rather than just time itself. The focus must be on adding quality time in order to see any expected gains in student achievement.

Smith, Roderick, and Degener (2005) explored extended time in a study titled *Extended Learning Time and Student Accountability: Assessing Outcomes and Options for Elementary and Middle Grades* in 2005. Smith, Roderick, and Degener investigated the influence of student accountability policies and extended learning programs on student achievement in elementary and middle grade students. “Lighthouse funded elementary teachers to provide an added hour of literacy and mathematics instruction 3 to 4 days a week for 20 or more weeks of the school year to students with low test-score histories” (Smith et al., 2005, p. 4).

Smith et al. (2005) used both qualitative and quantitative methods. The study included survey data from over 350 schools involved in the Lighthouse program in the Chicago Public Schools. The data included over 85,000 students participating in the program.

Smith et al. (2005) found that in the third grade, in both mathematics and reading, there was a strong correlation between students’ achievement gains and their propensity to be in Lighthouse (p. 22). Smith et al. (2005) also found, when controlling for prior-year test scores as well as the school achievement characteristics and racial composition, a positive association between the percentage of all third graders in Lighthouse and the achievement of at-risk students in that grade (p. 22).

Smith et al. (2005) concluded the following:

To summarize, then, our HLM analyses provided partial or case-specific support for the proposition that recent learning gains among CPS elementary students might reflect a learning time or programmatic effect. The strongest case resided in our analysis of third-

grade students where clear positive effects between Lighthouse programs and achievement gains were found. (p. 25)

Smith et al. also explained the importance of adding quality time versus just adding time. The results showed a positive effect only on classes that were provided with the high quality Lighthouse programs. Therefore, policymakers must be most concerned with the quality of the time.

In a systematic review of empirical literature since 1985, Patall, Cooper, and Allen (2010) noted the following:

After a comprehensive search of the literature, 15 empirical studies of various designs conducted since 1985 were found. The literature revealed that (a) designs are generally weak for making causal inferences and (b) outcomes other than achievement are scarcely studied. That said, findings suggest that extending school time can be an effective way to support student learning, particularly (a) for students most at risk of school failure and (b) when considerations are made for how time is used. (p. 401)

Patall et al. (2010) concluded the research designs are weak for making strong causal inferences, and outcomes other than academic achievement have yet to be the focus of study (p. 431). Patall et al. also found that adding time to the school day or year has its greatest effect on students most at risk. Therefore, adding time in general to all students will not provide achievement gains for all of the students. Policymakers should focus on adding time for at-risk students, and that needs to be high quality time.

### **Conceptual Framework**

This study examined the various school inputs (student, teacher, and school) to determine the influence of the length of the instructional day on Grades 6, 7, and 8 New Jersey Assessment



of Skills and Knowledge (NJ ASK) scores in both Language Arts and Mathematics for the year 2011. This study conducted a production framework analysis of the inputs against the outputs of the NJ ASK. Gordon and Vaughn (2011) explained “The production function explains a basic technological relationship between scarce resources, or inputs, and output” (p. 25).

## **CHAPTER III**

### **METHODOLOGY**

This quantitative research study explains the influence of the student, staff, and school variables on student achievement in relation to the length of the instructional day. There is limited quantitative research on the topic of the influence of the instructional day on middle school student achievement as measured by the NJ ASK for Grades 6, 7, and 8 in both Language Arts and Mathematics. This study measures the influence of the minutes of the instructional day on achievement while controlling for student, school, and staff variables. Finally, this study adds to the existing literature which provides bureaucrats, policymakers, and school administrators with additional data and evidence to make decisions on promoting and funding length of time programs to better meet the needs of the students they serve.

#### **Research Design**

I used a cross sectional research design, specifically using a correlational design to explain the relationship between length of the instructional day and student achievement on the NJ ASK Language Arts and Mathematics sections for Grades 6, 7, and 8. I used simultaneous regression models to determine how the predictor variables influence student achievement. The predictor variables in this study are student variables (mobility, attendance, percentage of special education students, percentage of limited English proficient students, and socioeconomic status), staff variables (attendance, mobility, and advanced degrees), and school variables (school size, length of instructional day, length of the school day). These predictor variables were analyzed to see if they had a statistically significant relationship to the percentage of students who scored Proficient and Advanced Proficient on the NJ ASK 6, 7, and 8.

## Research Questions

**Research Question 1:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 2:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 3:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 4:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 5:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 6:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized

assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

### **Null Hypotheses**

**Null Hypothesis 1:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Language Arts scores of public school students within districts leveled A-J.

**Null Hypothesis 2:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Mathematics scores of public school students within districts leveled A-J.

**Null Hypothesis 3:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Language Arts scores of public school students within districts leveled A-J.

**Null Hypothesis 4:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Mathematics scores of public school students within districts leveled A-J.

**Null Hypothesis 5:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Language Arts scores of public school students within districts leveled A-J.

**Null Hypothesis 6:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Mathematics scores of public school students within districts leveled A-J.

### **Sample Population/Data Source**

This sample consists of public middle schools within the State of New Jersey. The schools that are included in this sample meet the following criteria:

1. The schools are classified as public.
2. The schools contain Grades 6, 7, and 8.
3. The schools reported all testing and demographic information to the New Jersey Department of Education.

The number of schools that had complete data for each subject for Grades 6, 7, and 8 included the following:

- Grade 6 Language Arts ( $n=201$ ) and Grade 6 Mathematics ( $n=200$ )
- Grade 7 Language Arts ( $n=199$ ) and Grade 8 Mathematics ( $n=199$ )
- Grade 8 Language Arts ( $n=198$ ) and Grade 8 Mathematics ( $n=200$ )

### **Data Collection**

The data for this study were retrieved from the New Jersey Department of Education's web site. The 2011 Microsoft Excel zipped files were downloaded, extracted, and saved to a data folder. County, district, and school codes were merged to create unique identification codes. Data from all charter and middle schools that tested students in Grades 6-8 on the New Jersey Assessment of Skills and Knowledge (NJ ASK) were used in this study. The data were then sorted to remove data for any school that did not house Grades 6-8. Schools were eliminated from the study if they were missing portions of the required data. The schools were then sorted by grade level and then alphabetically by county in Microsoft Excel. That file was then further broken down into separate workbooks for each grade level. Each workbook

included three separate worksheets titled Language Arts Scores, Mathematics Scores, and District Factor Group (DFG).

Table 3

*NJDOE Data Used in the Excel File*

County Name
District Name
School Name
DFG
School Day (minutes)
Instructional Day (minutes)
Student Mobility
Faculty Attendance
Student Attendance
Faculty Master's Degree or Higher
Faculty Mobility
Enrollment
Percentage of Students with Limited English Proficiency
Percentage of Student with Disabilities
Percentage of Students on Free or Reduced-Price Lunch

The results of the New Jersey Assessment of Skills and Knowledge 6, 7, and 8 were added to the spreadsheet. For this study, the percentage of the students who scored Proficient or Advanced Proficient (TPAP) were classified together as one percentage.

- Total Proficient for Math in Grade 6 and Total Advanced Proficient in Math in Grade 6
- Total Proficient for Math in Grade 7 and Total Advanced Proficient in Math in Grade 7
- Total Proficient for Math in Grade 8 and Total Advanced Proficient in Math in Grade 8
- Total Proficient for Language Arts in Grade 6 and Total Advanced Proficient for Language Arts in Grade 6
- Total Proficient for Language Arts in Grade 7 and Total Advanced Proficient for Language Arts in Grade 7
- Total Proficient for Language Arts in Grade 8 and Total Advanced Proficient for Language Arts in Grade 8

The data were then cleaned and formatted to be imported into IBM's SPSS statistical software. The number of schools meeting the criteria were then categorized by District Factor Group information located in the NJDOE databases.

The number of traditional public schools that housed and tested Grade 6 students in Language Arts was  $n=201$  (see Table 4).

Table 4

*Number of Grade 6 Schools within Their District Factor Group for Language Arts*

<b>DFG</b>	<b>Number of Schools</b>	<b>DFG</b>	<b>Number of Schools</b>
A	18	FG	30
B	18	GH	36

CD	16	I	44
DE	27	J	12

The number of traditional public schools that housed and tested Grade 6 students in Mathematics was  $n=200$  (see Table 5).

Table 5

*Number of Grade 6 Schools within Their District Factor Group for Mathematics*

<b>DFG</b>	<b>Number of Schools</b>	<b>DFG</b>	<b>Number of Schools</b>
A	17	FG	30
B	18	GH	36
CD	16	I	44
DE	27	J	12

The number of traditional public schools that housed and tested Grade 7 students in Language Arts was  $n=199$  (see Table 6).

Table 6

*Number of Grade 7 Schools within Their District Factor Group for Language Arts*

<b>DFG</b>	<b>Number of Schools</b>	<b>DFG</b>	<b>Number of Schools</b>
A	16	FG	30
B	18	GH	36
CD	16	I	44
DE	27	J	12



The number of traditional public schools that housed and tested Grade 7 students in Mathematics was  $n=199$  (see Table 7).

Table 7

*Number of Grade 7 Schools within Their District Factor Group for Mathematics*

<b>DFG</b>	<b>Number of Schools</b>	<b>DFG</b>	<b>Number of Schools</b>
A	16	FG	30
B	18	GH	36
CD	16	I	44
DE	27	J	12

The number of traditional public schools that housed and tested Grade 8 students in Language Arts was  $n=202$  (see Table 8).

Table 8

*Number of Grade 8 Schools within Their District Factor Group for Language Arts*

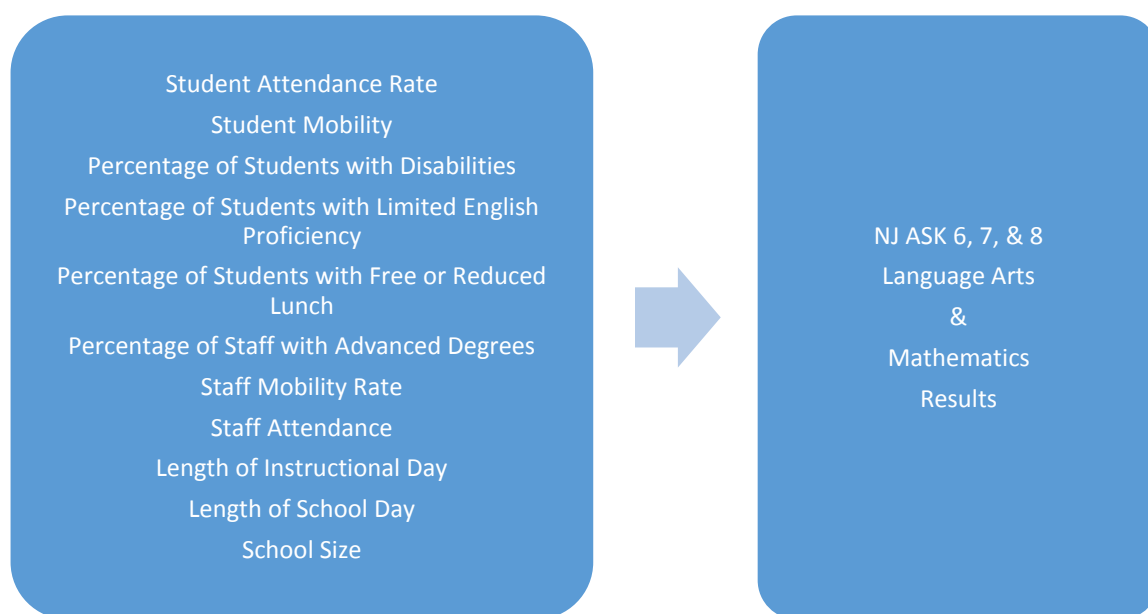
<b>DFG</b>	<b>Number of Schools</b>	<b>DFG</b>	<b>Number of Schools</b>
A	19	FG	30
B	18	GH	36
CD	16	I	44
DE	27	J	12

The number of traditional public schools that housed and tested Grade 8 students in Mathematics was  $n=200$  (see Table 9).

Table 9

*Number of Grade 8 Schools within Their District Factor Group for Mathematics*

<b>DFG</b>	<b>Number of Schools</b>	<b>DFG</b>	<b>Number of Schools</b>
A	17	FG	30
B	18	GH	36
CD	16	I	44
DE	27	J	12



*Figure 1. Simultaneous regression framework.*

### **Data Analysis**

This study examined the data using simultaneous multiple regressions using IBM's SPSS Version 21. The strength and direction of the relationship of both the predictor and outcome

variables were determined by reviewing the standard beta coefficients. Power was used to determine if the sample sizes were large enough to support statistically significant outcomes.

Field (2013) explains the following:

The simplest rule of thumb is that the bigger the sample size, the better: the estimate of  $R$  that we get from regression is dependent on the number of predictors,  $k$ , and the sample size,  $N$ . In fact, expected  $R$  for random data is  $k/(N-1)$  . . . Obviously for random data we'd want the expected  $R$  to be 0 (no effect) and for this to be true we need large samples (p. 313).

The study used data only from traditional public middle schools that had Grades 6-8. The total number of schools reporting NJ ASK scores were as follows: Grade 6 LAL, 787; Grade 6 Math, 787; Grade 7 LAL, 654; Grade 7 Math, 654; Grade 8 LAL, 646; and Grade 8 Math, 641. That listing of schools was then reviewed, searching only for schools that reported having attendance in only Grades 6, 7, and 8. Schools not meeting that criteria were then deleted. Ultimately, that process reduced the total number of schools that reported both NJ ASK Math and Language Arts scores in only Grades 6, 7, and 8 to the following: Grade 6 LAL, 201; Grade 6 Math, 200; Grade 7 LAL, 199; Grade 7 Math, 199; Grade 8 LAL, 202; and Grade 8 Math, 200.

The final list of schools was then reviewed to determine if there was enough power to run the analysis. That process was accomplished using Field's (2013) suggested expected  $R$  for random data. The formula used was  $k/(N-1)$ . The outcome was that all of the sample sizes produced an Expected  $R$  value close to zero. Those outcomes met the Field's (2013) parameters for random data (see Table 10).

Table 10

*Power Expected R for Random Data*

<b>Dependent Variable</b>	<b>Number of Predictors</b>	<b>Sample Size</b>	<b>Expected R</b>
Grade 6 LA (TPAP)	11	201	.054
Grade 6 Math (TPAP)	11	200	.055
Grade 7 LA (TPAP)	11	199	.055
Grade 7 Math (TPAP)	11	199	.055
Grade 8 LA (TPAP)	11	198	.056
Grade 8 Math (TPAP)	11	200	.055

The data were then cleaned and formatted. The data were then imported into IBM's SPSS Version 21 statistical software. The descriptive function with the skewness option was selected to determine the skewness of all of the variables. Simultaneous multiple regressions were then used to determine the relationship between the various independent variables student attendance rate, student mobility, percentage of students with disabilities, percentage of students with limited English proficiency, percentage of students with free or reduced-price lunch, percentage of staff with advanced degrees, staff mobility rate, staff attendance, length of instructional day, length of the school day, and school size against the dependent variable of the Total Proficient and Advanced Proficient on the NJ ASK Grades 6, 7, and 8 in both Language Arts and Math.

Tests of normality were then run to determine if the populations were normally distributed. First the original ten predictor variables were run using simultaneous multiple

regression models. Additionally, reduced simultaneous multiple regressions were then run using only the variables that were found to be significant in the original models.

Table 11

*Simultaneous Regression Models*

Model 1A LAL 6 <sup>th</sup> Grade	All Staff, Student, and School Variables	Faculty Attendance Rate
		Faculty Mobility Rate
		Percentage of Staff with Master's Degree or Higher
		Student Attendance Rate
		Student Mobility Rate
		Percentage of Students
		Eligible for Free or
		Reduced Lunch (%FRL)
		Percentage of Students
		with Limited English
		Proficiency
		Percentage of Students
		with Disabilities
		Length of School Day in
		Minutes

Length of Instructional  
Day in Minutes  
School Size

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Model 1B Math 6 <sup>th</sup> Grade	All Staff, Student, and School Variables	Faculty Attendance Rate
		Faculty Mobility Rate
		Percentage of Staff with Master's Degree or Higher
		Student Attendance Rate
		Student Mobility Rate
		Percentage of Students Eligible for Free or Reduced Lunch (%FRL)
		Percentage of Students with Limited English Proficiency
		Percentage of Students with Disabilities
		Length of School Day in Minutes

Length of Instructional

Day in Minutes

School Size

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Model 2A LAL 7 <sup>th</sup> Grade	All Staff, Student, and School Variables	Faculty Attendance Rate
		Faculty Mobility Rate
		Percentage of Staff with Master's Degree or Higher
		Student Attendance Rate
		Student Mobility Rate
		Percentage of Students
		Eligible for Free or
		Reduced Lunch (%FRL)
		Percentage of Students
		with Limited English
		Proficiency
		Percentage of Students
		with Disabilities
		Length of School Day in
		Minutes

Length of Instructional  
Day in Minutes  
School Size

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Model 2B Math 7 <sup>th</sup> Grade	All Staff, Student, and School Variables	Faculty Attendance Rate
		Faculty Mobility Rate
		Percentage of Staff with Master's Degree or Higher
		Student Attendance Rate
		Student Mobility Rate
		Percentage of Students Eligible for Free or Reduced Lunch (%FRL)
		Percentage of Students with Limited English Proficiency
		Percentage of Students with Disabilities
		Length of School Day in Minutes



Length of Instructional  
Day in Minutes  
School Size

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Model 3A LAL 8 <sup>th</sup> Grade	All Staff, Student, and School Variables	Faculty Attendance Rate
		Faculty Mobility Rate
		Percentage of Staff with Master's Degree or Higher
		Student Attendance Rate
		Student Mobility Rate
		Percentage of Students
		Eligible for Free or
		Reduced Lunch (%FRL)
		Percentage of Students
		with Limited English
		Proficiency
		Percentage of Students
		with Disabilities
		Length of School Day in
		Minutes

Length of Instructional  
Day in Minutes  
School Size

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Model 3B Math 8 <sup>th</sup> Grade	All Staff, Student, and School Variables	Faculty Attendance Rate
		Faculty Mobility Rate
		Percentage of Staff with Master's Degree or Higher
		Student Attendance Rate
		Student Mobility Rate
		Percentage of Students
		Eligible for Free or
		Reduced Lunch (%FRL)
		Percentage of Students
		with Limited English
		Proficiency
		Percentage of Students
		with Disabilities
		Length of School Day in
		Minutes

Length of Instructional  
Day in Minutes  
School Size

#### Reduced Simultaneous Multiple Regression Models

- Model IV A: LAL 6<sup>th</sup> Grade – Variables found to be significant in original regression
- Model IV B: Math 6<sup>th</sup> Grade – Variables found to be significant in original regression
- Model V A: LAL 7<sup>th</sup> Grade – Variables found to be significant in original regression
- Model V B: Math 7<sup>th</sup> Grade – Variables found to be significant in original regression
- Model VI A: LAL 8<sup>th</sup> Grade – Variables found to be significant in original regression
- Model VI B: Math 8<sup>th</sup> Grade – Variables found to be significant in original regression

#### **Dependent Variables**

The dependent variables are the percentages of students scoring Proficient or above at each grade level 6-8 in Language Arts and Mathematics on the New Jersey Assessment of Skills and Knowledge (NJ ASK). The New Jersey Department of Education aligned the NJ ASK to the State's core curriculum standards (CCCS) and uses the results to measure performance of students on the curriculum content. The test results illustrate how students have mastered the content standards. The NJDOE, together with lawmakers, has labeled students by their scores

as Partially Proficient (scored <200), Proficient (scored between 200-250), and Advanced Proficient (scored between 250-300). The NJDOE recommends students who scored at the Partially Proficient level should receive additional instructional support.

### **Instrumentation**

The New Jersey Department of Education's (2012B) *Technical Report for 2011* indicated that there were various components within both the Language Arts and Mathematics tests called content clusters.

Table 12

*NJ ASK 2011 Language Arts and Mathematics Content Clusters for Grades 6-8*

<b>Language Arts (LAL)</b>	<b>Mathematics</b>
<b>Reading</b>	Numbers and numerical operations
Working with text	Geometry and measurement
Analyzing text	Patterns and algebra
<b>Writing</b>	Data analysis, probability, and discrete mathematics
Speculative prompt	
Expository prompt	

### **Reliability and Validity**

According to the NJDOE (2012), reliability of assessment is the degree to which assessment results measure particular knowledge and skills. Validity of assessment is the degree to which an assessment measures what it is intended to measure and the extent to which the

inferences made and actions taken on the basis of the assessment outcomes are accurate and appropriate (p. 25).

“An assessment that is not reliable cannot be valid” (AERA, APA, & NCME, 1999, p. 9).

The NJDOE reviews all assessments to make sure all of the data are reported and recorded accurately. The processes below are used to maintain data reliability and validity:

1. Assessments are aligned to state content standards.
2. Controls are built in to the assessments. Examples of these controls include read-behinds, double scoring, and rescoring when results are in question.
3. All student demographic data can be validated by the school districts during a record change process.
4. Automatic adjudication of test scores is available for open-ended items for students who are close to proficiency. Additional adjudications may be requested by the districts when reviewing Cycle 1 reports.
5. All proficiency statistics are calculated at the 95% confidence interval.
6. All students and subgroups that incorporate a 75% confidence interval are designated as safe harbor.
7. Appeal processes are available at any step in the process. This is a safeguard allowed by the United States Department of Education to prevent errors in the data.

Table 13

*2010-2011 Coefficient Alpha and SEM by Grade and Content Area*

Grade Level & Subject	Coefficient Alpha Score	Standard Error of Measurement (SEM)
6 <sup>th</sup> grade LAL	.89	3.40
7 <sup>th</sup> grade LAL	.88	3.52
8 <sup>th</sup> grade LAL	.91	3.25
6 <sup>th</sup> grade Math	.91	3.23
7 <sup>th</sup> grade Math	.92	3.20
8 <sup>th</sup> grade Math	.92	3.13

**CHAPTER IV**  
**ANALYSIS OF THE DATA**  
**INTRODUCTION**

This study was relational, non-experimental, explanatory, and cross-sectional in nature, using quantitative methods to explain the influence of student, staff, and school independent variables on 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> grade student achievement in both Language Arts and Mathematics on the 2011 NJ ASK. The variable of interest was the length of the instructional day and controlled student, staff, and school variables. This study provides descriptive research on the relationship between the length of the instructional day and other predictor variables and student achievement.

The goal of this study was to provide political and educational officials with evidence to make future decisions on whether adding instructional time was an intervention that would improve student achievement.

**Research Questions**

**Research Question 1:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 2:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 3:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 4:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 5:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Research Question 6:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

### **Null Hypotheses**

**Null Hypothesis 1:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Language Arts scores of public school students within districts leveled A-J.

**Null Hypothesis 2:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Mathematics scores of public school students within districts leveled A-J.



**Null Hypothesis 3:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Language Arts scores of public school students within districts leveled A-J.

**Null Hypothesis 4:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Mathematics scores of public school students within districts leveled A-J.

**Null Hypothesis 5:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Language Arts scores of public school students within districts leveled A-J.

**Null Hypothesis 6:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Mathematics scores of public school students within districts leveled A-J.

### **Data**

The data used in this study were downloaded from the New Jersey Department of Education School Performance Reports web site. The 2011 New Jersey School Report Card data were used because they contained all of the variables required for this study. The 2011 New Jersey School Report Card reported data from the 2010-2011 school year. The New Jersey Department of Education reported enrollment data as of October 15, 2010. Furthermore, the data reported were all school level data.

The following is a list of the variables used in this study with the associated definitions as provided by the New Jersey Department of Education. These definitions can be found in the 2011 New Jersey School Report Card.

**School Size** – This is the total number of students enrolled in a school as per the New Jersey Department of Education.

**Faculty and Administrator Credentials** - These are percentages of faculty and administrative members in the school who hold a bachelor's, master's, or doctoral degree.

**Faculty Mobility Rate** - This represents the rate at which faculty members come and go during the school year. It is calculated by using the number of faculty who entered or left employment in the school after October 15 divided by the total number of faculty reported as of that same date.

**Faculty Attendance Rate** – This is the average daily attendance for the faculty of the school. It is calculated by dividing the total number of days present by the total number of days contracted for all faculty members.

**Length Instructional Day** - This is the amount of time per day that a typical student is engaged in instructional activities under the supervision of a certified teacher.

**Length of School Day** - This is the amount of time a school is in session for a typical student on a normal school day.

**LEP** -- Limited English Proficient is defined in N.J.A.C. 6A:15-1.2 as pupils whose native language is other than English and who have difficulty speaking, reading, writing or understanding the English language as measured by an English language proficiency test. Thus, they require bilingual or ESL programs in order to learn successfully in classrooms where the language of instruction is English.

**Student Attendance Rate** - These are the grade-level percentages of students on average who are present at school each day. They are calculated by dividing the sum of days present in each grade level by the sum of possible days present for all students in each grade. The school and

state totals are calculated by the sum of days present in all applicable grade levels divided by the total possible days present for all students.

**Students on Free and Reduced-Price Lunch** – Students are entitled to free lunches if their family’s income is below 130% of the annual income poverty level guideline established by the U.S. Department of Health and Human Services and updated annually by the Census Bureau (currently \$23,550 for a family of four). The poverty guidelines are issued each year in the Federal Register by the Department of Health and Human Services. The guidelines are a simplification of the poverty thresholds for use for administrative purposes (e.g., determining financial eligibility for certain federal programs). Children that are members of households receiving food stamp benefits or cash assistance through the Temporary Assistance for Needy Families block grant, as well as homeless, runaway, and migrant children, also qualify for free meals. Students with family incomes below 185% of the poverty level are eligible for a reduced-price lunch. Schools cannot charge children who receive reduced-price lunches more than 40 cents per meal, but each school food authority sets the exact student contribution level independently.

**Students with Disabilities** - This is the percentage of students with an Individualized Education Program (IEP), including speech, regardless of placement and programs. This is calculated by dividing the total number of students with IEPs by the total enrollment.

**Student Mobility Rate (School Level)** - This school level variable is the percentage of students who both entered and left the school during the school year. The calculation is derived from the sum of students entering and leaving after the October enrollment count divided by the total enrollment.

The data were then exported, formatted, cleaned, and imported into IBM SPSS Version 21. The researcher was focused on finding out if the length of the instructional day had a statistically significant influence on student achievement at the middle school level while controlling for student, staff, and school variables. For the purpose of this study, student achievement was measured by the results on the New Jersey Assessment of Skills and Knowledge (NJ ASK) for Grades 6, 7, and 8 in both Language Arts and Mathematics.

The unit of analysis for this study was “school.” The study used data only from traditional public middle schools that had Grades 6-8. The total number of schools reporting NJ ASK scores were as follows: Grade 6 LAL, 787; Grade 6 Math, 787; Grade 7 LAL, 654; Grade 7 Math, 654; Grade 8 LAL, 646; and Grade 8 Math, 641. That listing of schools was then reviewed searching only for schools that reported having attendance in only Grades 6, 7, and 8. Schools not meeting that criteria were then deleted. Ultimately, that process reduced the total number of schools that reported both NJ ASK Math and Language Arts scores in only Grades 6, 7, and 8 to the following: Grade 6 LAL, 201; Grade 6 Math, 200; Grade 7 LAL, 199; Grade 7 Math, 199; Grade 8 LAL, 202; and Grade 8 Math, 200

The final list of schools was then reviewed to determine if there was enough power to run the analysis. That process was accomplished using Field’s (2013) suggested expected  $R$  for random data. The formula used was  $k/(N-1)$ . The outcome was that all of the sample sizes produced an Expected  $R$  value close to zero. Those outcomes met the Field’s (2013) parameters for random data (see Table 14).

Table 14

*Power: Expected R for Random Data*

<b>Dependent Variable</b>	<b>Number of Predictors</b>	<b>Sample Size</b>	<b>Expected R</b>
Grade 6 LA (TPAP)	11	201	.054
Grade 6 Math (TPAP)	11	200	.055
Grade 7 LA (TPAP)	11	199	.055
Grade 7 Math (TPAP)	11	199	.055
Grade 8 LA (TPAP)	11	198	.056
Grade 8 Math (TPAP)	11	200	.055

### **Variables**

The total percent (%) Proficient and Advanced Proficient (TPAP) on the New Jersey Assessment of Skills and Knowledge 2011 for Grades 6, 7, and 8 in both Language Arts and Mathematics by school were used as the dependent variables in this study. Previous research has determined that the following independent variables influence student achievement. The independent or predictor variables used in this study include the following: student mobility, student attendance, percentage of students eligible for free and reduced lunch (%FRL), percentage of students with limited English proficiency (LEP), percentage of students with disabilities, staff mobility, staff attendance, and percentage of staff with master's degree or higher, length of school day, length of instructional day, and school size (see Table 15).

Table 15

*Independent Variables Used in This Study*

<b>Student</b>	<b>Staff</b>	<b>School</b>
Percentage of students with Limited English Proficiency(%LEP)	Staff Attendance (FATTEND)	School Size (TOTENROLL)
Percentage of students with free or Reduced lunch (%FRL)	Staff Mobility (STMOB)	Length of Instructional Day (TotalInstruc)
Percentage of students with disabilities (%DIS)	Faculty and Administrators with a master's degree or higher (MA+)	Length of the School Day (TotalSchDay)
Student Attendance Rate (Gr6Attend, Gr7Attend, Gr8Attend)		
Student Mobility (Mobility)		

**Procedure**

The data for each grade level and subject area were imported into IBM's SPSS, Version 21. Each grade level and subject area were imported separately to determine the significance levels of each of the independent variables as well as their predictive strength and direction.

The first step was to determine and confirm that the data met the assumptions of regression. The assumptions of regression are that the data are normally distributed and that the residuals are not correlated. The variables were all analyzed using the "Descriptives" command in the IBM SPSS software with the skewness option checked. The output of that command indicated that the dependent variable was normally distributed except for Grade 6 Mathematics and Grade 8 LAL. The data for those grade levels and subjects were reviewed further to determine the cause of the skewness. This researcher found three schools that did not report student mobility and removed those schools from the dataset. There was also a school reporting excessively high student mobility which this researcher removed, as that school was a true

outlier. This process lowered the dependent variable skewness to -1.737 for Grade 6 Math and -2.349 Grade 8 Language Arts. All other dependent variables were found normally distributed because the outputs for the dependent variables fell between +1.5 and -1.5. The same is also true for the statistically significant independent predictor variables and variable of focus (See Table 16) except for Grade 6 LAL and Mathematics (student attendance), Grade 8 LAL (student mobility). The Durbin-Watson statistic was also checked, which indicated that the residuals for each of the regression analyses was between 1 and 4. This indicated that the residuals were not correlated (see Table 16).

Table 16

*Assumption Check for Regression I – NJ ASK 6 LAL*

Descriptive Statistics							
	<i>N</i>	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
TPAP	201	14.00	93.00	69.8602	16.35201	-1.163	.172
%FRL	201	.00	97.53	26.0834	26.01827	1.123	.172
GR6ATTEND	201	87.20	99.60	95.7179	1.47485	-2.116	.172
TotalInstruc	201	300.00	415.00	343.2687	19.25662	.903	.172
Valid N (listwise)	201						

*Assumption Check for Regression II – NJ ASK 6 Math*

Descriptive Statistics							
	<i>N</i>	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
TPAP	200	20.00	98.60	79.7520	14.18325	-1.737	.172
%FRL	200	.00	97.50	26.2216	25.96778	1.114	.172
GR6ATTEND	200	88.00	99.60	95.7605	1.34896	-1.598	.172
TotalInstruc	200	300.00	415.00	343.3100	19.29600	.896	.172
Valid N (listwise)	200						

*Assumption Check for Regression II – NJ ASK 7 LAL*

Descriptive Statistics							
	<i>N</i>	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
TPAP	199	16.80	92.10	69.4844	15.63939	-1.102	.172
%FRL	199	.00	99.11	25.5562	25.48081	1.129	.172
GR7ATTEND	199	89.90	100.00	95.4251	1.27381	-.273	.172
TotalInstruc	199	300.00	415.00	343.3518	19.33560	.888	.172
Valid N (listwise)	199						

*Assumption Check for Regression IV – NJ ASK 7 Math*

Descriptive Statistics							
	<i>N</i>	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
TPAP	199	16.80	92.10	69.4844	15.63939	-1.102	.172
%FRL	199	.00	99.11	25.5562	25.48081	1.129	.172
GR7ATTEND	199	89.90	100.00	95.4251	1.27381	-.273	.172
TotalInstruc	199	300.00	415.00	343.3518	19.33560	.888	.172
Valid N (listwise)	199						

*Assumption Check for Regression V – NJ ASK 8 LAL*

Descriptive Statistics							
	<i>N</i>	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
TPAP	198	20.00	98.30	85.0783	13.85945	-2.349	.173
%FRL	198	.00	100.00	25.5644	25.53448	1.062	.173
GR8ATTEND	198	87.90	99.90	95.0212	1.51005	-.800	.173
STMOB	198	.30	44.30	7.3328	6.98024	2.436	.173
TotalInstruc	198	300.00	415.00	343.0354	19.22387	.935	.173
Valid N (listwise)	198						



*Assumption Check for Regression VI – NJ ASK 8 Math*

Descriptive Statistics							
	<i>N</i>	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
TPAP	200	21.10	94.50	75.0605	15.20718	-1.401	.172
%FRL	200	.00	100.00	25.1062	25.12391	1.093	.172
GR8ATTEND	200	87.90	99.90	95.0495	1.46815	-.708	.172
TotalInstruc	200	300.00	415.00	343.3100	19.29600	.896	.172
Valid N (listwise)	200						

Table 17

*Durbin-Watson Statistic for Each of the Initial Regressions*

<b>Regression Model</b>	<b>Durbin-Watson Statistic</b>
<i>Regression Model I:</i> Total Proficient and Advanced Proficient on NJ ASK 6 LAL	1.511
<i>Regression Model II:</i> Total Proficient and Advanced Proficient on NJ ASK 6 Math	1.403
<i>Regression Model III:</i> Total Proficient and Advanced Proficient on NJ ASK 7 LAL	1.386
<i>Regression Model IV:</i> Total Proficient and Advanced Proficient on NJ ASK 7 Math	1.386
<i>Regression Model V:</i> Total Proficient and Advanced Proficient on NJ ASK 8 LAL	2.162
<i>Regression Model VI:</i> Total Proficient and Advanced Proficient on NJ ASK 8 Math	1.444

Table 18

*Descriptive Statistics for Dependent Variables in Each Model*

<b>Variable</b>	<i>N</i>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>
TPAP Grade 6 LAL	201	69.860	72.900	16.352
TPAP Grade 6 Math	200	79.752	83.750	14.183
TPAP Grade 7 LAL	199	69.484	72.700	15.639
TPAP Grade 7 Math	199	69.484	72.700	15.639
TPAP Grade 8 LAL	198	85.078	88.400	13.859
TPAP Grade 8 Math	200	75.060	79.400	15.207

After the assumptions were checked and met, simultaneous multiple regressions were run separately for each of the grade levels and subject areas (see Table 19). First, all of the independent variables were run to determine which of those variables were statistically significant for each of the models. The models were then run a second time, using only the variables that were deemed statistically significant during the first trial (see Table 20).

The descriptive statistics indicate that there were 201 schools in the dataset for NJ ASK 6 Language Arts. The percentage of schools with students achieving a minimum of 200 on the NJ

ASK 6 Language Arts was 69.860%. There were 200 schools in the dataset for NJ ASK 6 Mathematics. The percentage of schools with students achieving a minimum of 200 on the NJ ASK 6 Mathematics was 69.860%.

The descriptive statistics indicate that there were 199 schools in the dataset for NJ ASK 7 Language Arts. The percentage of schools with students achieving a minimum of 200 on the NJ ASK 7 Language Arts was 69.484%. There were 199 schools in the dataset for NJ ASK 7 Mathematics. The percentage of schools with students achieving a minimum of 200 on the NJ ASK 7 Mathematics was 69.484%.

The descriptive statistics indicate that there were 198 schools in the dataset for NJ ASK 8 Language Arts. The percentage of schools with students achieving a minimum of 200 on the NJ ASK 8 Language Arts was 85.078%. There were 199 schools in the dataset for NJ ASK 8 Mathematics. The percentage of schools with students achieving a minimum of 200 on the NJ ASK 8 Mathematics was 75.060%.

Table 19

*Initial Regressions for Each Dependent Variable*

<b>Regression</b>	<b>Dependent Variable</b>	<b>Independent Variable</b>
Model 1A LAL 6 <sup>th</sup> Grade	All Staff, Student, and School Variables	Faculty Attendance Rate  Faculty Mobility Rate  Percentage of Staff with Master's Degree or Higher

Student Attendance Rate

Student Mobility Rate

Percentage of Students

Eligible for Free or

Reduced Lunch (%FRL)

Percentage of Students

with Limited English

Proficiency

Percentage of Students

with Disabilities

Length of School Day in

Minutes

Length of Instructional

Day in Minutes

School Size

---

Model 1B Math 6<sup>th</sup> Grade

All Staff, Student, and

School Variables

Faculty Attendance Rate

Faculty Mobility Rate

Percentage of Staff with

Master's Degree or

Higher

Student Attendance Rate

Student Mobility Rate

Percentage of Students

Eligible for Free or

Reduced Lunch (%FRL)

Percentage of Students

with Limited English

Proficiency

Percentage of Students

with Disabilities

Length of School Day in

Minutes

Length of Instructional

Day in Minutes

School Size

---

Model 2A LAL 7<sup>th</sup> Grade

All Staff, Student, and

School Variables

Faculty Attendance Rate

Faculty Mobility Rate

Percentage of Staff with

Master's Degree or

Higher

Student Attendance Rate

Student Mobility Rate

Percentage of Students

Eligible for Free or

Reduced Lunch (%FRL)

Percentage of Students

with Limited English

Proficiency

Percentage of Students

with Disabilities

Length of School Day in

Minutes

Length of Instructional

Day in Minutes

School Size

---

Model 2B Math 7<sup>th</sup> Grade

All Staff, Student, and

School Variables

Faculty Attendance Rate

Faculty Mobility Rate

Percentage of Staff with

Master's Degree or

Higher

Student Attendance Rate

Student Mobility Rate

Percentage of Students

Eligible for Free or

Reduced Lunch (%FRL)

Percentage of Students

with Limited English

Proficiency

Percentage of Students

with Disabilities

Length of School Day in

Minutes

Length of Instructional

Day in Minutes

School Size

---

Model 3A LAL 8<sup>th</sup> Grade

All Staff, Student, and

School Variables

Faculty Attendance Rate

Faculty Mobility Rate

Percentage of Staff with

Master's Degree or

Higher

Student Attendance Rate

Student Mobility Rate

Percentage of Students

Eligible for Free or

Reduced Lunch (%FRL)

Percentage of Students

with Limited English

Proficiency

Percentage of Students

with Disabilities

Length of School Day in

Minutes

Length of Instructional

Day in Minutes

School Size

---

Model 3B Math 8<sup>th</sup> Grade

All Staff, Student, and

School Variables

Faculty Attendance Rate

Faculty Mobility Rate

Percentage of Staff with

Master's Degree or

Higher



Student Attendance Rate  
 Student Mobility Rate  
 Percentage of Students  
 Eligible for Free or  
 Reduced Lunch (%FRL)  
 Percentage of Students  
 with Limited English  
 Proficiency  
 Percentage of Students  
 with Disabilities  
 Length of School Day in  
 Minutes  
 Length of Instructional  
 Day in Minutes  
 School Size

Table 20

*Variables Found To Be Statistically Significant in Each Model*

<b>Regression</b>	<b>Dependent Variable</b>	<b>Independent Variable</b>
Regression I	TPAP NJ ASK 6 LAL	<ul style="list-style-type: none"> <li>• Percentage of Students Eligible for</li> </ul>

		<p>Free and Reduced Lunch (%FRL)</p> <ul style="list-style-type: none"> <li>• Student Attendance</li> </ul>
Regression II	TPAP NJ ASK 6 Math	<ul style="list-style-type: none"> <li>• Percentage of Students Eligible for Free and Reduced Lunch (%FRL)</li> <li>• Student Attendance</li> </ul>
Regression III	TPAP NJ ASK 7 LAL	<ul style="list-style-type: none"> <li>• Percentage of Students Eligible for Free and Reduced Lunch (%FRL)</li> <li>• Student Attendance</li> </ul>
Regression IV	TPAP NJ ASK 7 Math	<ul style="list-style-type: none"> <li>• Percentage of Students Eligible for Free and Reduced Lunch (%FRL)</li> <li>• Student Attendance</li> </ul>
Regression V	TPAP NJ ASK 8 LAL	<ul style="list-style-type: none"> <li>• Percentage of Students Eligible for Free and Reduced Lunch (%FRL)</li> </ul>

		<ul style="list-style-type: none"> <li>• Student Attendance</li> <li>• Student Mobility</li> </ul>
Regression VI	TPAP NJ ASK 8 Math	<ul style="list-style-type: none"> <li>• Percentage of Students Eligible for Free and Reduced Lunch (%FRL)</li> <li>• Student Attendance</li> </ul>

### Research Question 1: Analysis and Results

What is the influence of the length of the instructional day on sixth grade student achievement in Language Arts as measured by the 2011 New Jersey Assessment of Skills and Knowledge when controlling for student, staff, and school variables?

The following statistical analyses were run in order to answer this research question. First, a simultaneous multiple regression was run in IBM SPSS with all 11 independent variables included (see Table 22). Existing research in the field was considered when selecting the independent variables to be used in this study. The preliminary simultaneous multiple regression indicated that the following variables had statistically significant beta coefficients: percentage of students eligible for free and reduced lunch (%FRL) and student attendance. The length of instructional day variable was also retained, as it was the variable of interest even though it was found not to be statistically significant ( $p > .600$ ). In the initial regression, the *R* square was .822 (see Table 21). The variable %FRL had a VIF (variance inflation factor) of 2.468. That VIF is considered high by some researchers (Field, 2013; Morgan et al., 2013); this indicates the possibility exists for multicollinearity issues with variables within this model.

Table 21

*Preliminary Grade 6 Language Arts Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.906 <sup>a</sup>	.822	.811	7.10525	1.511

a. Predictors: (Constant), MA+, %ELL, TotalSchDay, TOTAL, MOBILITY, FATTEND, %DIS, GR6ATTEND, TotalInstruc, %FRL, STMOB

b. Dependent Variable: TPAP

Table 22

*Preliminary Grade 6 Language Arts Coefficients Table*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	-242.711	47.073				-5.156	.000	-335.568	-149.855		
%FRL	-.359	.030	-.571	-11.835	.000	-.419	-.299	-.853	-.652	-.364	.405	2.468
%DIS	.033	.167	.007	.196	.845	-.296	.361	-.168	.014	.006	.811	1.234
%ELL	-.380	.108	-.116	-3.534	.001	-.592	-.168	-.249	-.249	-.109	.871	1.148
GR6ATTEND	2.882	.441	.260	6.537	.000	2.012	3.752	.619	.429	.201	.597	1.675
TOTENROLL	-.001	.002	-.017	-.512	.609	-.004	.003	.142	-.037	-.016	.842	1.187
TotalSchDay	.068	.040	.066	1.726	.086	-.010	.147	.240	.125	.053	.643	1.554
TotalInstruc	-.017	.032	-.020	-.525	.600	-.081	.047	.163	-.038	-.016	.652	1.534
STMOB	-.279	.102	-.132	-2.726	.007	-.480	-.077	-.710	-.194	-.084	.402	2.488
FATTEND	.244	.297	.028	.821	.413	-.342	.829	.391	.060	.025	.798	1.252
MOBILITY	.047	.096	.015	.483	.630	-.144	.237	-.065	.035	.015	.958	1.044
MA+	.087	.037	.080	2.342	.020	.014	.160	.395	.168	.072	.806	1.240

a. Dependent Variable: TPAP

A reduced model simultaneous multiple regression using only the variables found to be statistically significant in the initial regression was then run to address the possibilities of multicollinearity issues. The reduced regression also included the length of instructional day, as it was the variable of interest in this study. Three predictor variables were retained and eight were deleted.

The reduced model simultaneous multiple regression for Grade 6 Language Arts showed an  $R$  Square value of .797 and the Adjusted  $R$  Square value of .794. The adjusted  $R$  Square is the amount of the variance that can be explained in the dependent variable of total Proficient and Advanced Proficient (TPAP) when the independent variables of %FRL, student attendance, and length of instructional day are taken into consideration. This model predicts 79% of the variance in the TPAP on the Grade 6 NJ ASK Language Arts scores. The Grade 6 Language Arts ANOVA table reports that the regression was statistically significant ( $F(3,197) = 258.087$ ,  $p < .001$ ) (see Table 24).

Table 23

*Second Simultaneous Multiple Regression for Grade 6 Language Arts Model Summary*

Model Summary <sup>b</sup>					
Model	$R$	$R$ Square	Adjusted $R$ Square	Std. Error of the Estimate	Durbin-Watson
1	.893 <sup>a</sup>	.797	.794	7.42024	1.532

a. Predictors: (Constant), TotalInstruc, GR6ATTEND, %FRL

b. Dependent Variable: TPAP

Table 24

*Second Simultaneous Multiple Regression for Grade 6 Language Arts ANOVA Table*

ANOVA <sup>a</sup>						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	42630.806	3	14210.269	258.087	.000 <sup>b</sup>
	Residual	10846.815	197	55.060		
	Total	53477.622	200			

a. Dependent Variable: TPAP

b. Predictors: (Constant), TotalInstruc, GR6ATTEND, %FRL

The coefficients table (Table 25) indicates that two out of three predictor variables were found to be statistically significant in this model. The variables that were found to be statistically significant were percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ). The length of the instructional day ( $p > .566$ ), which was the target variable of interest, was found to be not statistically significant. Additionally, the coefficients table indicated no existing issues with multicollinearity. The variance factors (VIF) range from 1.027 – 1.269).

The standardized beta for each of the significant predictor variables was then squared to provide the effect size. The effect size was used to determine the amount of variance of the outcome variables that can be explained by each significant predictor variable. The variable %FRL was found to be the strongest contributor to the overall model, explaining 51.4% of the overall variance in student performance on the Grade 6 NJ ASK Language Arts. The negative beta ( $\beta = -717$ ,  $p < .001$ ) indicates that as the school's percentage of students on FRL increases, the percentage of students Proficient and Advanced Proficient decreases. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 8.6% of the overall variance in student performance on the Grade 6 NJ ASK Language

Arts. The positive beta ( $\beta = .294, p < .001$ ), accounts for 8.6% of the total variance explained in the model. The positive beta indicates that as student attendance increases, so does student performance on the Grade 6 NJ ASK Language Arts.

Table 25

*Second Simultaneous Multiple Regression for Grade 6 Language Arts Coefficients Table*

Model	Coefficients <sup>a</sup>											
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-236.196	39.074		-6.045	.000	-313.252	-159.139					
%FRL	-.451	.023	-.717	-19.851	.000	-.496	-.406	-.853	-.817	-.637	.788	1.269
1 GR6ATTEN	3.263	.399	.294	8.178	.000	2.476	4.050	.619	.503	.262	.795	1.258
D												
TotalInstruc	.016	.028	.019	.575	.566	-.039	.070	.163	.041	.018	.973	1.027

a. Dependent Variable: TPAP

**Null Hypothesis 1:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Language Arts scores of public school students within districts leveled A-J.

The researcher retains the null hypothesis based on the data analysis and findings previously discussed. In both simultaneous multiple regressions, length of instructional day was not a statistically significant predictor variable ( $\beta = .019, p > .566$ ).

### **Research Question 2: Analysis and Results**

What is the influence of the length of the instructional day on sixth grade student achievement in Mathematics as measured by the 2011 New Jersey Assessment of Skills and Knowledge when controlling for student, staff, and school variables?

The following statistical analyses were run in order to answer this research question. First, a simultaneous multiple regression was run in IBM SPSS with all 11 independent variables included (see Table 27). Existing research in the field was considered when selecting the independent variables to be used in this study. The preliminary simultaneous multiple regression indicated that the following variables had statistically significant beta coefficients: percentage of students eligible for free and reduced lunch (%FRL) and student attendance. The length of instructional day variable was also retained, as it was the variable of interest even though it was found not to be statistically significant ( $p > .072$ ). In the initial regression, the  $R$  square was .736 (see Table 26). The variable %FRL had a VIF (variance inflation factor) of 3.035. That VIF is considered high by some researchers (Field, 2013; Morgan et al., 2013); this indicates the possibility exists for multicollinearity issues with variables within this model. However, recently, the field of statistics has posited that this VIF threshold might be too small and some researchers have suggested that VIFs can be as great as 10 (Lewis-Black & Lewis-Black, 2016).

Table 26

*Preliminary Grade 6 Mathematics Model Summary*

Model Summary <sup>b</sup>					
Model	$R$	$R$ Square	Adjusted $R$ Square	Std. Error of the Estimate	Durbin-Watson
1	.858 <sup>a</sup>	.736	.721	7.49450	1.403

a. Predictors: (Constant), MA+, %ELL, TotalSchDay, MOBILITY, TOTENROLL, FATTEND, %DIS, GR6ATTEND, TotalInstruc, STMOB, %FRL

b. Dependent Variable: TPAP



Table 27

*Preliminary Grade 6 Mathematics Coefficients Table*

Model	Coefficients <sup>a</sup>											
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-157.988	53.536		-2.951	.004	-263.596	-52.380					
%FRL	-.359	.036	-.658	-10.085	.000	-.430	-.289	-.829	-.592	-.378	.329	3.035
%DIS	.159	.144	.047	1.100	.273	-.126	.444	-.146	.080	.041	.758	1.320
%ELL	-.270	.114	-.098	-2.375	.019	-.494	-.046	-.235	-.171	-.089	.827	1.209
GR6ATTEND	2.244	.504	.213	4.449	.000	1.249	3.239	.592	.309	.167	.610	1.640
TOTENROLL	-.001	.002	-.017	-.404	.687	-.005	.003	.120	-.029	-.015	.814	1.229
TotalSchDay	.068	.042	.076	1.640	.103	-.014	.150	.212	.119	.061	.652	1.534
TotalInstruc	-.061	.034	-.083	-1.810	.072	-.127	.005	.104	-.131	-.068	.669	1.496
STMOB	-.103	.113	-.054	-.912	.363	-.325	.119	-.651	-.066	-.034	.397	2.521
FATTEND	.289	.315	.039	.918	.360	-.332	.909	.372	.067	.034	.792	1.262
MOBILITY	.134	.102	.050	1.318	.189	-.066	.335	-.031	.096	.049	.958	1.043
MA+	-.016	.040	-.017	-.392	.696	-.094	.063	.310	-.029	-.015	.788	1.268

a. Dependent Variable: TPAP

A reduced simultaneous multiple regression model using only the variables found to be statistically significant in the initial regression was then run to address the possibilities of multicollinearity issues. The reduced regression also included the length of instructional day, as it was the variable of interest in this study. Three predictor variables were retained and eight were deleted.

The reduced model simultaneous multiple regression for Grade 6 Mathematics showed an *R* Square value of .736 and the Adjusted *R* Square value of .721. The adjusted *R* Square is the amount of the variance that can be explained in the dependent variable of total Proficient and Advanced Proficient (TPAP) when the independent variables of %FRL, student attendance, and

length of instructional day are taken into consideration. This model predicts 72% of the variance in the TPAP on the Grade 6 NJ ASK Mathematics scores. The Grade 6 Mathematics ANOVA table reports that the regression was statistically significant ( $F(3,196) = 168.929, p < .001$ ) (see Table 29).

Table 28

*Second Simultaneous Multiple Regression for Grade 6 Mathematics Model Summary*

Model Summary <sup>b</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.849 <sup>a</sup>	.721	.717	7.54729	1.428

a. Predictors: (Constant), TotalInstruc, GR6ATTEND, %FRL

b. Dependent Variable: TPAP

Table 29

*Second Simultaneous Multiple Regression for Grade 6 Mathematics ANOVA Table*

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28867.300	3	9622.433	168.929	.000 <sup>b</sup>
	Residual	11164.459	196	56.962		
	Total	40031.759	199			

a. Dependent Variable: TPAP

b. Predictors: (Constant), TotalInstruc, GR6ATTEND, %FRL

The coefficients table (Table 30) indicates that two out of three predictor variables were found to be statistically significant in this model. The variables that were found to be statistically significant were percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ). The length of the instructional day ( $p > .379$ ), which was the target variable of interest, was found to be not statistically significant. Additionally, the

coefficients table indicated no existing issues with multicollinearity. The variance factors (VIF) range from 1.027 to 1.401.

The standardized beta for each of the significant predictor variables was then squared to provide the effect size. The effect size was used to determine the amount of variance of the outcome variables that can be explained by each significant predictor variable. The variable %FRL was found to be the strongest contributor to the overall model, explaining 51.8% of the overall variance in student performance on the Grade 6 NJ ASK Mathematics. The negative beta ( $\beta = -.720, p < .001$ ) indicates that as the school's students on free and reduced lunch (%FRL) population increases, the percentage of students Proficient and Advanced Proficient decreases. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 4.7% of the overall variance in student performance on the Grade 6 NJ ASK Mathematics. The positive beta ( $\beta = .216, p < .001$ ), accounts for 4.7% of the total variance explained in the model. The positive beta indicates that as student attendance increases, so does student performance on the Grade 6 NJ ASK Mathematics.

Table 30

*Second Simultaneous Multiple Regression for Grade 6 Mathematics Coefficients Table*

Model	Coefficients <sup>a</sup>											
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	-119.331	45.673		-2.613	.010	-209.405	-29.257				
%FRL	-.393	.024	-.720	-16.126	.000	-.441	-.345	-.829	-.755	-.608	.714	1.401
1 GR6ATTE	2.276	.467	.216	4.872	.000	1.354	3.197	.592	.329	.184	.721	1.387
ND												
TotalInstruc	-.025	.028	-.034	-.882	.379	-.080	.031	.104	-.063	-.033	.974	1.027

a. Dependent Variable: TPAP

**Null Hypothesis 2:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Mathematics scores of public school students within districts leveled A-J.

The researcher retains the null hypothesis based on the data analysis and findings previously discussed. In both simultaneous multiple regressions, length of instructional day was not a statistically significant predictor variable ( $\beta = -.034$ ,  $p > .379$ ).

### **Research Question 3: Analysis and Results**

What is the influence of the length of the instructional day on seventh grade student achievement in Language Arts as measured by the 2011 New Jersey Assessment of Skills and Knowledge when controlling for student, staff, and school variables?

The following statistical analyses were run in order to answer this research question. First, a simultaneous multiple regression was run in IBM SPSS with all 11 independent variables included (see Table 32). Existing research in the field was considered when selecting the independent variables to be used in this study. The preliminary simultaneous multiple regression indicated that the following variables had statistically significant beta coefficients: percentage of students eligible for free and reduced lunch (%FRL) and student attendance. The length of instructional day variable was also retained, as it was the variable of interest even though it was found not to be statistically significant ( $p > .121$ ). In the initial regression, the  $R$  square was .701 (see Table 31). The variable %FRL had a VIF (variance inflation factor) of 2.963. That VIF is considered high by some researchers (Field, 2013; Morgan et al., 2013); this indicates the possibility exists for multicollinearity issues with variables within this model. However,

recently, the field of statistics has posited that this VIF threshold might be too small and some researchers have suggested that VIFs can be as great as 10 (Lewis-Black & Lewis-Black, 2016).

Table 31

*Preliminary Grade 7 Language Arts Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.837 <sup>a</sup>	.701	.684	8.79835	1.386

a. Predictors: (Constant), MA+, %DIS, TotalSchDay, TOTENROLL, MOBILITY, FATTEND, GR7ATTEND, TotalInstruc, STMOB, %FRL, %ELL

b. Dependent Variable: TPAP

Table 32

*Preliminary Grade 7 Language Arts Coefficients Table*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	-184.802	63.340				-2.918	.004	-309.755	-59.849		
%FRL	-.441	.042	-.719	-10.452	.000	-.525	-.358	-.812	-.607	-.418	.338	2.963
%DIS	-.041	.421	-.009	-.098	.922	-.871	.789	-.194	-.007	-.004	.173	5.778
%ELL	.181	.708	.025	.255	.799	-1.217	1.578	-.224	.019	.010	.165	6.078
GR7ATTEND	2.456	.601	.200	4.083	.000	1.269	3.642	.534	.286	.163	.666	1.501
TOTENROLL	.002	.002	.030	.716	.475	-.003	.006	.129	.052	.029	.890	1.123
TotalSchDay	.052	.049	.052	1.052	.294	-.045	.148	.214	.077	.042	.648	1.543
TotalInstruc	-.062	.040	-.076	-1.558	.121	-.140	.016	.107	-.113	-.062	.669	1.496
STMOB	.107	.133	.050	.804	.423	-.156	.370	-.591	.059	.032	.409	2.446
FATTEND	.276	.363	.034	.761	.448	-.440	.993	.355	.056	.030	.819	1.221
MOBILITY	.082	.123	.028	.665	.507	-.161	.325	-.021	.049	.027	.905	1.105
MA+	.068	.046	.066	1.466	.144	-.024	.160	.386	.107	.059	.798	1.253

a. Dependent Variable: TPAP

A reduced model simultaneous multiple regression using only the variables found to be statistically significant in the initial regression was then run to address the possibilities of multicollinearity issues. The reduced regression also included the length of instructional day, as it was the variable of interest in this study. Three predictor variables were retained and eight were deleted.

The reduced model simultaneous multiple regression for Grade 7 Language Arts showed an *R* Square value of .690 and the Adjusted *R* Square value of .685. The adjusted *R* Square is the amount of the variance that can be explained in the dependent variable of total Proficient and Advanced Proficient (TPAP) when the independent variables of %FRL, student attendance, and length of instructional day are taken into consideration. This model predicts 69% of the variance in the TPAP on the Grade 7 NJ ASK Language Arts scores. The Grade 7 Language Arts ANOVA table reports that the regression was statistically significant ( $F(3,195) = 144.819$ ,  $p < .001$ ) (see Table 34).

Table 33

*Second Simultaneous Multiple Regression for Grade 7 Language Arts Model Summary*

Model Summary <sup>b</sup>					
Model	<i>R</i>	<i>R</i> Square	Adjusted <i>R</i> Square	Std. Error of the Estimate	Durbin-Watson
1	.831 <sup>a</sup>	.690	.685	8.77140	1.358

a. Predictors: (Constant), TotalInstruc, GR7ATTEND, %FRL

b. Dependent Variable: TPAP

Table 34

*Second Simultaneous Multiple Regression for Grade 7 Language Arts ANOVA Table*

ANOVA <sup>a</sup>						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	33426.110	3	11142.037	144.819	.000 <sup>b</sup>
	Residual	15002.812	195	76.937		
	Total	48428.922	198			

a. Dependent Variable: TPAP

b. Predictors: (Constant), TotalInstruc, GR7ATTEND, %FRL

The coefficients table (Table 35) indicates that two out of three predictor variables were found to be statistically significant in this model. The variables that were found to be statistically significant were percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ). The length of the instructional day ( $p > .233$ ), which was the target variable of interest, was found to be not statistically significant. Additionally, the coefficients table indicated no existing issues with multicollinearity. The variance factors (VIF) range from 1.039 – 1.307.

The standardized beta for each of the significant predictor variables was then squared to provide the effect size. The effect size was used to determine the amount of variance of the outcome variables that can be explained by each significant predictor variable. The variable %FRL was found to be the strongest contributor to the overall model, explaining 52.9% of the overall variance in student performance on the Grade 7 NJ ASK Language Arts. The negative beta ( $\beta = -727$ ,  $p < .001$ ) indicates that as the school's %FRL population increases, the percentage of students Proficient and Advanced Proficient decreases. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 3.8% of the overall variance in student performance on the Grade 7 NJ ASK Language Arts. The

positive beta ( $\beta = .196, p < .001$ ) accounts for 3.8% of the total variance explained in the model.

The positive beta indicates that as student attendance increases, so does student performance on the Grade 7 NJ ASK Language Arts.

Table 35

*Second Simultaneous Multiple Regression for Grade 7 Language Arts Coefficients Table*

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-135.337	53.808		-2.515	.013	-241.458	-29.216					
%FRL	-.446	.028	-.727	-15.960	.000	-.502	-.391	-.812	-.753	-.636	.765	1.307
GR7ATTEND	2.407	.559	.196	4.310	.000	1.306	3.509	.534	.295	.172	.767	1.303
TotalInstruc	-.039	.033	-.049	-1.196	.233	-.104	.025	.107	-.085	-.048	.963	1.039

a. Dependent Variable: TPAP

**Null Hypothesis 3:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Language Arts scores of public school students within districts leveled A-J.

The researcher retains the null hypothesis based on the data analysis and findings previously discussed. In both simultaneous multiple regressions, length of instructional day was not a statistically significant predictor variable ( $\beta = -.049, p > .233$ ).

#### **Research Question 4: Analysis and Results**

What is the influence of the length of the instructional day on seventh grade student achievement in Math as measured by the 2011 New Jersey Assessment of Skills and Knowledge when controlling for student, staff, and school variables?



The following statistical analyses were run in order to answer this research question. First, a simultaneous multiple regression was run in IBM SPSS with all 11 independent variables included (see Table 37). Existing research in the field was considered when selecting the independent variables to be used in this study. The preliminary simultaneous multiple regression indicated that the following variables had statistically significant beta coefficients: percentage of students eligible for free and reduced lunch (%FRL) and student attendance. The length of instructional day variable was also retained, as it was the variable of interest, even though it was found not to be statistically significant ( $p > .121$ ). In the initial regression, the  $R$  square was .701 (see Table 36). The variable %FRL had a VIF (variance inflation factor) of 2.963. That VIF is considered high by some researchers (Field, 2013; Morgan et al., 2013); this indicates the possibility exists for multicollinearity issues with variables within this model. However, recently, the field of statistics has posited that this VIF threshold might be too small and some researchers have suggested that VIFs can be as great as 10 (Lewis-Black & Lewis-Black, 2016).

Table 36

*Preliminary Grade 7 Mathematics Model Summary*

Model Summary <sup>b</sup>					
Model	$R$	$R$ Square	Adjusted $R$ Square	Std. Error of the Estimate	Durbin-Watson
1	.837 <sup>a</sup>	.701	.684	8.79835	1.386

a. Predictors: (Constant), MA+, %DIS, TotalSchDay, TOTENROLL, MOBILITY, FATTEND, GR7ATTEND, TotalInstruc, STMOB, %FRL, %ELL

b. Dependent Variable: TPAP

Table 37

*Preliminary Grade 7 Mathematics Coefficients Table*

Model	Coefficients <sup>a</sup>											
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-184.802	63.340		-2.918	.004	-309.755	-59.849					
%FRL	-.441	.042	-.719	-10.452	.000	-.525	-.358	-.812	-.607	-.418	.338	2.963
%DIS	-.041	.421	-.009	-.098	.922	-.871	.789	-.194	-.007	-.004	.173	5.778
%ELL	.181	.708	.025	.255	.799	-1.217	1.578	-.224	.019	.010	.165	6.078
GR7ATTEND	2.456	.601	.200	4.083	.000	1.269	3.642	.534	.286	.163	.666	1.501
TOTENROLL	.002	.002	.030	.716	.475	-.003	.006	.129	.052	.029	.890	1.123
TotalSchDay	.052	.049	.052	1.052	.294	-.045	.148	.214	.077	.042	.648	1.543
TotalInstruc	-.062	.040	-.076	-1.558	.121	-.140	.016	.107	-.113	-.062	.669	1.496
STMOB	.107	.133	.050	.804	.423	-.156	.370	-.591	.059	.032	.409	2.446
FATTEND	.276	.363	.034	.761	.448	-.440	.993	.355	.056	.030	.819	1.221
MOBILITY	.082	.123	.028	.665	.507	-.161	.325	-.021	.049	.027	.905	1.105
MA+	.068	.046	.066	1.466	.144	-.024	.160	.386	.107	.059	.798	1.253

a. Dependent Variable: TPAP

A reduced model simultaneous multiple regression using only the variables found to be statistically significant in the initial regression was then run to address the possibilities of multicollinearity issues. The reduced regression also included the length of instructional day, as it was the variable of interest in this study. Three predictor variables were retained and eight were deleted.

The reduced model simultaneous multiple regression for Grade 7 Mathematics showed an *R* Square value of .690 and the Adjusted *R* Square value of .685. The adjusted *R* Square is the amount of the variance that can be explained in the dependent variable of total Proficient and Advanced Proficient (TPAP) when the independent variables of %FRL, student attendance, and

length of instructional day are taken into consideration. This model predicts 69% of the variance in the TPAP on the Grade 7 NJ ASK Mathematics scores. The Grade 7 Mathematics ANOVA table reports that the regression was statistically significant ( $F(3,195) = 144.819, p < .001$ ) (see Table 38).

Table 38

*Second Simultaneous Multiple Regression for Grade 7 Mathematics Model Summary*

Model Summary <sup>b</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.831 <sup>a</sup>	.690	.685	8.77140	1.358

a. Predictors: (Constant), TotalInstruc, GR7ATTEND, %FRL

b. Dependent Variable: TPAP

Table 39

*Second Simultaneous Multiple Regression for Grade 7 Mathematics ANOVA Table*

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33426.110	3	11142.037	144.819	.000 <sup>b</sup>
	Residual	15002.812	195	76.937		
	Total	48428.922	198			

a. Dependent Variable: TPAP

b. Predictors: (Constant), TotalInstruc, GR7ATTEND, %FRL

The coefficients table (Table 40) indicates that two out of three predictor variables were found to be statistically significant in this model. The variables that were found to be statistically significant were percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ). The length of the instructional day ( $p > .233$ ), which was the target variable of interest, was found to be not statistically significant. Additionally, the

coefficients table indicated no existing issues with multicollinearity. The variance factors (VIF) range from 1.039 – 1.307).

The standardized beta for each of the significant predictor variables was then squared to provide the effect size. The effect size was used to determine the amount of variance of the outcome variables that can be explained by each significant predictor variable. The variable %FRL was found to be the strongest contributor to the overall model, explaining 52.9% of the overall variance in student performance on the Grade 7 NJ ASK Mathematics. The negative beta ( $\beta = -727, p < .001$ ) indicates that as the school's %FRL population increases, the percentage of students Proficient and Advanced Proficient decreases. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 3.8% of the overall variance in student performance on the Grade 7 NJ ASK Mathematics. The positive beta ( $\beta = .196, p < .001$ ), accounts for 3.8% of the total variance explained in the model. The positive beta indicates that as student attendance increases, so does student performance on the Grade 7 NJ ASK Mathematics.

Table 40

*Second Simultaneous Multiple Regression for Grade 7 Mathematics Coefficients Table*

Coefficients <sup>a</sup>												
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 %FRL	-.446	.028	-.727	-15.960	.000	-.502	-.391	-.812	-.753	-.636	.765	1.307
GR7ATTEND	2.407	.559	.196	4.310	.000	1.306	3.509	.534	.295	.172	.767	1.303
TotalInstruc	-.039	.033	-.049	-1.196	.233	-.104	.025	.107	-.085	-.048	.963	1.039

a. Dependent Variable: TPAP

**Null Hypothesis 4:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Mathematics scores of public school students within districts leveled A-J.

The researcher retains the null hypothesis based on the data analysis and findings previously discussed. In both simultaneous multiple regressions, length of instructional day was not a statistically significant predictor variable ( $\beta = -.049$ ,  $p > .233$ ).

#### **Research Question 5: Analysis and Results**

What is the influence of the length of the instructional day on eighth grade student achievement in Language Arts as measured by the 2011 New Jersey Assessment of Skills and Knowledge when controlling for student, staff, and school variables?

The following statistical analyses were run in order to answer this research question. First, a simultaneous multiple regression was run in IBM SPSS with all 11 independent variables included (see Table 42). Existing research in the field was considered when selecting the independent variables to be used in this study. The preliminary simultaneous multiple regression indicated that the following variables had statistically significant beta coefficients: percentage of students eligible for free and reduced lunch (%FRL) and student attendance. The length of instructional day variable was also retained, as it was the variable of interest even though it was found not to be statistically significant ( $p > .265$ ). In the initial regression, the *R* square was .833 (see Table 41). The variable %FRL had a VIF (variance inflation factor) of 3.551. That VIF is considered high by some researchers (Field, 2013; Morgan et al., 2013); this indicates the possibility exists for multicollinearity issues with variables within this model. However,

recently, the field of statistics has posited that this VIF threshold might be too small and some researchers have suggested that VIFs can be as great as 10 (Lewis-Black & Lewis-Black, 2016).

Table 41

*Preliminary Grade 8 Language Arts Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.913 <sup>a</sup>	.833	.824	5.82195	2.162

a. Predictors: (Constant), MA+, %DIS, TotalSchDay, MOBILITY, TOTENROLL, GR8ATTEND, FATTEND,

TotalInstruc, STMOB, %FRL, %ELL

b. Dependent Variable: TPAP

Table 42

*Preliminary Grade 8 Language Arts Coefficients Table*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	-23.016	39.551				-5.82	.561	-101.043	55.010		
%FRL	-.316	.031	-.582	-10.313	.000	-.376	-.255	-.856	-.603	-.309	.282	3.551
%DIS	-.144	.227	-.038	-.636	.526	-.592	.303	-.156	-.047	-.019	.253	3.948
%ELL	.740	.335	.138	2.205	.029	.078	1.401	-.161	.160	.066	.229	4.368
GR8ATTEND	1.306	.341	.142	3.832	.000	.634	1.978	.600	.270	.115	.650	1.539
TOTENROLL	-.001	.001	-.026	-.827	.409	-.004	.002	.144	-.061	-.025	.886	1.128
TotalSchDay	.047	.033	.054	1.452	.148	-.017	.112	.251	.106	.043	.651	1.537
TotalInstruc	-.029	.026	-.041	-1.119	.265	-.081	.022	.164	-.082	-.033	.680	1.471
STMOB	-.650	.101	-.327	-6.456	.000	-.849	-.451	-.819	-.428	-.193	.348	2.871
FATTEND	-.113	.238	-.015	-.473	.636	-.582	.357	.320	-.035	-.014	.837	1.195
MOBILITY	-.066	.084	-.025	-.784	.434	-.232	.100	-.093	-.057	-.023	.857	1.167
MA+	-.005	.031	-.006	-.169	.866	-.066	.056	.339	-.012	-.005	.783	1.277

a. Dependent Variable: TPAP

A reduced model simultaneous multiple regression using only the variables found to be statistically significant in the initial regression was then run to address the possibilities of multicollinearity issues. The reduced regression also included the length of instructional day, as it was the variable of interest in this study. Three predictor variables were retained and eight were deleted.

The reduced model simultaneous multiple regression for Grade 8 Language Arts showed an *R* Square value of .821 and the Adjusted *R* Square value of .817. The adjusted *R* Square is the amount of the variance that can be explained in the dependent variable of total Proficient and Advanced Proficient (TPAP) when the independent variables of %FRL, student attendance, and length of instructional day are taken into consideration. This model predicts 82% of the variance in the TPAP on the Grade 8 NJ ASK Language Arts scores. The Grade 8 Language Arts ANOVA table reports that the regression was statistically significant ( $F(4,193) = 220.863$ ,  $p < .001$ ) (see Table 44).

Table 43

*Second Simultaneous Multiple Regression for Grade 8 Language Arts Model Summary*

Model Summary <sup>b</sup>					
Model	<i>R</i>	<i>R</i> Square	Adjusted <i>R</i> Square	Std. Error of the Estimate	Durbin-Watson
1	.906 <sup>a</sup>	.821	.817	5.92901	2.119

a. Predictors: (Constant), TotalInstruc, GR8ATTEND, %FRL, STMOB

b. Dependent Variable: TPAP

Table 44

*Second Simultaneous Multiple Regression for Grade 8 Language Arts ANOVA Table*

ANOVA <sup>a</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
1					
Regression	31056.081	4	7764.020	220.863	.000 <sup>b</sup>
Residual	6784.556	193	35.153		
Total	37840.637	197			

a. Dependent Variable: TPAP

b. Predictors: (Constant), TotalInstruc, GR8ATTEND, %FRL, STMOB

The coefficients table (Table 45) indicates that two out of three predictor variables were found to be statistically significant in this model. The variables that were found to be statistically significant were percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ), student attendance ( $p < .001$ ), and student mobility ( $p < .001$ ). The length of the instructional day ( $p > .894$ ), which was the target variable of interest, was found to be not statistically significant. Additionally, the coefficients table indicated no existing issues with multicollinearity. The variance factors (VIF) range from 1.040 – 2.396).

The standardized beta for each of the significant predictor variables was then squared to provide the effect size. The effect size was used to determine the amount of variance of the outcome variables that can be explained by each significant predictor variable. The variable %FRL was found to be the strongest contributor to the overall model, explaining 27.1% of the overall variance in student performance on the Grade 8 NJ ASK Language Arts. The negative beta ( $\beta = -521, p < .001$ ) indicates that as the school's %FRL population increases, the percentage of students Proficient and Advanced Proficient decreases. The next strongest predictor variable found to be statistically significant was student attendance. Student attendance explains 2.6% of



the overall variance in student performance on the Grade 8 NJ ASK Language Arts. The positive beta ( $\beta = .162, p < .001$ ), accounts for 2.6% of the total variance explained in the model. The positive beta indicates that as student attendance increases, so does student performance on the Grade 8 NJ ASK Language Arts. The last predictor variable to be found statistically significant was student mobility. Student mobility explains 1.2% of the overall variance in student performance on the Grade 8 NJ ASK Language Arts. The negative positive beta ( $\beta = -.340, p < .001$ ), accounts for 1.2% of the total variance explained in the model. The negative beta indicates that as student mobility increases, the percentage of student's Proficient and Advanced Proficient decreases.

Table 45

*Second Simultaneous Multiple Regression for Grade 8 Language Arts Coefficients Table*

Coefficients <sup>a</sup>												
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	-42.938	33.423				-1.285	.200	-108.859	22.983		
%FRL	-.283	.026	-.521	-11.046	.000	-.333	-.232	-.856	-.622	-.337	.417	2.396
1 GR8ATTEND	1.486	.336	.162	4.421	.000	.823	2.149	.600	.303	.135	.693	1.444
STMOB	-.675	.097	-.340	-6.990	.000	-.865	-.484	-.819	-.449	-.213	.393	2.543
TotalInstruc	-.003	.022	-.004	-.133	.894	-.047	.041	.164	-.010	-.004	.961	1.040

a. Dependent Variable: TPAP

**Null Hypothesis 5:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Language Arts scores of public school students within districts leveled A-J.

The researcher retains the null hypothesis based on the data analysis and findings previously discussed. In both simultaneous multiple regressions, length of instructional day was not a statistically significant predictor variable ( $\beta = -.004$ ,  $p > .894$ ).

### **Research Question 6: Analysis and Results**

What is the influence of the length of the instructional day on eighth grade student achievement in Math as measured by the 2011 New Jersey Assessment of Skills and Knowledge when controlling for student, staff, and school variables?

The following statistical analyses were run in order to answer this research question. First, a simultaneous multiple regression was run in IBM SPSS with all 11 independent variables included (see Table 47). Existing research in the field was considered when selecting the independent variables to be used in this study. The preliminary simultaneous multiple regression indicated that the following variables had statistically significant beta coefficients: percentage of students eligible for free and reduced lunch (%FRL) and student attendance. The length of instructional day variable was also retained, as it was the variable of interest even though it was found not to be statistically significant ( $p > .385$ ). In the initial regression, the *R* square was .735 (see Table 46). The variable %FRL had a VIF (variance inflation factor) of 3.203. That VIF is considered high by some researchers (Field, 2013; Morgan et al., 2013); this indicates the possibility exists for multicollinearity issues with variables within this model. However, recently, the field of statistics has posited that this VIF threshold might be too small and some researchers have suggested that VIFs can be as great as 10 (Lewis-Black & Lewis-Black, 2016).

Table 46

*Preliminary Grade 8 Mathematics Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.858 <sup>a</sup>	.735	.720	8.04819	1.444

a. Predictors: (Constant), MA+, %ELL, TotalInstruc, MOBILITY, TOTENROLL, GR8ATTEND, FATTEND, TotalSchDay, STMOB, %FRL, %DIS

b. Dependent Variable: TPAP

Table 47

*Preliminary Grade 8 Mathematics Coefficients Table*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	-119.878	54.776				-2.189	.030	-227.933	-11.823		
%FRL	-.423	.041	-.700	-10.421	.000	-.504	-.343	-.824	-.605	-.391	.312	3.203
%DIS	-.210	.295	-.053	-.712	.477	-.792	.372	-.144	-.052	-.027	.254	3.933
%ELL	.929	.489	.144	1.900	.059	-.036	1.894	-.150	.137	.071	.245	4.088
GR8ATTEND	1.915	.471	.185	4.067	.000	.986	2.844	.563	.284	.153	.681	1.468
TOTENROLL	.001	.002	.026	.642	.522	-.003	.005	.150	.047	.024	.854	1.171
TotalSchDay	.056	.045	.058	1.228	.221	-.034	.145	.232	.089	.046	.635	1.575
TotalInstruc	-.031	.036	-.040	-.870	.385	-.103	.040	.135	-.063	-.033	.670	1.493
STMOB	-.097	.120	-.048	-.814	.417	-.333	.139	-.652	-.059	-.031	.405	2.471
FATTEND	.099	.332	.012	.300	.765	-.555	.753	.343	.022	.011	.822	1.216
MOBILITY	-.045	.109	-.016	-.414	.680	-.260	.170	-.088	-.030	-.016	.961	1.040
MA+	.053	.043	.053	1.240	.216	-.031	.138	.375	.090	.047	.780	1.282

a. Dependent Variable: TPAP

A reduced model simultaneous multiple regression using only the variables found to be statistically significant in the initial regression was then run to address the possibilities of

multicollinearity issues. The reduced regression also included the length of instructional day, as it was the variable of interest in this study. Three predictor variables were retained and eight were deleted.

The reduced model simultaneous multiple regression for Grade 8 Mathematics showed an *R* Square value of .716 and the Adjusted *R* Square value of .711. The adjusted *R* Square is the amount of the variance that can be explained in the dependent variable of total Proficient and Advanced Proficient (TPAP) when the independent variables of %FRL, student attendance, and length of instructional day are taken into consideration. This model predicts 71% of the variance in the TPAP on the Grade 8 NJ ASK Mathematics scores. The Grade 8 Mathematics ANOVA table reports that the regression was statistically significant ( $F(3,196) = 164.320, p < .001$ ) (see Table 49).

Table 48

*Second Simultaneous Multiple Regression for Grade 8 Mathematics Model Summary*

Model Summary <sup>b</sup>					
Model	<i>R</i>	<i>R</i> Square	Adjusted <i>R</i> Square	Std. Error of the Estimate	Durbin-Watson
1	.846 <sup>a</sup>	.716	.711	8.17294	1.427

a. Predictors: (Constant), TotalInstruc, GR8ATTEND, %FRL

b. Dependent Variable: TPAP

Table 49

*Second Simultaneous Multiple Regression for Grade 8 Mathematics ANOVA Table*

ANOVA <sup>a</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
1					
Regression	32928.180	3	10976.060	164.320	.000 <sup>b</sup>
Residual	13092.198	196	66.797		
Total	46020.378	199			

a. Dependent Variable: TPAP

b. Predictors: (Constant), TotalInstruc, GR8ATTEND, %FRL

The coefficients table (Table 50) indicates that two out of three predictor variables were found to be statistically significant in this model. The variables that were found to be statistically significant were percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ). The length of the instructional day ( $p > .943$ ), which was the target variable of interest, was found to be not statistically significant. Additionally, the coefficients table indicated no existing issues with multicollinearity. The variance factors (VIF) range from 1.032 – 1.337).

The standardized beta for each of the significant predictor variables was then squared to provide the effect size. The effect size was used to determine the amount of variance of the outcome variables that can be explained by each significant predictor variable. The variable %FRL was found to be the strongest contributor to the overall model, explaining 51.8% of the overall variance in student performance on the Grade 8 NJ ASK Mathematics. The negative beta ( $\beta = -.720$ ,  $p < .001$ ) indicates that as the school's %FRL population increases, the percentage of students Proficient and Advanced Proficient decreases. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 4.7% of the

overall variance in student performance on the Grade 8 NJ ASK Mathematics. The positive beta ( $\beta = .217, p < .001$ ) accounts for 4.7% of the total variance explained in the model. The positive beta indicates that as student attendance increases, so does student performance on the Grade 8 NJ ASK Mathematics.

Table 50

*Second Simultaneous Multiple Regression for Grade 8 Mathematics Coefficients Table*

Coefficients <sup>a</sup>												
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-126.985	44.666		-2.843	.005	-215.073	-38.897					
%FRL	-.436	.027	-.720	-16.349	.000	-.489	-.383	-.824	-.760	-.623	.748	1.337
GR8ATTEND	2.249	.450	.217	4.995	.000	1.361	3.137	.563	.336	.190	.768	1.302
TotalInstruc	-.002	.030	-.003	-.072	.943	-.062	.058	.135	-.005	-.003	.969	1.032

a. Dependent Variable: TPAP

**Null Hypothesis 6:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Mathematics scores of public school students within districts leveled A-J.

The researcher retains the null hypothesis based on the data analysis and findings previously discussed. In both simultaneous multiple regressions, length of instructional day was not a statistically significant predictor variable ( $\beta = -.003, p > .943$ ).

### Conclusion

The null hypotheses for all six research questions in this paper were retained. There was not a statistically significant relationship between the length of the instructional day and the

percentage of students who scored Proficient or Advanced Proficient on the NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8. The percentage of students eligible for free and reduced lunch and student attendance were the only variables found to be statistically significant in each of the twelve simultaneous multiple regressions. Student mobility was found to be a statistically significant predictor on the percentage of students' Proficient and Advanced Proficient only on the Grade 8 NJ ASK Language Arts.

On the Grade 6 NJ ASK Language Arts, the percentage of students eligible for free and reduced lunch (%FRL) was the strongest predictor of having an influence over student achievement. The variable %FRL was found to be the strongest contributor to the overall model, explaining 51.4% of the overall variance in student performance on the Grade 6 NJ ASK Language Arts. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 8.6% of the overall variance in student performance on the Grade 6 NJ ASK Language Arts.

On the Grade 6 NJ ASK Mathematics, the percentage of students eligible for free and reduced lunch (%FRL) was the strongest predictor of having an influence over student achievement. The variable %FRL was found to be the strongest contributor to the overall model, explaining 51.8% of the overall variance in student performance on the Grade 6 NJ ASK Mathematics. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 4.7% of the overall variance in student performance on the Grade 6 NJ ASK Mathematics.

On the Grade 7 NJ ASK Language Arts, the percentage of students eligible for free and reduced lunch (%FRL) was the strongest predictor of having an influence over student achievement. The variable %FRL was found to be the strongest contributor to the overall model,

explaining 52.9% of the overall variance in student performance on the Grade 7 NJ ASK Language Arts. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 3.8% of the overall variance in student performance on the Grade 7 NJ ASK Language Arts.

On the Grade 7 NJ ASK Mathematics, the percentage of students eligible for free and reduced lunch (%FRL) was the strongest predictor of having an influence over student achievement. The variable %FRL was found to be the strongest contributor to the overall model, explaining 52.9% of the overall variance in student performance on the Grade 7 NJ ASK Mathematics. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 3.8% of the overall variance in student performance on the Grade 7 NJ ASK Mathematics.

On the Grade 8 NJ ASK Language Arts, the percentage of students eligible for free and reduced lunch (%FRL) was the strongest predictor of having an influence over student achievement. The variable %FRL was found to be the strongest contributor to the overall model, explaining 27.1% of the overall variance in student performance on the Grade 8 NJ ASK Language Arts. The next strongest predictor variable found to be statistically significant was student attendance. Student attendance explains 2.6% of the overall variance in student performance on the Grade 8 NJ ASK Language Arts. The last predictor variable to be found statistically significant was student mobility. Student mobility explains 1.2% of the overall variance in student performance on the Grade 8 NJ ASK Language Arts.

Finally, on the Grade 8 NJ ASK Mathematics, the percentage of students eligible for free and reduced lunch (%FRL) was the strongest predictor of having an influence over student achievement. The variable %FRL was found to be the strongest contributor to the overall model,



explaining 51.8% of the overall variance in student performance on the Grade 8 NJ ASK Mathematics. The only other predictor variable found to be statistically significant was student attendance. Student attendance explains 4.7% of the overall variance in student performance on the Grade 8 NJ ASK Mathematics.

Overall, the percentage of students eligible for free and reduced-price lunch (%FRL) was the strongest predictor of having an influence over student achievement for each assessment and on each grade level. These findings provide strong evidence that the length of the school day does not influence student achievement. However, %FRL is the strongest indicator of student achievement. The findings also indicate that attendance matters in regard to student achievement.

## **CHAPTER V**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **Introduction**

There has been a major focus in recent years on improving student test scores on high stakes tests. One of the most popular reforms mentioned is to extend the daily amount of instructional time. Most bureaucrats make these recommendations in the hope that extending the instructional day for students will lead to an increase in standardized test scores. Arne Duncan (Hull, 2011, p.1) stated the following:

Our students today are competing against children in India and China. Those students are going to school 25 to 30 percent longer than we are. Our students, I think, are at a competitive disadvantage. I think we're doing them a disservice.

Most people would assume that if more instructional time is added to the school day, it would have a direct correlation to an increase in student learning. There is very little research available on the effect that instructional time has on student achievement. The research that is available is inconclusive. Therefore, the goal of the researcher was to add to the research on this topic by comparing standardized test scores in the state of New Jersey to the length of instructional time.

#### **Purpose**

The purpose of this study was to explain the influence of the length of instructional day, if any, on Grades 6, 7, and 8 student achievement in both Math and Language Arts as measured by the New Jersey Assessment of Skills and Knowledge (NJ ASK) 2011. This study also examined the influence of other variables related to student, school, and staff variables. Those variables included percentage of students with limited English proficiency, percentage of

students with free or reduced lunch, percentage of students with disabilities, student attendance rate, student mobility, staff attendance, staff mobility, faculty and administrators with a master's degree or higher, school size, instructional time, and length of the school day.

### **Organization of the Chapter**

This chapter provides a summary of findings from this study, as well as providing empirically based recommendations for administrators in the areas of both policy and practice. The chapter concludes with recommendations for future research. The researcher hopes this study adds to the existing literature (deAngelis, 2014; Sammarone, 2014; Plevier, 2016) on this topic and provides future decision makers with data that will help them make evidenced-based decisions. This chapter and the results of this study can serve as the needed evidence on this topic that can help influence future policy and practice.

### **Research Questions and Answers**

What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient scores of the New Jersey Assessment of Skills and Knowledge for Grades 6, 7, and 8 when controlling for student, staff, and school variables? That is the main question that guided this study.

This study ran and analyzed 12 simultaneous multiple regressions, and it was determined that the length of the instructional day was not statistically significant in Grades 6, 7, and 8 on the 2011 NJ ASK Language Arts and Math assessments. Additionally, when controlling for student, school, and staff variables, no statistically significant relationships were found between the length of the instructional day and the NJ ASK 2011 Language Arts and Math assessments.

**Research Question 1:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized

assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Null Hypothesis 1:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Language Arts scores of public school students within districts leveled A-J.

**Answer:** The null hypothesis was retained for this research question based on the analysis. No statistically significant relationship exists between the length of the instructional day and the Grade 6 Language Arts scores on the 2011 NJ ASK when controlling for student, staff, and school predictor variables.

A simultaneous multiple regression was run to answer this research question. The percent of students scoring Proficient and Advanced Proficient was the dependent variable. Based on existing research, 11 predictor variables were selected to be included in the initial regression. The initial regression model indicated an  $R$  square value of .822. The preliminary regression found two out of the 11 predictor variables to be statistically significant for this model. The percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ) were found to be statistically significant indicators of the percent of students scoring Proficient and Advanced Proficient on the Grade 6 NJ ASK Language Arts. Length of instructional day ( $p > .600$ ) was the variable of interest and was found not to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 6 NJ ASK Language Arts.

A reduced model simultaneous multiple regression was then run. The reduced model indicated an  $R$  Square of .797. The regression determined that two out of the three variables included in this model were statistically significant. The percentage of students eligible for free

and reduced lunch (%FRL) contributed to 51.4% of the variance, and student attendance contributed to 8.6% of the variance. The length of the instructional day ( $\beta = .019, p > .566$ ) was again not found to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 6 NJ ASK Language Arts. This finding indicated and validates the retention of the first null hypothesis.

**Research Question 2:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 6 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 6 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Null Hypothesis 2:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 6 Mathematics scores of public schools within districts leveled A-J.

**Answer:** The null hypothesis was retained for this research question based on the analysis. No statistically significant relationship exists between the length of the instructional day and the Grade 6 Mathematics scores on the 2011 NJ ASK when controlling for student, staff, and school predictor variables.

A simultaneous multiple regression was run to answer this research question. The percent of students scoring Proficient and Advanced Proficient was the dependent variable. Based on existing research, 11 predictor variables were selected to be included in the initial regression. The initial regression model indicated an *R* square value of .736. The preliminary regression found two out of the 11 predictor variables to be statistically significant for this model. The percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ) were found to be statistically significant indicators of the percent of

students scoring Proficient and Advanced Proficient on the Grade 6 NJ ASK Mathematics. Length of instructional day ( $p>.027$ ) was the variable of interest and was found not to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 6 NJ ASK Mathematics.

A reduced model simultaneous multiple regression was then run. The reduced model indicated an *R* Square of .736. The regression determined that two out of the three variables included in this model were statistically significant. The percentage of students eligible for free and reduced lunch (%FRL) contributed to 51.8% of the variance, and student attendance contributed to 4.7% of the variance. The length of the instructional day ( $\beta= -.034, p>.379$ ) was again not found to be a statistically significant indicator of the percent of students scoring proficient and advanced proficient on the Grade 6 NJ ASK Mathematics. This finding indicated and validates the retention of the second null hypothesis.

**Research Question 3:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Null Hypothesis 3:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Language Arts scores of public school students within districts leveled A-J.

**Answer:** The null hypothesis was retained for this research question based on the analysis. No statistically significant relationship exists between the length of the instructional day and the Grade 7 Language Arts scores on the 2011 NJ ASK when controlling for student, staff, and school predictor variables.

A simultaneous multiple regression was run to answer this research question. The percent of students scoring Proficient and Advanced Proficient was the dependent variable. Based on existing research, 11 predictor variables were selected to be included in the initial regression. The initial regression model indicated an  $R$  square value of .701. The preliminary regression found two out of the 11 predictor variables to be statistically significant for this model. The percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ) were found to be statistically significant indicators of the percent of students scoring Proficient and Advanced Proficient on the Grade 7 NJ ASK Language Arts. Length of instructional day ( $p > .121$ ) was the variable of interest and was found not to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 7 NJ ASK Language Arts.

A reduced model simultaneous multiple regression was then run. The reduced model indicated an  $R$  Square of .690. The regression determined that two out of the three variables included in this model were statistically significant. The percentage of students eligible for free and reduced lunch (%FRL) contributed to 52.9% of the variance, and student attendance contributed to 3.8% of the variance. The length of the instructional day ( $\beta = -.049$   $p > .233$ ) was again found not to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 7 NJ ASK Language Arts. This finding indicated and validates the retention of the third null hypothesis.

**Research Question 4:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 7 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 7 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Null Hypothesis 4:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 7 Mathematics scores of public school students within districts leveled A-J.

**Answer:** The null hypothesis was retained for this research question based on the analysis. No statistically significant relationship exists between the length of the instructional day and the Grade 7 Mathematics scores on the 2011 NJ ASK when controlling for student, staff, and school predictor variables.

A simultaneous multiple regression was run to answer this research question. The percent of students scoring Proficient and Advanced Proficient was the dependent variable. Based on existing research, 11 predictor variables were selected to be included in the initial regression. The initial regression model indicated an  $R$  square value of .701. The preliminary regression found two out of the 11 predictor variables to be statistically significant for this model. The percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ) were found to be statistically significant indicators of the percent of students scoring Proficient and Advanced Proficient on the Grade 7 NJ ASK Mathematics. Length of instructional day ( $p > .121$ ) was the variable of interest and was found not to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 7 NJ ASK Mathematics.

A reduced model simultaneous multiple regression was then run. The reduced model indicated an  $R$  Square of .690. The regression determined that two out of the three variables included in this model were statistically significant. The percentage of students eligible for free and reduced lunch (%FRL) contributed to 52.9% of the variance, and student attendance contributed to 3.8% of the variance. The length of the instructional day ( $\beta = -.049$   $p > .233$ ) was



again found not to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 7 NJ ASK Mathematics. This finding indicated and validates the retention of the fourth null hypothesis.

**Research Question 5:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Language Arts measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Null Hypothesis 5:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Language Arts scores of public school students within districts leveled A-J.

**Answer:** The null hypothesis was retained for this research question based on the analysis. No statistically significant relationship exists between the length of the instructional day and the Grade 8 Language Arts scores on the 2011 NJ ASK when controlling for student, staff, and school predictor variables.

A simultaneous multiple regression was run to answer this research question. The percent of students scoring Proficient and Advanced Proficient was the dependent variable. Based on existing research, 11 predictor variables were selected to be included in the initial regression. The initial regression model indicated an *R* square value of .833. The preliminary regression found two out of the 11 predictor variables to be statistically significant for this model. The percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ) were found to be statistically significant indicators of the percent of students scoring Proficient and Advanced Proficient on the Grade 8 NJ ASK Language Arts. Length of instructional day ( $p > .265$ ) was the variable of interest and was found not to be a

statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 8 NJ ASK Language Arts.

A reduced model simultaneous multiple regression was then run. The reduced model indicated an *R* Square of .821. The regression determined that two out of the three variables included in this model were statistically significant. The percentage of students eligible for free and reduced lunch (%FRL) contributed to 27.1% of the variance, while student attendance and student mobility contributed to 2.1% and 1.2% of the variance, respectively. The length of the instructional day ( $\beta = -.004$   $p > .894$ ) was again not found to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 8 NJ ASK Language Arts. This finding indicated and validates the retention of the fifth null hypothesis.

**Research Question 6:** What is the influence of the length of the instructional day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Mathematics measured by the New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

**Null Hypothesis 6:** No statistically significant relationship exists between the length of the instructional day and the 2010-2011 New Jersey Assessment of Skills and Knowledge 8 Mathematics scores of public school students within districts leveled A-J.

**Answer:** The null hypothesis was retained for this research question based on the analysis. No statistically significant relationship exists between the length of the instructional day and the Grade 8 Mathematics scores on the 2011 NJ ASK when controlling for student, staff, and school predictor variables.

A simultaneous multiple regression was run to answer this research question. The percent of students scoring Proficient and Advanced Proficient was the dependent variable.

Based on existing research, 11 predictor variables were selected to be included in the initial regression. The initial regression model indicated an  $R$  square value of .735. The preliminary regression found two out of the 11 predictor variables to be statistically significant for this model. The percentage of students eligible for free and reduced lunch (%FRL) ( $p < .001$ ) and student attendance ( $p < .001$ ) were found to be statistically significant indicators of the percent of students scoring Proficient and Advanced Proficient on the Grade 8 NJ ASK Mathematics. Length of instructional day ( $p > .385$ ) was the variable of interest and was found not to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 8 NJ ASK Mathematics.

A reduced model simultaneous multiple regression was then run. The reduced model indicated an  $R$  Square of .716. The regression determined that two out of the three variables included in this model were statistically significant. The percentage of students eligible for free and reduced lunch (%FRL) contributed to 51.8% of the variance and student attendance contributed to 4.7% of the variance. The length of the instructional day ( $\beta = -.003$   $p > .943$ ) was again not found to be a statistically significant indicator of the percent of students scoring Proficient and Advanced Proficient on the Grade 8 NJ ASK Mathematics. This finding indicated and validates the retention of the sixth null hypothesis.

### **Discussion**

There were no statistically significant relationships found between the length of the school day and the percent of students scoring Proficient and Advanced Proficient on the 2011 NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8. Policymakers are constantly recommending both lengthening the school day and adding instructional time to the school day as the most common reform to address increasing student achievement. Differences in the

amount of time that students receive instruction in core subjects are of substantial concern for policymakers and others seeking to improve instruction (Corey et al., 2012, p. 160). However, they do this blindly, as there is little or no empirical evidence and research to support such a reform. Millions of dollars have been spent on these types of reforms. However, research continues to prove otherwise. Baker et al. (2004) concluded that as a number of studies have shown, we find here that there is no significant relationship at the cross-national level between achievement test scores and the amount of instructional time (p. 322). Therefore, decision makers and school administrators should focus on areas that are proven to influence student achievement.

The percentage of students eligible for free and reduced lunch (%FRL) was found to be the strongest predictor on the 2011 NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8 in this study. The variable %FRL has long been a focus area of bureaucrats. Federal programs to address poverty have been developed to address %FRL over the years. These programs include Title I, No Child Left Behind, and the most recent version, Every Student Succeeds Act (ESSA). These programs provide monies to schools with the greatest %FRL needs to be used to increase student achievement. Schools should be using these monies to develop programs that address poverty issues experienced by their students. Tienken (2012b) points out, “There is at least 45 years of empirical research that documents the connection between poverty and ultimate student achievement as measured by standardized tests” (p. 5). Additionally, Sirin (2005) found that of all the factors examined in the meta-analytic literature, family SES at the student level is one of the strongest correlates of academic performance. At the school level, the correlations were even stronger (p. 438). Therefore, it is clear that the research and evidence explain that the focus should be on addressing student poverty in order to influence student achievement.

Student attendance was also found to be a statistically significant predictor of percent of students scoring Proficient and Advanced Proficient on the NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8. Previous research has also indicated that student attendance is an important factor in predicting student achievement. Students with better attendance records are cited as having stronger test performance (Balfanz & Byrnes, 2006; Lamdin, 1996; Nichols, 2003). Student attendance is positively correlated with student achievement. Lamdin (1996) also relied on aggregate data to show that student attendance had a positive and significant relationship with academic performance. Low student attendance is usually associated with high %FRL and has been proven to have crippling long term effects on future earnings. Economically, students who do not attend school as frequently (and thus have a higher correlated risk for non-promotion and dropping out) tend to face greater future financial hardships, such as unemployment (Alexander, Entwisle, & Horsey, 1997; Broadhurst, Patron, & May-Chahal, 2005; Kane, 2006). The previous empirical research is overwhelming and concurs with the findings in this study. Therefore, it is imperative that programs be developed to improve student attendance. There should be incentive programs that encourage better attendance.

This study focused on the key question of whether the length of the instructional day influences student achievement. The results of this study have indicated that longer instructional days have no statistically significant influence on student achievement. However, adding time to the school day remains a top priority of lawmakers and decision makers to increase student achievement. Empirical research exists that suggests that the focus should not be on just adding time; instead, the focus should be on the quality of time. Caldwell et al (1982) emphasized the importance of engaged time that has the strongest effect on student achievement. The time a student spends engaged has much more of an effect than just adding time, where a student has

the potential not to be engaged. Corey (2012) confirmed that just adding instructional time to the school day by itself will not improve achievement. It is the quality of the instructional time that will make a difference. The results of this study have been confirmed with previous research when it comes to adding instructional time to the school day. Therefore, it is recommended that a focus should be placed on improving the existing time already provided. This can be accomplished by providing professional development that provides strategies on how to increase student engagement.

Historically, time has long been an issue that bureaucrats have focused on when it comes to improving student achievement. These same bureaucrats should be reviewing the previous research on this topic. Doing so will allow them to better focus their money and efforts in the areas that will have the most impact. This study has confirmed the previous research that lengthening the instructional day does not improve student achievement. There is not a statistically significant relationship between the length of the instructional day and the percent of students scoring Proficient and Advanced Proficient on the NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8. However, this study did find that the percentage of students eligible for free and reduced lunch (%FRL) was the strongest predictor of student achievement. The researcher hopes that this study will assist decision makers who are contemplating adding instructional time to the school day. Again, the focus should be on improving student engagement within the existing instructional day and not just adding more time to the day.

### **Recommendations for Administrative Policy and Practice**

No statistically significant relationship was found between the length of the instructional day and the percent of students achieving Proficient and Advanced Proficient on the 2011

NJ ASK Language Arts and Mathematics assessment. This finding remains consistent with other recent research (deAngelis, 2014; Sammarone, 2014; Plevier, 2016) that focused on the length of the school day or instructional time. Lawmakers continue to focus on adding instructional time to the school day as the number one remedy for increasing student achievement. Adding instructional time adds a significant cost to providing education to students. These costs are not justified based on the findings of this study and other similar studies. One relatively recent estimate, prepared for the National Education Commission on Time and Learning, predicted that increasing the school year nationally to 200 days would cost between \$34.4 and \$41.9 billion annually (Aronson, Zimmerman, & Carlos, 1998). These monies should be focused on addressing poverty programs. This student found statistically significant evidence that high %FRL and high student mobility are strong predictors of low student achievement. Lawmakers must recognize these predictors and develop programs that address students with high FRL and high mobility.

Students with high %FRL remain the number one factor in determining influence on student achievement. Sirin (2005) found that of all the factors examined in the meta-analytic literature, family SES at the student level is one of the strongest correlates of academic performance. The findings in this study concur with previous research. Stull (2013) concluded while it is not possible to raise a child's family SES, it is possible to understand how family SES affects school conditions and to use school conditions to compensate for differences in family SES (p. 63). There are programs that can be developed to help students with high %FRL.

The researcher found in this study that the percentage of students on free and reduced lunch was the strongest predictor of achievement on the NJ ASK Mathematics and Language Arts 2011 for Grades 6, 7, and 8. That finding in this study agrees with the previous research. In

no state does the group of students categorized as economically disadvantaged ever score higher than its middle class and wealthy peers on any state test, at any level (Tienken 2011). The evidence is overwhelming that programs need to be developed to address poverty, which is the greatest predictor of student achievement overall. Children attending classrooms in the United States with more highly trained staff exhibit a higher level of positive behavior and development (Hayes & Zaslow, 1990). Attracting high quality teachers to low-income communities has been a challenge. However, it should remain a focus area for program development to address students living in poverty. Teacher quality can make a difference with students of low SES. Clotfelter et al. (2010), consistent with other studies (see, in particular, Hanushek, Kain, O'Brien, & Rivkin, 2005; Clotfelter, Ladd, & Vigdor, 2006), found clear evidence that teachers with more experience are more effective than those with less experience (p. 27). Incentive programs should be explored for attracting high quality teachers. AmeriCorps and Teach for America are two programs that were designed to provide quality teachers in high poverty communities. More effort should be focused on expanding programs addressing quality teachers in those communities.

It is evident that high-quality early childhood development programs have proven to be successful in helping students overcome early problems (Magnuson et al., 2004; Hair et al., 2006). Early childhood programs such as full day pre-school are programs that have been developed to help address students living in poverty. Full day pre-school programs are most often found in low income communities. Programs like Headstart have been implemented to address the needs of students from high poverty communities. Additional programs should be implemented to provide high quality opportunities at an early age to these students.



Student attendance was another strong indicator of having an influence on student achievement. This finding agrees with previous studies on student attendance. Students with better attendance records are cited as having stronger test performance (Balfanz & Byrnes, 2006; Lamdin, 1996; Nichols, 2003). Students with low attendance are associated with problems later in life. Having consistently low levels of attendance in early grade levels is also correlated with higher future academic risks, including non-promotion (Neild & Balfanz, 2006) and dropping out (Rumberger, 1995; Rumberger & Thomas, 2000). Students with poor attendance typically face a bleak financial future. Economically, students who do not attend school as frequently (and thus have a higher correlated risk for non-promotion and dropping out) tend to face greater future financial hardships, such as unemployment (Alexander, Entwisle, & Horsey, 1997; Broadhurst, Patron, & May-Chahal, 2005; Kane, 2006). Therefore, programs should be developed to provide incentives to students to have excellent attendance and reduce dropouts. There is significant evidence that achievement goes up with students who have good attendance. Students with good attendance are less likely to drop out of school. Programs should also be developed to get parents involved and understand the importance of education and attending school.

Instructional time has been the main focus of both political and educational leaders when it comes to improving student achievement. Many of those officials believe that adding more time to the instructional day is the solution to improving student achievement. The results of this study did not concur with those beliefs. This study did not find any statistically significant relationship between the length of the instructional day and student achievement on the 2011 NJ ASK Mathematics and Language Arts for Grades 6, 7, and 8. This study did find that the percentage of students on free and reduced lunch was a statistically significant predictor of student achievement. This study also found in one instance that student mobility was a

statistically significant predictor of student achievement. The researcher hopes that the results of this study can be used to help both political and educational leaders make decisions regarding adding instructional time. The focus when it comes to instructional time should not be adding time. It should be on how best to use the time provided and how to increase student engagement during that time.

### **Recommendations for Future Research**

The influence of the length of the instructional day on student achievement on the 2011 NJ ASK Language Arts and Mathematics was examined in this study. No statistically significant relationship was found between the length of the instructional day and the percent of students achieving Proficient and Advanced Proficient scores on the 2011 NJ ASK Language Arts and Mathematics. These results indicate that additional studies should be researched providing additional empirical data to determine the validity of increasing the instructional school day. This additional research can add to the completed studies that can assist decision makers in making future recommendations for adding time to the instructional day. Future studies should explore the following:

- Create an added-value study that examines the influence of the length of instructional day along with the average teacher evaluation score on student achievement on the 2015 PARCC scores for New Jersey.
- Examine the influence of length of instructional time on student achievement by District Factor Group (DFG). This may indicate that length of instructional time may influence student achievement only at certain DFGs.
- An additional study may include examining the influence of length of instructional time on student achievement using all of the data available for Grades 6, 7, and 8

instead of just focusing on traditional middle schools. This version could confirm the results of this study.

- An additional study may also include the influence of the length of the instructional day on student achievement for Grades 6, 7, and 8 on the 2015 PARCC scores for New Jersey.
- This study could also be recreated focusing in on Grades 3, 4, and 5, as well as well as Grade 11.
- Recreate this same study in other states in the region and compare them to the results in this study.
- Recreate this same study comparing the length of the instructional day with PARCC scores at specific grade levels across all of the states using PARCC.

### **Conclusion**

There is no statistically significant relationship between the length of the instructional day and percent of students scoring Proficient and Advanced Proficient on the 2011 NJ ASK Language Arts and Mathematics for Grades 6, 7, and 8. This analysis indicates that a focus should be placed on both socioeconomic status (%FRL) and student attendance when it comes to creating new programs, policies, reforms, and initiatives. These are the only two predictors in this study to have influence on student achievement. More time should be spent addressing high FRL and low student attendance. Last, this study indicates that just adding more instructional time does not influence student achievement. Therefore, the focus should be on making the existing time available to be of high quality.

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