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# Impact of Preschool Education on the Academic Achievement of Low Socio-Economic Status Elementary Students

Gary Dawson

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IMPACT OF PRESCHOOL EDUCATION ON THE ACADEMIC ACHIEVEMENT OF  
LOW SOCIO-ECONOMIC STATUS ELEMENTARY STUDENTS

A Dissertation

Submitted to the School of Education

Duquesne University

In partial fulfillment of the requirements for  
the degree of Doctor of Education

By

Gary L. Dawson

May 2014

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Gary L. Dawson

2014

**DUQUESNE UNIVERSITY**  
**SCHOOL OF EDUCATION**  
**INTERDISCIPLINARY DOCTORAL PROGRAM FOR EDUCATIONAL**  
**LEADERS**

***Dissertation***

Submitted in Partial Fulfillment of the Requirements  
For the Degree of Doctor of Education (Ed.D.)

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December 18, 2013

IMPACT OF PRESCHOOL EDUCATION ON THE ACADEMIC ACHIEVEMENT OF  
LOW SOCIO-ECONOMIC STATUS ELEMENTARY STUDENTS

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## ABSTRACT

# IMPACT OF PRESCHOOL EDUCATION ON THE ACADEMIC ACHIEVEMENT OF LOW SOCIO-ECONOMIC STATUS ELEMENTARY STUDENTS

By

Gary L. Dawson

May 2014

Dissertation supervised by Dr. James E. Henderson

The purpose of this study was to determine if attending a four-year-old preschool program had an impact on the academic achievement of elementary age students. With limited funding and the demands of No Child Left Behind legislation, schools are constantly evaluating the effectiveness and cost of the ongoing programming. In addition, educational literature points to school readiness as a significant indicator of future student academic success. With this in mind, this study investigated the impact of preschool attendance on student standardized reading and math test scores throughout the elementary age school experience.

The population for this study was comprised of current sixth grade students attending a large middle school in a rural southwestern Pennsylvania school district. From this group a sample was selected. The sample included all students from the

population meeting testing criteria and selection requirements. The sampled students were split into two groups comprised of those student who attended a pre-k 4 program and those who did not attend. A multivariate statistical analysis was completed to determine if there was a significant difference between the standardize math and reading scores of the two groups across 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> grades. Also during the analysis, socioeconomic status was evaluated for significant interaction with preschool attendance and as an independent variable.

After analysis, it was found that only during the 5<sup>th</sup> grade did preschool attendance significantly impact standardized test scores with those who attended preschool scoring higher on the reading portion. However, socioeconomic status did have a significant impact on test scores in both 3<sup>rd</sup> and 5<sup>th</sup> grades. The results were somewhat surprising showing socioeconomic status is certainly a variable educators need to be aware of and pre-k 4 attendance showing some impact but not as much as this investigator initially thought.

DEDICATION

TO MY FAMILY AND FRIENDS

## ACKNOWLEDGEMENT

This life-changing journey could not have been completed without the help and support of many. First the patience and understand of my wonderful wife Lisa and my two children Kayla and Brandon were boundless. They were there throughout the program with support when needed and doing without my help when I was away at class or holed up in a room writing.

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## **Chapter One**

### **Introduction**

Any society that hopes to thrive in the future must train and mentor their youngest members. These youngest members of our society will at some future point in time be governmental and community leaders, doctors, lawyers, scientists, mothers, and fathers. The greatest gift the current generation can offer their young people is knowledge. Through knowledge comes the ability to make informed decisions and self-determination. Societies benefit from and grow when each generation builds upon what the last has achieved; never ending, always improving and moving forward. In America, a common societal goal has been to see that the next generation has a better life than the last. The question will be, does this generation have the fortitude and moral belief to carry this noble standard through for the next?

One way our society can carry forward the always-improving ideal is to ensure the best possible preparation of our youngest citizens. In our attempt to maintain this all import ideal, our society will face a host of new challenges. Our society is changing and households today look very different than they did 25 years ago. In many households, both parents work or the household only contains one parent. Many families are blended, containing members with different fathers, mothers and needs/issues. In today's world, dad is not always leaving home with a smile and a briefcase, and mom is not always there to get the children a good breakfast and put them off to school every morning with a smile and a kiss. Many times Mom and Dad are gone before the children get up in the morning. These "latch-key kids" have the responsibility to get themselves up, make themselves breakfast, get ready for school, and catch the bus or walk to school on time.

This may not be a problem for a high school senior however, this may be asking too much of an elementary school student. Many times older siblings are recruited to fill quasi-parental roles and help with some of the day-to-day care of the younger children. The demands these families face trying to survive day to day while raising a family can become daunting. In addition, when these families face economic hardships the pressure and stress make it very difficult to maintain the household while supporting the educational needs of their children. Add in possible language barriers such as living in a predominately Spanish speaking household in an area where Spanish speaking educational professionals are rare, and the very difficult becomes impossible causing the children's educational needs to fall aside leaving them with less opportunity which in turn leaves society with less opportunity.

If we are to maintain or societal ideal of each succeeding generation doing better than the previous, we must recognize the difficulties families are facing today and work diligently to ensure all children are prepared to receive and are receiving the best possible education our society can offer. We must recognize these children are our future and if our society would like to continue to lead the world, we will need a well-prepared and educated citizenry. To accomplish our educational goals, we must recognize some of the most important educational foundations begin in the earliest grades when children learn to be students. They learn to read, use basic math skills, and interact with others through various types of communication. If children are not ready to learn these lessons when they reach the school house steps, their educational experience could be delayed at best and upset to the point they never reach their full potential at worst. To break this cycle, our educational system must work with families to ensure the youngest of our students

are receiving the nurturing support they need to reach the schoolhouse ready and willing for the education that awaits them. We can do this through a variety of means, but in the end, we as a society must recognize the link between school readiness and school performance. In order to ensure school readiness for all students, society should implement state sponsored socially accepted educational programming.

The link between school readiness and early student performance has been documented in the literature (Gormley, 2005; Gormley, Gayer, Phillips, & Dawson, 2005). Students starting their school careers lacking the requisite skills for academic success will experience difficulty with their academic performance (Gromley, Gayer et al., 2005). There are several student backgrounds that seem to commonly fall into this category including low socio-economic status students and immigrant students. The United States government has recognized the impact of low socio-economic status on early learners and in 1965 implemented the Head Start program (Garces, Thomas, & Currie, 2002). Head Start is a program operated in all fifty states and is coordinated through a single governmental agency. The programs goals address the issues faced by low economic status families (Garces et al. 2002). Another intervention method currently being widely considered is state funded universal preschool (Zimiles, 1985). Research has shown this to be an effective method of addressing many school readiness issues (Garces et al., 2002). There also seems to be overall agreement in the literature that preschool programs are a good expenditure of resources (Ripple, Gilliam, Chanana, & Zigler, 1999; Nores, Belfield, Barnett, & Schweinhart, 2005 & Dawson, 2005). Educational experts and governmental agencies seem to agree quality preschool programs are beneficial to students. Fortunately, the students who seem to benefit the most are

those who are the most needy. With this in mind, preschool attendance may help some school districts with specific local deficiencies. For instance, what impact does a high quality preschool program have on standardized testing? With the onset of No Child Left Behind (NCLB), state and local standardized testing has become of premier importance to both local and state school boards of education. These tests have become high stakes, and the success of many schools and school districts are determined by the results of these tests. Finding themselves under the testing gun, schools are motivated to provide early support.

Schools in the Commonwealth of Pennsylvania are no different. Pennsylvania's testing instrument is the Pennsylvania System of School Assessment (PSSA), and meeting Adequate Yearly Progress (AYP) is a mandatory goal for all public schools in the Commonwealth of Pennsylvania. Adequate Yearly Progress, as part of NCLB, attempts to ensure all students are meeting learning goals that prepare them for their future. The law requires all students achieve at the proficient level or better in both Language Arts and Mathematics by 2014. AYP simply measures school districts as well as individual school buildings progress towards meeting this lofty requirement. The act has set benchmarks for each school year since the inception of NCLB building towards the ultimate 100% goal in 2014. The most current information concerning PSSA and AYP can be found at Pennsylvania Department of Education's web site:

<http://paaya.emetric.net> (PDE, 2012).

### **Significance of the Problem**

There have been many questions raised about the quality of education in the United States (Uy, 2008). Billions of dollars are spent every year offering all children a public

education. The taxpayer often asks what they are getting for their hard earned tax dollars. The public education system in the United States has been shown to not be the shining light of the world where academic achievement is concerned (Darling-Hammond, 2007). Several countries score higher than the United States in math and science (Uy, 2008; Gandjour, 2008; Gonzales, Williams, Jocelyn, Roey, Kastberg, & Brenwald, 2008). Educational Leaders in the United States have proposed many reasons for this phenomenon. For example, the United States offers kindergarten to 12<sup>th</sup> grade education to all children not just those meeting eligibility requirements or members of a certain caste of society. With this in mind, many children come to school not ready for the experience awaiting them. Educational leaders are constantly considering ways to resolve the school readiness problem experienced by so many of our youngest students. An idea under consideration by educational leaders around the country is to offer a high quality universal preschool program to all students (Zigler, Gilliam & Jones, 2006). Currently, most preschool programs around the country cater to those students and families meeting low income eligibility requirements or are the children of families whose parents have the financial means to pay for a private preschools experience (Ripple, Gilliam, Chanana, & Zigler, 1999). Many families eligible for state subsidized preschool do not take advantage of the offer. The current system of Head Start programs, private preschools, and limited public school offerings, are not meeting the needs of the country's children and expansion of preschool attendance across the country is needed (Garces et al., 2002). The needs go far beyond just those students eligible for Head Start and other low socioeconomic status based programs. The students who would benefit the most from universal preschool would be those just above the poverty lines (Greene,

2006). Families below this level approximately \$40,000-\$50,000; have the availability to access federally funded programs. More affluent families have the means to take advantage of more expensive private pay programs. Those families just above the poverty line have the least access to high quality preschool programs, and the needs of children of this group does not end just because their families earn a few extra dollars breaking some imaginary income ceiling (Greene, 2006).

We have an opportunity to lessen the number of children entering kindergarten with physical, emotional, or cognitive deficits by offering early intervention preschool programs to all children (DiBello & Neuharth-Pritchett, 2008). This justifies the continued funding of preschool programs and may suggest programs should be expanded to reach all children in the United States (Zigler, Gillian, & Jones, 2006). The justification for the expansion of preschool offerings is the most basic of all reasons; fairness. Expanded preschool offerings would level the playing field and give all students the opportunity to enter kindergarten ready for the experience. Children will enter school with the requisite skills to achieve at their maximum level. The educational establishment in the United States only has to look around the world for examples of preschool programs providing environments that allow children to learn, grow, and achieve (Zuckerman & Halfon, 2003).

### **Research Questions**

1. What is the impact of preschool programs on the PSSA reading and math scores of elementary students attending school in a rural southern Pennsylvania school district?

2. Does socio-economic status have an impact on the PSSA reading and math scores of students attending an elementary school in a rural southern Pennsylvania school district?
3. Does an interaction exist between preschool attendance and socio-economic status on PSSA reading and math scores of students attending an elementary school in a rural southern Pennsylvania school district?

### **Research Hypothesis**

1. Students attending pre-K four preschool education programs will achieve statistically higher elementary math and reading PSSA scores than those students who did not attend.
2. Students from families of low socio-economic status families who attend pre-K four preschool education programs will achieve statistically higher elementary and math PSSA scores than those low socio-economic status students who did not attend.

### **Identification of Variables**

#### **Independent Variables:**

1. Attendance in a pre-K four preschool program
2. Socio-economic status as define by the Federal Free and Reduced Lunch Program

#### **Dependent Variables:**

1. Third, fourth, and fifth grade PSSA math scores
2. Third, fourth, and fifth grade PSSA reading scores

**Conditions:**

1. Student participation in Pennsylvania state mandated testing in the third, fourth, and fifth grade
2. Third, fourth, and fifth grade reading and math scores from a current sixth grade group will be collected.
3. Collection of demographic information allowing assignment to appropriate preschool participation group

**Definitions**

Adequate Yearly Progress – Minimum expected achievement level as defined by the federal No Child Left Behind Act (Renter & Hamilton, 2003).

No Child Left Behind - Federal legislation designed to hold schools accountable for student achievement (Renter & Hamilton, 2003).

PSSA – Pennsylvania System of School Assessments – Designed to assess student knowledge on specific state provided academic standards. Given yearly to students in third through eighths and eleventh grades. Assessing every Pennsylvania student in grades 3 through 8 in reading and math, every Pennsylvania student in grades 5 and 8 in writing, and every Pennsylvania student in grades 4 and 8 in science. (Popham, 2003) (PDE, 2013).

Low Socio-economic Status – students whose families qualify for the national Free and Reduced Lunch Program

Latch Key Kids - Children who are left at home alone to care for themselves before or after school (Long & Long, 1983).

Universal Preschool Programming- An educational system where all children regardless of income have a high quality pre-K four experience available without cost to the family or meeting any type of needs based testing.

Immigrant Students - A student whose first language is not English (NCES, 1996).

### **Assumptions**

It is assumed that, students who attend pre-K preschool programs all benefit from the experience and will be better prepared for their forthcoming school experience. The children in this study attend a single rural school district in southern Pennsylvania. These children will attend a wide variety of preschool programs including Head Start based to private pay for service programs. Even with the variance from program to program, attending students will show academic benefit.

### **Limitations**

The population for this study is sixth grade students in a rural south-central Pennsylvania County. Due to this localized selection, the generalizability of the study across the State of Pennsylvania will be limited.

## **Chapter Two**

### **Review of Literature**

With the current state of economic issues across the country, it is more important than ever school districts are ensuring they are using resources in the most effective and efficient manner possible. There are many studies addressing the fiduciary prudence of preschool programs. Of these, there are several preeminent studies to which the rest refer and seem to be cornerstones in this arena of research. The most enduring study is the High/Scope Perry Preschool study. The Perry study was conducted in the 1960's to at risk students in Michigan. Three and four year old students were randomly selected and assigned to treatment and control groups. This would provide some assurance that differences in outcomes were most likely a result of the programming. The longitudinal nature of this study allowed the participants to be followed throughout their lives. A program follow-up at age 27 concluded it is a "social program from which everybody wins" (Barnett, 1996, p. 65). At age 27, members of the treatment group were one third less likely to be high school dropouts.

The most recent update (age 40) shows an increased likelihood of collegiate degree attainment. In addition, the most recent study also shows other benefit associated with the program. For example, more males were employed (70% treatment vs. 53% control), fewer were incarcerated (9% treatment vs. 26% control) and both male and female participants showed lower dependence on welfare programs (Nores, Belfield et al., 1996).

All of this adds up to a better life for the participants of the program. They were more likely to be employed and less likely to be entangled with the legal system. This

would seem to be a better outcome by anyone's measure. Second, society realized great benefits from the program. It could be inferred less entanglement with the legal system translates to lower crime rates for the community and what community is not interested in lower crime. As a result of this program, society realized a net benefit of \$180,455. This figure translates to \$12.90 for every dollar invested in the program (Nores, Belfield et al., 1996). For this program, the money spent was truly an investment for which society realized full repayment and an actual return on their investment.

*The Effects of Universal Pre-K on Cognitive Development* by Gromley, et al. (2005) looked at cognitive development of preschool students in Oklahoma. The study was an attempt to determine if the recent move by the state of Oklahoma from targeted preschool to universal preschool was an effective change. The study administered pre and post Woodcock-Johnson Achievement tests to 1597 students across all economic strata. The testing revealed a five-month gain in the treatment group when compared to their non-preschool counterparts. The Oklahoma program is interesting because it set high standards for preschool programs. Oklahoma compensates preschool teachers at the same rate as elementary teachers allowing schools to hire only preschool teachers meeting state certification requirements. This has been shown as a strong predictor of high quality environments for young children (NICHD, 1999, 2002). Without these requirements, other states may not experience the same results. Are the results worth the money invested in the program? There is no reference to this in the article. It is a subjective question to be answered by those directly involved such as parents, community members, and local/state governments. The above two studies were localized in scope. The first took place in Ypsilante, Michigan and the other in Tulsa, Oklahoma. The next

study considers school readiness across five states including Michigan, New Jersey, Oklahoma, South Carolina, and West Virginia. "The Effects of State Prekindergarten on Young Children's School Readiness in Five States" by Barnett, Lamy, and Jung (2005) found four very specific findings. First, state funded preschools increased vocabulary scores nearly four raw points or 31% more growth over a one-year time period. Second, children attending state funded preschools increased their average math scores by 13%. Third, state funded preschools increased print awareness by 39%. Last, the study found no effects on phonological awareness. This broader scope study gives generally positive results associated with state funded preschool attendance.

The three studies discussed are certainly not the only studies available; however, they provide a good look at the types of studies available. Also, the studies above seem to be the cornerstones upon which other studies are built or refer. The results provided generally correlate with the results of many of the other studies available. With this knowledge, society should strive to give this advantage to all our children and communities.

We as a society can stay the status quo and continue with the mixed plate of methods currently used across the country with most locations not offering some type of universal preschool programming, or will we learn from the studies discussed above and move forward with an investment in universal preschool for our children. We continue to be the country that spends billions of dollars yearly to educate every child but whose results when compared to the rest of the world shows lack luster achievement (Darling-Hammond, 2007). Some children continue to show up at the schoolhouse door not ready for the experience that awaits them resulting in less than optimum achievement (Duncan,

Claessens, Houston, Pagani, Engel, Sexton, Dowsett, Magnuson, Klebanov, Feinstein, Brooks-Gunn, Duckworth & Japel, 2007). Schools can continue to develop programs to help these students later in their school career. Our children can continue to operate from a deficit pushing them into high schools unable to read and complete simple mathematics. On the other hand, we as a society can say enough, take the moral high ground and develop a meaningful and effective universal preschool programming that guarantees every student will reach the school house door ready to learn and achieve at their highest potential. We can follow President George W. Bush's (2002) endorsement of early education and focus on building early academic skills. Trying to ensure "on the first day of school, children know their letters and numbers. They need a strong vocabulary. These are the building blocks of learning, and this nation must provide them" (Bush, 2002).

The issue of universal preschool would be best addressed as a long-term issue. There will be no easy answers and there will be no one solution. Education is a local issue with local politics, customs, and needs. The best solutions will be tailored to fit local needs while still providing the best preparation possible for our children. The only two universal requirements should be; all children should be included and the program should be of high quality and research based. From this base, state departments of education and local school districts will need to communicate with their stakeholders and build a program that ensures all students are prepared and ready when they reach their primary education experience (Duncan, Claessens, et al., 2007). The choices are many and methods to be used extensive but choose they must and work towards what is in the best interest of their students.

As stated above, there are choices as to the type of preschool offerings and the quality of each. When making this decision for our children, we must choose wisely and not just choose the one that will cost the community the least in dollars. If we do, we may find the cost of lost possibilities for our children to be unbearable. The most discussed program is the federally funded Head Start Program. Head Start is as stated a federally funded preschool program targeted at economically disadvantaged children. The program began in 1965 as part of the “war on poverty.” The program now has a budget of \$4.7 billion and serves 800,000 children (Garces, Thomas et al., 2002). In addition to being a preschool program, Head Start is a comprehensive social program for low-income children and their families. Head Start provides health care and counseling services in addition to educational programming (Zigler, Gilliam et al., 1983). The program now serves approximately 40% of the children eligible for the program.

Over the past decade, questions have been raised about the effectiveness of this mammoth federal program. One of the first questions raised was: Can this nationwide program be effectively administered from Washington D.C. (Ripple et al., 1999)? One group suggests devolving the program and passing the funding along to the states as block grants. Social policy analyst Douglas Besharov of the American Enterprise Institute and Wade Horne, formerly the federal official responsible for the Head Start program argue four points: First, states are best equipped to determine the needs of their local populations. Second, states should be empowered to develop their own policies. Third, local governments should integrate Head Start into their local educational institutions. Last, local educational entities should be able to end the competition between Head Start and other programs for staff and students.

There are of course opponents of the devolution of Head Start. Educational literature is firm on the importance of both the services provided to children as well as those provided to parents to elicit educational success among at risk children (Powell, 1989). Another concern is variability within the program. Head Start struggles to maintain program quality and fidelity across the country (Harms & Clifford, 1990). Centers rated good or better vary from 9% in North Carolina to 78% for a national sample (Brant, Burchinal, Lau, & Sparling, 1994). With a centralized leadership, Head Start has difficulty in this area. Finally, the United States General Accounting Office in 1995 reported other centrally managed federal programs moved to block grant status tend to falter under state control. Perhaps with states already in the education business, this may not be the case with preschool programs. However, this concern should be addressed and considered (Ripple, Gilliam et al. 1999).

If society chooses to move towards other forms of preschool, the choices may come from one of three categories or possibly some combination. The first is the move towards universal state funded preschool (Gromley, 2005; Ripple et al., 1999; Zigler et al., 2006). Several educational groups including the Council of Chief State School Officers and the Committee for Economic Development (CED) feel this is the direction the country is currently moving and this will help resolve school readiness issues of all students not just those from a targeted group or from families who can afford private preschool services (Barnett, Brown & Shore, 2004). Second we must consider the outcomes and benefits of existing preschool programs and decide if successes are worth the investment in the programs. The answer is not obvious and is not emphatically stated in the literature. The answer is subjective and each concerned party has to understand the

evidence and make an informed decision. Hopefully this is the technique educational leadership will employ. The last question addresses the type of program that will best serve the children of the United States. This boils down to Head Start vs. all other programs including state funded preschool, private preschool, and faith based preschools (Ripple et al., 1999; Harms & Clifford, 1980; Greene, 2006). Head Start is a formidable program with federal backing. The program provides services far beyond education and caters to at risk children. Head Start faces difficulties maintaining fidelity in its programs across the country and at times has difficulty attracting staff (Harms & Clifford, 1990). Private preschools may have the same problems or not, it just depends on the location and the particular program. With block grants, can private preschools offer a higher quality program? Some say yes, some say no; again it just depends (Barnett, Brown & Shore, 2004).

There are several preschool implementation options. Head start is effective in many locations and is working. So perhaps this is at least a piece of the solution. However the program does bring with it the following restriction, Head Start does not meet the earlier stated definition of a universal preschool program due to the fact, it is restricted to low income families only. In addition, in some locations the program's effectiveness comes into question. On the other end of the spectrum, we have local private for profit and not for profit preschool programs. The programs are run by churches, community groups, local school systems, and privately held organizations. Perhaps these types programs could meet the needs of some students and provide excellent choices for some families, but it is doubtful they can meet the universal preschool program definition. Funding for these programs is limited and many times

comes from the student's families in the form of tuition. Many families just do not have the means to support pay for services programs. If we as a society are going to truly address this issue, we must ensure universal preschool programming program becomes part the same societal fabric as our current public schools. However, the delivery of the programming may be provided in a more varied form offering choice to parents and communities on how to address the issue of universal preschool delivery. There is room for all current preschool products being offered around the country. This variety will provide choice, and competition will force each to watch program quality. However if our society is to ensure universal availability, some type of public funded universal preschool system administered through local school systems seems to be the only logical approach (Gromley, 2005; Gromley, Gayer et al., 2005 & Green, 2006).

Public education in the United States is largely funded by state and local taxes. With this type of funding, nation wide comprehensive plans can be difficult if not impossible to implement. The United States Department of Education can initiate programs like No Child Left Behind that require states to meet certain requirements if they wish to receive federal funds. But even then, all fifty states have developed their own individual ways of meeting the requirements. Possibly this same idea may work for preschool programming as well.

*No Child Left Behind and Pennsylvania System of School Assessment (PSSA)*

On January 8, 2002 President George W. Bush signed onto law the No Child Left Behind Act (United States Dept. of Ed., n.d.) (DeBray, McDermott & Wohlstetter, 2005; NCLB, 2002 & NCLB, 2004). To meet the requirements of the NCLB legislation, each state must measure the academic proficiency of its students and work to reduce

achievement gaps between certain lower performing groups and their peer groups. The target groups include ethnicity, socioeconomic status, limited English proficient (LEP), and disabled students. The overall goal of NCLB legislation is for every student to achieve adequate yearly progress (AYP) ultimately reaching 100% proficiency in reading and math by the year 2014 (NCLB, 2004). The Commonwealth of Pennsylvania has developed and instituted the Pennsylvania System of School Assessment (PSSA) to meet this federal initiative.

## **Chapter Three**

### **Methodology**

#### **Introduction Statement**

With the introduction of the federal No Child Left Behind Law (NCLB), all 50 states have been required to put in place approved testing programs to ensure all students are achieving adequate yearly progress and are meeting benchmark goals. The Commonwealth of Pennsylvania put in place the Pennsylvania System of School Assessment (PSSA). This evaluation program puts in place sets of standards at benchmark points to be met by all students by the 2014 school year. If districts fail to meet these required benchmarks, they are required to file an approved School Improvement Plan with the Pennsylvania Department of Education (PDE). This plan must lay out the school's plan to overcome deficiencies and improve student achievement to a level allowing the school/students to meet future benchmark goals. If over a period of time a school is unable to rectify their inability to meet benchmark goals, PDE may take punitive steps up to and including school reconstitution to insure all students are meeting adequate yearly progress and reaching appropriate benchmarks. This federal requirement has made student achievement of utmost importance to all school administrators and districts.

Tight budget restraints and pressures to meet PSSA requirements have schools and districts looking for ways to improve student achievement while maintaining costs at an acceptable level. One theory is to offer good preschool programming to promote school readiness for all students (Barnett, Lamy, & Jung, 2005). Student readiness can be traced to student achievement throughout the literature and has been shown to be a

reasonable financial as well as social investment (Ripple, Gilliam, Chanana, & Zigler, 1999; Nores, Belfield, Barnett & Schweinhart, 2005 & Dawson, 2005). Perhaps if students reach the elementary grades school ready, they will perform at a higher level and have higher academic success. With the above theory in mind, the researcher would like to investigate the relationship between standardized achievement scores, of elementary students, as measured by the PSSA testing program and attendance in existing local preschool programming.

### **Population Description**

The target population for this study will be the current sixth grade students attending a school district located in a rural southern Pennsylvania county. This population includes approximately 125 students attending the only middle school in the school district. The focus will be on students attending the fore mentioned school district for grades third through fifth and completed all mandatory state testing during said time frame.

### **Sampling Methodology**

The study will utilize a non-random sample, and the sample will include all students from the above group who meet the following minimum criteria. Students who have been enrolled at their current placement for third through fifth grade and have completed both reading and math PSSA testing during the above said time period. In addition, the student's guardian will have completed the informational survey and informed consent documentation.

## **Measurement Devices**

### **Pennsylvania System of School Assessment (PSSA)**

As part of the No Child Left Behind legislation (NCLB), public schools were required to put systems in place to ensure the success of all students within their districts. The Commonwealth of Pennsylvania adopted the Pennsylvania System of School Assessments (PSSA) to meet this federal requirement. The PSSA is a standards base criterion-referenced assessment measuring a student's mastery of specific academic requirements. In addition, the PSSA tests are used to determine the degree to which a school's programs enable students to attain proficiency of the standards (PDE, 2001).

### **Preschool Survey (see appendix A)**

A preschool survey will be sent to the parent of each student in the targeted population. This survey will ask parents for information about their child's preschool experience, including years of attendance, length of time attended each day, and number of days attended each week. In addition to daily attendance, parents will be asked about the type of preschool program their child attended including church based, public school system based, non-public school based, Head Start, or any other type.

## **Data Collection Methods**

A building level school administrator will distribute a study description letter, informational survey and informed consent documentation to each student through classroom teachers. Students will be asked to deliver the above documentation to their parents/guardians. After parents/guardians have read the information and completed the fill in portions, the student will be asked to return the completed documentation to the school. After collecting the completed documentation from students and

parents/guardians, the school official will eliminate the data for the students whose parents/guardians either chose not to participate or failed to return the required documentation. The official will then collate the information on the surveys with the official Pennsylvania Department of Education PSSA student performance file release provided by Data Recognition Corporation (DRC). The data will then be stripped of all identifiers and turned over to the researcher for quality review and statistical analysis.

### **Statistical Procedures**

The researcher will first inspect the data for completeness and accuracy. The data will then be entered in the statistical package, SPSS, for analysis. At this point, a factorial MANOVA will be run to determine if there is a statistical difference between the average reading and math scores of those students who attended pre-K preschool compared to those who did not attend a pre-K preschool program in each of the grade levels of testing. In addition, a determination will be made if a statistical difference exists between the PSSA test scores of students of low socio-economic status who attended a preschool program when compared to the PSSA test scores of students of low socio-economic status students who did not attend a preschool program. Lastly, testing will give insight into the interaction of the two independent variables, attendance status and socio-economic status, with the dependant variable, PSSA test scores.

The statistical testing methodology will allow the researcher to examine the performance of students across the three year testing window (third grade-fifth grade) employed by the Commonwealth of Pennsylvania in the PSSA testing procedures. This backwards looking longitudinal study will provide the researcher with details of not only if there is a statistical difference between student achievement of preschool attending

students when compared to non-attending students, but also if the difference remains over the three year window. This should provide insight into the duration of the achievement advantage, if any, enjoyed by preschool attending youth. Multivariate testing would also refine the above stated testing to target low socio-economic status children. The researcher would like to see if similar longitudinal results are obtained from the low socio-economic group compared to the more general group testing outlined above.

## **Chapter Four**

### **Results**

After distribution of materials to the target population thirty-five completed Consent to Participate forms and Preschool Attendance Surveys were returned. A SPSS data sheet was created and the information from the surveys was entered. In addition, testing and socio-economic data for the above thirty-five students was retrieved from school record files and also entered. The data was then checked for correctness, stripped of all identifiers, and handed over to the researcher for analysis. The researcher then ran a factorial MANOVA to determine the answers to the research questions. In addition to the MANOVA, the researcher ran six two way ANOVAS to ensure testing assumptions were met.

#### **Assumptions**

The first assumption addressed was that of homogeneity of variances. Levene's Test of Homogeneity of Variance assessed this assumption. The results are as follows; dependant variables PSSA third grade reading scale score ( $p = .970$ ), PSSA third grade math scale score ( $p = .558$ ), PSSA fourth grade reading scale score ( $p = .330$ ), PSSA fourth grade math scale score ( $p = .201$ ), PSSA fifth grade reading scale score ( $p = .230$ ), PSSA fifth grade math scale score ( $p = .053$ ). With the p value less than .05, variance of the dependant variable is equal across groups. The values above show Levene's test was not violated indicating dependant variable variance was equal across all groups in this study.

The next assumption test performed was to determine if the data contained outliers. During the univariate testing, SPSS was set to calculate studentized residuals for

PSSA reading and math scale scores grades third through fifth. These residuals were saved and evaluated by the researcher. If any of the residuals were greater than or less than three (3) standard deviations, the point was determined to be an outlier. After evaluating the data, only one participant was found to be an outlier at two points with a standard deviation of -3.18 for third grade math PSSA scale score and -3.24 for fourth grade math PSSA scale score. . After looking at results with the data point included and excluded, the data was found to not materially affect the results so the point was left in the data for analysis and inclusion in this study.

The last assumption test performed to investigate normality within the data sets. The test was again an evaluation of the student residuals calculated in the outlier testing discussed above. SPSS was set to construct a Normal Q-Q plot each set of the student residuals. The researcher evaluated each Q-Q plot in an effort to determine if normality was violated. After evaluating each plot the researcher found, in general, each plot showed all data to closely follow the expected normal values. This in turn shows the normality assumption has not been violated (see appendix D1-D6 for plots).

### **Multivariate Testing**

After assumption testing was completed and the researcher found no significant assumption violations, a factorial MANOVA was performed to investigate the following research questions:

1. What is the impact of preschool programs on the PSSA Reading and Math scores of elementary students attending the target elementary school?
2. Does socio-economic status have an impact on the above stated question?

3. Does an interaction exist between preschool and socio-economic status on the third, fourth, and fifth grade reading and math PSSA scores?

The MANOVA was run with socio-economic status and preschool attendance as independent variables and grade specific PSSA reading and math scale scores listed as dependant variables. This testing was repeated for third, fourth, and fifth grades. The researcher then evaluated each multivariate result for statistically significant independent variable interaction as well as statistically significant between-subjects effects.

A factorial multivariate analysis of variance was run to determine the effect of preschool attendance and socio-economic status on academic performance. Two measures of academic performance were included: Third grade reading and math PSSA scale scores. Homogeneity of variance-covariance matrices was assessed by Box's M test ( $p = .744$ ). Students who attended preschool and were from the low socio-economic group scored lower on both third grade math and reading PSSA ( $M=1422.0$ ,  $SD=144.4$ ;  $M=1342.8$ ,  $SD=164.4$ ) than those students who attended preschool but were not part of the low socio-economic group ( $M=1440.5$ ,  $SD=123.0$ ;  $M=1447.7$ ,  $SD=164.1$ ). The same trend held true for the student who did not attend preschool. Those in the low socio-economic status group scored as follows on math and reading scores ( $M=1358.0$ ,  $SD=96.2$ ;  $M=1185.5$ ,  $SD= 212.8$ ) compared to those students not part of the low socio-economic group ( $M=1457.3$ ,  $SD=205.7$ ;  $M=1458.4$ ,  $SD=174.2$ ). The differences between preschool attendance and socio-economic status on the combined dependent variables was not statistically significant,  $F(2, 27) = .522, p > .05$ ; Wilks'  $\Lambda = .963$ ; partial  $\eta^2 = .037$ .

Next, the researcher evaluated Tests of Between-Subjects Effects to determine if a statistically significant interaction exists between the independent variables preschool attendance and socioeconomic status on each of the dependant variables, third grade PSSA reading and math scale scores. After evaluation, the researcher determined there was no statistically significant difference between those students who attended preschool and those who did not for third grade PSSA reading and math scale scores,  $F(1, 28) = 0.822, p = .372, \text{partial } \eta^2 = .029$ ;  $F(1, 28) = 0.098, p = .757, \text{partial } \eta^2 = .003$ . In addition, there was no statistically significant difference between those students who were members of the low socio-economic status group and those who were not low socio-economic status for third grade PSSA math scale scores,  $F(1, 28) = 0.606, p = .443, \text{partial } \eta^2 = .021$ . However, there was statistical difference between low socio-economic status students and those who were not for third grade reading scores,  $F(1, 28) = 5.459, p = .027, \text{partial } \eta^2 = .163$  ( $M=1290.3, SD=178.5$ ;  $M=1453.2, SD=165.1$  respectively). Finally, there was not a statistically significant interaction between preschool attendance and socio-economic status on PSSA third grade reading and math scale scores,  $F(1,28) = 1.078, p = .308, \text{partial } \eta^2 = .037$ ;  $F(1,28) = .285, p = .598, \text{partial } \eta^2 = .010$  respectively.

**Table D7.** Multivariate test results for MANOVA dependant variable; third grade PSSA reading and math scale scores, independent variables; socio-economic status, preschool attendance

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Wilks' Lambda	.017	786.465 <sup>b</sup>	2.000	27.000	.000	.983
Preschool	Wilks' Lambda	.969	.425 <sup>b</sup>	2.000	27.000	.658	.031
Socioecon	Wilks' Lambda	.826	2.845 <sup>b</sup>	2.000	27.000	.076	.174
Preschool * Socioecon	Wilks' Lambda	.963	.522 <sup>b</sup>	2.000	27.000	.599	.037

a. Design: Intercept + Preschool + Socioecon + Preschool \* Socioecon

Again, a factorial multivariate analysis of variance was run to determine the effect of preschool attendance and socio-economic status on academic performance. Two measures of academic performance were included; fourth grade reading and math PSSA scale scores. Homogeneity of variance-covariance matrices was assessed by Box's M test ( $p = .288$ ). Students who attended preschool and were from the low socio-economic group again scored lower on both fourth grade math and reading PSSA (M=1530.0, SD=94.7; M=1382.6, SD=170.1) than those students who attended preschool but were not part of the low socio-economic group (M=1594.6, SD=148.8; M=1480.8, SD=150.9). The same trend held true for the student who did not attend preschool. Those in the low socio-economic status group scored as follows on math and reading scores (M=1452.0, SD=NA; M=1218.0, SD= NA) compared to those students not part of the low socio-economic group (M=1582.5, SD=257.3; M=1457.9, SD=217.3). The differences between preschool attendance and socio-economic status on the combined dependent variables was not statistically significant,  $F(2, 26) = .252, p > .05$ ; Wilks'  $\Lambda = .981$ ; partial  $\eta^2 = .019$ . Also, the same type of Between-Subjects Effects analysis described above was repeated using fourth grade PSSA reading and math scale scores for the dependant variables. Again after looking over results the researcher determined there was no statistically significant difference between those students who attended preschool and those who did not for fourth grade PSSA reading and math scale scores,  $F(1, 27) = 0.808, p = .377$ , partial  $\eta^2 = .029$ ;  $F(1, 27) = 0.170, p = .683$ , partial  $\eta^2 = .006$ . In addition, there was no statistically significant difference between those students who were members of the low socio-economic status group and those who were not low socio-economic for fourth grade PSSA reading and math scale scores,  $F(1, 27) = 2.627, p$

= .117, partial  $\eta^2 = .089$ ;  $F(1, 27) = .798$ ,  $p = .379$ , partial  $\eta^2 = .029$ . Finally, there was not a statistically significant interaction between preschool attendance and socio-economic status on PSSA fourth grade reading and math scale scores,  $F(1,27) = .461$ ,  $p = .503$ , partial  $\eta^2 = .017$ ;  $F(1,27) = .091$ ,  $p = .765$ , partial  $\eta^2 = .003$  respectively.

**Table D8.** Multivariate test results for MANOVA dependant variable; fourth grade PSSA reading and math scale scores, independent variables; socio-economic status, preschool attendance

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Wilks' Lambda	.030	425.898 <sup>b</sup>	2.000	26.000	.000	.970
Preschool	Wilks' Lambda	.968	.435 <sup>b</sup>	2.000	26.000	.652	.032
Socioecon	Wilks' Lambda	.908	1.323 <sup>b</sup>	2.000	26.000	.284	.092
Preschool * Socioecon	Wilks' Lambda	.981	.252 <sup>b</sup>	2.000	26.000	.779	.019

a. Design: Intercept + Preschool + Socioecon + Preschool \* Socioecon

Once again, the same type of analysis discussed above was completed to determine the effect of preschool attendance and socio-economic status on academic performance. Two measures of academic performance included were fifth grade reading and math PSSA scale scores. Homogeneity of variance-covariance matrices was assessed by Box's M test ( $p = .083$ ). Students who attended preschool and were from the low socio-economic group again scored lower on both fifth grade math and reading PSSA ( $M=1411.8$ ,  $SD=98.4$ ;  $M=1324.0$ ,  $SD=144.7$ ) than those students who attended preschool but were not part of the low socio-economic group ( $M=1484.3$ ,  $SD=151.3$ ;  $M=1476.1$ ,  $SD=146.6$ ). The same trend held true for the student who did not attend preschool. Those in the low socio-economic status group scored as follows on math and reading scores ( $M=1203.0$ ,  $SD=55.2$ ;  $M=1044.3$ ,  $SD= 192.8$ ) compared to those students not part of the low socio-economic group ( $M=1465.4$ ,  $SD=217.7$ ;  $M=1396.4$ ,  $SD=239.1$ ). The differences between preschool attendance and socio-economic status on the combined

dependent variables was not statistically significant,  $F(2, 29) = 1.055, p > .05$ ; Wilks'  $\Lambda = .932$ ; partial  $\eta^2 = .068$ . Also, the same type of Between-Subjects Effects analysis described above was repeated again using fifth grade PSSA reading and math scale scores for the dependant variables. Once again after looking over results the researcher determined there was no statistically significant difference between those students who attended preschool and those who did not for fifth grade PSSA math scale scores,  $F(1, 30) = 2.685, p = .112$ , partial  $\eta^2 = .082$ . However, there was statistical difference between low socio-economic status students and those who were not for fifth grade reading scores,  $F(1, 30) = 10.7, p = .003$ , partial  $\eta^2 = .263$  ( $M=1219.1, SD=208.6$ ;  $M=1442.4, SD=191.1$ ) and math scores,  $F(1, 30) = 5.8, p = .022$ , partial  $\eta^2 = .162$  ( $M=1333.5, SD=134.5$ ;  $M=1476.3, SD=178.5$ ). In addition, there was statistical difference between those students who did not attended preschool and those who did for fifth grade PSSA reading scale scores,  $F(1, 30) = 5.442, p = .027$ , partial  $\eta^2 = .154$  ( $M=1320.9, SD=268.6$ ;  $M=1438.1, SD=157.5$ ) respectively. Finally, there was not a statistically significant interaction between preschool attendance and socio-economic status on PSSA fifth grade reading and math scale scores,  $F(1,30) = 1.683, p = .204$ , partial  $\eta^2 = .053$ ;  $F(1,30) = 1.865, p = .182$ , partial  $\eta^2 = .059$  respectively.

**Table D9.** Multivariate test results for MANOVA dependant variable; fifth grade PSSA reading and math scale scores, independent variables; socio-economic status, preschool attendance

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Wilks' Lambda	.017	836.849 <sup>b</sup>	2.000	29.000	.000	.983
Preschool	Wilks' Lambda	.845	2.654 <sup>b</sup>	2.000	29.000	.087	.155
Socioecon	Wilks' Lambda	.733	5.273 <sup>b</sup>	2.000	29.000	.011	.267
Preschool * Socioecon	Wilks' Lambda	.932	1.055 <sup>b</sup>	2.000	29.000	.361	.068

a. Design: Intercept + Preschool + Socioecon + Preschool \* Socioecon

## Summary

Analysis here showed a mixed bag of results with several significant results. The evaluation of third grades reading scale scores show a statistical difference between the socio-economic groups while the math scale scores did not share this trend. When preschool attendance was evaluated as the independent variable, there was no statistical difference between math and reading scale scores at the third grade level. The fourth grade testing showed no statistical differences between math and reading scale scores with the independent variables preschool attendance and socio-economic status. The fifth grade analysis indicated there was significant difference between both PSSA math and reading scores when socio-economic status was considered. When preschool attendance was considered as the independent variable, a PSSA reading scale scores were statistically different but the trend did not extend to math scale scores. In addition, across the three grade testing window there was not significant interaction between the independent variables socio-economic status and preschool attendance on PSSA math and reading scale scores. The one universal trend discussed earlier was the testing averages when socio-economic status was considered. For both math and reading scale scores across the three grade-testing window, the low socio-economic status's testing averages were lower than their peers.

## **Chapter 5**

### **Discussion**

#### **Introduction**

Today, education is facing some difficult times as it has over its long history. With the economy faltering, public funding shrinking, and No Child Left behind transforming, schools are expected to ensure the growth of all students under their care with fewer resources available. With this in mind, school administrations are being asked to evaluate school programming for cost and effectiveness and still achieve successful outcomes with all students. These students come to the door of the schoolhouse with all levels of readiness. In order to close the readiness gap experienced by some students, educational leaders suggest offering high quality universal preschool programming to all students (Zigler, Gilliam & Jones, 2006). Before committing to costly programming, an evaluation of the possible effectiveness would seem to be prudent. This small study is one step in an effort to determine if students who attend preschool programming have higher academic achievement as measured by elementary standardized testing.

This study evaluated a current sixth grade cohort's third, fourth, and fifth grade PSSA reading and math scores to determine if there is a statistical difference between the scores of those students who attended preschool when compared to those who did not. In addition, the study also evaluated if socio-economic status played a role in student scores on standardized testing and determined if this variable interacts with preschool attendance in a significant way to influence standardized test scores. After data collection and statistical analysis, the findings were mixed but interesting.

### **Grade Three Results**

After completion of statistical analysis, the researcher determined there to be no significant interaction between the independent variable socio-economic status and preschool attendance. In addition the researcher found there to be no statistical difference between PSSA reading and math scale scores when preschool attendance was considered as well as PSSA math scores when socio-economic status was considered as the lone independent variable. However there was a statistical difference between PSSA reading scale scores between groups based on socio-economic status. This interesting fact seems to indicate third graders coming from homes of higher socio-economic status are achieving at a higher academic level in the area of reading during their third grade year. This result is important due to the fact reading plays a significant role in many subjects throughout the school day and affects many areas of the educational process. Also, this seems to fit with the idea students from low socio-economic homes come to school lacking requisite skills and experience difficulty with their academic performance (Gromley, Gayer et al., 2005). However, preschool attendance did not seem to overcome this discrepancy. As stated earlier, there was no significant difference between test scores based on preschool attendance and there was no significant interaction between the two independent variables preschool attendance and socio-economic status.

### **Grade Four Results**

Interestingly enough, the reading discrepancy discussed above was not significant in the fourth grade data. During the fourth grade testing analysis, the researcher found no statistically significant variances in test scores and again found no significant interaction of the two independent variables. The same students who had significantly lower PSSA

reading scores in third grade were able to close the gap and in fourth grade achieve reading scores statistically equal to their peers. This is certainly an interesting situation and is deserving of some further investigation. Any time students are able to close an achievement gap, the cause of the success is important. The school district and administration would be interested in root causes to determine if they could be reproduced on a wider scale and perhaps expanded to other subject area. In addition, staff performance could be evaluated to see if a skilled educator(s) could be responsible and identified. This staff member's skills and ideas could then be leverage for professional development and staff improvement across a broader section of the schools professional staff. Also, a longitudinal look at this trend could be analyzed to determine if this situation has or does repeat itself or was this occurrence a one-year anomaly. The fact that there was not a significant difference between groups is normally a welcome sight for school districts. Adequate achievement is being met and all groups are performing at necessary levels indicating the school is serving all members of the community well and no groups are "falling through the cracks". This case is especially interesting because a lower performing group was able to close the gap. Certainly, this is a great achievement, and one to be celebrated by the hard working staff and students.

### **Grade Five Results**

Unfortunately when this group's fifth grade PSSA testing data was analyzed, socio-economic status again proved to influence both reading and math scale scores. Preschool attendance proved statistically significant when considering reading scale scores. Preschool attendance for math scale scores and the interaction between the two independent variables was not statistically significant at this grade level. This would

seem to indicate students from low socio-economic status homes lost ground academically during their fifth grade experience to their peers from higher socio-economic status homes. Again, this is certainly interesting and deserving of further examination. Here the researcher must ask why did this group of low socio-economic students make up ground during their fourth grade experience only fall back during their fifth grade year? I am not sure this study answers this question but does raise the issue for school administration or further research to investigate. Perhaps there are systematic deficiencies some students are unable to overcome. Also as stated, those who did not attend preschool had significantly lower PSSA reading scale scores. Perhaps during the fifth grade experience, reading takes on a larger role in test completion, putting this group and the overlapping low socio-economic students who scored significantly lower on PSSA reading scale scores at a testing disadvantage.

### **Answers to Research Questions**

**Research Question 1.** What is the impact of preschool programs on the PSSA reading and math scores of elementary students attending school in a rural southern Pennsylvania school district?

Overall, the results of this study would seem to indicate preschool attendance did not have a consistent impact on PSSA test scores. Preschool attendance did not significantly impact reading or math PSSA scale scores during the third or fourth grade years or math scale scores during the fifth grade year. However those students who attended preschool did have significantly higher PSSA reading scale scores during the fifth grade year. This fact raises important questions to be answered by school personnel. During earlier years when one would think a difference would be evident, there was

none. But later in the elementary experience, a difference between those students who attended compared to those who did not became significant with those who attended a preschool program scoring significantly higher on PSSA reading scale scores. Perhaps as the PSSA reading test level increases those students who attended preschool have a reading level advantage giving them an testing advantage that presents itself at higher grade level testing but does not present itself in earlier testing. Another possibility could be students who attended preschool start their school experience with slightly better reading skills. This gap continues to grow as students move through their elementary experience causing a large enough deficiency to show as significant at the fifth grade level. Both of these possibilities could be easily investigated by evaluating reading levels throughout the PSSA elementary testing window. This would show if there is a reading level gap to begin with and then show what happens to this gap as students move from grade to grade.

**Research Question 2.** Does socio-economic status have an impact on the PSSA reading and math scores of students attending an elementary school in a rural southern Pennsylvania school district?

Socio-economic status does play a statistically significant role in third grade reading and fifth grade reading and math scale scores. Also the socio-economic status is significant on the interaction of the independent variables PSSA reading and math scale scores during the fifth grade year as well. There was no significant difference in test scores during the fourth grade year or for math during the third grade year. Socio-economic status has long been studied to determine if it has an effect on academic achievement. The researcher wonders here if the differences are related to school

readiness or current level achievement? This question could be answered by additional investigation. School readiness evaluation could be performed at school entrance and across the first year of students' school experience. This should give a school readiness picture and provide a better understanding of differences if any as students enter school. In addition to readiness, an evaluation of school year achievement (summative/formative assessment) could be analyzed to determine if students from low socio-economic status home are showing academic growth throughout the school year. As a requirement of NCLB, academic growth should already be of interest to school personnel, and if found to be lacking, adjustments to programming should be ongoing throughout the school year. Further investigation may provide insight into root cause of achievement discrepancies allowing for direct and efficient intervention.

**Research Question 3.** Does an interaction exist between preschool attendance and socio-economic status on PSSA reading and math scores of students attending an elementary school in a rural southern Pennsylvania school district?

During multivariate analysis, the interaction of the dependant variables is significant on socio-economic status during the fifth grade year and is close with a  $p = .076$  ( $p < .05$  considered significant) during the third grade year. There was no significance shown during the fourth grade year. Although interesting, this really does not change any of the issues discussed above and reinforces the impact of socio-economic status on PSSA reading and math scale scores.

### **Implications for Further Research**

The results of the study were certainly mixed with some significant differences in test scores across the three-year study period. During the third to fourth grade transition,

students were able to close an achievement gap in reading. Low socio-economic status students who as a group had significantly lower PSSA reading scale scores during their third grade testing cycle were able to grow and show no significant difference during their fourth grade testing cycle. The closing of this gap is commendable and deserves further investigation. The reasons for this significant achievement, if understood, could be leveraged and possibly utilized in other areas as well as at various grade levels. Deeper investigations into curriculum, student habits, professional staff's abilities, education activities, and longitudinal evaluation of the phenomenon could lead to this needed understanding and help the school make continued achievement gap closure a normal educational opportunity.

As positive an event the third to fourth grade transition was, the fourth to fifth grade transition proved to be disappointing. During the fourth grade testing cycle there were no significant differences in PSSA math and reading scores when independent variables preschool attendance and socio-economic status were considered. During the fifth grade testing cycle, there were significant differences in reading and math PSSA scores when considering socioeconomic status as the independent variable and a difference in reading when preschool attendance was considered as the independent variable. Additional evaluation is needed here as well. The evaluation could be similar to the above situation only looking to explain the opposite response. Why the drop and how can the school address the situation? This one step forward then one step back is certainly not the trend education organizations are striving for so breaking this cycle would be an important outcome from this extended study.

Due to the lack of consistency across this study and small sample used, a complementary study using larger sample sizes and cohorts from a variety of schools may provide some insight into the results found in this study. This would certainly increase generalizability across broader contexts and perhaps provide some clarity as to which of the above-suggested additional investigations may make the most sense. If not to gain broader understanding, the school district where this study was carried out may want to take a longer longitudinal look in to the results and see if they remain consistent across several cohorts. This could be done immediately by looking backwards at older cohorts and then continued in a forward fashion as each cohort finishes elementary PSSA testing. This may provide insight that allows educational professionals in this district to leverage the positives and mitigate the negative findings in the study.

In addition to increases in sample size and population, further academic and readiness evaluations could indicate root causes of differences as well as a better understanding of the inconsistencies. For example, school readiness evaluations could be administered to students upon entrance to gain an understanding of academic levels of entering students. This could provide curriculum-starting places for kindergarten through second grade staff. Perhaps there are students who could benefit from some remedial work before starting the first grade curriculum. If students are arriving not ready for the academic experience that awaits them, they would start academically behind their peers and perhaps stay there for their entire school career.

### **Implications for Practice**

With the pressures of NCLB and state implemented standardized testing, including desegregated data, teachers in today's classrooms are expected to know their

students, understand their strengths and weaknesses, undergo constant formative assessment, and adjust instruction to meet the needs of all, in order to move students academically one school year or more ahead of where they found them at the start of the school year. The desegregated data mentioned above forces teachers to not only look at the overall group but also look at desegregated groups such as gender, race, special education status, and socio-economic status. This means success and achievement of the overall group of students under their tutelage is not enough, they must also ensure each of these desegregated groups is also making adequate yearly progress. In order for teachers to be up to the task, they must incorporate pre-school year student data analysis into their normal formative assessment regime. By doing this, they can understand where students are academically when they arrive in their classroom, and also understand any weaknesses and issues they bring with them to the schoolhouse. The purpose of this analysis was to investigate if students who attend preschool programming achieve higher standardized test scores in reading and math during their elementary experience, and if socio-economic status influences these same test scores. Perhaps this type of analysis in addition to other quantitative and qualitative analysis can better inform teachers of possible student shortcomings and strengths at the beginning of the school year. These shortcomings can then be mitigated and strengths can be leveraged to maximize student achievement from the beginning of the school year. Over time and with ongoing analysis, trends could be identified and programming could be added or adjusted to meet the customized needs of the target audience, the children. Awareness of these trends would allow teachers to take educated guesses about student academic levels and needs allowing students to start the school year at appropriate levels and with appropriate

curriculum in place. As the year proceeds, ongoing mass customization can take over to ensure the classroom and every student is working at the optimum level to ensure the greatest possible yearly progress. This analysis although limited certainly leads us to believe socio-economic status is influencing PSSA test scores in both third and fifth grade. Teachers should be aware of this trend, continue to evaluate the situation with their current students, and address any deficiencies and academic shortcomings as soon as possible. In this analysis, the socio-economic achievement gap disappeared during the fourth grade year. A greater awareness of students' backgrounds and academic strengths and weaknesses may help staff to determine the root cause of the achievement. This in turn may provide the opportunity to spread this accomplishment to other grades and across cohorts providing greater student achievement for all students in all grades.

### **Conclusion**

This one small study should certainly not be the end of this type of investigation. Schools are a microcosm of the community in which they exist and the world at large. Students come to the schoolhouse with all of the issues, shortcomings, and strengths that exist within our community. With this in mind, schools are still expected to educate all students, and all students are expected to achieve at an adequate yearly rate regardless of any shortcomings or weaknesses. Schools are expected to do this in a 180-day window with limited funding. In order to achieve their lofty goals and appropriately serve their clientele, educational professionals need to know their students and understand their needs while accepting these needs will vary student to student. In order for each student to achieve at their maximum level, teachers must customize their classroom experiences to mitigate these weaknesses and build on the strengths of each and every child.

Understanding cultural, religious, racial, and socioeconomic conditions that exist with the community become invaluable when attempting mass customization of learning. This study has shown in this community for this cohort socioeconomic status made a difference in test scores. Each teacher in front of each group of students must find what is enhancing achievement and leverage it. Additionally, they must understand what is limiting achievement and attempt to mitigate it. Only then will every child, in every classroom learn and achieve at the highest level they are able.

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**APPENDIX A:**

Preschool Attendance Survey

## Preschool Attendance Survey

The purpose of this survey is to determine the type of preschool programming attended by children currently enrolled in your home school's sixth (6) grade. In order to obtain this important information, we are asking you to fill out the short questionnaire below and return the form to your child's teacher. As always, thank you for your help and support.

Student Name: \_\_\_\_\_

1. Did your child attend a kindergarten program? (YES NO)

If yes to the above question

- a. How many days a week on average did your child attend the kindergarten program? (1,2,3,4,5)
- b. How many hours per day on average did they attend? (1-4, more than 4)
- c. Please identify the type of kindergarten program attended:  
(Head Start, church/religious based, public school system, non-public/private nonreligious based, other \_\_\_\_\_)

2. Did your child attend a preschool program the year before they would have been eligible for kindergarten attendance? (YES NO)

If you answered NO to question 2 stop here and return the form to your child's school. If you answered yes to question 2 please complete the remainder of the questionnaire.

3. How many days a week on average did your child attend the preschool program? (1,2,3,4,5)

4. How many hours per day on average did they attend? (1-4, more than 4)

5. Please identify the type of preschool program attended:  
(Head Start, church/religious based, public school system, non-public/private nonreligious based, other \_\_\_\_\_)

6. Do you feel the preschool program your child attended was beneficial to your child educational experience up to this point? (please use the back of this paper to answer)

**APPENDIX B:**

Consent to Participate Form

## CONSENT TO PARTICIPATE IN A RESEARCH STUDY

- TITLE:** The Impact of Preschool Education on the Academic Achievement of Low Socio-economic Status Elementary Students
- INVESTIGATOR:** Gary Dawson
- ADVISOR:** The advisor for this research is Dr. James Henderson, Professor in the School of Education at Duquesne University. This research fulfills the dissertation requirement for the degree of Doctorate of Education in the Interdisciplinary Doctorate of Educational Leaders program at Duquesne University.
- SUPPORT:** This study does not have a funding source.
- PURPOSE:** You are being asked to participate in a research study designed to help understand the impact of preschool attendance on the academic achievement of elementary students.
- YOUR PARTICIPATION:** You will be asked to fill out a brief survey of your child's preschool experiences and return associated permission forms and survey to the school.
- RISK AND BENEFITS:** Your participation will help expand the understanding of the interaction between preschool attendance and the academic achievement of elementary students. While there is a potential risk of breach of confidentiality, the following steps will be implemented to ensure this does not occur:
1. Only professionals who currently have access to this level of information will be handling the raw data that includes identifiers.
  2. Identifying materials will be stripped from the data before its release to the researcher for implementation of the data analysis.
  3. After quality control evaluation of the data, any crossover sheets allow repairing of original data with identifier rich data will be destroyed.
- COMPENSATION:** Participants will not be compensated. In addition, this study will not have any monetary cost to you.
- RIGHT TO WITHDRAW:** You may withdraw from the study and you may choose to withdraw your data at any time.

**SUMMARY OF RESULTS:** If requested, a summary of the results of this study will be provided to you at no cost. The researcher will provide the results to you.

**VOLUNTARY CONSENT:** I have read the above statements and understand what is being requested of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason. On these terms, I certify that I am willing to participate in this research project. I understand that if I have further questions about my participation in this study, I may call the student investigator, Gary Dawson (814-623-4250), Dr. James Henderson, Advisor and Chair for this Study (412-396-4880), or Dr. Joseph Kush, Chair of the Duquesne University Institutional Review Board (412-396-6326).

\_\_\_\_\_  
Participant's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Students Name (Please Print)

\_\_\_\_\_  
Researcher's Signature

\_\_\_\_\_  
Date

**APPENDIX C:**

Recruitment Letter

Gary Dawson  
Doctoral Student and Principal Investigator  
Duquesne University  
814-623-4250

To Whom it May Concern:

We are conducting a research study that attempts to determine the connection between preschool attendance and elementary age academic achievement. This will be done by statistically investigating the interaction between Pennsylvania System of School Assessment (PSSA) scores, preschool attendance, and socio-economic status. Your child is currently enrolled in sixth (6) grade and is a member of the cohort chosen for this study. With this in mind, we would like to ask your consideration for participation in the study.

This study will involve the statistical evaluation of your child's third (3), fourth (4) and Fifth (5) grade math and reading PSSA scores and preschool information provided by you via the survey attached. Your responsibility would be to simply fill out the short preschool survey and sign the attached permission form. The total time required for the task should be less than ten minutes. After completion of the two forms, seal them in the provided envelope and return them to your child's current homeroom teacher for collection and inclusion in this important study. If you have any questions or concerns, please feel free to contact me at (814)-623-4250.

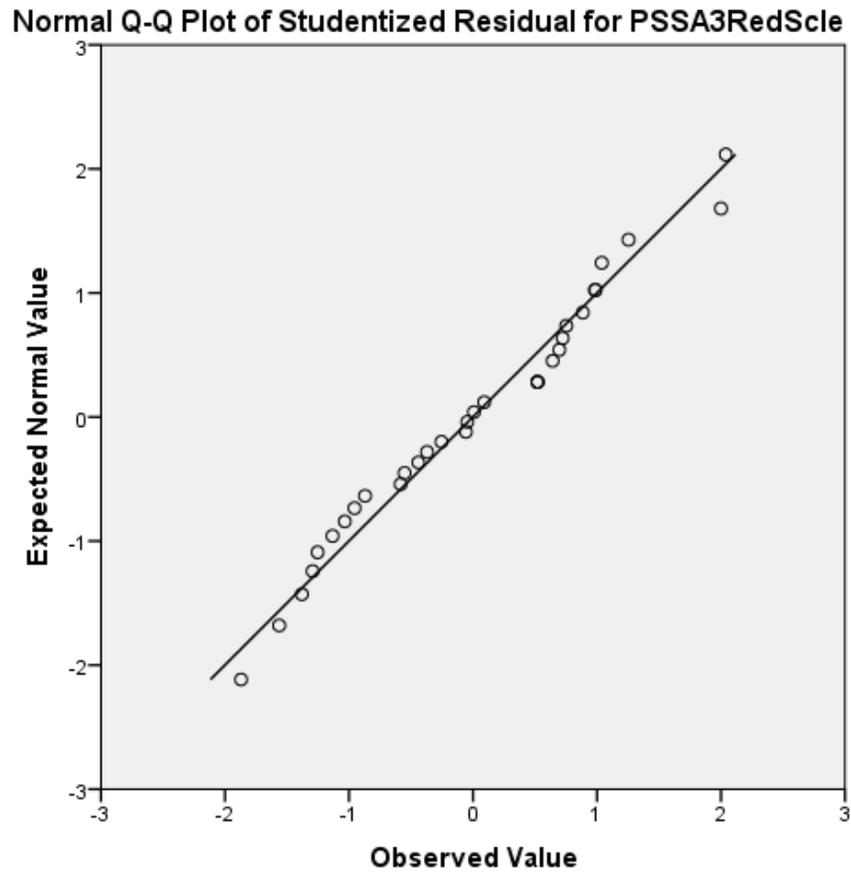
Sincerely,

Gary Dawson

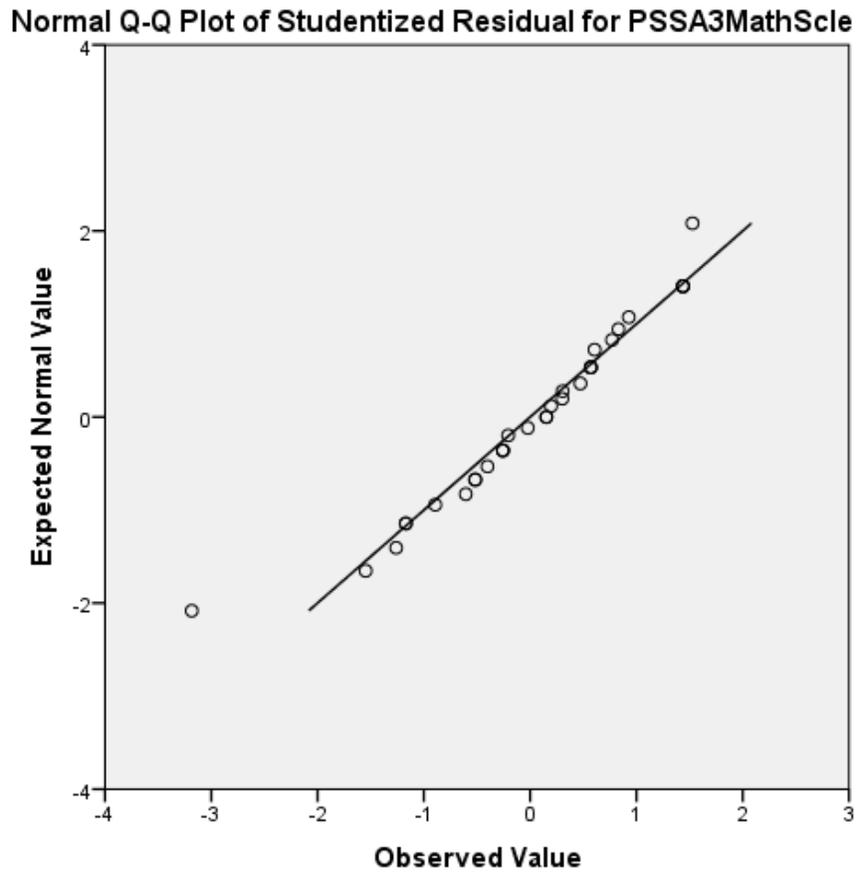
**APPENDIX D:**

Charts and Graphs

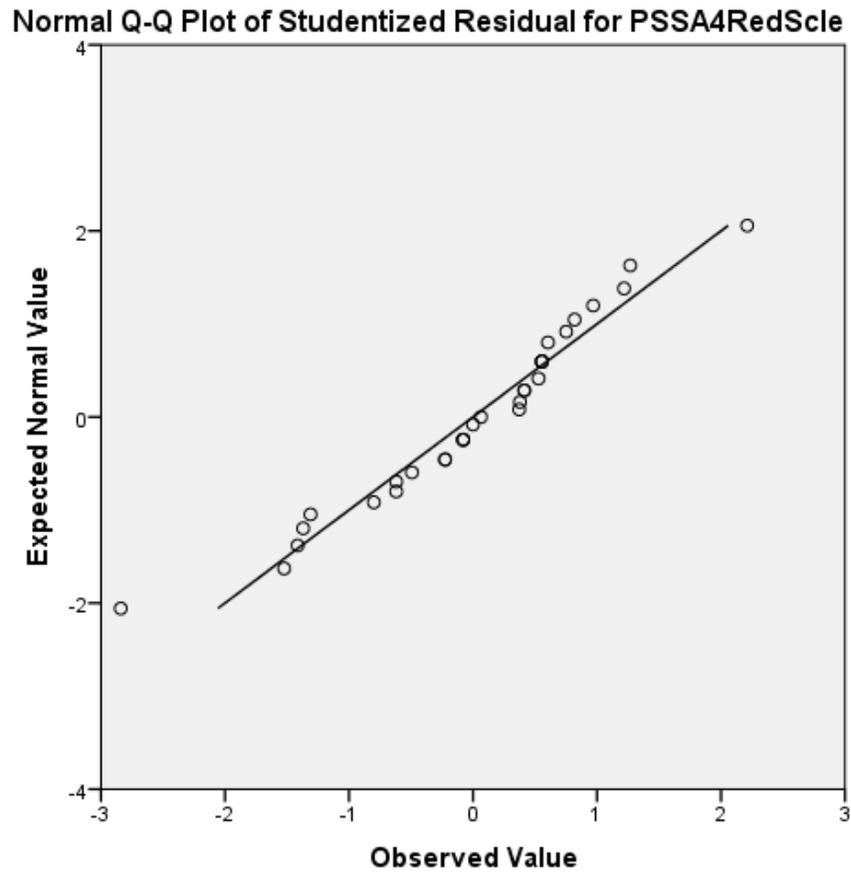
**Chart D1. Normal Q-Q Plot PSSA Third Grade Reading Scale Score**



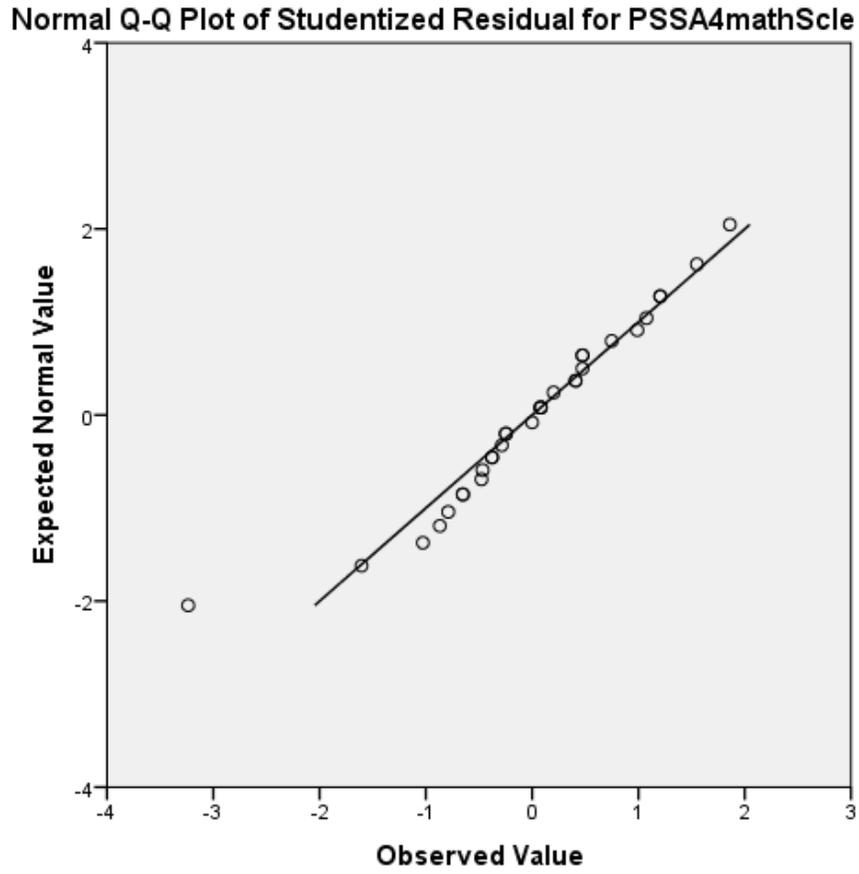
**Chart D2. Normal Q-Q Plot PSSA Third Grade Math Scale Score**



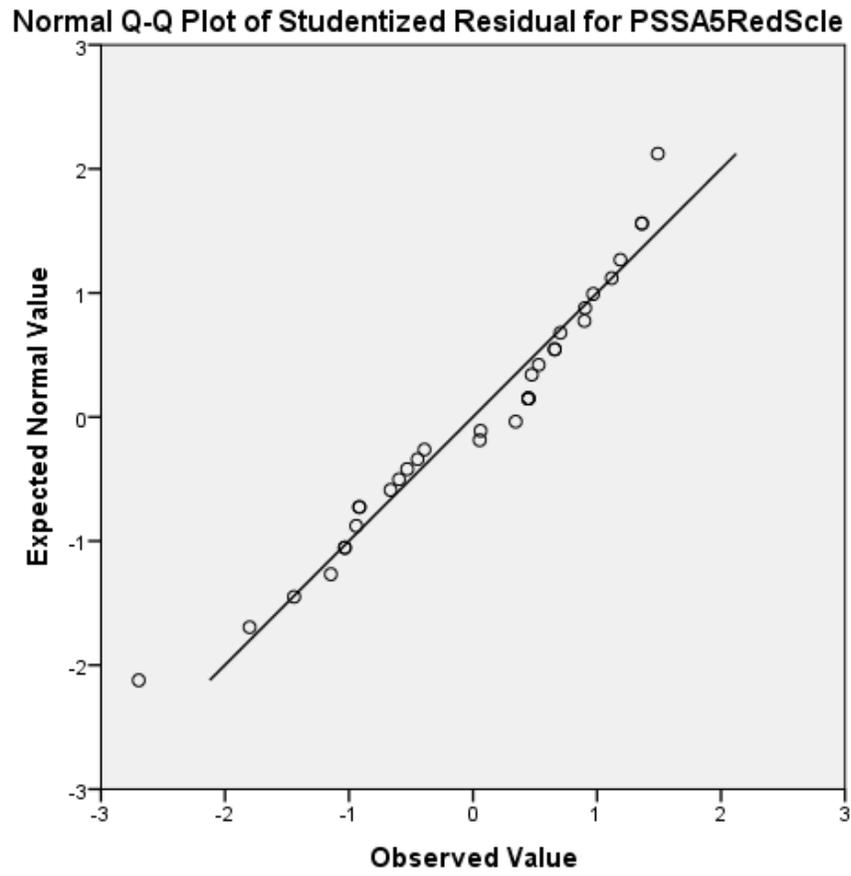
**Chart D3. Normal Q-Q Plot PSSA Fourth Grade Reading Scale Score**



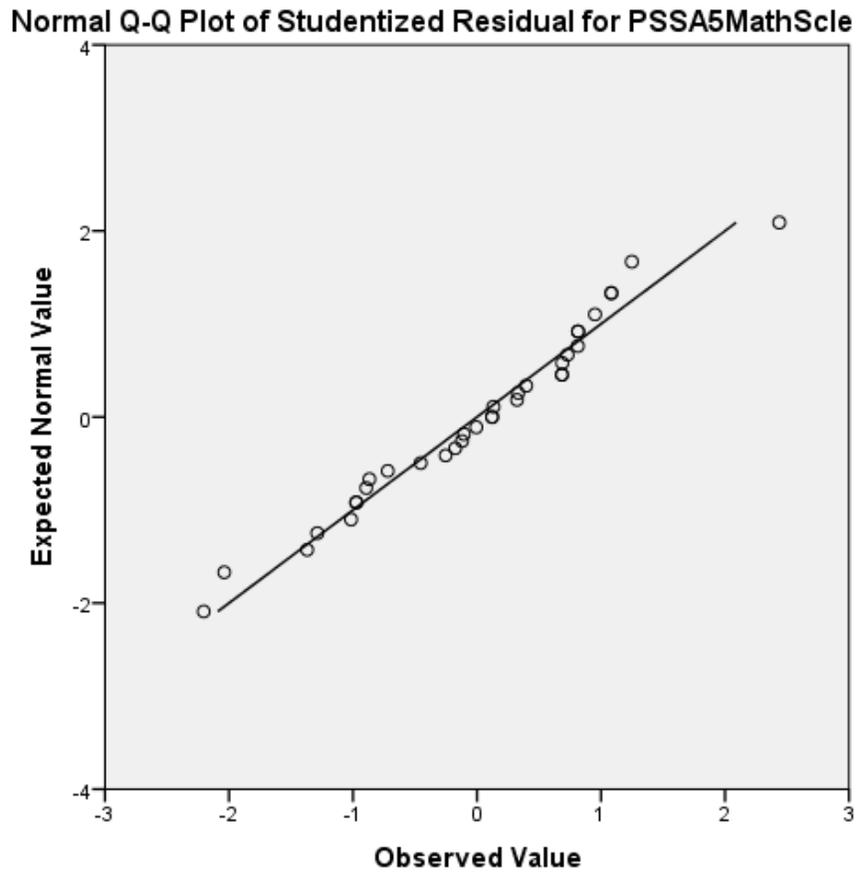
**Chart D4. Normal Q-Q Plot PSSA Fourth Grade Math Scale Score**



**Chart D5. Normal Q-Q Plot PSSA Fifth Grade Reading Scale Score**



**Chart D6. Normal Q-Q Plot PSSA Fifth Grade Math Scale Score**



**Table D7.** Multivariate test results for MANOVA dependant variable; third grade PSSA reading and math scale scores, independent variables; socio-economic status, preschool attendance

Effect		Value	Hypothesis			Partial Eta	
			F	df	Error df	Sig.	Squared
Intercept	Pillai's Trace	.983	786.465 <sup>b</sup>	2.000	27.000	.000	.983
	Wilks' Lambda	.017	786.465 <sup>b</sup>	2.000	27.000	.000	.983
	Hotelling's Trace	58.257	786.465 <sup>b</sup>	2.000	27.000	.000	.983
	Roy's Largest Root	58.257	786.465 <sup>b</sup>	2.000	27.000	.000	.983
Preschool	Pillai's Trace	.031	.425 <sup>b</sup>	2.000	27.000	.658	.031
	Wilks' Lambda	.969	.425 <sup>b</sup>	2.000	27.000	.658	.031
	Hotelling's Trace	.032	.425 <sup>b</sup>	2.000	27.000	.658	.031
	Roy's Largest Root	.032	.425 <sup>b</sup>	2.000	27.000	.658	.031
Socioecon	Pillai's Trace	.174	2.845 <sup>b</sup>	2.000	27.000	.076	.174
	Wilks' Lambda	.826	2.845 <sup>b</sup>	2.000	27.000	.076	.174
	Hotelling's Trace	.211	2.845 <sup>b</sup>	2.000	27.000	.076	.174
	Roy's Largest Root	.211	2.845 <sup>b</sup>	2.000	27.000	.076	.174
Preschool *	Pillai's Trace	.037	.522 <sup>b</sup>	2.000	27.000	.599	.037
Socioecon	Wilks' Lambda	.963	.522 <sup>b</sup>	2.000	27.000	.599	.037
	Hotelling's Trace	.039	.522 <sup>b</sup>	2.000	27.000	.599	.037
	Roy's Largest Root	.039	.522 <sup>b</sup>	2.000	27.000	.599	.037

a. Design: Intercept + Preschool + Socioecon + Preschool \* Socioecon

b. Exact statistic

**Table D8.** Multivariate test results for MANOVA dependant variable; fourth grade PSSA reading and math scale scores, independent variables; socio-economic status, preschool attendance

Effect		Value	Hypothesis			Sig.	Partial Eta Squared
			F	df	Error df		
Intercept	Pillai's Trace	.970	425.898 <sup>b</sup>	2.000	26.000	.000	.970
	Wilks' Lambda	.030	425.898 <sup>b</sup>	2.000	26.000	.000	.970
	Hotelling's Trace	32.761	425.898 <sup>b</sup>	2.000	26.000	.000	.970
	Roy's Largest Root	32.761	425.898 <sup>b</sup>	2.000	26.000	.000	.970
Preschool	Pillai's Trace	.032	.435 <sup>b</sup>	2.000	26.000	.652	.032
	Wilks' Lambda	.968	.435 <sup>b</sup>	2.000	26.000	.652	.032
	Hotelling's Trace	.033	.435 <sup>b</sup>	2.000	26.000	.652	.032
	Roy's Largest Root	.033	.435 <sup>b</sup>	2.000	26.000	.652	.032
Socioecon	Pillai's Trace	.092	1.323 <sup>b</sup>	2.000	26.000	.284	.092
	Wilks' Lambda	.908	1.323 <sup>b</sup>	2.000	26.000	.284	.092
	Hotelling's Trace	.102	1.323 <sup>b</sup>	2.000	26.000	.284	.092
	Roy's Largest Root	.102	1.323 <sup>b</sup>	2.000	26.000	.284	.092
Preschool * Socioecon	Pillai's Trace	.019	.252 <sup>b</sup>	2.000	26.000	.779	.019
	Wilks' Lambda	.981	.252 <sup>b</sup>	2.000	26.000	.779	.019
	Hotelling's Trace	.019	.252 <sup>b</sup>	2.000	26.000	.779	.019
	Roy's Largest Root	.019	.252 <sup>b</sup>	2.000	26.000	.779	.019

a. Design: Intercept + Preschool + Socioecon + Preschool \* Socioecon

b. Exact statistic

**Table D9.** Multivariate test results for MANOVA dependant variable; fifth grade PSSA reading and math scale scores, independent variables; socio-economic status, preschool attendance

Effect		Value	Hypothesis			Sig.	Partial Eta Squared
			F	df	Error df		
Intercept	Pillai's Trace	.983	836.849 <sup>b</sup>	2.000	29.000	.000	.983
	Wilks' Lambda	.017	836.849 <sup>b</sup>	2.000	29.000	.000	.983
	Hotelling's Trace	57.714	836.849 <sup>b</sup>	2.000	29.000	.000	.983
	Roy's Largest Root	57.714	836.849 <sup>b</sup>	2.000	29.000	.000	.983
Preschool	Pillai's Trace	.155	2.654 <sup>b</sup>	2.000	29.000	.087	.155
	Wilks' Lambda	.845	2.654 <sup>b</sup>	2.000	29.000	.087	.155
	Hotelling's Trace	.183	2.654 <sup>b</sup>	2.000	29.000	.087	.155
	Roy's Largest Root	.183	2.654 <sup>b</sup>	2.000	29.000	.087	.155
Socioecon	Pillai's Trace	.267	5.273 <sup>b</sup>	2.000	29.000	.011	.267
	Wilks' Lambda	.733	5.273 <sup>b</sup>	2.000	29.000	.011	.267
	Hotelling's Trace	.364	5.273 <sup>b</sup>	2.000	29.000	.011	.267
	Roy's Largest Root	.364	5.273 <sup>b</sup>	2.000	29.000	.011	.267
Preschool *	Pillai's Trace	.068	1.055 <sup>b</sup>	2.000	29.000	.361	.068
Socioecon	Wilks' Lambda	.932	1.055 <sup>b</sup>	2.000	29.000	.361	.068
	Hotelling's Trace	.073	1.055 <sup>b</sup>	2.000	29.000	.361	.068
	Roy's Largest Root	.073	1.055 <sup>b</sup>	2.000	29.000	.361	.068

a. Design: Intercept + Preschool + Socioecon + Preschool \* Socioecon

b. Exact statistic