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The Effect of Grade Configuration on the Academic Achievement of Special Needs Students: the Case of New Jersey

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THE EFFECT OF GRADE CONFIGURATION ON THE ACADEMIC ACHIEVEMENT OF SPECIAL NEEDS STUDENTS: THE CASE OF NEW JERSEY

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ABSTRACT

For over thirty years, research has been conducted on the relative benefits of integrating the sixth through eighth grades within the structure of the K-8 elementary school or of establishing a freestanding middle school structure. While the available research clearly supports the positive effects of the K-8 structure on academic achievement in the middle grades, there has been little study explicitly of students classified as "special needs." This study analyzes the effects of the K-8 versus 6-8 grade configurations on the proficiency rates for sixth and eighth grade special education scores on the 2011 NJ ASK in Math and Language Arts.

K-8 and 6-8 configured schools' mean scores were compared in Math and Language Arts to determine if K-8 schools' performance was significantly different than 6-8 schools. Analysis was also conducted for schools that were situated in similar district factor groups so as to account for socioeconomic status. A two-way ANOVA was performed to see if the variables grade configuration and district factor group had an individual and/or a combined interaction effect on special education proficiency rates. To further examine the grade configurations' effect on the dependent variable proficiency rates for special education students, a hierarchical multiple regression was conducted. Within this regression, the independent variable of grade configuration was examined to see if its effects were different after controlling for the variables total school size, mobility rate, economic disadvantage, and percentage of special education students within a school. Finally, the proportion of variance in achievement attributable to the independent and control variables in sixth and eighth grade was compared to determine if there was any difference in their influence on proficiency rates by grade level.

The major findings showed that even though K-8 schools outperformed 6-8 schools in Language Arts and Math for special needs students, these results were significant only in the sixth grade. Control and independent variables had more of an effect on sixth grade proficiency rates than in eighth grade, while they also had less of an effect in Math than they did in Language Arts. The results of this study will help district and school-level leaders decide which configuration will be best suited for the special education population in their community.

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DEDICATION

First and foremost, I dedicate this work to my parents, Willie and Juanita Nelson. They were my first teachers who guided me but also gave me the freedom to explore and learn on my own. They made me comfortable to ask the question "why" even when I knew it annoyed them.

Second, I dedicate this work to all of the parents and families in my neighborhood growing up. They knew all of the children in the neighborhood and were not afraid to sit us down, correct us, and lecture us when we were doing something we shouldn't (and we knew our parents were going to get a phone call). There are way too many to name here; but I learned from all of them by their actions what community is, and they set the example of what it should be.

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CHAPTER 1

INTRODUCTION

Ever since the publication of *A Nation at Risk* by the National Commission of Excellence in Education (1983) and *Turning Points* by the Carnegie Council of Adolescent Development (1989), the United States education system has been working to improve results at the middle school level. Some researchers like Yeche (2005) have labeled the Grades 6-8 as the years where America has fallen short in comparison to our international competitors. In looking at the international rankings on the PISA and TIMMS tests, it is easy to see how one might make that connection. In 2003, on the PISA test, the United States was ranked 24th out of the 29 countries that took the test among its 15-year-olds in Math literacy and problem solving (Yeche, 2005). Then in 2009 the United States was tied with two other countries for 32nd place on the Mathematics scale on the TIMMS (Organisation for Economic Co-operation and Development, 2009). This corresponds to the Nation's Report Card more formally known as the National Assessment of Educational Progress (NAEP), which states that between the years 2003-2006, not one of the state's eighth grade reading scores improved and seven actually declined (U.S. Department of Education Institute of Educational Sciences, 2006). By contrast from 1999-2004, throughout the country elementary students made significant gains in reading and math, while middle school students made minimal gains in math and remained level in reading (Gootman, 2007). In New York State, Gootman (2007) also found that regardless of a district's socioeconomic status, reading scores drop from fifth to 6th grade when most students enter middle school.

Researchers have been trying to determine the best grade formation for middle school students for over 100 years (Hough, 2004; Weiss & Kipnes, 2006; Byrnes & Ruby, 2007). There have been many studies conducted to test the effectiveness of school configurations. The two most commonly used school configurations for middle grade students are K-8 (where middle school students are integrated with elementary school students) and traditional middle schools (Grades 6-8 are separated out, usually in a different building, from the elementary and the high school grades). Student achievement, number of transitions, grade span and class size are just a few of the variables researchers have been looking at when comparing K-8 schools with middle schools. It has been found that students who transition to another school for the middle grades tend to have lower results on standardized tests and report cards, a higher rate of disciplinary actions, and are less prepared for high school (Offenberg, 2001; Weiss & Baker-Smith, 2010; Cook, MacCoun, & Muschkin, 2007).

The number of K-8 schools has been rising at a steady rate (Hough, 2004). According to research done by the National Middle School Association (2010) Pre-K-8 and K-8 schools are rising faster than their middle school counterparts within the nation. From 2007 to 2010, Pre-K-8 schools rose 27%, from 1,653 to 2,104. K-8 schools showed a slightly smaller rise of 15%, from 3,194 in 2007 to 3,685 schools in 2010. Middle schools did not have the same rate of increase. Middle schools increased only 3.5 % during the same three-year period, moving from 9,267 to 9,599 schools (National Middle School Association, 2010). Many large U.S. cities have started to consider or have implemented a change in their middle grade configuration to a K-8 model (Gootman, 2007; Yeche, 2005; Hough, 2004). With the rise in K-8 schools nationwide, school

districts have examined the advantages and disadvantages of having a K-8 or traditional middle school, and many have chosen to move away from the middle school model.

Many of the studies conducted on middle school grade configuration focus on either only general education students, or they look at the total population of a grade or school and do not look at the sub-group of special education students. There are two studies that do specifically examine the effects of grade configuration on middle school special education students. Ellis, Gaudet, and Hoover (2005) conducted a two-year study of all of Massachusetts' urban elementary and middle school special education students. Their research "suggested a possible over-representation of schools using a Kindergarten through 8 (K-8) grade configuration among the top performers" (Ellis et al., 2005, p. 1). This led them to examine the 114 K-8 schools in the state to determine if the K-8 configuration had a positive effect on students with special needs and if so, why. They found that special education students were the subgroup most affected positively by being in a K-8 environment and a small school setting. Ellis et al.'s (2005) results were more aligned with most of the large body of work that compares general education students in K-8 and traditional middle schools. Offenberg (2001) found similar results for general education eighth graders in K-8 schools. His findings showed that the K-8 students made higher gains in academic achievement than eighth graders in middle schools.

Fink (2010) conducted a retrospective study looking at over 5000 general and special education students at the end of fifth grade in Baltimore, Maryland, and followed them through the end of their eighth grade year to determine which setting produced the higher student achievement and attendance for general and special education students in Baltimore. She discovered that only sixth grade reading scores for special education

students in K-8 schools and sixth grade math scores for regular education students made significant statistical gains. All seventh and eighth grade scores, both regular and special education plus sixth grade regular education students in reading and sixth grade special education students in Math showed no significant differences between grade span configurations. As far as attendance is concerned, both sixth grade regular and special education students showed significantly higher attendance rates in K-8 schools than students in middle schools. These findings align with studies done by Sanders-Smith (2009) and Dove, Pearson, and Hooper (2010). Sanders-Smith (2009) found no significant difference between students in Grades 6-8 in K-8 and middle schools located in eastern North Carolina. Dove, Pearson and Hooper (2010) looked only at sixth grade students in Arkansas and found that there was no significant difference between students in the two school configurations.

The environment in which students learn can be a key factor in the academic success of the student body. Eccles, Midgley, Wigfield, Miller-Buchanan, Reuman, Flanagan, and Mac Iver (1993) found that different environments may be needed to address the needs of the various stages of development. The educational environment must actively provide an atmosphere in which the maximum learning and developmental needs are provided for the students. The environments provided by K-8 and 6-8 configured schools vary and, for the special education student, could be problematic.

Both Ellis et al.'s (2005) and Fink's (2010) studies were conducted in urban areas and used Hierarchical Linear Modeling as a means to analyze their data but had found varied results for the sub-population of special education students. Ellis et al. (2005) found that special education students had a positive interaction with the K-8

configuration, while Fink (2010) found that only sixth grade special education students in reading were positively affected by the K-8 structure. Grades 6-8 general education and Grades 7-8 special education students showed no statistically significant advantage to being in K-8 structured schools. The lack of special education studies on school configuration and the inconsistent findings of the few that have been done, in conjunction with the fact that students with special needs historically have scored below their regular education counterparts, helps to frame the major research question of this proposed study: How, and to what extent, do the school configurations K-8 and 6-8 affect the academic achievement of the sixth and eighth grade special education population?

As seen in Table 1 from the National Center for Educational Statistics (2011), from 1980 to 2005 the number of students nationwide who were aged 3-21 and received services under IDEA (Individuals with Disabilities Education Act) had increased every year. Students with disabilities hit their apex in the 2004-2005 school year with 6.72 million students, which made up 13.8% of the nation's student population. Starting the next school year and every year after that until the 2009-2010 school year, the number of students with disabilities declined. By the 2009-2010 school year, there were 6.48 million students with disabilities, which comprised 13.1% of all students within that year (National Center for Educational Statistics, 2011). Scull and Winkler (2011) state that the predominant reason for the overall drop in the numbers of special education students is the decrease in the number of students who are being labeled Specific Learning Disabled (SLD). From its peak in 2000-2001 at 2.86 million students, or 6.1% of the total student body, the number of classified students dropped to 2.43 million (4.9% of the student body) in 2009-2010. Also, students being classified with mental retardation and

emotional disturbances experienced a drop as well. Students labeled Other Health Impairments (OHI) more than doubled and autistic students quadrupled. Even with their large gains these two disabilities only make up 1.4% and 0.8% of the United States total student population in the 2009-2010 school year (Scull & Winkler, 2011)

Table 1

Number and Percentage Distribution of Children and Youth Ages 3 to 21 Served under the Individuals with Disabilities Education Act (IDEA), Part B, and Number Served as a Percentage of Total Public School Enrollments, by Disability Type: Selected School Years, 1980-1981 through 2009-2010

Disability type	1980–81	1990–91	2000–01	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10
	Number served (in thousands)								
All disabilities	**4,144**	**4,710**	**6,296**	**6,719**	**6,713**	**6,686**	**6,606**	**6,483**	**6,481**
Specific learning disabilities	1,462	2,129	2,868	2,798	2,735	2,665	2,573	2,476	2,431
Speech or language impairments	1,168	985	1,409	1,463	1,468	1,475	1,456	1,426	1,416
Intellectual disability	830	534	624	578	556	534	500	478	463
Emotional disturbance	347	389	481	489	477	464	442	420	407
Hearing impairments	79	58	78	79	79	80	79	78	79
Orthopedic impairments	58	49	83	73	71	69	67	70	65
Other health impairments	98	55	303	521	570	611	641	659	689
Visual impairments	31	23	29	29	29	29	29	29	29
Multiple disabilities	68	96	133	140	141	142	138	130	131
Deaf-blindness	3	1	1	2	2	2	2	2	2
Autism	—	—	94	191	223	258	296	336	378
Traumatic brain injury	—	—	16	24	24	25	25	26	25

Disability type	1980–81	1990–91	2000–01	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10
	Number served as a percentage of total public school enrollment[2]								
All disabilities	**10.1**	**11.4**	**13.3**	**13.8**	**13.7**	**13.6**	**13.4**	**13.2**	**13.1**
Specific learning disabilities	3.6	5.2	6.1	5.7	5.6	5.4	5.2	5.0	4.9
Speech or language impairments	2.9	2.4	3.0	3.0	3.0	3.0	3.0	2.9	2.9
Intellectual disability	2.0	1.3	1.3	1.2	1.1	1.1	1.0	1.0	0.9
Emotional disturbance	0.8	0.9	1.0	1.0	1.0	0.9	0.9	0.9	0.8
Hearing impairments	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2

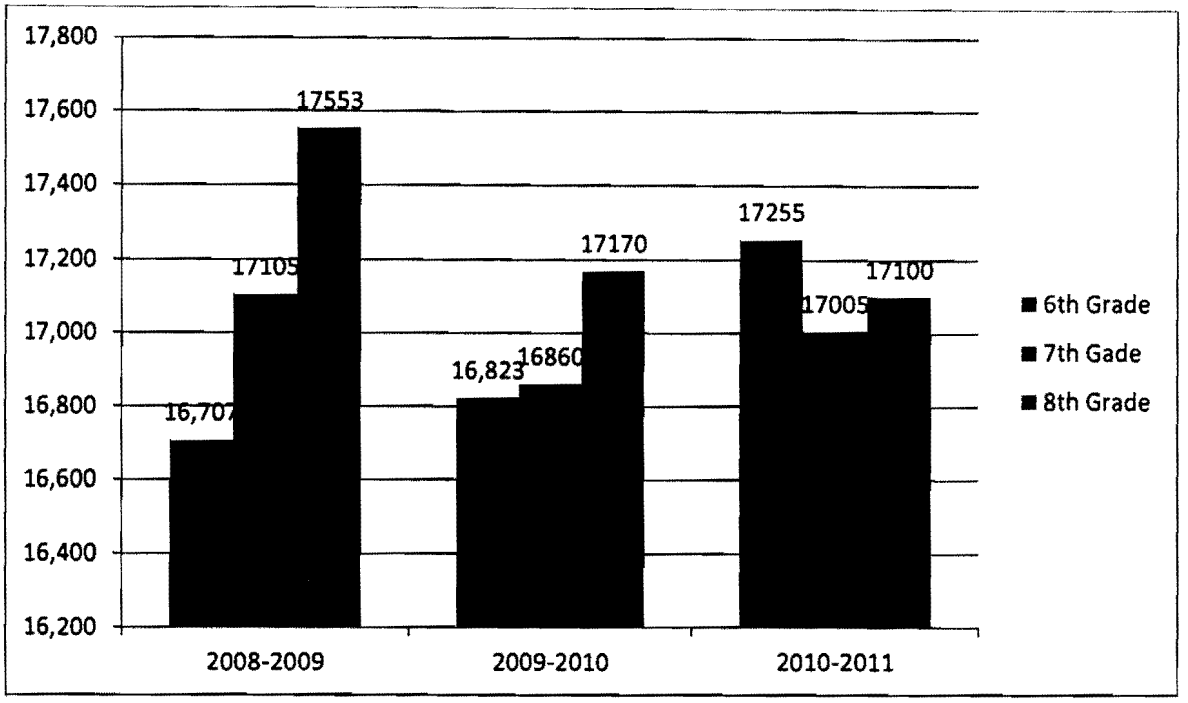
Orthopedic Impairments	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Other health impairments	0.2	0.1	0.6	1.1	1.2	1.2	1.3	1.3	1.4
Visual impairments	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Multiple disabilities	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Deaf-blindness	#	#	#	#	#	#	#	#	#
Autism	—	—	0.2	0.4	0.5	0.5	0.6	0.7	0.8
Traumatic brain injury	—	—	#	#	#	0.1	0.1	0.1	0.1

Note. From National Center for Educational Statistics, 2012

New Jersey's special education population is moving in the opposite direction of the national trend. Table 2 shows students who received special education services in the state of New Jersey from the 2008-2009 through the 2010-2011 school years. According to the New Jersey Department of Education (2011f) in the 2010-2011 school year there were a total of 313,972 middle grade students (sixth-eighth grades) who took the New Jersey Assessment of Skills and Knowledge (NJ ASK) within the state. Of those, 51,360 were special education students. As students advance from sixth through eighth grades, the number of special education students increases. From 2009-2011 the data show that as a cohort the number of sixth grade special education students continuously rose each year until those students became eighth graders.

Table 2

Classified New Jersey Students in Grades 6-8 Who Took the NJ ASK in the 2008-2009 School Year through the 2010-2011 School Year



In 2009-2010 New Jersey had the sixth largest percentage of special education students compared to its total student population in the nation with 16.84% (Scull & Winkler, 2011). From the 2000-2001 to the 2009-2010 school year, New Jersey has exhibited very little change in the identification rate of special education students with there being only a difference of -.04% over the ten-year period.

There are many factors that may play a role in why New Jersey's special education population is growing. At the time of the last national census in 2010, New Jersey was the most populated state in the country per square mile with 1,195.5 people. It was also the eleventh largest state in terms of population (U.S. Census Bureau, 2012). Therefore, the number of special education students may be a reflection of New Jersey's large population. Another factor that may be affecting New Jersey's growing special education population is the size or growth of the minority population. According to

Ellmer (2010), students of color, specifically African-Americans, Latinos, and Native Americans, are "often represented in special education programs in disproportionate number with overrepresentation" (p. 3). In 2010, African-Americans and Latinos had a higher population percentage in the state of New Jersey when compared to the national average. African-Americans and Latinos made up 14.6% and 18.1% of New Jersey's population, which was 1.5% and 1.4% higher, respectively, than the United States' average. The Native American population in New Jersey is half of the national average but make up only 0.6% of the total state population (U.S. Census Bureau, 2012).

The academic achievement of special education students has varied. A study conducted in Texas showed that the average special education program has improved mathematics scores for its students in Texas while not being a detriment to general education students (Hanushek, Kain, & Rivkin, 2002). Packard, Hazelkorn, Harris, & McLeod (2011) found that ninth grade students with learning disabilities achieved better academic results in separate resource rooms than in inclusion settings where they are co-taught by general and special education teachers. The 64% national graduation rate for special education students lags behind the 73.9% general education student rate by 9.9% (National Center for Learning Disabilities, 2013). New Jersey's special education graduation rate is 73%, which is higher than the national average but with a 10% gap between special and general education graduation rates in New Jersey, the difference between the two is almost identical to the national gap. In fact, nationally, the difference between graduation rates of special and general education students vary greatly between the states with a range of +1% through -52% (Advocacy Institute, 2012).

From 2007-2011, schools with grades configured as K-8 or middle school (6-8) experienced a decrease in their total amount of schools in New Jersey. In 2007, there were 304 middle schools and 272 K-8 schools in New Jersey (Keegan, 2010). By 2011, the New Jersey State Report Card showed that there were 258 K-8 schools and 210 middle schools throughout the state (New Jersey Department of Education, 2012a). One reason why there was such a drop in the number of middle schools throughout the state is due to the increase of students leaving the traditional public school setting and going to charter schools. From 2007 to 2011, the total number of charter school students in sixth grade increased by 23%, seventh grade by 24% and eighth grade by 28% (New Jersey Department of Education, 2012e).

Whereas there was a drop in both configurations, middle schools had a 32% reduction in its numbers, while K-8 schools had only a 5% loss. Table 3 lists the number of middle and K-8 schools by District factor groups (DFG's). New Jersey classifies every district with a DFG code so that schools and districts can be compared based on common socioeconomic statuses rather than geographic location. Doing this allows researchers to "reduce the variation in reported scores which is due to factors beyond the control of local educators" (New Jersey State Department of Education, 2012, p.1). There are eight commonly used DFG codes: A, B, CD, DE, FG, GH, I, and J, with A districts being the least affluent and J districts being the most affluent. The table shows that for the more disadvantaged districts, K-8 schools outnumber their middle school counterparts. As districts become less disadvantaged, the number of middle schools catches up to and eventually passes those of K-8 schools. This information shows that the use of the K-8 or middle school configuration varies depending on the DFG. The K-8 structure is seen

predominantly in the less affluent DFG's while the DFG's with higher socioeconomic status tend to have stayed with the traditional middle school model.

Table 3

Number of K-8 and Middle Schools in New Jersey Based on 2011 State Report Card

District Factor Group	Number of K-8 Schools	Number of Middle Schools	Total
A	113	21	134
B	44	21	65
CD	28	16	44
DE	24	27	51
FG	20	33	53
GH	7	37	44
I	18	43	61
J	3	12	15
Total	258	210	468

Statement of the Problem

It has been established that special education students should be given additional accommodations to help them succeed in the classroom and/or on standardized tests through various forms of legislation such as IDEA in 1997 and ESEA in 1994, which later became known as the Improving America's Schools Act (Thurlow, Quenemoen, Altman, & Cuthbert, 2008). Students are given an Individualized Education Plan (IEP), which outlines the educational program for that child based on his or her specific needs. Under IDEA, students may receive individual or small group instruction, curriculum or

teaching modifications, assistive technology, transition services, and other specialized services such as physical, occupational, and speech therapy (Individuals with Disabilities Act, 1997). Some of the accommodations for the NJ ASK tests that students may receive are an additional 50% or 100% time to complete their work, a scribe, questions read aloud to them, and taking the test in a small group setting (New Jersey Department of Education, 2010).

The K-8 configuration encompasses both elementary and middle school grades and tends to take on elementary characteristics. Some of those characteristics are the way in which classes are scheduled and taught and the philosophical approach to learning. K-8 schools also tend to have smaller grade levels which in turn can produce smaller class sizes, but due to the larger range of grades offered, fewer elective courses are available (Rubensteing, R., Schwartz, A.E., Stiefel, L., & Zabel, J., 2009; Akos, 2002). The middle school configuration predominantly takes on the traits of a high school in the same characteristics that K-8 mirrors elementary schools (Rubenstein, Schwartz, Stiefel, & Zabel, 2009; Akos, 2002).

The environment in which any student is taught can affect his or her overall academic and social progress. Some researchers have even stated that students who are in a setting that does not meet their needs in the classroom and on a social level can experience more harm than good from that setting (Eccles, Midgley, Wigfield, Miller-Buchanan, Reuman, Flanagan, & Mac Iver, 1993).

The findings of Ellis et al. (2005) and Fink (2010) show two different outcomes for the middle grade special education students. Ellis et al. (2005) found that special education students in the K-8 configured schools overwhelmingly did better than special

education students in middle schools. Fink (2010) found that only sixth grade special education students showed a statistically significant gain in reading, while only sixth grade general education students made significant gains. In Fink's (2010) work seventh and eighth grade students, whether they were classified as general or special education, showed no significant difference between students in K-8 or middle schools.

The numbers of special education students separated out by DFG shows that the distribution of special education students is bi-modal at the higher and lower ends of the DFG's. The national and state rise in K-8 schools and the increase of special education students in New Jersey are important factors that may impact the education of this population. The research that has been conducted for middle grade students tends to lean more towards the K-8 structure, showing more benefits for regular education students than the traditional middle school with a 6-8 grade span. Districts with lower socio-economic status have been making a shift to increasing the number of K-8 schools in their districts, while districts with higher socioeconomic status have remained with the traditional middle school configuration even though their special education population has increased. Based on this information, it poses the question "Does grade configuration have an impact on academic achievement for special education students in sixth and eighth grade?"

Special education students have different needs and receive additional support to help overcome their disability, but very few researchers have sought to examine which middle school configuration is best for them. There has been no clear path agreed upon by researchers that school officials should take when deciding which configuration is best for the special education population. These facts, coupled with the growth of New

Jersey's special education population amid the broader national decline, define a unique threat to addressing the needs of this sub-population in the middle grades. The problem then lies in the fact that if school districts pick configurations based on research that was conducted for general education students, there is a possibility that the special education population's needs will not be met to maximize their potential to learn.

Purpose of the Study

The purpose of this study is to determine if school configuration has an effect on academic achievement on the 2011 NJ ASK in Language Arts and Math for sixth and eighth grade special education students in New Jersey. This was done by using the percentage of special education students in a school who have scored Proficient and Advanced Proficient to calculate the total proficiency rate for sixth and eighth grades. Taking into account that there may be additional factors besides school configuration that may also be affecting the academic achievement for the special education population, this study controlled for the following four school variables: total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students within the school. Most research that has been conducted on school configuration discusses general education students and how they fare in various school settings. The research conducted within this study intends to provide insight on the effectiveness of the K-8 and 6-8 middle school configurations for this understudied special subpopulation of students. Also, the study sought to determine if the effects of the four control variables attenuate between the sixth to eighth grade populations.

Research Questions

This study sought to determine the following: To what extent does school configuration impact academic achievement on special education proficiency on the NJ ASK in Language Arts and Math, for sixth and eighth grade? The more specific research questions include the following:

1. Do K-8 configured schools perform on average better than schools configured as traditional middle schools for the sixth and eighth grade special education population on the NJ ASK in Math and Language Arts?
2. What is the impact of grade configuration on academic achievement on the 2011 NJ ASK for the sixth and eighth grade special education subgroup population when controlling for the variables total school size, mobility rate, percentage of economically disadvantaged students and percentage of special education students in K-8 and traditional middle schools in Math and Language Arts?
3. How do the effects of the control variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students differ by grade level between the sixth and the eighth grade special education subgroup population in K-8 and traditional middle schools in Math and Language Arts on the 2011 NJ ASK?

Hypothesis

The hypothesis that this study examines is that schools configured as K-8 on average have higher academic achievement in Math and Language Arts compared to traditional middle schools for the sixth and eighth grade special education populations.

The null hypothesis on which this study is based is that schools configured as K-8 do not differ significantly in terms of academic achievement in Math and Language Arts compared to traditional middle schools for the sixth and eighth grade special education populations. School leaders and decision makers could benefit from the rejection of the null hypothesis as it can aid them in making more informed decisions when discussing the proper grade span for the special education middle grade students.

Significance of the Study

Pardini (2002) discusses how the school superintendent Barbara Byrd-Bennett came to the decision to move away from the middle school configuration. The district faced test scores that dropped drastically, absences, and suspension rates rising at alarming rates once students entered sixth grade. She decided to move the district to the K-8 school model and reported a rise in attendance and test scores for sixth grade students in K-8 schools. Plans like these have been reported all over the country. Cincinnati, Ohio, Everett, Massachusetts, and Fayetteville, Tennessee, all had plans to convert their entire districts to K-8 schools to aid the middle school students to be more successful in school. Oklahoma City, Oklahoma, Baltimore, Maryland, and Philadelphia, Pennsylvania, put in plans that phased in the creation of K-8 schools over various periods of times but for similar reasons (Pardini, 2002).

By having empirical data that show whether grade configuration on average has a significant effect on special education proficiency of K-8 and traditional middle schools, New Jersey lawmakers, superintendents, principals, and other educators can focus on creating schools and programs that are best suited for this special education population. In many cases students who are classified do not score as high on standardized tests as

their general education classmates. "The reporting requirements of the No Child Left Behind Act (NCLB) have revealed that disabled students lag far behind their peers in academic achievement" (Snell, 2004, p 1). With this in mind, analyzing the effect of grade configuration on schools could help stakeholders make more informed decisions as to which configuration provides the most benefit on average for special education students in the first and last year of the middle grades.

Definition of Terms

District Factor Groups (DFG's) - Used by the state of New Jersey to provide a systematic approach for classifying the state's school districts based on the socio-economic status observed within the community served by the district.

IDEA - is the primary federal program that authorizes state and local aid for special education and related services for children with disabilities.

K-8 Schools - Schools that have a configuration of grades that run from kindergarten or pre-kindergarten through the eighth grade.

Middle grade Students - Those students who are in Grades 6-8.

National Assessment on Educational Progress (NAEP) - Sometimes referred to as "the nation's report card." It biennially measures student achievement levels in reading and math at Grades 4 and 8 and in other selected subjects in alternate years. While NAEP does not provide student or school performance data, its national, state-level, and sub-population data inform educational policymaking and assist states in measuring the rigor of statewide assessment programs.

New Jersey Assessment of Skills and Knowledge (NJ ASK) - 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 Core Curriculum Content Standards in Language Arts literacy and Math at each grade level and science at Grades 4 and 8.

No Child Left Behind (NCLB) - 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.

Hierarchical Multiple Regression – A method of analysis that allows the researcher to account for control and independent variables in the order that they choose versus accounting for all of the variables at the same time.

Proficiency Rate on NJ ASK - The percentage of special education students who have scored Proficient and Advanced Proficient on the NJ ASK across a grade level.

Programme of International Student Assessment (PISA) - An international study which began in the year 2000. It aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students in participating countries/economies. Since the year 2000, over 70 countries and economies have participated in PISA.

School Configuration - The range of a school's grades.

Special Education Student - Any student who receives additional services to help him or her to improve academically. The student must have an Instructional Education Plan

Student Achievement - The number of students who have met or exceeded the Proficient score (200) on the New Jersey Assessment of Skills and Knowledge.

Third International Mathematics and Science Study (TIMMS) - An international comparative study designed to provide information about educational achievement and learning contexts for the participating countries in mathematics and science in Grades 7 ***and 8.***

Third International Mathematics and Science Study-Repeat (TIMMS-R) - In 1999, due to poor results, a second TIMMS report was issued and called the Third International Mathematics and Science Study–Repeat.

Traditional Middle Schools - Schools that have a configuration of grades that run from sixth through eighth grades.

Summary Organization of the Study

This dissertation is organized into five chapters, including this introduction in Chapter I. Chapter II reviews literature that compares middle grade students in K-8 and traditional middle schools; in particular, Chapter II analyzes the literature on the history of middle school configurations, research on K-8 and 6-8 configured schools including studies on special education students within K-8 and traditional middle schools, and student achievement within these configurations. Chapter III proposes the research design and methodology and describes the collection of the data that were used in this study. Chapter IV analyzes the data and publishes the results of the data analysis. Chapter V details the findings of the data analysis, provides discussion on these findings, and proposes further research in the area of this study.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Within this study, the review of the literature presents research that focuses on the comparing of schools that are configured using the K-8 and the middle school models. The chapter is divided into the following sections: (a) the history of middle school configurations, (b) studies that were conducted prior to 1984, (c) studies that were conducted after 1984 to include those that had outcomes focused on student achievement, student achievement and student attendance, student achievement and student discipline, transitions, multiple outcomes, high school preparedness, educators' views, practices and professional development, and (d) a summary of the findings. The researcher also uses specific cases as well as current research to establish the path through which middle school configuration and the middle school concept have evolved.

The researcher reviews studies that have been conducted on grade configuration, but there is still no definitive agreement from the field of researchers as to the best way to decide the appropriate grade configuration range for classified or non-classified students. There are very few studies that actually attempt to look at special education students and compare how they perform in either the K-8 or middle school configurations. The research contains anecdotal, theoretical, and empirical studies which show not only various opinions and statistical data on the best grade configuration for middle school students but also philosophies supporting and not supporting the middle school concept.

The History of Middle School Configurations

From its creation, the United States education system has had to make changes to its infrastructure to meet the needs of its growing population. As the country moved from an agricultural system to a more industrial-based nation, the school system had to make changes as well, as more families were sending children to school. Schools that started out as one-room schoolhouses were not separated into grades. Graded schools began in Boston during the 1850s and then expanded throughout the United States. The grading process started first in the city/urban areas and then expanded to the rural communities. Only when high schools were created did the idea of continuous school from elementary through high school take form (Callahan, 1960).

At the dawn of the twentieth century, the 8/4 model of schools was the predominant choice for school configurations. In an 8/4 model an elementary school is comprised of the first eight grades and a high school made up of the last four. Elwood Cubberly, a professor at Teacher's College, suggested that "large schools in central locations could provide more and better education and resources" (Howley, 2002, para. 3). This prompted administrators to move ahead with larger graded schools, which started the K-8 configuration as the prevalent school grade span of the time (Howley, 2002; Pardini, 2002).

There were exceptions to the rule. In 1888, there was a drive prompted by then Harvard president Charles Eliot to reorganize the primary and secondary grades so that students in the last years of elementary school would be introduced to algebra and Latin at earlier ages. Eliot, along with the National Education Association Committee of Ten on Secondary School Studies, believed that students "wasted time in the last years of

elementary school" (Mac Iver & Ruby, n.d., p 1). Due to a growing concern about the older elementary students "spending too much time in a repetitious curriculum," in 1894 there was a recommendation from the Report of the Committee of Ten on Secondary School Studies to move to a 6/6 model, in which the seventh and eighth grades would move from the elementary to the high school (National Education Association, 1894, as cited in Clark & Clark, 1994, p. 8).

Since many students were not expected to graduate from high school during this time frame, other models were present. Between 1908 and 1911 a movement had started that advocated changing the 6/6 model to a 6/3/3 model in which the upper six grades would be split into two levels, a senior level and a junior level, each comprised of three grades (Clark & Clark, 1994). This allowed school personnel to create programs for those students who decided to stay in school and not enter the workforce. Then in 1909 it was Frank Forest Bunker who is widely given credit for "establishing the first developed middle school in Berkeley, California" which also housed the 6/3/3 model (Popper, 1967, p. 11). This allowed students to receive an elementary education and an additional three years of junior high school. The first junior high school organized in this fashion started in 1909 (Clark & Clark, 1994). This had changed by 1920; four out of five high school graduates had attended a K-8 school and then moved on to a four-year high school (Alexander & McEwin, 1989).

The junior high school model was seen as a necessary adoption after a substantial rise in elementary aged students after World War I. This model moved the older students, who were previously placed in elementary schools to a more centralized building, freeing up space in the neighborhood school for the growing younger grade population

(Alexander & George, 1981). The main reason junior high schools gained so much popularity was that there was a high dropout rate and many people believed that adolescents needed a curriculum that was tailored to their specific needs (Cuban, 1992; Angus et al., 1988). According to Yecke (2005), junior high schools normally included Grades 7-9 and mirrored high schools in the way they were organized and in academic focus. Many of the mainstays in today's schools such as homeroom, teacher advisor programs, extracurricular activities, and core curriculum approaches emphasizing the correlation of subject areas and the integration of learning across disciplines can be said to have begun in the junior high schools (Mac Iver & Ruby, n.d., p. 1).

Moving the ninth grade to the junior high school created a connection with senior high schools that made the curriculum of both schools very similar and hard to distinguish from each other. This is illustrated in the 1975 publication by the Association for Supervision and Curriculum Development (ASCD), *The Middle School We Need.* "Many alleged characteristics of the senior high have 'contaminated' the junior high—a departmentalized subject-matter curriculum, interscholastic athletics . . . And now it appears that many middle schools have continued these same sins . . . Thus, it should come as no surprise that the only real differences between many middle schools and junior highs have been in name and grade organization. This model lasted for several decades" (Gatewood & Dilig, 1975, pp. 3-4). A constraint to the junior high model were the Carnegie unit requirements for the high school students. The ninth graders had specific courses that they had to take in order to graduate and be prepared for college. This influenced what courses would be offered to the seventh and eighth graders within the school (Mac Iver & Ruby, n.d.).

In the 1940s and 1950s the educational philosophy known as the "Life Adjustment Movement" gained supporters that advocated for more socialization and less focus on academic rigor (Yecke, 2005). Alvin Howard was one of the first advocates in the 1950s for the creation of middle schools housing Grades 6-8 that would lift the rules of the Carnegie units and hence make the curriculum more tailored to the adolescent student (Mac Iver & Ruby, n.d.). This movement motivated those who were opposed to the academic rigor within junior high schools to demand reform. Grantes, Noyce, Patterson, and Robertson (1961) describe this sentiment in their book *The Junior High School We Need.* The idea was restated at the Cornell Junior High School Conference in 1963 (Alexander & George, 1981). This reform movement launched a new grade configuration.

It was during this time that the middle school concept was initiated. Yeche (2005, p 2) defines the middle school concept as "the belief that the purpose of schools is to create children imbued with egalitarian principles—in touch with their political, social, and psychological selves—who eschew competition and individual achievement and instead focus on identity development and perceived societal needs."

The first middle schools began to take shape in the early 1960s when the ninth grade was moved to the high school and sixth grade was moved to the middle school. The most important change was the fact that the link to the high school was severed and younger students were introduced to the new school model (Alexander & George, 1981). In his book *The Middle School*, Donald Eichorn (1966) proposed removing activities that may be more designed for high school such as proms and interscholastic athletics. Instead, the book proposes to engage students in activities such as intramural athletics so

that the pressure to be competitive would not be as prevalent. This prompted a rise in the number of middle schools within the United States. "In 1965 only 5% of middle grade schools in the United States were 6-8 or 5-8 middle schools, and 67% were 7-9 junior high schools. By the year 2000 these percentages were reversed: only 5% of middle grade schools were 7-9 junior high schools and 69% were 6-8 or 5-8 middle schools" (Mac Iver & Ruby, n.d., p. 2). This was partly due to the desegregation laws of the times. School districts found that moving the sixth grade to the middle school created more space in which to accommodate the new diverse student body within a district (Mizell, 2004).

During this time organizations such as the National Middle School Association (NMSA) were founded on the premise that "the middle school should be very different from the traditional high school" (Yeche, 2005, p. 9) and advocated for its growth. There were some exceptions to this movement. In Chicago the middle school movement did not take hold as it did in the rest of the country. From the 1950s the K-8 schools remained prominent in Chicago due to the lower cost to run them than middle schools and junior high schools. Also, parents preferred to have their children in a single school during that eight-year time span (Pardini, 2002).

In the rest of the country the middle school was the prevailing configuration for students in Grades 6-8. Even though middle schools greatly outnumbered any other configuration for this age group, there were many who criticized their effectiveness. Lounsbury (1991) states that even though the middle school was formed in part to provide a unique experience for students, in many ways the newly formed middle school was similar in practice to the old high school.

It is Paul George (1988) who is credited with actually separating middle schools from the high school. He warned that middle schools have to work towards achieving things other than just academics. He believed that middle schools should align themselves with the middle school concept, which could be the driving force to spread justice and equality throughout society. Paglin and Fager (1997) also stated that "the middle school...was conceived as a more child-centered institution with 'responsive practices' such as interdisciplinary team teaching, advisory programs, and flexible scheduling. The middle school offers a more varied curriculum and more electives or exploratory classes than are usually offered at junior high schools" (pp. 5-6). His view was in direct opposition to the National Commission of Excellence in Education's publication *A Nation at Risk* (1983). This document made the claim that American academics were declining and that academic standards had to be raised if our school systems were ever to improve. The theories in *A Nation at Risk* and public demand for school improvement led to President George H.W. Bush's governor's summit in Charlottesville, Virginia, in 1989. At this summit the idea of developing national rigorous standards and making sure schools are responsible for their implementation was born.

Ironically, the same year as President Bush's governor's summit, a report published by Carnegie Council on Adolescent Development called *Turning Points: Preparing American Youth for the 21st Century* (1989) was released and blamed a public that was satisfied with the status quo and the traditional education model that emphasized academics at the cost of students' social and emotional growth for a dysfunctional population of adolescents. The views of *Turning Points* were very similar to those of Paul George. Both espoused ideas of middle schools being places that were in need of

transformation in order to aid society. *Turning Points* was used as a rallying cry by advocates like Paul George to raise ideas like the Life Adjustment Movement to a national level of promoting the middle school concept.

Everyone was not behind the middle school concept. A public agenda survey discovered that more than half of all teachers polled believed that when education institutions had low expectations and academic standards, these were serious problems. Within the same survey the percentage of the general public who agreed was higher than those of the teachers (Farkas & Johnson, 1996). Another survey done by Johnston and Williamson (1998) found that only 13% of parents believed that their child's middle school curriculum was rigorous and/or challenging. They reported that 83% either did not agree or did not know if the program was rigorous enough.

When the Third International Mathematics and Science Study (TIMSS) was released, it helped promote the theories of objectors of the middle school movement. The TIMSS reported that in 1995 fourth graders in science scored above the international average but by eighth grade the results had not remained constant. Sixteen countries scored higher than the United States in eighth grade science with nine of them having statistically significant differences. In math the disparity was wider. In fourth grade, students were performing at the international average. For eighth graders, twenty-seven countries outscored the United States with significant statistical differences in twenty of those countries. Of the twelfth graders tested, only the countries of Cyprus and South Africa had scored lower than the United States in either subject (Office of Educational Research and Improvement, 1999).

The U.S. research coordinator for the study, Dr. William Schmidt, stated that "one of the single most important policy implications of the TIMSS study is this precipitous decline in our international ranking from fourth to eighth grade" (Viadero, 1998, p. 25). Sentiments like Schmidt's, along with public and parental dissatisfaction, created doubts about the middle school concept. Former U.S. Secretary of Education Richard Riley echoed these concerns during his "state of American education" speech in 1998. He stated, "While we do a very good job at teaching math and science in the early years, we begin to drift in the middle years and fall behind the international standard of excellence" (Pardini, 2002, p. 3). National attention was given to this issue as articles were written in publications such as the *School Board News, Teacher Magazine*, and *Education Week* that asked the question of whether the middle school concept was adequately preparing our students to compete with their foreign counterparts.

Due to the poor results from the TIMSS, the test was re-administered in 1999 to confirm the original tests scores. The second test was called the TIMSS-R (TIMSS-Repeat). Eighth grade students in thirty-eight countries participated. U.S. officials were hopeful that fourth grade interventions such as curriculum changes that produced higher scores would create a stronger academic foundation for those students as they transitioned to eighth graders by 1999 (Hoff, 2000). The results from the TIMSS-R were not any better than the TIMSS. In math the same fourth graders who were at international average on the TIMSS test were twenty-two points below the international average as eighth graders. In science on the TIMSS, U.S. fourth graders scored twenty-eight points above the international average; but on the TIMSS-R, as eighth graders they had taken a thirty-seven point drop to nine points below the international average (Hoff, 2000).

Additionally, the Program of International Student Assessment (PISA) found in 2003 that U.S. fifteen-year-olds were 24th out of 29 countries in problem solving and math literacy (Cavanaugh & Robelen, 2004). Results from the National Assessment on Educational Progress (NAEP) in 2005 showed that the average reading scale score for eighth graders remained stagnant with a range of scores from 260-264 from 1992-2009. By the time the students reached high school, the achievement level had actually dropped (National Assessment of Educational Progress, Long Term Data, 2009).

Results from the NAEP, TIMSS and TIMSS-R helped to advocate for stricter accountability standards for America's schools. According to Yeche (2005), many school districts decided to move back to the K-8 because it has "shown promise in raising the academic achievement of early adolescents" (p. 19). Byrnes and Ruby (2007) describe the transition to K-8 schools from middle schools as a "return to the old" (p. 102). Even though private, parochial, and several European schools have continued to use the K-8 configuration through the last century (Herman, 2004), over the last 25 years there has been a resurgence in the K-8 structure for public schools in various states such as Massachusetts, Pennsylvania, Ohio, Tennessee, Oklahoma, Maryland, and New York, including school districts like Cincinnati, Cleveland, Philadelphia, and Baltimore (Hough 2005; Pardini 2002; Reising 2002).

Currently there is a rise in schools that have adopted the Pre-K/K-8 model. In 2010, the number of Pre-K/K-8 schools rose by 19% nationally from 2007 (NMSA, 2010). Urban cities have seen the largest rise in K-8 schools by many researchers (Abella, 2005; George, 2005; Herman, 2004; Mizell, 2005; Seller, 2004) Some cities have decided to change their entire district to K-8 schools or are planning a slow move to phasing in

the K-8 schools for their communities (Abella, 2005; Anfara & Buehler, 2005; George, 2005; Look, 2001; Mizell, 2005). Many people believe that middle schools have not lived up to their potential but rather have adopted many of the flaws they were supposed to correct in replacing junior high schools (Weiss & Kipnes, 2006). According to Zernike (2007), middle schools actually sapped self-esteem and fostered bullying.

Studies Prior to 1984

Prior to 1984 there were few studies that empirically looked at the relationship between academic achievement and grade organization (Wihry, Coladarci, & Meadow, 1992). Calhoun (1983), through his review of grade organization literature, did find a few studies that addressed this question. Stout (1962) studied academic achievement for seventh to twelfth graders. He found that there was higher achievement when these grades were set up in a three-by-three configuration rather than a seventh through twelfth grade combined school. White (1964) found that achievement was higher when seventh graders were housed in their own school or in schools that contained seventh and eighth grades versus any other grade span. Overall, Calhoun found that the effectiveness of middle and junior high schools was either more apparent in middle schools or that there was no difference found. Even though Calhoun's research shows middle graded schools were able to produce better results than other school configurations, none of his research for sixth and ninth graders found a consistent relationship between a school's grade span and academic achievement (Calhoun, 1983). Researchers of that time rarely controlled for other influences such as socioeconomic status, race, gender, students with disabilities, etc. (Wihry, Coladarci, & Meadow, 1992). This raises questions about the validity of the results for these studies.

Studies After 1984

Student Achievement

The researcher credited with the first study of K-8 schools that controlled for socio-economic status is Moore (1984) in New York City. In his study he compared nine K-8 and nine urban junior high schools, focusing on variables such as academic achievement, attitudes toward school, and attendance. He found that students in the K-8 setting not only outperformed their junior high counterparts in reading achievement but also had higher attendance rates, a more positive attitude towards school, and higher self-esteem.

In Pennsylvania, a study was conducted by Becker (1987) in which he compared sixth grade scores on the 1986 Pennsylvania Education Quality Assessment (E.Q.A.) for 330 schools. The schools were in small towns or rural communities and excluded the major metropolitan cities such as Philadelphia and Pittsburgh. Becker tested over 30,000 sixth graders and the analysis focused on a random sampling of one third of those tested who were given one of three alternative forms of the achievement test. While controlling for SES, he created four background variables: "low," which was any student who scored lower than one standard deviation below the mean on the index; "low-middle," which ranges from -1 standard deviation to the mean; and "high-middle" and "high," which were both defined as students who scored above the mean. Becker found that "low" background students in elementary schools scored much better than "low" background students in middle schools. The "low-middle" students did better in the elementary setting as well but only by half as much as the "low" students. The "high-middle" students in elementary schools did only slightly better than sixth graders in middle

schools, and the "high" students consistently performed better in non-elementary settings (Becker, 1987, p. 8). Based on Becker's findings, sixth grade students who perform below the standard deviation and some who score above it benefit from being in an elementary setting rather than any other configuration. Becker's (1987) research is validated by Simmons and Blyth's (1987); they both found that sixth graders do well in an elementary setting. The difference between the two is that Becker's research took into account socioeconomic status while Simmons and Blyth (1987) did not. This makes socioeconomic status a factor in determining student achievement for K-8 and middle school students.

In Maine, Wihry, Coldarci, and Meadow (1992) conducted a rural study of 163 schools that found grade span to be a significant predictor of academic achievement. They used the idea of "educational production function" as an effective way to analyze educational outcomes (Wihry, Coldarci, & Meadow, 1992, p. 59). They studied various variables to include full scale models which comprised the eight content areas measured on the Maine Educational Assessment (MEA): grade span; socioeconomic status; college graduates for a community; regular instructional expenditures, which were primarily teacher salaries and instructional materials; school size or student population; pupil/staff ratio; post-baccalaureate education for full- or part-time teachers having 15 or more credit hours of education based on their bachelor's degree; and the average tenure of elementary school teachers.

Socioeconomic status was found to have an effect on MEA scores. Being a college graduate and teacher experience both showed to be significant predictors of student achievement. Every one percentage point rise in the community for those who

the similarities in the "instructional and social environments" between the two configurations (Wihry, Coldarci, & Meadow, 1992, p. 67).

In Philadelphia, Offenberg (2001) compared student achievement for eighth graders of K-8 and middle schools. He looked at a multitude of items such as performance on standardized tests, the number of students who enrolled in selective high schools for ninth grade, and ninth grade achievement and performance index achievement component gains (academic gains at the school level). He felt it was necessary to control for socioeconomic status by adding the school poverty rate into his regression models. What he found was that even after controlling for SES, K-8 schools had outperformed middle schools at a rate between 3.5 and 8.5 NCE's (Normal Curve Equivalents). Offenberg also found that students at K-8 schools were more likely to enroll in and attend specialized high schools at a rate of 11% higher than their middle school counterparts. The study also highlighted the fact that there was a direct relationship between the number of students in a grade level and academic achievement. As the number of students in a grade level increase, achievement scores decrease.

Abella (2005) studied roughly 4400 middle school and 360 K-8 school students in Miami, Florida. Abella found that students in sixth and seventh grades who attended K-8 schools had higher reading levels than those students who attended 6-8 schools. By the time the students in both schools had reached the ninth grade, the reading levels for all students were identical to one another. K-8 students were able to maintain their higher level of achievement in mathematics and a higher attendance rate over their middle school counterparts.

Ellis, Gaudet, and Hoover (2005) used hierarchical linear modeling to determine how various grades within the K-8 structure performed on standardized tests for urban elementary and middle school students with special needs in Massachusetts. For their study they reviewed fourth, seventh, and eighth graders' 2004 Massachusetts Comprehensive Achievement System (MCAS) test results in Math and/or English Language Arts (ELA). Specifically, four tests were used: fourth grade Math, fourth grade ELA, seventh grade ELA, and eighth grade Math. They looked at five target characteristics: free- or reduced-lunch eligibility, limited English proficiency, gender, non-White, and special needs. They found that four out of five of the characteristics had a consistent negative relationship with the MCAS. Gender showed mixed results. It was during this phase of the study that special needs students were found to have better performance in schools with small settings.

Achievement for students who did not have any of the five target characteristics showed that the impact of the K-8 setting had a negative impact on all four exams, but fourth grade ELA and Math were the only ones that were statistically significant. Students who were eligible for free or reduced lunch or with limited English proficiency were also affected negatively at Grade 4 and were mixed at the seventh and eighth grade levels by K-8 configurations. Non-White students had a positive impact with the K-8 setting on all tests, but the results were not statistically significant (Ellis, Gaudet, & Hoover, 2005).

The K-8 setting found a positive relationship for special needs students on fourth grade English Language Arts, fourth grade Math, and seventh grade English Language Arts. The eighth grade test was also positive but not statistically significant. In an attempt

to find out why these results occurred, the researchers then conducted surveys of 27 K-8 principals and teachers to see if they could determine why there were positive results for their students and what the strengths and weaknesses of the configuration were. The interviewees did not credit the schools' strengths to its configuration but to its shared responsibility across the various grade levels: communication and collaboration among the staff; reduction of student transitions, which helps to relive student stress; and a stronger sense of community among the staff, parents, and students. They also noted some negatives of K-8 schools: (a) they are not being able to meet the needs of students with a large range of developmental and instructional levels, (b) the small class size limits peer group size and does not offer the same amount or variety of courses that middle schools offer, (c) there is the possibility of students being so nurtured that it makes the transition to high school more difficult, and (d) K-8 schools offer no tangible advantage to creating parent relationships (Ellis, Gaudet, & Hoover, 2005). The mixed findings here show that even though there are positives for some students, specifically special needs, non-White and limited English proficient students, it is not a guarantee that the same benefit will carry over for all students in K-8 schools.

Byrnes and Ruby (2007) decided to compare K-8 schools and middle schools in Philadelphia differently than other researchers. Because the Philadelphia school district was undergoing a K-8 conversion process during the time of this study (1999-2004) but also had a population of established K-8 schools, they decided to look at how old and new K-8 schools compared to middle schools independently over a five-year period. They looked at 40,883 eighth grade students from 95 schools across the city. They defined new K-8 schools as K-8 schools that had been established at any time during the

five-year period. Old K-8 schools were schools that were already open and running prior to the five-year study. They used students' prior knowledge (students' fifth grade scores on the Pennsylvania State System of Assessment) as a control for prior levels of achievement. They discovered that the old K-8 schools had significant higher levels of achievement when looking at prior and current knowledge. They also had smaller percentages of high poverty and of Black and Hispanic students when compared to middle schools and higher numbers of White and Asian students. Most eighth grade students in K-8 schools attended the same school in fourth grade. They were also taught by more experienced teachers who had smaller rates of teacher absenteeism and higher levels of certification.

New K-8 schools did not fare as well. Even though they shared the same advantages as the old K-8 schools, such as students experiencing fewer transitions and being in smaller schools when compared to middle schools, the new K-8 schools were selected to serve populations with higher percentages of Hispanic students and lower achievement than middle school students under the district's K-8 conversion policy. Students at the new K-8 schools had lower achievement scores and teachers who were less experienced and had achieved lower levels of certification than those at the middle school level. They found that students in the newer K-8 schools showed no difference statistically in their performance than middle school students in math and reading. Even after controlling for population demographics, old K-8 schools still held a significant advantage, though a reduced one, in both subjects. New K-8 schools found a significant advantage in reading but not in math. As Byrnes and Ruby went through their experiments, old K-8 schools consistently outperformed new K-8 schools and middle

schools. Even though both new and old K-8 schools had the benefit of smaller class sizes and fewer transitions, the demographic population of the new K-8' schools with high minority and high poverty students were a major reason why old K-8 schools performed better than new K-8 schools and middle schools. Creating a variable that was able "to control for whether or not students were in the same elementary school" allowed Byrnes and Ruby (2007, p. 112) to determine if the transitioning to a middle school had a negative effect on student achievement. Once Byrnes and Ruby (2007) controlled for school transition and average grade size, there were no discernible differences between new K-8 and middle schools in terms of academic achievement.

Another study that looked at middle school achievement in North Carolina was conducted by Sanders-Smith (2009) during her doctoral dissertation. She looked at middle schools and K-8 schools in the eastern part of the state to discover if there was a difference in academic achievement. She utilized the North Carolina End of Grade test to determine academic progress. She found that there were no significant differences in Math or Reading test scores for Grades 6-8 between K-8 schools and middle schools. Her findings were consistent with work done by Dove, Pearson, and Hooper (2010). Of the 281 schools within their study, they found there was no relationship between grade span configuration and academic achievement in Language Arts or Math on the Arkansas Benchmark Assessment for all sixth graders in Arkansas in any configuration studied (PK-6, K-6, 1-6, sixth grade only, 6-7, 6-8, 5-6, 5-7 and 5-8). Even though both studies showed no significant differences between the grade configurations studied, they did touch on teacher practices in certain subject areas that may have accounted for slight gains.

Keegan (2010) examined students in New Jersey who attended K-8 and 6-8 middle schools and looked for trends in student performance on the New Jersey Assessment of Skills and Knowledge (NJ ASK) in reference to attendance, expulsion, and suspension rates. During his study Keegan controlled for socioeconomic level, school size, and class size. School and class size were controlled for by utilizing the corresponding number that is reported by the NJDOE on the New Jersey School Report Card for each school. Socioeconomic status was controlled by utilizing New Jersey's system of classifying every school by one of the eleven District factor groups (DFG's). The state uses many different factors from the U.S. Census to determine a school's DFG, such as percentage of population with no high school diploma, percentage with some college, occupation, population density, income, unemployment, and poverty. What he found was that students in K-8 schools scored higher in every variable except in expulsions.

Rockoff and Lockwood (2010) looked at student achievement for all students housed in middle schools and K-8 schools in New York City. They analyzed patterns of student achievement before and after students transitioned to middle school. Students who transitioned to middle schools exhibited a drop in reading and Mathematics of about 0.15 standard deviations and that trend continues through eighth grade. They also found that these students have a decline in attendance rates, which continues through their eighth-grade year.

In trying to find reasons why students showed a drop once they had transitioned to middle school, the researchers analyzed other variables they thought might have a direct relationship to these outcomes. They included average per-pupil funding, parent and

student school satisfaction measures, class size, school size, diversity of the student population, and peer stability which they define as "the fraction of a student's school-grade peers who were school-grade peers in the prior year" (Rockoff & Lockwood, 2010, p. 16). They found that middle school students were more diverse but had less peer stability, and larger amounts of students per grade. Similar to MacIver (1990), Rockoff and Lockwood (2010) found that school configuration is not the only factor that impacts student achievement. They concluded that these variables may have a negative effect on student achievement.

Another New York City study conducted by Schwartz, Stiefel, Rubenstein and Zabel (2011) looked at academic achievement for all eighth grade students. They attempted to find how student performance is affected by the path that a student moves along in elementary and middle school. Within their sample they tracked students who were in fourth grade and, based on their school at that time, what elementary and middle grade configuration they would attend if they stayed in that school district.

They found that students in the K-4/5-8 and K-8 settings had higher performances in math than the K-6/7-8 and K-5/6-8 settings. The K-5/6-8 setting had the highest percentage of White students, the lowest percentage of students who qualified for free or reduced lunch, and the highest third-grade scores. Thus, the setting that had the percentage of non-minority students with the highest beginning scores had the lowest achievement gains in math. In reading, the K-8 configured schools outperformed the other three settings by a 0.15 standard deviation. The K-5 setting was the most commonly used configuration, where its students would transfer to a 6-8 middle school. K-4 students normally transferred to 5-8 middle schools or into K-8 schools. K-4 schools

had the highest percentage of their students eligible for free lunch and K-5 schools had the lowest. Also the K-5 schools had the largest percentage of White students, whereas K-6 and K-8 had the highest percentage of Black students, with K-4 having the highest percentage of Hispanic students. Schwartz et al. (2011) found that "students who stay on the path as determined by the school's configuration have higher test scores on third and fourth grade tests and are less likely to be eligible for the free-lunch program and more likely to be White or Asian than students who go off the intended path" (p. 299).

Hildreth (2011) explored Baltimore's K-8 and 6-8 schools to find if there was any relationship between the school configuration and eighth grade reading and mathematics proficiency scores as well as ninth grade acceptance to selective high schools. Her study used Baltimore public school students' scores from 12,572 fifth grade students and followed them through their eighth-grade year, where their numbers declined to 7,772. Using hierarchical generalized linear modeling (HGLM), they found that 6-8 graded schools had a higher rate of students who were not proficient in mathematics or reading when they were in fifth grade as compared to students in K-8 schools. Students in middle schools were more likely to be older than the rest of their classmates, which could be explained through a higher retention rate.

The Yakimowski and Connolly (as cited in Hildreth, 2011) study also looked at students who attended a K-8 school versus students who were enrolled in a separate K-5 then a separate 6-8 middle school in Baltimore, Maryland. The first thing that stands out is the disparity in the ethnic breakdowns between the schools. In the K-5/6-8 setting 80% of the students were Black, while K-8 schools only had 54% of the same race. The same trend held true when they looked at the proportion of students who qualified for free or

reduced lunch. In the K-5/6-8 schools 78% qualified for the federal lunch program, but only 47% of K-8 students qualified for the same services. Students who attended the K-5/6-8 schools had lower baseline starting points on standardized tests. Once the researchers controlled for demographic and prior performance characteristics, the researchers found that "students in K-8 schools, on average, scored approximately nine scale score points higher than students who attended different elementary and middle schools. K-8 students were more likely to enroll in the district's selective high schools and were more likely to remain enrolled in district schools for sixth grade. Parents and principals also reported higher levels of satisfaction with K-8 schools" (Yakimowsky & Connolly, as cited in Hildreth, 2011, pp. 52-53).

Student Achievement and Attendance

A study was conducted by Fink (2010) in which she examined regular and special education students in the Baltimore public schools. She followed 5312 fifth grade students as they transitioned to middle school or remained in a K-8 school in the sixth, seventh, and eighth grades to determine which configuration had the greatest effect on student achievement in reading and math on the Maryland Student Assessment (MSA) and on attendance. Special education students were defined as students who had an Individualized Education Plan (IEP). The independent variables were school configurations which were made up of K-8 or middle schools. Fink used prior achievement in a similar way to Byrnes and Ruby (2007). She utilized fifth grade scores in reading and math on the Maryland Student Assessment as a predictor of student achievement. The dependent variables are reading and math achievement in fifth grade

and student attendance in fifth grade while controlling for free- and reduced-price meals, race/ethnicity, and gender.

Fink (2010) found that regular and special education students both tended to do better in K-8 schools than middle schools. Only sixth grade special education students had a significantly higher showing in K-8 schools than special education students in middle schools. Seventh and eighth grade special education students and six to eighth grade regular education students did not show a significant difference between the two configurations. In math, general and special education students tended to score at the same level in K-8 schools and middle schools. Sixth grade regular education students did produce significant gains in K-8 schools, which did not happen for sixth grade special education students in the same school setting. The researchers found no significant difference for seventh and eighth graders in math. Sixth graders as a whole (regular and special education) showed higher attendance rates in K-8 schools than in middle schools. Seventh and eighth graders showed no significant difference between K-8 and middle schools. Schools that had high attendance rates produced students with higher attendance rates even if those students had poor attendance rates in fifth grade. These findings would lead one to believe that during the sixth grade year, the effects of the school's configuration were at its highest. As students transitioned to seventh and eighth grades, the culture of the school took precedence, and students' academic performance and attendance rates took on more of the predominant characteristic being exhibited within the culture of the building.

Student Achievement and Student Discipline

Franklin and Glascock (1998) looked at 156 rural schools in Louisiana. They studied students' persistence as defined by attendance, suspensions, expulsions, dropouts and academic achievement on standardized tests. They analyzed schools with the configurations K-6/7, 6/7-8/9, 7/8/9-12, and K-12 schools. School data for Grades 6, 7, and 9-12 were looked at and the researchers found that sixth and seventh grade students performed better academically in elementary and K-12 settings than in middle or secondary schools. They also found that students in eleventh grade showed no difference in performance.

Cook, MacCoun, Muschkin, and Vigdor (2007) analyzed sixth grade student infractions and standardized end-of-grade (EOG) test scores in North Carolina from the school year 2000-2001. They studied reported infractions from North Carolina's administrative database that records discipline problems across the state. The study's sample consisted of 99 school districts. The schools' locales included in this sample ranged from rural to mid-sized cities. The sample they examined was of sixth grade students who attended an elementary school or a middle school. Students in K-8 schools were excluded from this study. What they found was that sixth grade students who attended middle schools had approximately "one infraction for every two students" (p. 12). Cook et al. (2007) do state that the infractions were made by a small percentage of the students, as 16.5% of the students were present in the database. The amount of incidence and rate of occurrence for every recorded infraction was higher for sixth grade students who attended middle schools than for those who attended elementary schools. Incidence rates were three times as high, while occurrence rates were twice as high. They

believe that the infraction rate may be understated due to the fact that their sample of middle school sixth graders were more privileged on average than those throughout the state.

On EOG test scores for Math and reading, Cook et al. (2007) found results in line with the infraction findings. They found that students who were scheduled to attend middle schools had higher Math and reading scores as fourth and fifth graders than those who were scheduled to remain in elementary schools. This would lead one to believe that those students who are going to attend middle schools start off with an advantage over their sixth grade elementary counterparts. As these students are tested in sixth grade, the students in middle schools have lost that advantage by about 10% of the standard deviation. "The disadvantage associated with moving to middle school in sixth grade is roughly equivalent to the disadvantage associated with having an inexperienced rather than an experienced teacher for a year" (Clotfelter, Ladd, & Vigdor, as cited in Cook et al., 2007, p. 16). These two results combined lead Cook et al. (2007) to believe that the transition to middle school in sixth grade made students suffer long-term academic as well as behavioral problems and that they should be separated from older adolescent students.

Transitions

In a five-year longitudinal study that followed students from childhood to early adolescence in Milwaukee, Simmons and Blyth (1987) looked at the impact of pubertal change and the movement from an elementary school to a large-scale secondary school for white youth. By following sixth grade students as they transitioned to seventh grade, then measuring them again when they were in ninth and tenth grades, the researchers

were able to compare students who came from K-8 schools and students who moved from K-6 schools. The sixth graders who were enrolled in the K-6 model would transition to a 7-9 junior high school, then finally land in a 10-12 senior high school. The students who were in a K-8 model would make only one move to a four-year senior high school. This study was able to track which path to senior high school produced the better prepared student when it came to self-esteem, preparedness, and extra-curricular activity participation. What Simmons and Blyth (1987) found was that "the structure of school transitions does appear to have an effect on individuals at this period in the life course" (p. 251). For sixth grade students, the K-6 structure produced more students with positive attitudes toward school and positive attitudes in regards to their self-image, including "a high self-rating of looks, sports ability, schoolwork ability, intelligence, and a high self-rating of popularity" (p. 251). They also had higher teacher evaluations and better mathematics achievement scores as compared to sixth graders in the K-8 setting.

When those same students transitioned to seventh grade, the results changed for the students who moved to the junior high setting. The seventh grade students in the K-8 setting reported higher self-esteem for girls, higher participation and taking leadership roles in extracurricular activities, higher GPA's and math achievement scores. Boys have a lower rate of victimization in the K-8 school setting. (Simmons & Blyth, 1987).

In ninth grade, when the K-8 students make their only transition to senior high school and the K-6 students become the oldest students in the junior high school, the results were mixed with some variables showing the junior high being more favored and other variables showing more benefit for the four-year senior high school. In tenth grade, however, students who came from the K-8 setting had been acclimated to senior high

school for one year, while the K-6 students were making another transition. The K-8 students in tenth grade "felt fewer feelings of anonymity, greater extracurricular participation, and for girls, higher self-esteem and leadership" (Simmons & Blyth, 1987, p. 253). The only variable that showed a disadvantage for K-8 students was in victimization.

In Missouri, Alspaugh (1998) looked at rural school districts to find any similarities or differences for students who transition to middle and high schools as compared to students who do not make a transition because they are enrolled in K-8 schools. He looked at three groups of 16 districts: Group 1 districts had K-8 schools that feed into a 9-12 high school, Group 2 districts had one elementary school that feeds into one middle school and that one middle school then feeds into one high school, and Group 3 districts had two to three elementary schools that feed into one middle school and then into one high school. He used two-way ANOVAs to analyze fifth and sixth grade standardized state tests. Alspaugh found that students who attended K-8 schools had increased their scale score points by an average of 7.4 points, while students who went from one elementary school to a middle school showed a decline of 5 points on average and students who came from multiple elementary schools to one middle school declined by an average of 7.1 points.

As students transitioned to their respective high schools all three groups reported a loss in student achievement. Students in K-8 schools reported the smallest amount of achievement loss and had the smallest dropout rate as compared to the other configurations. Students who came from multiple elementary schools and merged into one middle school showed the most achievement loss and the highest dropout rate

compared to the other two configurations, although the dropout rate between the students who came from one elementary school and those who came from multiple elementary schools was similar. The author states that students who come from middle schools potentially find themselves in a "double-jeopardy situation" where the achievement loss could be contributing to the higher dropout rates (Alspaugh, 1998, p. 24).

Also in Michigan, Wren (2003) found that in a large urban inner city school district in Michigan that "the more levels that a school services the better the students perform. The more transitions a student makes, the worse the student performs..." (p. 10). After analyzing 232 schools within the district she states that in looking at grade span configuration and school-to-school transition independently the results remain constant. When the variables are studied together, only school-to-school transition was proven to be a significant predictor of student achievement.

Studies with Multiple Outcomes

As a strong advocate for K-8 schools, Yeche (2005) highlighted the reasons why many people believed that the middle school concept was a failure. Her views on the middle school concept were that it did not adequately prepare students to compete internationally as illustrated on the TIMMS or on the PISA reports. She describes three different case studies of the experiences of schools in Milwaukee, Philadelphia, and Baltimore, respectively, as they transitioned to a K-8 configuration. In each case she explains the views of parents, teachers, and administrators concerning how the move to a K-8 configuration affected the discipline and behavior, achievement, cross-grade interactions, transfer students, and students' length of time in the building.

In Baltimore, the K-8 school still performed better and had fewer discipline issues than the local middle school, but teachers felt that parent involvement had dropped due to a policy of students with poor academic backgrounds being allowed to transfer to the school. Older transfer students tend to have a hard time adjusting to the academic and behavioral expectations of the K-8 school. Teachers expressed that the biggest shortcoming they found with the K-8 model is the "inability to provide as wide an array of choices as the local middle school" (Yeche, 2005, p. 27). There were also concerns over the transition to high school. Teachers felt there was an underlying conflict between the nurturing aspects of the elementary school and the need to help prepare students for high school.

The Milwaukee case study showed some similarities and differences to the Baltimore case study. As in Baltimore, the K-8 school in Milwaukee outperformed the local middle school in the area of standardized test scores and higher expectations academically and behaviorally for their students. The largest difference between them came in cross-grade interactions. The Milwaukee school reported that they had experienced great benefit from having their middle school students' work with the elementary population, which the Baltimore school did not share due to the large number of imposed transfers put upon them (Yeche, 2005).

In Philadelphia, the K-8 school that was examined had shown gains in all grades over a three-year period. Those gains were highlighted with 16% -30% of the students scoring at or above the national average (Yeche, 2005). Even with these gains more than half of the student population is below the national average. Teachers attribute this to the 40% of students for whom English is not their first language. Yeche (2005) points out

that the school in Milwaukee has 35% of their students who do not speak English as a first language but have a much higher achievement level.

Proponents of traditional middle school education believe that the configuration of a building is just one piece of what makes a middle school successful or not (Swaim, 2004; Epstein & Mac Iver, 1990). Organizations like the National Middle School Association (NMSA) have stated that the reason middle schools have not shown the same success as K-8 schools is that the middle school concept is not being fully implemented and therefore the middle school configuration is not to blame (Swaim, 2004). As stated earlier, Yeche (2005) defines the middle school concept as "the belief that the purpose of schools is to create children imbued with egalitarian principles--in touch with their political, social, and psychological selves--who eschew competition and individual achievement and instead focus on identity development and perceived societal needs" (p. 2). Bowie (2007) found that district personnel in Baltimore and Philadelphia have increased the number of K-8 schools due to better results from established K-8 schools. She reported that in Baltimore and Philadelphia there was "no significant difference in achievement between those students and their peers in traditional middle schools of sixth through eighth grades" (p. 1). Bowie references Mac Iver as saying that the results of the higher achieving K-8 schools could be skewed due to K-8 schools being in more affluent areas of Philadelphia and able to attract and retain better teachers. Mac Iver states that the quality of teaching, the curriculum, and other factors are just as important as the school's configuration. This is alluded to by Byrnes and Ruby (2007) as they describe that older K-8 schools in Philadelphia have smaller percentages of high poverty. Taking these

findings into account, the degree of teachers' credentials and the rate at which students move between schools can also affect student performance in either school configuration.

Weiss and Kipnes (2006) studied Philadelphia eighth grade students in K-8 and middle schools. Their findings differed from some of their contemporaries. They looked at four outcomes: students' average final grades, students who received an F as a final grade, students who had a 20 or more percent absentee rate, and student discipline records. When compared separately, the middle schools show a significant difference with students having lower grade averages than K-8 school students, more likely to fail a course, and poor attendance records. They also have lower self-esteem and exhibit feelings of being less safe and more threatened in middle schools than in K-8 schools.

The researchers controlled for two school-level predictors, school size and racial composition. They describe the predictors school size as being the number of eighth grade students in the 1995-96 school year and racial composition as the percentage of African-American students in the student population. Individual predictors were listed as students' race, gender, whether a student has been retained at least once during his or her school career before the end of their eighth grade year, parents' education level, parents' income, and middle school attendance.

When the researchers analyzed their multi-level model, they found middle school attendance was not significant when it was the only predictor or when they controlled for school and individual variables to any of the four outcomes. Grade averages and the likelihood of failing a course were not significant for students who attended middle schools versus those who attended K-8 schools. Even though the grade average for those who attended K-8 schools was slightly higher, it was nowhere near significant (Weiss &

Kipnes, 2006). They did find that class size and being an African American raised a student's chances to fail at least one course and have lower grade averages. When controlling for these factors, Weiss and Kipnes (2006) found that in most cases school configuration did not have a significant effect on the four outcomes. These findings show that the K-8 schools studied in Philadelphia by Weiss and Kipnes did not have the same dominance over middle-graded schools as those of Offenberg (2001) did.

High School Preparedness

Weiss and Baker-Smith (2010) also looked at the relative effectiveness of how middle schools and K-8 schools prepare students for ninth grade in Philadelphia. They conducted 1483 interviews of incoming ninth graders and their parents and again when those students had finished their ninth grade year. Over 1200 interviews of students and the parents of students who had just completed the ninth grade were conducted. They found that ninth graders who attended middle schools for eighth grade scored significantly lower than those students who attended K-8 schools by more than two full points in their final grade average. When looking at the variables receiving an *F* as a final grade, number of absences, nonacademic peers' views on school, and student delinquent behavior, the same results occur. Students who have attended middle schools are more likely to have higher rates of these variables: peers who have negative nonacademic views about school and a higher rate of missing school. Middle school was a significant predictor for all of the outcomes except missing school. An interesting find was that "students from middle schools are less likely to have friends who hold attitudes hostile toward school and are more likely to be delinquent in school than are those who attended a K-8 school" (Weiss & Baker-Smith, 2010, p. 833).

Weiss and Baker-Smith (2010) built on their findings to see if the same results occurred with students who attended one of the four magnet high schools in Philadelphia. When they looked at grade average, the coefficient was reduced but still significant for those students who attended middle schools. Receiving an *F* as a final grade and having excessive numbers of absences was not significant for students who attended middle schools once the predictor of magnet schools was added. Having friends with anti-school values was not connected to the variable school attendance at a magnet school as it was for middle school students. When the predictor of magnet school attendance is added, most of the middle school differences on student outcomes are no longer significant. Magnet school and K-8 school attendance were positive significant factors on student outcomes for ninth graders.

Weiss and Baker-Smith (2010) found similar results to Simmons and Blyth (1987) in regard to what extent the K-8 and middle school structures prepare middle-grade students for high school. Both studies found that K-8 schools produced positive results in the outcomes they researched. Simmons and Blyth (1987) were focused on how transition, or the lack of transition, affected students as to social aspect, while Weis and Baker-Smith (2010) looked at a combination of academics and social behavior. The social findings for both showed for most indicators that students from K-8 schools adjusted better to high school.

Educators' Views, Practices, and Professional Development

In a national study, McEwin, Dickinson, and Jacobson (2004) found that students are more likely to receive instruction through interdisciplinary teams in middle schools than in K-8 schools. The researchers found that 77% of middle schools and 33% of K-8

schools were using the interdisciplinary practice to teach students. These are important findings as they align with findings from various researchers who found that students who experience interdisciplinary teaming/instruction in middle schools have higher achievement scores than K-8 schools (Felner, Jackson, Kasak, Mulhall, Brand, & Flowers, 1997; Lee & Smith, 1993; Mertens, Flowers, & Mulhall, 1998).

McEwin, Dickinson, and Jacobson (2004) found in their national study of over 100 K-8 schools that 84% of those who replied believed that the ideal configuration for middle grade students is a separate middle school and only 16% believed that the K-8 setting is better for these students. These results were similar to a study conducted by Valentine, Clask, Hackman, and Petzko (2002) who found that 65% of middle level principals also believed that the middle school configuration of Grades 6-8 was the best for student achievement.

Schmitt (2004) looked at 43 schools within a Midwestern state to gauge the level of professional development that was being conducted at those schools. She found that traditional middle schools were more engaged in professional development activities for the teachers than K-8 schools. They also found that when looked at in totality, professional development and grade configuration did not have a direct relationship to student achievement.

Summary

Over the last 30 years there has been a multitude of research that has studied the effectiveness of Pre-K/K-8 and middle schools. Most of the studies discuss the academic achievement or social benefit for general education students, but few expound upon how the Pre-K/K-8 configuration may affect a school's special education population. Student

achievement tends to be the outcome that is studied more than any other regardless of whether it was on classroom/school based assessments or standardized tests. Even though the K-8 schools have had more positive results for general education middle grade students, there have been a number of studies that do not show a difference between the two configurations when it comes to student achievement. Many researchers express the need for further research on grade configuration.

The number of transitions a middle grade student makes has been shown to have an effect on his or her current academic performance and future academic and social preparedness for high school. Interdisciplinary practices and professional development are both items that have stronger representation in middle schools than in K-8 configured schools. When interviewed, most principals have expressed that they believe the middle school is the better place to house middle grade students so that their needs may be met.

CHAPTER III

METHODOLOGY

Research Design

This is a quantitative, cross-sectional study in which a two-group comparison design was implemented using existing data. The purpose of this study is to determine whether school configuration had an effect on academic achievement on the 2011 NJ ASK in Language Arts and Math for sixth and eighth grade special education students in New Jersey. This was done by using the percentage of special education students in a school who have scored Proficient and Advance Proficient to gain the total proficiency rate for sixth and eighth grades. The study also determined to what extent the variables total school size, mobility rate, and percentages of economically disadvantaged and special education students have an effect on academic achievement in K-8 and traditional middle schools. The schools in this study are all part of a New Jersey public school district that is governed by a local board of education. Schools that are classified by the New Jersey Department of Education as charter schools, vocational schools, or specialized schools were not included in this study as they have specific curriculum criteria that may not be aligned with the curriculum of the public schools within the same town in which they reside or have different criteria for the admission of special education students. The 2011 NJ ASK proficiency percentages, school configuration, total school size, mobility rates, percentages of economically disadvantaged and special education students for the K-8 and middle schools within this study are publicly available on the New Jersey Department of Education website.

Theoretical Framework

In this study the dependent variable student achievement was measured using NJ ASK scores of sixth and eighth grade special education students in K-8 and 6-8 schools in New Jersey. New Jersey school districts are situated in a wide variety of environments that include city, suburban, town, and rural communities (U.S. Department of Education, 2012). A school's grade configuration, especially for middle-school-aged students and what information they can provide can vary greatly depending on the grade configuration of the respective building (Yeche, 2005; Wihry, Coladarci, & Meadow, 1992; White, 1964; Swaim, 2004; Snell, 2004). The learning environment that a school produces for students can also have an effect on the academic behavior produced within the school (Fink, 2010). Adolescent-aged students have been the focus of many studies over the last 30 years. There have been researchers who believe that the developmental changes that adolescents face can in part be the result of developmental changes at the individual and social environmental levels (Eccles, Midgley, Wigfield, Miller-Buchanan, Reuman, Flanagan, & Mac Iver, 1993; Higgins & Parsons, 1983).

Eccles et al. (1993) propose that "some of the negative psychological changes associated with adolescent development result from a mismatch between the needs of developing adolescents and the opportunities afforded them by their social environments" (p. 90). These researchers examined how the imbalance between the student and the interactions he or she faces at home and school may contribute to the adolescent not being successful in those environments.

Using the person-environment fit theory (P-E Fit theory) as developed by Hunt (1975) as a starting point, Eccles and Midgley (1989) surmised that a decline in

adolescent behavior and motivation could be a result of an inappropriate educational environment. In P-E Fit theory behavior, motivation and mental health are affected by "the fit between the characteristics individuals bring to their social environment. Individuals are not likely to do well, or be motivated, if they are in social environments that do not meet their psychological needs (Eccles et al., 1993, p. 91). Under P-E Fit, motivation, interest, performance, and behavior will decline if the environment of the school does not match the needs of the adolescents it serves (Eccles et al., 1993).

This led researchers to consider the possibility that there could be systematic differences between middle grade classrooms in elementary and junior high settings that could be the cause of a portion of the motivational changes among adolescents as they transition into middle or junior high schools. If this is correct, then some early adolescent problems may be a result of the negative changes in the school environment (Higgins & Parsons, 1983).

In Stage-Environment Fit Theory, Eccles et al. (1993) propose that if different educational environments may be needed to meet the developmental needs for different age groups, then it is also plausible that "some types of changes in educational environments may be inappropriate at certain stages of development (e.g., the early adolescent period). In fact, some types of changes in the educational environment may be developmentally regressive. Exposure to such changes is likely to lead to a particularly poor person-environment fit, and this lack of fit could account for some of the declines in motivation seen at this developmental period" (Eccles et al., 1993, p. 92).

Within Stage-Environment Fit, the fit between the developmental needs of the student and the educational environment is what is important. The paths of both the

student and the educational environment will produce positive consequences and growth when both are in synch. If the school environment can be aware and responsive to the evolving needs of the students and provide the kind of experiences that will foster continued growth, then that environment or stage should have a positive impact on the students. When the two paths are not in sync and the educational environment or stage does not specifically take into account the educational needs of the students, continued growth will happen at a smaller rate and produce educational declines, especially if the environment is developmentally regressive (Eccles et al., 1993).

This study uses Eccles et al. (1993) Stage-Environment Fit theory as a guide not only to study how special education students are performing on the NJ ASK but also to determine if the effects of the control variables are different for sixth and eighth grade special education students. Selecting to analyze NJ ASK scores for special education sixth and eighth grade students answers the question "Upon whom is this study focused?" The purpose of the study is two-fold: (1) It provides information that may aid school stakeholders in deciding whether school configurations matter when looking at the student achievement of special education students in Grades 6 and 8 and (2) It will determine which configuration, K-8 or middle school, seems to provide an environment that is more appropriate for middle grade adolescents to succeed based on the dependent variable NJ ASK scores.

Population

The population for this study is students in schools in New Jersey that were configured with the K-8 or 6-8 grade spans. The schools had to have a reported 2011 NJ ASK special education proficiency percentage for both Math and Language Arts in either

sixth or eighth grade. There were a total of 120 sixth grade and 122 eighth grade schools that met this criterion. Sixth grade schools were made up of 88 middle and 32 K-8 schools, while the eighth grade schools were comprised of 83 middle and 39 K-8 schools. To ensure that the same schools were being analyzed in both subject areas, schools that did not have both Math and Language Arts special education proficiency percentages were not included in this study. The sixth and eighth grades were the only grades examined for this study. There were 4027 sixth grade and 3756 eighth grade special education students that were housed in the K-8 and traditional middle schools that were used in this study.

Instrument

The NJ ASK was developed to adhere to the federal mandates enacted with the No Child Left Behind Act. Federal regulations required every state to conduct "annual standards-based assessment of all children in grade 3 through 8" (New Jersey Department of Education, 2012b, p. 1). Grades 3-8 students take a Language Arts Literacy and Mathematics portion of the test. Grades 4 and 8 take an additional Science section. The scoring of the exam is broken into three ranges of scale scores: Partially Proficient, 100-199; Proficient, 200-249; and Advanced Proficient, 250-300. Students whose scores fall in the Partially Proficient range "are considered to be below the state minimum of proficiency and those students may be most in need of instructional support" (New Jersey Department of Education, 2012c, p. 1). The test is given to students within these grades every spring so that educators have the most time possible to prepare their students, giving them the best chance of receiving a score of Proficient on the assessment. All special education students must take the NJ ASK unless their IEP specifically states that

they are to take the Alternate Proficiency Exam, which is reserved for students with severe cognitive disabilities. The NJ ASK's validity is based partially in how well it assesses the New Jersey Core Curriculum Content Standards. New Jersey school districts must ensure that all curriculum and teacher instruction are aligned to the standards. They must also take measures so that student performance is being assessed in each content area of the standards and that teachers receive professional development that is focused on the standards. "Adequate representation of the content domains defined in the CCCS is assured through use of a test blueprint and a responsible test construction process. New Jersey performance standards, as well as the CCCS, are taken into consideration in the writing of multiple-choice and constructed response items and constructed-response rubric development. Each test must align with and proportionally represent the sub-domains of the test blueprint" (New Jersey Department of Education, 2012d, p. 140). Reliability and validity were consistent across all subgroups, including general and special education students. A full description and analysis of the reliability and validity of the NJ ASK was published in the *New Jersey ASK 2011 Grades 3-8 Technical Report* (New Jersey Department of Education (e), 2012).

For grades 6-8, the NJ ASK is comprised of multiple choice, short constructed response and extended constructed response questions in Mathematics and multiple choice and open-ended response questions in Language Arts Literacy. In Language Arts Literacy each multiple-choice question was worth one point while the open-ended responses were worth four points that are scored on a rubric. The Language Arts Literacy section is divided into three sections: Analyzing Text, Working with Text, and Writing, which is further divided into persuasive and explanatory writing.

Instrument Reliability

The 2011 NJ ASK employs multiple methods to ensure the reliability of the exam. The goals of the reliability process are to ensure that the test produces stable scores repeatedly under like conditions for both general education students and subgroup populations, including special education students. Cronbach Alpha was conducted to deduce the reliability of the exam for general education students and all of the subgroups studied. For sixth and eighth grade students, regardless of subgroup they fell within, the acceptable range was 0.70-0.95, which establishes that the test overall was reliable. Table 4 shows the general and special education Cronbach Alphas for both Math and LAL in sixth and eighth grades (New Jersey Department of Education, 2012d).

Table 4

Cronbach Alpha scores for 6th and 8th Grade General and Special Education Students in Math and LA on the 2011 NJ ASK.

	6th Grade Math	6th Grade LA	8th Grade Math	8th Grade LA
General Ed Stds	0.91	0.89	0.92	0.91
Special Ed Stds	0.90	0.89	0.89	0.89

Instrument Validity

The questions found on the 2011 NJ ASK were created to align with and measure the NJ Core Curriculum Content Standards to determine if all students can demonstrate the required skills to show proficiency in the Math, Language Arts, and Science subject areas. All of the standards and assessments are reviewed by professionals from the state

Department of Education and bias and sensitivity review committees to "identify and eliminate elements that may favor one group (e.g., language, culture, ethnicity) over another. Test items are developed under universal test design principles with New Jersey special student populations in mind so that no student group is disadvantaged" (New Jersey Department of Education, 2012d, p. 26). The fact that accommodations are provided for special education students helps to reduce inaccuracy and ambiguity so that student knowledge and ability can be analyzed (New Jersey Department of Education, 2012d). Validity is also evident by the ability to compare and interpret proficiency scores across different subgroups. The student item responses for all of the subgroups are "combined for item analysis, calibration and equating. These analyses include all students regardless of the test version taken; i.e., operational, Spanish, Braille, or Large Print" (New Jersey Department of Education, 2012d, p. 26).

Data Collection: Description of Variables

1. Dependent Variable - 2011 NJ ASK proficiency rate for sixth and eighth grade special education subgroup in Math and Language Arts.
2. Independent Variable - school configuration. This is the grade range which a school services. In this study the configurations 6-8 and K-8 are analyzed.
3. Control Variables
    a. Total School Size - The total student population in the school in 2011.
    b. 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. The data within mobility rate were transformed using $\log_{10}$ to create a normal distribution.

c. Economically Disadvantaged -This is the percentage of students who qualify for free or reduced lunch within a school. It is calculated by dividing the total number of students who are eligible for free or reduced lunch by the total enrollment.

d. District Factor Group (DFG) -This divides the schools within a set of data into two categories, upper and lower. The schools in the upper DFG reside in the four more affluent District factor groups (FG, GH, I, J). Schools within the lower DFG's are housed in the four least affluent DFG's (A, B, CD, DE). This was solely used in the two-way ANOVA so as to not compare interactions of schools from different socioeconomic statuses.

e. Percentage of Students with Disabilities - This shows 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.

The dependent variable for this study was 2011 NJ ASK proficiency percentages in sixth and eighth grade for K-8 and traditional middle schools. The independent variable was grade configuration, either K-8 or traditional middle school. Within the hierarchical multiple regression there were four control variables used: total school size, mobility rate, percentage of economically disadvantaged students in a school, and percentage of special education students in a school. In the two-way ANOVA, district

factor group and configuration were studied. The New Jersey Department of Education (NJDOE) provides a website which maintains a listing of all public schools as well as performance data for those schools within the state. All of the data collected in this study are available to the public via The New Jersey Department of Education website.

The dependent variable NJ ASK proficiency rate was calculated by adding the percentage of Proficient and Advanced Proficient students for a school's sixth and eighth grade special education population. The independent variable grade configuration was determined by researching the reported grade span of each school in New Jersey from the NJDOE website. A list was then generated only of schools that were configured K-8 or 6-8. K-8 schools were then dummy coded 1 while 6-8 schools were coded 0. For four of the five control variables, total school size, mobility rate, district factor group, and percentage of special education students in a school, public data were available for the schools collected in this study. The percentage of economically disadvantaged students was calculated by taking the number of students within the school who were reported as economically disadvantaged and dividing that number by the total population figure. Datasets were created with this information that were compatible with the SPSS program to conduct a hierarchical multiple regression and a two way ANOVA. Sixth and eighth grade had two datasets each, one for Math and another for Language Arts.

There are four situations in which the State of New Jersey will suppress testing information and not make a school's results public. They are as follows: (a) Data are not reported where the number of students with valid scale scores for a particular group is greater than zero but less than 11, (b) Data are not reported for groups where over 90% of the students are Partially Proficient, (c) Data are not reported where educational program

or demographic groups are mutually exclusive (e.g., gender) and there are one or two students with a valid scale score in one of the groups (e.g., male), and (d) Data are not reported when it is otherwise possible to identify individual student performance" (New Jersey Department of Education, 2012d, p. 3).

By using publicly available data, no request was needed to be made to the NJDOE for suppressed material. Only schoolwide information was used; therefore, no individual's information was compromised and individual confidentiality was upheld. This study does not and will not provide names or identifiable characteristics of any specific students or schools.

Hypothesis

The overarching hypothesis was that there was no significant difference between the K-8 and traditional middle school proficiency rates for sixth and eighth grades when controlling for total school size, mobility rate, percentage of economically disadvantaged, and percentage of special education students in a school. If this hypothesis were to be rejected, K-8 schools could be producing a setting that is more conducive to academic achievement on the NJ ASK.

The individual hypotheses, which correspond to the research questions, are presented below. The research questions from Chapter I are presented first so that the reader may view them in conjunction with their associated hypothesis.

Research Questions

1. Do K-8 configured schools perform on average better than schools configured as traditional middle schools for the sixth and eighth grade special education population on the NJ ASK in Math and Language Arts?

2. What is the impact of grade configuration on academic achievement on the 2011 NJ ASK for the sixth and eighth grade special education subgroup population when controlling for the variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students in K-8 and traditional middle schools in Math and Language Arts?
3. How do the effects of the control variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students differ by grade level between the sixth and the eighth grade special education subgroup population in K-8 and traditional middle schools in Math and Language Arts on the 2011 NJ ASK?

Individual Hypotheses

The null hypotheses for the above research questions are as follows:

1. K-8 configured schools' performance will not on average be significantly different than schools configured as traditional middle schools for the sixth and eighth grade special education population on the NJASK in Math and Language Arts.
2. Controlling for the variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school, K-8 schools will not on average significantly affect school proficiency rates on the NJ ASK for the sixth and eighth grade special education population.

3. The effects of the control variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school will not be significantly different between sixth and eighth grade levels on Math and Language Arts NJ ASK special education proficiency rates for K-8 and traditional middle schools.

Data Analysis

The research conducted was cross-sectional in nature. Hypothesis 1 was tested using a two-way ANOVA. Grade configuration (coded 0=6-8 schools, 1=K-8), and district factor group (coded 0=lower DFG schools, 1= upper DFG Schools) served as the independent variables and NJ ASK special education proficiency rates produced mean scores for sixth and eighth grade in Language Arts and Math as the dependent variable. The research also sought to find if there was an interaction between grade configuration and DFG as individual variables and if there was an effect on the dependent variable special education proficiency rates after the two variables were combined. The data produced would be able to show if K-8 schools' performance on average was significantly different than 6-8 schools.

Hypotheses 2 and 3 were tested using hierarchical multiple regression (HMR). HMR allows researchers to test variables in the order that they chose, and not all at once, based on the amount of variance in the dependent variable (Petrocelli, 2003). Multiple regression is a form of statistical analysis that predicts the value of an outcome from more than one independent variable. HMR goes a step further by examining the relationship between a dependent variable and multiple independent variables when

controlling for the effects of a different set of independent variables. It provides a hypothetical model of the relationship between several variables (Field, 2009).

There were two blocks of independent variables that were regressed upon the NJ ASK special education proficiency rates. The first model analyzed all four of the control variables with the dependent variable. This gave the researcher a preliminary test as to what extent these variables affect the dependent variable. The second model added the independent variable configuration to the set of control variables. The addition of the independent variable into the second model showed whether K-8 or traditional middle schools have an effect on NJ ASK proficiency rates, taking into account the effects of the control variable. The amount of variance that grade configuration adds to the second model was reported via the R^2 change. This process was repeated for sixth and eighth grade Math and Language Arts.

An analysis of the coefficient tables allowed the researcher to examine individual betas for the control and independent variables for the sixth and eighth grades for both Language Arts and Mathematics. The coefficient table was produced during the HMR and used in part to study Hypotheses 2 and 3.

Assumptions

There are six assumptions that must be met and/or addressed when using HMR. The first assumption is that of sample size. Studies with small sample sizes do not offer enough scientific value and are not significant enough to consider the results repeatable. The formula to determine sufficient sample size is $N > 50 + 8$(the number of independent variables). This study has five independent variables and when that number is placed

into the equation, the minimum N that is required is 90. For this study the sample size for sixth grade schools is 120 and for eighth grade schools is 122, which satisfies this assumption.

The second assumption is normality. This refers to the rate at which the data are normally distributed along a bell curve. When sets of data are not naturally distributed evenly, procedures such as removing outliers and transforming data can be attempted to make the data fit into a normalized pattern. One method of determining the normalcy of the data is examining their skewness and kurtosis levels. Skewness and kurtosis levels that fall between -1 and + 1 are ideal, but for parametric statistics it is acceptable to have scores that fall between -2 and +2. Table 5 shows the skewness and kurtosis levels for the sixth grade control variables. Mobility ate had skewness and kurtosis levels higher than what is acceptable for parametric testing. This variable was transformed using $\log_{10}$ to bring its level within an acceptable range. The findings are presented in Table 6. The transformed data for mobility rate within a school were used for data analysis.

Table 5

Skewness and Kurtosis Levels for 6th Grade Control Variables before Transformation

Descriptive Statistics

6th Grade	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Total School Size	120	147.0	1534.0	706.550	289.1663	.542	.221	-.084	.438
Mobility Rate	120	.0	43.1	7.938	6.9123	1.993	.221	5.667	.438
Econom Disadvantaged	120	.0	95.2	28.824	28.4151	.956	.221	-.321	.438
Percent of Students with Disabilities	120	2.1	31.3	15.424	4.4248	.138	.221	1.183	.438
Valid N (listwise)	120								

Table 6

Skewness and Kurtosis Levels for 6th Grade Control Variables after Transformation

Descriptive Statistics

6th Grade	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
MobRate Log10	120	-.52	1.63	.7497	.38301	-.390	.221	.287	.438
Valid N (listwise)	120								

Data for the eighth grade control variables found similar results. A school's mobility rate was found to be out of acceptable skewness and kurtosis range and had to

be transformed using $\log_{10}$. Tables 7 and 8 show the results before and after the transformation. The transformed data were used for data analysis within this study.

Table 7

Skewness and Kurtosis Levels for 8th Grade Control Variables before Transformation.

Descriptive Statistics

8th Grade	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
School Size	122	147.0	1534.0	698.852	295.4295	.642	.219	-.199	.435
Mob Rate	122	.0	55.9	8.398	8.0297	2.399	.219	9.434	.435
Econ Disadvant	122	.0	95.6	31.125	30.6067	.771	.219	-.789	.435
Students with Disabilities	122	2.1	31.3	14.842	4.2554	.041	.219	1.649	.435
Valid N (listwise)	122								

Table 8

Skewness and Kurtosis Levels for 8th Grade Control Variables after Transformation.

Descriptive Statistics

8th Grade	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Mob Rate Log10	122	-.52	1.75	.7505	.41026	-.291	.219	-.039	.435
Valid N (listwise)	122								

The third assumption is one of linearity. This states that the data used should produce a straight line relationship with the dependent variable scores. For all four datasets, the information fell within acceptable guidelines of linearity.

The fourth assumption is homscedasticity. In this case the variance of the residuals about predicted dependent variable scores should be the same for all predicted scores. This means that all the levels of independent variables have the same variance of errors. When this does not occur, it could give distorted findings and abate the analysis. This is shown through scatter plots conducted with the regression standardized residual and regression standardized predicted values of the dependent variables from the four data sets. To determine if homoscdasticity occurs, the residuals should have data points centered around 0 in a non-uniform pattern. Three of the four scatter plots showed a non-uniform pattern. Eighth grade LAL did produce a scatter plot that showed a pattern with a majority of the data pushed to the right of 0. When the line of fit was placed on the scatter plot, it did show a fairly evenly dispersed set of data points above and below the line.

The fifth assumption is multicollinearity. This happens when two or more independent variables are too closely correlated and provide repeated data about the results. This is measured by the Tolerance and Variance Inflation Factor (VIF). For the four data sets the Tolerance factor was above the recommended 0.10, and the VIF was less than the recommended 10 for all variables. This shows there is an absence of multicollinearity.

The sixth assumption is the removal of outliers. For all four datasets the standardized residuals fell within the range of -3.3 and +3.3 which showed no outliers within the data.

Hypothesis 1

Hypothesis 1 states that K-8 configured schools' performance will not on average differ significantly from schools configured as traditional middle schools for the sixth and eighth grade special education population on the 2011 NJ ASK in Math and Language Arts. A two-way ANOVA was conducted in SPSS, utilizing special education proficiency rates for K-8 and 6-8 schools divided into two groups, schools that are in the four lower SES district factor groups and those schools in the four upper SES district factor groups. This provided average mean scores for both configurations to verify if the achievement outcomes are significantly different from the two school configurations. The two-way ANOVA also examined whether configuration and DFG have an effect individually or combined with the dependent variable. The process was conducted for Math and Language Arts in sixth and eighth grade using SPSS software.

Hypothesis 2

Hypothesis 2 states that when controlling for the variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school, K-8 schools' performance will not on average be significantly different than traditional middle schools for the sixth and eighth grade special education population on the NJ ASK in Math and Language Arts. A HMR analysis was performed with two models. The first model analyzed the effects of the control variables on the dependent variable, the 2011 NJ ASK proficiency rate for the special education subgroups in Math and Language Arts. The second model added the independent variable to the set of control variables, to see if grade configuration has an effect on special education proficiency rates in K-8 and traditional middle schools. The

value of the beta for configuration within the second model was analyzed to determine the strength and direction of the variable. The R^2 change would indicate if there is an added variance to the total effect on the dependent variable by adding configuration to Model 2. The process was conducted for Math and Language Arts in sixth and eighth grade using SPSS software.

Hypothesis 3

Hypothesis 3 states that the effects of the control variables total school size, mobility rate, percentage of economically disadvantaged students and percentage of special education students per school will not be significantly different for the sixth and eighth grade on Math and Language Arts NJ ASK special education proficiency rates for K-8 and traditional middle schools. An HMR was performed with two models. The individual beta weights from the coefficient tables were compared between Models 1 and 2 within the same grade; e.g., sixth grade Models 1 and 2 and eighth grade Models 1 and 2. The beta weights were also compared between the same models over both grades; e.g., Model 1 compared in sixth and eighth grade and Model 2 compared in sixth and eighth grade. The process was conducted for Math and Language Arts in sixth and eighth grade using SPSS software.

Limitations

Research on grade configuration has not been consistent in its results. This makes drawing general or valid conclusions about grade configuration very difficult. This study aims to add to the current literature of the effect of grade configuration and student achievement by analyzing student data at the schoolwide level. The limitations that have come about are as follows:

1. This study is limited to the way districts and/or schools have reported special education students' classifications for the NJ ASK. Students' classification must be provided to the state in early October for that school year's NJ ASK test that is usually taken in April or May. Students' being classified incorrectly or being classified after the October reporting date may provide false information about students' special education status.
2. There is a small population of special education students whose districts pay tuition for them to attend schools in another school/district. These students take the NJ ASK in the district in which they attend school, but their scores are sent back to their home districts.
3. This study is limited to the process of how results for the special education population are provided to the public by the New Jersey Department of Education. Results for the special education population on the NJASK are not separated by the fourteen individual special education classifications but rather they are all reported under the label of special education.

Delimitations

There are several delimitations to the study:

1. This study looked at schools only within the state of New Jersey. States with different percentages of socioeconomic status, special education rates, mobility rates, and school sizes may produce different results.
2. This study examined only schools that are configured as K-8 or as middle schools within the state of New Jersey. Schools that are configured in ways

other than K-8 or as a middle school were not part of this study and may foster different results.

3. The outcome variables are delimited to just NJ ASK results. The NJ ASK is a universal assessment given to all New Jersey students in Grades 3-8. Schools use a multitude of varying school-based measures of student achievement, such as report card grades, homework, class work etc. The calculation and assigning a grade to these outcomes varies from district to district and even between classes within the same building. Due to there not being one common method to assign a grade to these other school-based outcomes in the different schools, only NJ ASK scores were used as a dependent variable.
4. This study examined only the proficiency rates of the special education subgroups on the 2011 NJ ASK. It did not examine how the processes within a school affect the NJ ASK special education proficiency rate, such as how staff, students, and parents perceive configuration effects, student outcomes, teaching styles, and curricular decisions.
5. This study only explored results for 6^{th} & 8^{th} grade special education populations in K8 & 6-8 schools in New Jersey. It did not compare these results with those from the general education population.

Summary

This chapter provided details on New Jersey's Grade 6 and 8 special education students, including the research design, population, data collection, hypotheses, and data analysis involved in the study of the effects of the K-8 and middle school configuration

on academic achievement as defined by the NJ ASK for the special education subgroup. The hypotheses were created to address the research questions presented in this study. This study involved the special education subgroup in Grades 6 and 8 housed in K-8 and middle schools. Using HMR, data were analyzed to ascertain the effect of the K-8 and middle school configurations on NJ ASK results for the special education subgroup. Control variables such as total school size, mobility rate, economically disadvantaged, and percentage of special education students within a school were also examined to see what effect they had on this population. Chapter IV will present the findings and analyses of the data.

CHAPTER IV

ANALYSIS OF THE DATA

Introduction

This chapter presents the results of the data analysis conducted of sixth and eighth grade special education proficiency rates in K-8 and 6-8 middle schools in New Jersey. The analysis was cross-sectional in nature and included a comparison of mean proficiency scores of K-8 and middle schools as well as examining the effect, if any, of grade configuration on academic achievement when controlling for schoolwide factors.

The population for this study was K-8 and 6-8 configured schools that had unsuppressed sixth and eighth grade special education proficiency rates available on the New Jersey Department of Education's website. The data were collected from the New Jersey Department of Education website. These data were analyzed using the Statistical Package for Social Sciences (SPSS), Version 21 software. The study design, population, and instrument used were described in the previous chapter. This chapter provides a description of the characteristics of the sample as well as a presentation of the descriptive statistics on the basic independent and dependent variables. This is followed by a restatement of the hypothesis associated with each research question. A report of the results of the analysis for each hypothesis is also included and the chapter closes with a summary of the findings.

Sample Characteristics

Table 9 shows the number of K-8 and 6-8 schools that were used in the study separated by grade level and subject matter.

Table 9

Distribution of K-8 and 6-8 Schools by Grade Level

Grade	Configuration		
	K-8	6-8	All
6th Grade	32	88	120
8th Grade	39	83	122

Table 9 shows that K-8 schools made up 26% of the sixth grade sample and 32% of the eighth grade sample. Notwithstanding the difference in the number of schools per grade configuration, the total sample size by grade level (N=120 6th grade and N=122 8th grade) was sufficient to conduct the study.

Descriptive Statistics

Tables 10 and 11 provide the descriptive statistics for both the dependent and independent variables used in this study for Language Arts and Math in sixth and eighth grades.

Table 10

Descriptive Statistics for 6th Grade Language Arts and Math

Descriptive Statistics

	N	Mean	Std. Deviation
6th Grade LA Prof Rate	120	35.340	16.2197
6th Grade Math Prof Rate	120	51.522	18.9140
Total School Size	120	706.550	289.1663
Econom Disadvantaged	120	28.824	28.4151
Percent of Students with Disabilities	120	15.424	4.4248
MobilityRateLog10	120	.7492	.38315
DFG	120	.533	.5010
Configuration	120	.267	.4441
Valid N (listwise)	120		

Table 10 shows that sixth grade Math proficiency rates (51.52) had a higher mean score than Language Arts (35.34). When compared to the eighth grade, in Table 11, the opposite results occur, with Language Arts (56.82) having a larger mean score than Math (39.71). Eighth grade (17.11) had a slightly larger difference in mean scores than sixth grade (16.18).

Table 11

Descriptive Statistics for 8th Grade Language Arts and Math

Descriptive Statistics

	N	Mean	Std. Deviation
8th Grade LA Prof Rate	122	56.820	19.9251
8th Grade Math Prof Rate	122	39.719	17.7614
Total School Size	122	698.852	295.4295
Econom Disadvantaged	122	31.125	30.6067
Percent of Students with Disabilities	122	14.842	4.2554
MobilityRateLog10	122	.7504	.41056
DFG	122	.500	.5021
Configuration	122	.320	.4683
Valid N (listwise)	122		

Hypothesis 1

Findings for Hypothesis 1

H_{01} . K-8 configured schools' performance will not on average be significantly different than schools configured as traditional middle schools for the sixth and eighth grade special education population on the 2011 NJ ASK in Math and Language Arts.

The two-way ANOVAs that were performed in this study were repeated for Math and Language Arts in both sixth and eighth grades. Tables 12-25 show the main effects of

configuration (0=6-8 schools, 1=K-8 schools) and district factor group (0=4 lower SES DFG's, 1=4 higher SES DFG's) on the dependent variable sixth, seventh, and eighth grade special education proficiency rates from the 2011 NJ ASK in Math and Language Arts. Charts with descriptive statistics, between-subjects fields and an estimated marginal means for significant effects are included to further illustrate the results of the two-way ANOVA for each grade level in both Math and Language Arts.

Sixth Grade Language Arts.

For sixth grade Language Arts, Table 12 shows schools configured as 6-8 had a mean score of 35.56. Schools configured as K-8 had a mean score of 34.73. Schools that were in the lower four SES DFG's had a mean score of 27.2. Schools that were housed in the upper four SES DFG's had a mean score of 42.46. Table 13 shows the model was significant at the 0.000 level, F-Value of 13.55 and df of 3, 116.

Table 12

Descriptive Statistics Table for Main Effects Configuration and District Factor Group on 6th Grade Language Arts Proficiency Rates

Descriptive Statistics

Dependent Variable: 6th Grade LA Prof Rate

Configuration	DFG	Mean	Std. Deviation	N
6-8	lower DFG	23.377	9.3277	30
	upper DFG	41.862	15.6028	58
	Total	35.560	16.3145	88
K-8	lower DFG	31.612	14.8418	26
	upper DFG	48.267	15.9683	6
	Total	34.734	16.1985	32
Total	lower DFG	27.200	12.7740	56
	upper DFG	42.463	15.6217	64
	Total	35.340	16.2197	120

Table 13 shows that the main effect of configuration is significant with a p-value of 0.043, degrees of freedom of 1, 116, and an F-value of 4.194. The main effect of district factor group was also significant at the 0.000 level, degrees of freedom of 1, 116, and an F-value of 24.166. The interaction effect of configuration and district factor group was not significant with a p-value of 0.798, degrees of freedom of 1, 116 and an F-value of 0.066. DFG accounted for 17.2% of the variability in sixth grade special education Language Arts proficiency rates. While configuration was significant, it only accounted for 3.5% of the variability in the dependent factor.

Table 13

Between-Subject Test Results for Configuration and District Factor Group 6th Grade Language Arts

Tests of Between-Subjects Effects

Dependent Variable: 6th Grade LA Prof Rate

Source	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3	2708.279	13.552	.000	.260
Intercept	1	82357.005	412.113	.000	.780
Configuration	1	838.137	4.194	.043	.035
DFG	1	4829.264	24.166	.000	.172
Configuration * DFG	1	13.101	.066	.798	.001
Error	116	199.841			
Total	120				
Corrected Total	119				

a R Squared = .260 (Adjusted R Squared = .240)

Tables 14 and 15 show that the main effects of configuration and DFG are significant in this two-way ANOVA. K-8 schools had a mean score of 39.93 and a standard error of 3.20. Schools configured 6-8 had a mean score of 32.61 and a standard error of 1.59. In Language Arts, K-8 schools had scored 7.32 points higher than 6-8

schools on special education proficiency rates. Schools in the lower DFG's had a mean score of 27.49 and a standard error of 1.89, while schools in the upper DFG had a mean score of 45.06 and a standard error of 3.03.

Table 14

Estimated Marginal Means for Configuration for 6th Grade Language Arts

Estimates

Dependent Variable: 6th Grade LA Prof Rate

Configuration	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
6-8	32.619	1.590	29.471	35.768
K-8	39.939	3.201	33.599	46.280

Table 15

Estimated Marginal Means for District Factor Group for 6th Grade Language Arts

Estimates

Dependent Variable: 6th Grade LA Prof Rate

DFG	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
lower DFG	27.494	1.894	23.743	31.245
upper DFG	45.064	3.031	39.061	51.068

Based on the comparison of means, the data indicate that schools configured as K-8 tended to have higher mean proficiency rates in Language Arts for sixth grade special education students when compared with schools configured as 6-8 (39.94 ± 3.2 vs. 32.61 ± 1.59, $p = 0.043$). This produced a significant mean difference of 7.32. Similarly, schools housed within the four lower SES DFG's demonstrated lower scores than schools that were contained in the four upper SES DFG's (27.49 ± 1.89 vs. 45.06 ± 3.03, $p < 0.001$). This produced a significant mean difference of -17.57. The differences between

the available academic and financial resources, and number of students who qualify for free and reduced lunch for schools in upper and lower DFG's are vastly different; therefore, comparing the mean score between upper and lower DFG's may not present a fair comparison between the two groups.

Sixth Grade Math.

Tables 16-19 show the ANOVA results for grade configuration and DFG on Math proficiency rates. As can be seen in Table 16, schools configured as 6-8 had a mean score of 50.12. Schools configured as K-8 had a mean score of 55.36. Schools that were in the lower four SES DFG's had a mean score of 46.84. Schools that were housed in the upper four SES DFG's had a mean score of 55.61. Table 17 shows the corrected model was significant at the 0.002 level, F-Value of 5.115 and df of 3, 116.

Table 16

Descriptive Statistics Table for Main Effects Configuration and District Factor Group on 6th Grade Math Proficiency Rates

Descriptive Statistics

Dependent Variable: 6th Grade Math Prof Rate

Configuration	DFG	Mean	Std. Deviation	N
6-8	Lower DFG	40.687	17.1688	30
	Upper DFG	55.007	15.6087	58
	Total	50.125	17.4494	88
K-8	Lower DFG	53.954	22.5456	26
	Upper DFG	61.467	22.1570	6
	Total	55.363	22.3155	32
Total	Lower DFG	46.846	20.7616	56
	Upper DFG	55.613	16.2171	64
	Total	51.522	18.9140	120

Table 17 shows that the main effect of configuration is significant with a p-value of 0.032, degrees of freedom of 1, 116 and an F-value of 4.696. The main effect of district factor group was also significant at the 0.018 level, degrees of freedom of 1, 116 and an F-value of 5.752. The interaction effect of configuration and district factor group was not significant with a p-value of 0.456, degrees of freedom of 1, 116, and an F-value of 0.559. DFG accounted for 4.72% of the variability in sixth grade special education Math proficiency rates. While configuration was significant, it only accounted for 3.9% of the variability in the dependent factor, which was fairly close to the variability for DFG. When compared to Language Arts, grade configuration held almost the same variability in the dependent factor with Language Arts having 3.5% and Math with 3.9%.

Table 17

Between-Subject Test Results for Configuration and District Factor Group for 6th Grade Math.

Tests of Between-Subjects Effects

Dependent Variable: 6thGradeMathProfRate

Source	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3	1657.885	5.115	.002	.117
Intercept	1	174300.526	537.771	.000	.823
Configuration	1	1521.893	4.696	.032	.039
DFG	1	1864.203	5.752	.018	.047
Configuration * DFG	1	181.229	.559	.456	.005
Error	116	324.117			
Total	120				
Corrected Total	119				

[a] R Squared = .117 (Adjusted R Squared = .094)

Tables 18 and 19 show that the main effects of configuration and DFG are significant in this two-way ANOVA. K-8 schools had a mean score of 57.71 and a

standard error of 4.07. Schools configured 6-8 had a mean score of 47.84 and a standard error of 2.02. Schools in the lower DFG's had a mean score of 47.32 and a standard error of 2.41, while schools in the upper DFG's had a mean score of 58.23 and a standard error of 3.86. Just as in Language Arts, K-8 schools outperformed 6-8 schools by having a 9.87 higher average mean score. The margin that separated the K-8 and 6-8 schools was larger in Math for sixth graders than it was for them in Language Arts.

Table 18

Estimated Marginal Means for Configuration for 6th Grade Math.

Estimates

Dependent Variable: 6th Grade Math Prof Rate

Configuration	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
6-8	47.847	2.024	43.837	51.856
K-8	57.710	4.077	49.635	65.785

Table 19

Estimated Marginal Means for District Factor Group for 6th Grade Math.

Estimates

Dependent Variable: 6th Grade Math Prof Rate

DFG	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Lower DFG	47.320	2.412	42.543	52.097
Upper DFG	58.237	3.860	50.591	65.883

Based on the comparison of means, the data indicates that schools configured as K-8 tended to have higher mean proficiency rates in Math for sixth grade special education students when compared with schools configured as 6-8 grade (57.71 ± 4.07 vs. 47.84 ± 2.02, $p = 0.032$). This produced a significant mean difference of 9.86. Similarly, schools housed within the four lower SES DFG's demonstrated lower scores

than schools that were contained in the four upper SES DFG's (47.32 ± 2.41 vs. 58.23 ± 3.86, p = 0.018).This produced a significant mean difference of -10.91. The differences between the available academic and financial resources and number of students who qualify for free and reduced lunch for schools in upper and lower DFG's are vastly different; therefore, comparing the mean score between upper and lower DFG's may not present a fair comparison between the two groups.

Eighth Grade Language Arts.

The data in Table 20 show that schools configured as 6-8 had a mean score of 60.23. Schools configured as K-8 had a mean score of 49.54. Schools that were in the lower four SES DFG's had a mean score of 46.96. Schools that were housed in the upper four SES DFG's had a mean score of 66.67. Table 21 shows the model was significant at the 0.000 level, F-Value of 13.07 and df of 3, 118.

Table 20

Descriptive Statistics Table for Main Effects Configuration and District Factor Group 8th Grade Language Arts Proficiency Rates.

Descriptive Statistics

Dependent Variable: 8th Grade LA Prof Rate

Configuration	DFG	Mean	Std. Deviation	N
6-8	Lower DFG	47.262	18.3990	29
	Upper DFG	67.206	15.4829	54
	Total	60.237	19.0276	83
K-8	Lower DFG	46.700	19.1629	32
	Upper DFG	62.557	20.3678	7
	Total	49.546	20.0769	39
Total	Lower DFG	46.967	18.6491	61
	Upper DFG	66.672	15.9834	61
	Total	56.820	19.9251	122

Table 21 shows that the main effect of district factor group is significant with a p-value of 0.000, degrees of freedom of 1, 118, and an F-value of 18.46. The main effect of configuration was not significant at the 0.533 level, degrees of freedom of 1, 118, and an F-value of 0.39. The interaction effect of configuration and district factor group was also not significant with a p-value of 0.625, degrees of freedom of 1, 118 and an F-value of 0.24. DFG accounted for 13.5% of the variability in eighth grade special education Language Arts proficiency rates.

Table 21

Between-Subject Test Results for Configuration and District Factor Group for 8th Grade Language Arts

Tests of Between-Subjects Effects

Dependent Variable: 8th Grade LA Prof Rate

Source	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3	3993.786	13.070	.000	.249
Intercept	1	220391.527	721.260	.000	.859
Configuration	1	119.543	.391	.533	.003
DFG	1	5643.494	18.469	.000	.135
Configuration * DFG	1	73.525	.241	.625	.002
Error	118	305.565			
Total	122				
Corrected Total	121				

[a] R Squared = .249 (Adjusted R Squared = .230)

Table 22 shows that the main effect of DFG is significant in this two-way ANOVA. Schools in the lower DFG's had a mean score of 46.98 and a standard error of 2.24, while schools in the upper DFG had a mean score of 64.88 and a standard error of 3.51.

Table 22

8th Grade Language Arts Estimated Marginal Means for District Factor Group.

Estimates

Dependent Variable: 8th Grade LA Prof Rate

DFG	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Lower DFG	46.981	2.241	42.544	51.419
Upper DFG	64.881	3.511	57.928	71.834

Based on the comparison of means, the data indicate that upper DFG schools tended to have a higher mean proficiency rate in Language Arts for eighth grade special education students when compared to lower DFG schools (64.88 ± 3.51 vs. 46.98 ± 2.24, $p < 0.001$). This produced a significant mean difference of 17.9. The differences between the available academic and financial resources and number of students who qualify for free and reduced lunch for schools in upper and lower DFG's are vastly different; therefore, comparing the mean score between upper and lower DFG's may not present a fair comparison between the two groups.

Eighth Grade Math.

The data in Table 23 show that schools configured as 6-8 had a mean score of 39.58. Schools configured as K-8 had a mean score of 39.99. Schools that were in the lower four SES DFG's had a mean score of 35.67. Schools that were housed in the upper four SES DFG's had a mean score of 43.76. Table 24 shows that the model was significant at the 0.038 level, F-Value of 2.893, and df of 3, 118.

Table 23

Descriptive Statistics Table for Main Effects Configuration and District Factor Group for 8th Grade Math Proficiency Rates

Descriptive Statistics

Dependent Variable: 8th Grade Math Prof Rate

Configuration	DFG	Mean	Std. Deviation	N
6-8	Lower DFG	32.503	18.9610	29
	Upper DFG	43.393	15.8312	54
	Total	39.588	17.6645	83
K-8	Lower DFG	38.550	16.7835	32
	Upper DFG	46.614	24.0638	7
	Total	39.997	18.1950	39
Total	Lower DFG	35.675	17.9606	61
	Upper DFG	43.762	16.7441	61
	Total	39.719	17.7614	122

Table 24 shows that the main effect of district factor group is significant with a p-value of 0.024, degrees of freedom of 1, 118, and an F-value of 5.24. The main effect of configuration was not significant at the 0.265 level, degrees of freedom of 1, 116, and an F-value of 1.25. The interaction effect of configuration and district factor group was not significant with a p-value of 0.73, degrees of freedom of 1, 118, and an F-value of 0.11. DFG accounted for 4.3% of the variability in eighth grade special education Math proficiency rates. DFG was also the only variable significant in eighth grade Language Arts. DFG held more of the variance in the dependent variable at eighth grade Language Arts with 13.5% versus eighth grade Math at 4.3%.

Table 24

Between-Subject Test Results for Configuration and District Factor Group for 8th Grade Math

Tests of Between-Subjects Effects

Dependent Variable: 8th Grade Math Prof Rate

Source	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3	871.717	2.893	.038	.069
Intercept	1	114220.463	379.060	.000	.763
Configuration	1	378.235	1.255	.265	.011
DFG	1	1581.767	5.249	.024	.043
Configuration * DFG	1	35.137	.117	.733	.001
Error	118	301.325			
Total	122				
Corrected Total	121				

[a] R Squared = .069 (Adjusted R Squared = .045)

Table 25 shows that the main effect of DFG is significant in this two-way ANOVA. Schools in the lower DFG had a mean score of 35.52 and a standard error of 2.22, while schools in the upper DFG had a mean score of 45.00 and a standard error of 3.48.

Table 25

Estimated Marginal Means for District Factor Group for 8th Grade Math

Estimates

Dependent Variable: 8th Grade Math Prof Rate

DFG	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Lower DFG	35.527	2.225	31.120	39.933
Upper DFG	45.003	3.487	38.099	51.908

Based on the comparison of means, the data indicate that upper DFG schools tended to have a higher mean special education proficiency rate in Math for eighth grade

students when compared to lower DFG schools (45.00 ± 3.48 vs. 35.52 ± 2.22, p = 0.0024). This produced a significant mean difference of 9.47. The differences between the available academic and financial resources and number of students who qualify for free and reduced lunch for schools in upper and lower DFG's are vastly different; therefore, comparing the mean score between upper and lower DFG's may not present a fair comparison between the two groups.

Summary of Findings for Hypothesis 1

For sixth grade special education proficiency rates in Math and Language Arts, the null hypothesis was rejected, as K-8 schools' performance was significantly different than schools configured with Grades 6-8. In eighth grade special education proficiency rates, the study fails to reject the null hypothesis, as configuration (0=6-8 schools, 1=K-8 schools) was not statistically significant in Math or Language Arts. In all four of the two-way ANOVAs, district factor group proved to be the strongest main effect in each case by having the most variance in the dependent variable of all significant effects. Table 26 shows the mean scores for the effects that were statistically significant in sixth and eighth grade for Language Arts and Math.

Table 26

Mean Scores for Significant Effects of 6th and 8th Grade Language Arts and Math 2011 NJ ASK Special Education Proficiency Rates

Language Arts			
6th Grade		8th Grade	
DFG		DFG	
Upper	45.06	Upper	64.88
Lower	27.49	Lower	46.98
Configuration			
K-8	39.93		
6-8	27.49		
Math			
6th Grade		8th Grade	
DFG		DFG	
Upper	58.23	Upper	45.00
Lower	47.32	Lower	35.52
Configuration			
K-8	57.71		
6-8	47.84		

Table 26 shows that K-8 schools performed on average better than their 6-8 counterparts in both Math (+9.87 points) and Language Arts (+12.44). Even though configuration had a significant effect in sixth grade for both subjects, Language Arts special education proficiency rates had the wider gap between K-8 and 6-8 schools than Math. Grade configuration accounted for a small amount of the variance in NJ ASK special education proficiency rates for Math (3.9%) and Language Arts (3.5%) in sixth

grade. Math held a 0.4% higher variance in the dependent variable for sixth grade when compared to Language Arts. In eighth grade, configuration had lost its effect on the dependent variable for both subjects.

District factor group accounted for the most variance in both Math and Language Arts in sixth and eighth grades. Language Arts had more than three times the amount of variance in the dependent variable than Math within the same grade level. DFG had a 17.2% variance in sixth grade Language Arts compared to only 4.7% in sixth grade Math. In eighth grade the same pattern was discovered, as DFG held 13.5% of the variance in Language Arts special education proficiency rates but only 4.3% in eighth grade Math. Within a subject, the amount of variance DFG holds remains significant but it is reduced as one moves from sixth to eighth grade. In Language Arts, DFG posted a reduction of 3.7% from sixth to eighth grade. Math had a similar but not as large a drop as DFG's variance was reduced by 0.4%.

Hypothesis 2

Findings for Hypothesis 2

H_{02}. Controlling for the variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school, K-8 schools' performance will not on average be significantly different on the NJ ASK in Math and Language Arts than traditional middle schools for the sixth and eighth grade special education population.

Sixth Grade Language Arts.

Hierarchical multiple regression was used to determine to what extent, if any, grade configuration has an independent effect on a school's sixth and eighth grade special

education proficiency rates for Math and Language Arts. Table 27 shows the model summary for sixth grade Language Arts. It shows the effects of the control variables on special education proficiency rates: percentage of students with disabilities, total school size, total mobility, and percentage of economically disadvantaged students within the school. The second model adds the independent variable of grade configuration to the control variables from Model 1. Table 27 shows that Models 1 and 2 yielded a R^2 of 0.284 and 0.325, respectively. Model 2 has a R^2 Change of 0.041, which means that the addition of grade configuration accounts for 4.1% more variance in special education sixth grade Language Arts proficiency rates.

Table 27

6th Grade Language Arts Hierarchical Multiple Regression Model Summary, N=120

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.533[a]	.284	.259	13.9599	.284	11.411	4	115	.000
2	.570[b]	.325	.295	13.6167	.041	6.870	1	114	.010

[a] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged

[b] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged, Configuration

[c] Dependent Variable: 6th Grade LA Prof Rate

The ANOVA determines if there is a statistically significant relationship between the set of independent variables in each model and the dependent variable. Examining the ANOVA in Table 28 shows that both sets of predictors were statistically significant in the hierarchical regression model at the 0.000 level. Model 1 has an F value of 11.411 and df of 4, 115, while Model 2 had an F value of 10.969 and df of 5, 114.

Table 28

ANOVA for Hierarchical Multiple Regression Model for Control and Independent Variables and 6th Grade Language Arts Special Education Proficiency Rates

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8895.267	4	2223.817	11.411	.000[b]
	Residual	22411.081	115	194.879		
	Total	31306.348	119			
2	Regression	10169.028	5	2033.806	10.969	.000[c]
	Residual	21137.320	114	185.415		
	Total	31306.348	119			

[a] Dependent Variable: 6th Grade LA Prof Rate

[b] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged

[c] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged, Configuration

Table 29 shows how the individual predictor variables affect the dependent variable. The first model includes only the control variables to establish their baseline influence on the dependent variable. In the second model the independent variable of configuration (0=6-8 schools and 1=K-8 schools) was added. Grade configuration was statistically significant at the 0.010 level, t=2.621 and a standardized beta of 0.243. With a positive beta, it suggests that grade configuration has a significantly positive influence on sixth grade special education Math proficiency rates, meaning that K-8 configuration (coded 1) is positively associated with proficiency rate.

Table 29

Standardized Coefficient Beta Table in a Hierarchical Multiple Regression for Independent and Control Variables and 6th Grade Special Education Proficiency Rates in Language Arts.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	60.219	6.721		8.959	.000
	Total School Size	-.007	.005	-.116	-1.372	.173
	Econom Disadvantaged	-.254	.069	-.445	-3.658	.000
	Percent of Students with Disabilities	-.714	.303	-.195	-2.355	.020
	Mobility Rate (Log10)	-2.589	4.960	-.061	-.522	.603
2	(Constant)	56.632	6.698		8.456	.000
	Total School Size	-.005	.005	-.096	-1.156	.250
	Econom Disadvantaged	-.287	.069	-.502	-4.159	.000
	Percent of Students with Disabilities	-.480	.309	-.131	-1.552	.123
	Mobility RateLog10	-5.607	4.974	-.132	-1.127	.262
	Configuration	8.868	3.384	.243	2.621	.010

[a] Dependent Variable: 6th Grade LA Prof Rate

Sixth Grade Mathematics.

Table 30 shows the model summary for sixth grade Math. Each model shows the effects of the control variables on special education proficiency rates: percentage of students with disabilities, total school size, total mobility, and percentage of economically disadvantaged students in the school. The second model adds the independent variable of grade configuration to the control variables from Model 1. Table 30 shows that Models 1

and 2 yielded a R^2 of 0.051 and 0.097 respectively. Model 2 has a R^2 Change of 0.047, which means that the addition of configuration accounts for 4.7% of the variance within special education sixth grade Math proficiency rates.

Table 30

6th Grade Math Hierarchical Multiple Regression Model Summary, N=120

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.226[a]	.051	.018	18.7444	.051	1.541	4	115	.195
2	.312[b]	.097	.058	18.3592	.047	5.876	1	114	.017

[a] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged

[b] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged, Configuration

[c] Dependent Variable: 6th Grade Math Prof Rate

The ANOVA in Table 31 shows that the set of independent variables in Model 1 are not significant, but the addition of the independent variable grade configuration to the set of variables in Model 2 makes the second model significant at the 0.037 level with an F value of 2.460 and df of 5, 114. Even though the results were significant, the Math results were less predictable than Language Arts for sixth grade.

Table 31

ANOVA for Hierarchical Multiple Regression Model for Control and Independent Variables and 6th Grade Math Special Education Proficiency Rates.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2165.508	4	541.377	1.541	.195[b]
	Residual	40405.696	115	351.354		
	Total	42571.204	119			
2	Regression	4146.193	5	829.239	2.460	.037[c]
	Residual	38425.011	114	337.062		
	Total	42571.204	119			

[a] Dependent Variable: 6th Grade Math Prof Rate

[b] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged

[c] Predictors: (Constant), Mobility Rate (Log10), Percent of Students with Disabilities, Total School Size, Econom Disadvantaged, Configuration

Table 32 shows the standardized beta coefficients for the above analysis. The first model includes only the control variables to establish their baseline influence on the dependent variable. The first model was not statistically significant. In the second model the independent variable of grade configuration (0=6-8 schools and 1=K-8 schools) was added, which made the model significant. The independent variable configuration was statistically significant at the 0.017 level, t=2.424 and a standardized beta of 0.260. With a positive beta, it suggests that grade configuration has a significantly positive influence on sixth grade special education Math proficiency rates, meaning that K-8 configuration (coded 1) is positively associated with proficiency rate.

Table 32

Standardized Coefficient Beta Table in a Hierarchical Multiple Regression for Independent and Control Variables and 6th Grade Special Education Proficiency Rates in Math.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	66.296	9.025		7.346	.000
	Total School Size	-.004	.006	-.059	-.604	.547
	Econom Disadvantaged	-.130	.093	-.195	-1.393	.166
	Percent of Students with Disabilities	-.555	.407	-.130	-1.363	.176
	Mobility Rate (Log10)	.338	6.661	.007	.051	.960
2	(Constant)	61.822	9.030		6.846	.000
	Total School Size	-.002	.006	-.037	-.389	.698
	Econom Disadvantaged	-.170	.093	-.256	-1.834	.069
	Percent of Students with Disabilities	-.263	.417	-.061	-.630	.530
	Mobility Rate (Log10)	-3.426	6.706	-.069	-.511	.610
	Configuration	11.059	4.562	.260	2.424	.017

[a] Dependent Variable: 6th Grade Math Prof Rate

Eighth Grade Language Arts.

Table 33 shows the model summary for eighth grade Language Arts. It shows the effects of the control variables on special education proficiency rates: percentage of students with disabilities, total school size, total mobility, and percentage of economically disadvantaged students in the school. The second model adds the independent variable of grade configuration to the control variables from Model 1. Table 33 shows that Models 1 and 2 posted a R^2 of 0.359 and 0.362, respectively. Model 2 has a R^2 Change of 0.002,

which means that the addition of configuration accounted for 0.2% of the variance within special education eighth grade Language Arts proficiency rates.

Table 33

8th Grade Language Arts Hierarchical Multiple Regression Model Summary, N=122

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.600[a]	.359	.338	16.2171	.359	16.415	4	117	.000
2	.601[b]	.362	.334	16.2592	.002	.395	1	116	.531

[a] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged

[b] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged, Configuration

[c] Dependent Variable: 8th Grade LA Prof Rate

The ANOVA table determines if there is a statistically significant relationship between the set of independent variables in each model and the dependent variable. Examining the ANOVA in Table 34 shows that both models were statistically significant in the hierarchical regression model at the 0.000 level. Model 1 has an F value of 16.415 and df of 4, 117, while Model 2 had an F value of 13.143 and df of 5, 116.

Table 34

ANOVA for Hierarchical Multiple Regression Model for Control and Independent Variables and 8th Grade Language Arts Special Education Proficiency Rates.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17267.707	4	4316.927	16.415	.000[b]
	Residual	30770.266	117	262.994		
	Total	48037.973	121			
2	Regression	17372.090	5	3474.418	13.143	.000[c]
	Residual	30665.883	116	264.361		
	Total	48037.973	121			

[a] Dependent Variable: 8th Grade LA Prof Rate

[b] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged

[c] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged, Configuration

Table 35 shows how the individual predictor variables affect the dependent variable. The first model includes only the control variables to establish their baseline influence on the dependent variable. Both models were statistically significant. Economically disadvantaged was the most significant variable in either model. In the second model the independent variable of grade configuration (0=6-8 schools and 1=K-8 schools) was added. Grade configuration was not statistically significant, which means that grade configuration did not have a significant effect on special education proficiency rates for eighth grade Language Arts.

Table 35

Standardized Coefficient Beta Table in a Hierarchical Multiple Regression for Independent and control variables and 8th Grade Special Education Proficiency Rates in Language Arts.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	79.528	7.489		10.620	.000
	Total School Size	-.005	.005	-.075	-.997	.321
	Econom Disadvantaged	-.300	.076	-.461	-3.930	.000
	Percent of Students with Disabilities	-.261	.361	-.056	-.725	.470
	Mobility Rate (Log10)	-7.925	5.563	-.163	-1.425	.157
2	(Constant)	79.010	7.553		10.460	.000
	Total School Size	-.005	.005	-.073	-.966	.336
	Econom Disadvantaged	-.310	.078	-.477	-3.964	.000
	Percent of Students with Disabilities	-.231	.365	-.049	-.634	.528
	Mobility Rate (Log10)	-8.521	5.657	-.175	-1.506	.135
	Configuration	2.320	3.692	.055	.628	.531

[a] Dependent Variable: 8th Grade LA Prof Rate

Eighth Grade Math.

Table 36 shows the model summary for eighth grade Math. It shows the effects of the control variables on special education proficiency rates: percentage of students with disabilities, total school size, total mobility, and percentage of economically disadvantaged students in the school. The second model adds the independent variable of grade configuration to the control variables from Model 1. Table 36 shows that Models 1 and 2 yielded a R^2 of 0.088 and 0.104, respectively. Model 2 has a R^2 Change of 0.016,

which means that the addition of grade configuration accounted for 1.6 % of the variance within special education eighth grade Math proficiency rates.

Table 36

8th Grade Math Hierarchical Multiple Regression Model Summary, N=122

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.296[a]	.088	.057	17.2504	.088	2.819	4	117	.028
2	.322[b]	.104	.065	17.1709	.016	2.085	1	116	.151

[a] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged

[b] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged, Configuration

[c] Dependent Variable: 8th Grade Math Prof Rate

The ANOVA determines if there is a statistically significant relationship between the set of independent variables in each model and the dependent variable. Examining the ANOVA in Table 37 shows that both models were statistically significant. Model 1 was significant at the 0.028 level and Model 2 at the 0.024 level. Model 1 has an F value of 2.819 and df of 4, 117, while Model 2 had an F value of 2.693 and df of 5, 116. Eighth grade Mathematics was much more predictable than sixth grade Mathematics.

Table 37

ANOVA for Hierarchical Multiple Regression Model for Control and Independent Variables and 8th Grade Math Special Education Proficiency Rates.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3355.298	4	838.824	2.819	.028[b]
	Residual	34816.249	117	297.575		
	Total	38171.547	121			
2	Regression	3969.994	5	793.999	2.693	.024[c]
	Residual	34201.553	116	294.841		
	Total	38171.547	121			

[a] Dependent Variable: 8th Grade Math Prof Rate

[b] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged

[c] Predictors: (Constant), Mobility Rate (Log10), Total School Size, Percent of Students with Disabilities, Econom Disadvantaged, Configuration

Table 38 shows how the individual predictor variables affect the dependent variable. The first model includes only the control variables to establish their baseline influence on the dependent variable. Both models were statistically significant. In the second model the independent variable of configuration (0=6-8 schools and 1=K-8 schools) was added. Configuration was not statistically significant at the 0.151 level. Grade configuration was not statistically significant, which means that grade configuration did not have a significant effect on special education proficiency rates for eighth grade Math.

Table 38

Standardized Coefficient Beta Table in a Hierarchical Multiple Regression for Independent and Control Variables and 8th Grade Special Education Proficiency Rates in Math

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	57.989	7.966		7.280	.000
	Total School Size	.000	.005	.007	.073	.942
	Econom Disadvantaged	-.044	.081	-.076	-.544	.587
	Percent of Students with Disabilities	-.702	.384	-.168	-1.830	.070
	Mobility Rate (Log10)	-8.999	5.917	-.208	-1.521	.131
2	(Constant)	56.731	7.977		7.112	.000
	Total School Size	.001	.005	.012	.138	.891
	Econom Disadvantaged	-.070	.083	-.120	-.841	.402
	Percent of Students with Disabilities	-.628	.385	-.151	-1.632	.105
	Mobility Rate (Log10)	-10.445	5.974	-.241	-1.748	.083
	Configuration	5.630	3.899	.148	1.444	.151

[a] Dependent Variable: 8th Grade Math Prof Rate

Summary of Findings for Hypothesis 2

The null hypothesis that K-8 schools' performance does not differ significantly from 6-8 schools in Math and Language Arts on proficiency rates after controlling for the schoolwide variables, school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students within a school was rejected for sixth grade in both Math and Language Arts but was accepted for eighth grade in the same subjects. The findings of this study showed that K-8 schools (coded 1)

In comparing sixth and eighth grade results in Language Arts, the variable economically disadvantaged was the only variable that maintained its significance across both grade levels and models. Students with disabilities and grade configuration did not retain their significance in the eighth grade data, suggesting that their influence on the dependent variable decreased from sixth to eighth grade. For Model 1 economically disadvantaged moved from -0.445 to -0.461 from sixth to eighth grade, which was a 0.016 point increase in its standardized beta.

Model 2 added the introduction of the variable grade configuration. With this addition, economically disadvantaged went from-0.502 to -0.477 from sixth to eighth grade. This produced a 0.025 decrease in the standardized beta. Even though configuration was not a significant variable in eighth grade, its addition reduced the effect of being economically disadvantaged on the proficiency rates of special education students from sixth to eighth grade in Language Arts. Grade configuration had a significant effect only on sixth grade Language Arts scores; hence, its influence decreased from sixth to eighth grade.

In Math, Table 41 shows that no predictor attained statistical significance in Model 1. In Model 2, grade configuration was the only predictor variable that was significant. Configuration was significant at the 0.017 level, t-value of 2.424, and standardized beta of 0.260. Table 42 shows that for eighth grade Math proficiency rates, there were no significant predictor variables in Models 1 or 2. The findings from these two tables show that the effect of grade configuration is stronger on sixth grade special education proficiency rates than it is on eighth grade rates. Grade configuration loses its influence on older middle grade students.

Table 41

Standardized Coefficient Beta Table for Hierarchical Multiple Regression for Independent and Control Variables and 6th Grade Special Education Proficiency Rates in Math

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	66.296	9.025		7.346	.000
	Total School Size	-.004	.006	-.059	-.604	.547
	Econom Disadvantaged	-.130	.093	-.195	-1.393	.166
	Percent of Students with Disabilities	-.555	.407	-.130	-1.363	.176
	Mobility Rate (Log10)	.338	6.661	.007	.051	.960
2	(Constant)	61.822	9.030		6.846	.000
	Total School Size	-.002	.006	-.037	-.389	.698
	Econom Disadvantaged	-.170	.093	-.256	-1.834	.069
	Percent of Students with Disabilities	-.263	.417	-.061	-.630	.530
	Mobility Rate (Log10)	-3.426	6.706	-.069	-.511	.610
	Configuration	11.059	4.562	.260	2.424	.017

[a] Dependent Variable: 6th Grade Math Prof Rate

Table 42

Standardized Coefficient Beta Table for Hierarchical Multiple Regression for Independent and Control Variables and 8th Grade Special Education Proficiency Rates in Math

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	57.989	7.966		7.280	.000
	Total School Size	.000	.005	.007	.073	.942
	Econom Disadvantaged	-.044	.081	-.076	-.544	.587
	Percent of Students with Disabilities	-.702	.384	-.168	-1.830	.070
	Mobility Rate (Log10)	-8.999	5.917	-.208	-1.521	.131
2	(Constant)	56.731	7.977		7.112	.000
	Total School Size	.001	.005	.012	.138	.891
	Econom Disadvantaged	-.070	.083	-.120	-.841	.402
	Percent of Students with Disabilities	-.628	.385	-.151	-1.632	.105
	Mobility Rate (Log10)	-10.445	5.974	-.241	-1.748	.083
	Configuration	5.630	3.899	.148	1.444	.151

[a] Dependent Variable: 8th Grade Math Prof Rate

In Math for sixth grade special education students, there were no variables that significantly predicted their proficiency rates in Model 1. In Model 2 the only variable that was significant was grade configuration, which was located only within this model. Eighth grade had no predictor variables that were significant in either Model 1 or Model 2. Configuration was no longer a statistically significant variable, and its influence on the predictor variable decreased from sixth to eighth grade.

Summary of Findings for Hypothesis 3

The null hypothesis is rejected in Language Arts for the variable economically disadvantaged, as it was consistently significantly different in both models and grades. Its influence on the dependent variable increased within both grade levels as configuration was added to Model 2. Comparing sixth grade Models 1 and 2 to eighth grade Models 1 and 2, the effect of the variable economically disadvantaged increases in Model 1 but decreases in Model 2. Students with disabilities and configuration are significant only in the sixth grade and lose their influence in eighth grade. The null hypothesis is accepted with the variables total school size and mobility rate, as they were not significant in either grade or model for Language Arts.

The null hypothesis is accepted in Math for the variables total school size, mobility rate, and percentage of students with disabilities, as they were not significant in either grade or model for Math. Configuration was significant only in the sixth grade Model 2 but was not able to retain its significance in the eighth grade.

Summary of the Data Analysis

This chapter presented the results of the data analysis conducted of sixth and eighth grade special education proficiency rates in K-8 and 6-8 middle schools in New Jersey. The analysis was cross-sectional in nature and included a comparison of mean scores of K-8 and middle schools as well as examining the effect, if any, of grade configuration on academic achievement when controlling for schoolwide factors. The study attempted to determine if the K-8 or 6-8 grade configurations have an effect on academic achievement for the sixth and eighth grade special education population. The study also examined whether the influence of control and independent variables on the

dependent variable differs and how much of a difference there is from sixth to eighth grade. The data that was collected was historical and readily available to the public via the New Jersey Department of Education website.

A two-way ANOVA was used to compare the mean scores for K-8 and 6-8 configured schools as well as to determine if configuration had any effect at all on the dependent variable. Additional testing was conducted through a hierarchical multiple regression. This method was used to test the effect of grade configuration on special education proficiency rates after controlling for various schoolwide variables. Last, the individual strength of the control and independent variables on the dependent variable were examined to determine if their influence was greater or less in sixth and eighth grade.

Findings for all three hypotheses show that grade configuration had a significantly positive effect on special education proficiency rates in sixth grade in both Language Arts and Math. The results were different in eighth grade, as grade configuration was not significant in Language Arts or Math.

Table 43

The Standardized Coefficient Beta for Significant Control and Independent Variables in Language Arts and Math for 6th and 8th Grades

Language Arts	
6th Grade	8th Grade
Model 1 Econ. Disadvantaged -0.445 Model 1 Students with Disabilities -0.195	Model 1 Econ. Disadvantaged -0.46
Model 2 Econ. Disadvantaged -0.502 Model 2 Configuration 0.243	Model 2 Econ. Disadvantaged -0.477
Math	
6th Grade	8th Grade
Model 1 None	Model 1 None
Model 2 Configuration 0.260	Model 2 None

Table 43 shows that grade configuration had a stronger effect in Math (0.260) than in Language Arts (0.243), but as a whole Language Arts was more predictable than Math for both grades. Also sixth grade performance was more predictable than eighth grade performance. The control variable economically disadvantaged was the strongest predictor of special education proficiency rates. With grade configuration generating a positive beta, it shows that K-8 schools (coded 1) outperform the 6-8 configured schools (coded 0). The independent effect of configuration was relatively small compared to economically disadvantaged. Total school size and mobility rate had no significant influence on either sixth or eighth grade special education proficiency rates in Math or Language Arts.

The percentage of economically disadvantaged students had a significant effect in sixth and eighth grade for both models but only in Language Arts. In Model 1 the effect of economically disadvantaged is 0.016 higher from sixth to eighth grade, but in Model 2 its effect decreased by 0.025.

The variable students with disabilities is only significant in sixth grade Language Arts and has the least effect of all significant variables. In Math only one variable was significant in either sixth or eighth grade, and that was configuration for sixth grade in Model 2.

When just the variables grade configuration and district factor group were analyzed in the two-way ANOVA, again grade configuration showed a significant effect only in sixth grade Math and Language Arts but not for eighth grade in the same subjects. Table 44 outlines these results.

Table 44

Two-Way ANOVA Mean Scores for District Factor Group and Configuration

	Language Arts Mean Scores	
	Configuration	DFG
6th Grade	6-8 32.61 K-8 39.93	Upper DFG 45.06 Lower DFG 27.49
8th Grade		Upper DFG 64.88 Lower DFG 46.98
	Math Mean Scores	
	Configuration	DFG
6th Grade	6-8 47.84 K-8 57.71	Upper DFG 58.23 Lower DFG 47.32
8th Grade		Upper DFG 45.00 Lower DFG 35.52

K-8 schools outperformed 6-8 schools in both Math and Language Arts, but the difference in mean scores was greater in Math than in Language Arts. Schools that are in the upper DFG had a higher mean score in eighth grade than in sixth grade for Language Arts but a decrease in Math for the same demographic. This trend was repeated for sixth and eighth grade Language Arts and Math in the lower DFG as well. The data from both the two- way ANOVA and hierarchical multiple regression tend to show that grade configuration has more of an effect for lower middle grade students than upper middle grade students.

Chapter V will further discuss these results and their potential implications for the educational field as well as suggest topics for future research.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The scrutiny of international rankings in education has caused many to evaluate the effectiveness of the United States education system, paying particular attention to the middle grades. In fact, middle school grades have been the subject of many studies and research over the last 30 years. One of the facets that have been studied is the effect of a school's grade configuration on the academic outcomes of that school's population. Many of the grade configuration studies examine the characteristics that are prevalent within a specific grade configuration and how those characteristics may affect student achievement. The two most popular middle grade configurations are kindergarten to Grade 8 and kindergarten to Grade 5 and Grades 6-8.

Most studies examine the aggregated total school population or just general education students, but there are very few that look at how these two configurations affect the special education population within a school. For the total school population and general education students, many of the studies have tended to show that K-8 schools outperform their 6-8 counterparts in terms of academic achievement and school social factors such as discipline, attendance, and attitude towards school. The special education studies that have been completed show mixed findings and are inconclusive as to which configuration is the most effective for that population.

Nationally, K-8 schools have been increasing at a faster rate than 6-8 schools. New Jersey is one of the most densely populated states in the country and has one of the largest percentages of special education students. Special education is also one of the largest expenses a school district must account for, but little is done to determine the best

placement, as far as grade configuration is concerned, to create an effective environment for special education students.

Special education proficiency rates in K-8 and 6-8 schools was the focus for this study. This study examined the academic achievement of sixth and eighth grades in K-8 and 6-8 schools to determine whether, and to what extent, either configuration had an effect on the proficiency rates of special needs students on the 2011 NJ ASK. Chapter V presents an overview of the study, a summary and discussion of the principal findings, and recommendations for future research in the area of grade configuration and its effects on student achievement for special students in sixth and eighth grade.

Overview of the Study

The purpose of the study was to describe and evaluate the effects of grade configuration on the proficiency rates on the NJ ASK for sixth and eighth grade special education students. The study sought to test the main effects of district factor group and grade configuration on the dependent variable. It also determined if district factor group and grade configuration interact significantly in their effect on the dependent variable. Additionally, the study seeks to find if grade configuration has a differential effect on sixth and eighth grade proficiency rates after controlling for the variables total school size, mobility rate, economically disadvantaged, and percentage of disabled students within a school. Last, the study examines whether the influence of the control and independent variables total school size, mobility rate, economically disadvantaged, percentage of disabled students, and grade configuration differ in sixth and eighth grade special education proficiency rates.

Adding to the field of research, exploring the determinants/predictors of the academic achievement of middle school special education students was the ultimate goal of this study. Ellis et al. (2005) and Fink (2010) both examined special education students' academic achievement in their studies and found varying results. The findings of this study add to the collection of research on the effect of grade configuration on the academic achievement of special education students.

Research Design

This was a cross sectional study in which special education data were collected from 120 sixth grade and 122 eighth grade K-8 and 6-8 schools in the state of New Jersey. The sixth grade group was comprised of 32 K-8 and 88 6-8 schools, while the eighth grade group was comprised of 39 K-8 and 83 6-8 schools. The data collected were readily available to the public via the New Jersey Department of Education website. The special education students that make up the sixth and eighth grade scores that were analyzed were housed in either a K-8 or 6-8 configured school and took the 2011 NJ ASK. The sample used was comprised of K-8 or 6-8 configured schools with available special education 2011 NJ ASK proficiency rates. Schools were the unit of analysis, and proficiency rates were averaged for each school building in the sample by grade.

A two-way ANOVA was used to determine if grade configuration and district factor group have an effect on the school proficiency rates for special education students in sixth and eighth grades. Mean scores for K-8 and 6-8 schools were also examined to determine which configuration on average performed better on the 2011 NJ ASK. The data were also separated by schools that were housed in the upper four and lower four

district factor groups. This allowed schools to be grouped with other schools that share a common student socioeconomic profile.

Hierarchical multiple regression was used to further test if configuration had an effect on school proficiency rates after controlling for total school size, mobility rate, economically disadvantaged, and percentage of special education students within a school. This analysis was also used to show if the independent and control variables' influence on the dependent variable is different for sixth and eighth grade in Mathematics and Language Arts.

Data Analysis Procedures

SPSS Version 21 was used in the analysis of the data collected for this study, and the hypotheses were tested using a two-way ANOVA and hierarchical multiple regression. Only mobility rate data had to be transformed to correct for skewness. The data were tested for statistical significance for the control and independent variables total school size, mobility rate, economically disadvantaged, percentage of special education students, and grade configuration, using hierarchical multiple regression. In the two-way ANOVA, grade configuration, district factor group, and the combination of grade configuration and district factor group were tested for statistical significance. Mean differences were also produced, using the two-way ANOVA to establish which configuration on average performed better.

Individual Hypotheses

The following are the null hypotheses that were tested:

1. K-8 configured schools' performance will not on average be significantly different than schools configured as traditional middle schools for the sixth

and eighth grade special education population on the NJ ASK in Math and Language Arts.

2. Controlling for the variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school, K-8 schools will not on average significantly affect school proficiency rates on the NJ ASK for the sixth and eighth grade special education population.
3. The effects of the control variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school will not be significantly different between sixth and eighth grade levels on Math and Language Arts NJ ASK special education proficiency rates for K-8 and traditional middle schools.

Summary of the Findings

Hypothesis 1

Hypothesis 1 tested whether schools configured as K-8 schools performed better than schools configured as 6-8 for the special education population on the 2011 NJ ASK for sixth and eighth grades in Language Arts and Math. Mean scores, main effects, and interaction effects were analyzed using a two-way ANOVA. The null hypothesis was rejected for sixth grade, as K-8 schools' performance did significantly differ from schools configured as 6-8; but in eighth grade the null hypothesis was accepted, as K-8 schools did not significantly differ at the eighth grade level in Mathematics or Language Arts. The main effects of grade configuration and district factor group were analyzed to determine their effects on special education proficiency rates. The two main effects were

also examined to determine if together they created a significant interaction effect on the dependent variable. The interaction effect was not significant in any model.

While the interaction was not significant, grade level configuration did prove to have a larger effect on 6th grade than it did on 8th grade. Grade configuration netted a result that showed K-8 schools outperformed their 6-8 counterparts when comparing mean scores. In Language Arts there was a slightly larger gap between the mean scores of the two school configurations than in Mathematics. As stated above, grade configuration was significant at the sixth grade level only.

Schools were separated into one of two district factor groups. Schools from the four higher socioeconomic statuses were placed in one group, while schools from the four lower socioeconomic statuses were placed in another. Due to the wide disparity of resources that are available to the different schools in the upper and lower DFG's, analysis was done homogeneously. In Language Arts, schools within the upper and lower DFG's performed better in eighth grade than they did in sixth grade. For Mathematics, the trend was reversed. Sixth grades in K-8 and 6-8 schools outperformed eighth grades. These findings are consistent with other research in the field. Whitley, Lupart, and Beran (2007) also found a decline in Mathematics when comparing fifth and seventh grades in elementary and middle school settings.

The fact that Mathematics proficiency rates show a decrease from sixth to eighth grade leads one to suggest that the eighth grade Math skills that are needed to be Proficient are exponentially more difficult for special education students to learn than the skills needed in sixth grade. The skills needed to be Proficient in Language Arts are more

easily practiced and reinforced, as Language Arts skills transfer over to other subject areas, like science and social studies, more readily than Math skills do.

The findings from this study tend to align partially with the results of Fink (2010). She found that sixth grade special education students in K-8 schools in Baltimore, Maryland, scored significantly higher than their 6-8 counterparts in reading only. Whereas in eighth grade the results from both studies netted a non significant result in Math and Language Arts, but in sixth grade Math the data from this study shows that grade configuration had a significant effect over special education proficiency rates. This diverges from Fink's (2010) findings where she found 6th grade math scores non significant. Part of the reason behind these findings could be the make up of the sample (individual student scores vs. grade level proficiency rates), the difference in sample sizes (5312 student vs. 120 sixth grades and 122 eighth grades) and the different unit of analysis (Hierarchical Linear Model vs. Hierarchical Multiple Regression) are so vastly different they created a different result for Math.

Also, district factor group was consistently significant in predicting school proficiency rates for both sixth and eighth grade students in Language Arts and Mathematics. DFG was the larger of the two significant predictors in sixth grade and the only significant predictor for eighth grade in both subjects. This was not surprising based on the large amount of research that demonstrates how socioeconomic status shapes student achievement. Becker (1987) found that the elementary setting (K-8) was more beneficial to sixth grade reading scores for low socioeconomic status students, while the middle school setting was better for sixth grades from higher economic backgrounds. In Language Arts, the gap between sixth and eighth grade school proficiency rates for

special education students in upper and lower DFG's was larger than it was in Mathematics. The results for this hypothesis support the idea that grade configuration has a stronger influence on younger special education students than it does on older middle grade special education students.

Hypothesis 2

Hypothesis 2 tested whether K-8 schools' special education populations will significantly differ from 6-8 schools' special education populations on the NJ ASK in Mathematics and Language Arts at the sixth and eighth grade levels when controlling for the variables total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school. These control variables were selected because they are factors that the New Jersey Department of Education uses to help describe a school's student body makeup and economic status.

The null hypothesis was rejected for the sixth grade but accepted for the eighth grade in both subjects. Grade configuration's effect was significant only in predicting sixth grade proficiency rates for special education populations. Grade configuration had a slightly stronger influence on the sixth grade Mathematics proficiency rates than it did on Language Arts proficiency rates. These results further strengthen the findings from Hypothesis 1. The fact that grade configuration is still not significant after accounting for the control variables in eighth grade adds to the conclusion that grade configuration has more of a significant influence on younger middle grade level special education students than on older ones. These findings align with a study conducted by Abella (2005) that showed K-8 schools outperformed traditional middle schools; but that as students moved to eighth grade and then transitioned to high school, the scores from the two grade

configurations were identical. Hence, grade configuration loses its effect on academic achievement in eighth grade.

Hypothesis 3

Hypothesis 3 tested whether the effects of grade configuration, total school size, mobility rate, percentage of economically disadvantaged students, and percentage of special education students per school would significantly differ for sixth and eighth grade proficiency rates on the Math and Language Arts 2011 NJ ASK. The null hypothesis suggested that there would be no significant effect on grade configuration for sixth and eighth grade proficiency rates when controlling for the above-mentioned variables. The null hypothesis was rejected in Language Arts for the variable economically disadvantaged, as it was consistently significant in affecting proficiency rates for both sixth and eighth grade. Once grade configuration was added to the set of control variables in Model 2, economic disadvantage's effect remained significant and its influence increased slightly in both grades. The proportion of students with disabilities was significant only in the sixth grade Model 1. Grade configuration was also significant only for Language Arts in the sixth grade after accounting for the control variables.

The null hypothesis is accepted in Mathematics proficiency scores for all of the control variables, as none of them in either sixth or eighth grade were statistically significant. The independent variable of grade configuration was the only significant factor in sixth grade. In Language Arts, grade configuration held a slightly larger influence than it did in Mathematics. The findings for Hypothesis 3 coincide with the results from Hypotheses 1 and 2, as grade configuration retains its effect on the

proficiency rates of younger middle- grade special education students; but the same influence is not present at the eighth grade level.

Discussion and Implications for Practice

As stated in Chapter II, the studies that have been conducted comparing K-8 and 6-8 schools for middle grade students have yielded varied outcomes. Most studies were done at the local school district level with a few conducted at the state level. There has been no clear or uniform consensus as to which grade configuration is best suited for middle grade students, but there is more literature that states that K-8 schools are better for academic and social advancement of general education students. For the special education population, the studies that are available are very limited.

A school environment can have a profound effect on all of its students and arguably can have a stronger (positive or negative) effect on the special education versus the general education population. The effect of grade configuration on special education students is not a topic that drives school districts when making decisions on a school's grade span configuration. Many times grade configuration is an item that is discussed when districts have to react to a growing student population or are following the current trend in education. This has potentially created a situation in which special education students may not be in the school configuration that is most conducive to their learning.

In this study, some of the findings were in line with and some divergent from the literature in the field. This study found that the K-8 grade configuration positively affected school proficiency rates, but the effects of grade configuration were limited to the sixth grade special education proficiency rates. Furthermore, the variable economically disadvantaged was the largest predictor of academic achievement for the

special education population. The literature reviewed in Chapter II shows that in most general education studies K-8 schools do perform better than 6-8 schools for the general education population. The results for special education studies in the field are not consistent. The findings from this study align more closely with the idea that grade configuration, more specifically K-8 schools, have a positive effect on younger middle-grade special education students. More studies should be conducted to see if these findings are reaffirmed.

Furthermore, the fact that the results in this study found that eighth grade special education proficiency rates were not significantly affected by grade configuration was a surprise. This differs from much of the research reported in Chapter II, in which eighth grade academic results showed grade configuration having a positive effect for general education students. A possible reason for the disparity between general and special education proficiency results for eighth grade students could be that special education students have been part of curricula and programs created specifically to meet their needs academically and/or socially for three years that general education students are not privy to. It is arguable that special education programs may be offsetting the effects of grade configuration for these students. As most students (special and general education) enter the sixth grade, the fear of what they will encounter in the middle grades is prevalent. That fear of the unknown affects both types of students in sixth grade, but in eighth grade special education students have been in an environment for three years that is different than that of the general education students, even though they were housed in the same building. A more in-depth exploration would need to be conducted to determine if the

benefits gained from being in the special education program outweigh the benefits lost from being in either school configuration.

This study also examined the effects of certain variables on the proficiency rates for sixth and eighth grade special education populations in Language Arts and Mathematics. Economic disadvantage proved to be the strongest predictor of proficiency rates for the special education populations in Language Arts for both grade levels. Students with disabilities and grade configuration were the only other two significant predictors for Language Arts proficiency rates, but only in the sixth grade. This coincides with many studies that have discovered that a student's socioeconomic status is a predictor of that student's academic achievement and with those studies that state the effects of grade configuration will affect younger middle grade students more than older ones. For Mathematics however, economic disadvantage was not a significant predictor of proficiency rates in either sixth or eighth grade. The only variable that was significant was grade configuration in sixth grade. In light of these findings, additional testing would be needed to determine what effect economical disadvantage has on the varied levels of socioeconomic special education students.

An interesting finding in this study was that within the two-way ANOVA, the interaction effect of district factor group and grade configuration was not significant at all at either the sixth or eighth grade levels for Language Arts or Mathematics. District factor group by itself, however, was a significant predictor of proficiency rates for both sixth and eighth grade levels in Language Arts and Math. In New Jersey, schools are placed in district factor groups according to specific criteria that are closely linked to socio-economic status. An experimental study could be conducted that examines special

education students disaggregated by district factor groups after controlling for socio-economic status. To do this correctly, the researcher would have to take into account the disparity of resources available amongst the different district factor groups and use a larger sample from each DFG.

Recommendations for Policy and Future Research

The recommendations that are presented are based on the findings of this study centered on the effects of grade configuration on the proficiency rates of special education populations at the for sixth and eighth grade levels in Language Arts and Mathematics. There is one recommendation for future policy and twelve recommendations for future research. The results from this study will allow other researchers to replicate the study using different student populations and alternative school settings. These recommendations are provided with the hope that further research into grade configuration and how it affects student achievement will aid decision makers and all stakeholders in making the best choices for their special education populations when it comes to grade configuration:

Recommendation for Policy

With the differences in grade configuration amongst schools, policy should be enacted at the district level to force school boards and district administration to show proof to the community that they have conducted a thorough analysis of how a proposed new school configuration will affect the specific school population and its subgroups, including special education students. This will provide community stakeholders with a better understanding of why a specific

school's configuration has been selected and will ensure that certain groups of the student population will not be ignored.

Recommendations for Future Research

1. This study was restricted to the readily available special education proficiency rates on the New Jersey Department of Education website. In 75% of the schools configured as K-8 and 6-8, special education proficiency rates are suppressed. It is suggested that a researcher should request the results for the schools whose scores were suppressed. This would increase the sample size for future studies.
2. The study conducted here was quantitative in nature. A qualitative study looking at the perceptions of students, parents, and staff towards K-8 and/or 6-8 schools would benefit the field. This would provide a richer study that would help to explain to what extent the stakeholders and community value the school configuration their children or students attend. They would also be able to give their views on students' academic progress within these schools.
3. During the analysis of the two-way ANOVA and hierarchical multiple regression, grade configuration had more of an effect on younger middle-grade special education students than it did on older students. This result has been documented with other research in the field of grade configuration. A study that looks into why this result may be occurring could aid school administrators in establishing different and varied practices that would be of benefit for both groups of students within a K-8 or 6-8 building.

4. Socioeconomic status was examined by studying the control variables economic disadvantage and district factor groups. In both cases these variables proved to be significant in their effects on proficiency rates of special education populations. A case study of special education students and programs in K-8 and 6-8 schools from each DFG could give education stakeholders an idea of how these programs differ among the socio-economic categories.
5. Factors such as attendance, behavior, discipline, and student GPA's were not examined in this study. These items have a unique influence over the climate and environment of every school. As students get older, these factors have more influence over the said school environment. A longitudinal study of the long-term effects of these factors on middle grade special education students in K-8 and 6-8 schools could help school administrators discover if the school configuration has had any effect on these factors over time.
6. The ultimate goal of any school is to prepare its students for the next level of education or life. Middle schools must prepare their students for the rigors and challenges of high school. Research should be conducted that follows incoming freshmen to ascertain how well they feel their school (K-8 or 6-8) prepared them for high school. The researcher should follow up with these students midway through their freshman year and again at the end of the year to gauge if the students' feeling changed from before they started high school till the end of ninth grade. The researcher should have a mixed sample of ninth grade students who go to private and public high schools to gain a full

understanding of the extent to which K-8 and 6-8 schools prepare students for both types of high schools.

7. For many urban districts, the K-8 school configuration has been used heavily over the last 15 years. In most studies, all K-8 schools are put together in one sample, but there is some limited literature that has looked at how older K-8 schools compare to newer K-8 schools. Older schools are defined as being in existence longer than five years, while newer K-8 schools are less than five years old. Comparing the special education population within these school settings using a qualitative method could expose specific practices that older or newer K-8 schools are using that can be helpful to or are detrimental to special education students.
8. Most grade configuration studies are done at the local or state level. A multi-state study that explores the potential benefits of K-8 and/or 6-8 schools could be of use to all educators to determine common practices and themes among these schools. The first multi-state common assessment has been created by the Partnership for Assessment of Readiness for College and Careers (PARCC). The first assessment is currently slotted to be administered in 2015. This will, for the first time, allow educators to compare student data using the same measure for common classes at the elementary, middle, and high school levels. Utilizing the PARCC assessment as a common dependent variable, researchers could replicate this study using K-8 and 6-8 schools from multiple states to gain a national picture of how special education populations perform in these settings.

9. This study contained information only on the two most widely used grade configurations, K-8 and 6-8. In 2010, there were 16 other configurations that were used nationally. An experiment that looks into the effects that these other grade configurations produce could discover alternative methods and practices that are exclusive to their configuration but may be of benefit to other education stakeholders.
10. Special education students' classification is recorded for every child who falls within that subgroup. The results for all of the classifications are grouped together under the grouping 'special education'. A study should be conducted to see if grade configuration has an effect on each of the 14 special education classifications. By delving into this data it will allow decision makers to determine more specifically which classifications are more or less affected by grade configuration for their communities.
11. A study that compares the results from the special and general education populations to each other would be of benefit to educators. This would help decision makers determine if the results posted by the special education population are unique to them or do the results mirror what is happening with the general education population.
12. Lastly comparing special education scores from schools before and after they change their configuration will give leaders an insight as to how their population performs in both settings.

Conclusion

Chapter V presents the findings of this study that determined the effects of grade configuration on proficiency rates of special education populations on the 2011 NJ ASK in Language Arts and Math at the sixth and eighth grade levels. The study also sought to see if the variables total school size, mobility rate, economic disadvantage, and percentage of special education students within a school had a significant effect on the proficiency rates of special education populations at the sixth and eighth grade levels for Language Arts and Mathematics. Special education students, like any other subgroup of a school, are affected by the environment in which they learn. The environment within K-8 schools is familiar to middle grade students due to the time they have spent within the building in the elementary grades. The literature has overwhelmingly confirmed that the more transitions students make in their K-12 career, the more detrimental those transitions are to their overall academic progress. One of the drawbacks to students experiencing multiple school transitions is that they experience high levels of anxiety every time they change schools. K-8 schools have shown a propensity to alleviate some of this anxiety for their younger middle school students but do not have the same effect for their older ones. While future research on grade configuration and its effects on special education populations should be done, results from this study show that K-8 schools have outperformed 6-8 schools and that grade configuration is significant in sixth grade but not in eighth grade for special education students.

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