ABSTRACT

Title of Dissertation: A COMPARISON OF GRADE CONFIGURATION ON URBAN SIXTH TO EIGHTH GRADE STUDENT OUTCOMES IN REGULAR AND SPECIAL EDUCATION

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This study analyzed the effect of school/grade configuration for regular and special education students in K-8 schools and middle schools. The analysis looked at the effect of grade configuration on two outcomes: student achievement and student attendance. The study followed a cohort of fifth graders (regular and special education) through sixth, seventh and eighth grades, in either a K-8 or a middle school. The analysis used multilevel modeling to account for student demographics, prior achievement and school variation in achievement.

Many factors including demographic features such as race, free and reduced meals (FARMS), and prior achievement can affect middle grade performance. Because students and schools differ in terms of some of these variables, multilevel evaluation was necessary to partial out their effects to determine the effect of school grade configuration on student outcomes.

Results indicated that students performed slightly better academically, as measured by the Maryland State Assessments, in the K-8 schools but only at a statistically significant level for regular education 6th grade math and special education 6^{th} grade reading. Attendance results indicated that students in 6^{th} grade regular and special education performed statistically significantly better in K-8 schools but the magnitude was small.

Four major outcomes of this study had implications for policy and practice: (a) The results of this study do not support reconfiguration as a strategy for better outcomes; (b) Student performance in fifth grade was the best predictor of student success in the middle grades; (c) School performance had a significant effect on student performance, regardless of school configuration or placement in regular or special education; (d) These results suggest the importance of including special education students in high-performing schools, where they will have the potential to perform at higher levels.

A COMPARISON OF GRADE CONFIGURATION ON URBAN SIXTH TO EIGHTH GRADE STUDENT OUTCOMES IN REGULAR AND SPECIAL EDUCATION

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DEDICATION

In memory of my loving parents who nourished me and my beloved husband who cherished me. In honor of my wonderful children, grandchildren, and great grandchildren who sustain me. With my deep appreciation to all of you for the encouragement and support through the years. You light up my life.

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CHAPTER I

INTRODUCTION AND REVIEW OF LITERATURE

Every day twenty million 10- to 15-year-olds attend middle level schools in the United States (National Middle School Association, 2003). This is a critical period, as these students are making the transition from childhood to adolescence. Adolescence is a time of profound physical, emotional and developmental change (Jackson & Davis, 2000; National Middle School Association, 2003). Early adolescence can be very challenging for many children (Jackson & Davis, 2000; National Middle Schools Association, 2003).

Adolescence as a developmental stage is situated between childhood and young adulthood (Hall, 1904). The publication of G. Stanley Hall's *Adolescence* (1904) is widely viewed as the beginning of the field of adolescence as an area of scholarly and scientific research. In 1950 Erikson defined adolescence as the period between 13-20 (Erikson, 1950). The age of the onset of puberty has been becoming younger and the definition of adolescence has changed to include early, middle and older adolescence (American Academy of Pediatrics, 2010). In 2010 the American Academy of Pediatrics defines "Early Adolescence" as the period between 10 and 14. This is the age that is usually the population of the middle grade—grades 6, 7 and 8 (American Academy of Pediatrics, 2010).

Over the past 50 years an adolescent society as described by the sociologist James Coleman (1961) has evolved. One of the defining characteristics of this age group is the setting of peer norms and pressures to be socially adept, attractive, athletic and popular. Musicians, athletes, movie idols, and other popular figures are student models (Juvonen, Le, Kaganoff, Augustine, & Constant, 2004; Mirel, 2006) rather than success in school.

More recently the introduction of the new technology of neuro-imaging has permitted researchers to examine the brains of adolescents without any invasive procedures. This new science of neuro-imaging indicates that the brain continues to

develop and that it undergoes considerable development during adolescence (Blakemore, den Ouden, Choudbury, & Froth, 2007). Development in the areas of executive functioning which include planning, decision making, and anticipating consequences is not yet complete during early adolescence (Caskey & Anfara, 2007).

Middle school is also a critical period for schooling. Urban middle schools in particular have been struggling (Mac Iver & Mac Iver, 2006). One issue is that discipline problems and risky behavior are particularly prevalent in the population in urban middle schools, as reported by middle grade educators (Jackson & Davis, 2000). Another factor that has received national attention is the perception that middle schools are not safe (Young, 2002). School safety is a major concern and while the majority of shooting incidents that received the most national attention took place in the high schools, a variety of statistical studies show that school safety is a major challenge in middle schools as well (Juvonen et al., 2004; Young, 2002). School staff also report more violence in the middle school than in the elementary grades (Young, 2002). The National Longitudinal Study of Adolescent Health (2001) indicated that about 6% of sixth graders and as many as 9% of eighth graders carried a weapon to school in the past month. The middle grades are often when youth first experiment with tobacco, alcohol, sex, and drugs (Jackson & Davis, 2000). In addition, middle school students are subject to less violent but traumatizing incidents such as bullying (Juvonen et al., 2004; Young, 2002).

In this critical period, low-achieving students often end their academic preparation or drop out the first year of high school (Jackson & Davis, 2000; Leone, Christle, Nelson, Skiba, Frey, & Jolivette, 2003). Students in detention facilities often have a history of poor academic achievement in English and mathematics, poor attendance, and suspension in the middle school years (Leone et al., 2003). In *Turning Points 2000* (Jackson & Davis, 2000), there is a description of the escalation of high-risk behavior in the middle schools. Ten percent of the students are at very high risk and 25%

of the students are at high risk for significant involvement in activities such as drugs, alcohol and unprotected sex.

In many cases school systems only began to look at their failing middle schools because of the deficits in their entering high school freshmen (Juvenon et al., 2004; Mirel, 2006). Mirel (2006) has concluded that many of the problems in American high school achievement can be traced to low achievement in the elementary and middle school. As the tenets of the No Child Left Behind Act of 2001 (NCLB, 2001) became the focus of educational practice in the United States, the poor academic performance of students in the middle schools has been a growing focus of concern. Many high school students enter ninth grade reading at a sixth grade level or lower (Mirel, 2006).

There is over a century of discussion about middle grade students going back to the nineteenth century. How best to educate students at early adolescence, that is students entering puberty with all of its growth and changes and who are typically placed in grades 6, 7, and 8, continues to be a challenge in education today, particularly in urban schools. According to Balfanz and Mac Iver (2000), "In many respects, it is during the middle grades that the battle of urban education is lost" (p.137). Of significance to other authors (e.g., Brubacher, 1966; Butts & Cremin, 1953) in the mid 20th century, who examined the development of the American public education system, the portrait they painted of middle schools was of a haphazard evolution, non-data-based, and with no roots in any educational theory.

Purpose of the Study

The purpose of this study is to examine the effect of grade configuration in the middle grade years on selected educational outcomes in an urban school system across three grades. There has been a lack of empirical data and little data driven decision making as changes were implemented. This study followed a cohort of fifth graders as

they progressed through the middle grades in either a K-8 or a middle school setting. It examined the effect of grade configuration on achievement in reading and mathematics, as measured by the Maryland Student Assessment (MSA), for regular education students as well as students with IEPs in the 6th, 7th and 8th grades in a K-8 or middle school. The study also examined the effect of grade configuration on attendance rates for the regular education students and students with IEPs in grades 6, 7 and 8 in the K-8 school or in the middle schools.

Review of the Literature

Historical Perspective

Many current issues concerning students in the middle school years echo concerns that have been expressed since the beginning of the 20th century. The middle grade years—students age 10-15—have been viewed as a critical transition period in education (Juvonen et al., 2004). One source of concern involves the physical and emotional changes taking place during the onset of puberty while, simultaneously in many communities, there is a transition to a new school environment as students enter middle school (Carnegie Council on Adolescent Development, 1995).

A variety of school configurations have emerged over the decades. Although the reason for change in school grade configuration varied, it was not usually based on identified student needs, but was more often based on building availability or labor market needs (Brubacher, 1966). One grade configuration was the junior high. In 1893 the Committee of Ten issued its report that focused on a quality liberal arts college preparatory education for all high school students (National Education Association, 1893). Under the leadership of Charles Eliot, president of Harvard and the author of the final report of the Committee of Ten, the program was to be academically rigorous, intensive and demanding. The junior high schools were to prepare the students for high

school; however, the rigid organization of the junior high schools was equally challenging for young adolescents and did not result in students who were better prepared for high school (Mirel, 2006).

The debate over the most appropriate kind of schooling to be provided for young adolescents continued during the second half of the twentieth century (Mizell, 2005). There was generalized dissatisfaction with the junior high schools. Those same factors—rigid schedule, subject-centered education, a high school-like curriculum that had seemed so valuable at the turn of the century—were now seen as impediments to success for some of this age group. During that period deep concerns developed over the failure of many junior high schools to respond adequately to the unique developmental characteristics of middle-level students.

A new school/grade configuration for the middle grade population, identified as middle schools, was started in the 1960s as a shift from the junior high schools to deal with the educational issues of young adolescents. These schools included 6^{th}, 7^{th} and 8^{th} grade. By the early 1990s there was again growing dissatisfaction with the middle schools as well and educating adolescents was perceived as increasingly challenging.

Grade Configuration in the Middle School Years

A number of issues have surfaced historically about education in the middle grades. For example, transitioning to middle school can be traumatic for young teens (Alspaugh, 1998). Entering the large middle school can be daunting to many early adolescents.

Grade re-configuration has been one attempt to address this issue. However, a review of the literature regarding grade configuration for this age group finds there is little research-based data to support the national movement towards reinventing education for the middle school years through changing grade configurations. In addition, an

extensive review of the literature failed to yield studies regarding the effect of grade configuration on special education students. The National Center for Educational Statistics (NCES 2009) tracks students by disability and environment (regular, special school or class), but does not track grade configuration for the middle grade years i.e. middle school or K-8 setting in terms of student outcomes.

Grade Reconfiguration as a Response to Academic Achievement Gaps

The current spectrum of educational settings for students in the middle school years includes both K-8 schools and middle schools. The movement to reconfigure the educational setting is most significant in urban educational centers coping with achievement issues related to NCLB. By the end of the middle school grades, students in the United States rank significantly below their peers in other countries, though they are on par with them in 4th grade (Juvonen et al., 2004).

Achievement results across the state of Maryland yield similar findings. Student scores on the elementary school Maryland Student Assessment (MSA) reflect comparatively higher achievement for their grade level then student scores on the middle grade assessments (MSDE Report Card, 2006). Middle school reform was also the focus of the proposals articulated in Maryland delineating the types of major changes needed to provide quality education for middle grade students (Maryland Task Force on the Middle Learning Years, 1989). Major reports and studies are presented here to trace the evolution of the middle school and K-8 option.

At the beginning of the 21st century Cincinnati and Cleveland, Ohio; Minneapolis, Minnesota; Philadelphia, Pennsylvania; and Baltimore, Maryland were all in the midst of a move to reconfigure schools as K-8 rather than middle schools (Connolly, Yakimowski-Sbrenick, & Russo, 2002; Mac Iver & Mac Iver, 2006; Pardini, 2002). These school systems were all struggling to meet the requirements of the NCLB

legislation with its emphasis on test scores and data-driven measures of achievement (Hough, 2005). In Cleveland test scores decreased sharply, absences soared and suspensions escalated once students were in sixth grade (Pardini, 2002). Cincinnati reconfigured its schools to eliminate the middle school and focus on middle-school-aged population in the elementary school (Pardini). Baltimore began the process as well with strong support from parents (Connolly et al., 2002). Today, after the first decade of the 21st century, many school systems have completed that transformation. The websites for Cincinnati and Cleveland reveal almost entirely K-8 schools rather than middle schools. Philadelphia, Baltimore and New York have many more K-8 schools than middle schools (Baltimore City Public Schools, 2010; Cleveland Metropolitan School System, 2010; Cincinnati Public Schools, 2010; The School District of Philadelphia, 2010; New York City Department of Education, 2010).

However, the continuing search for improvement in the middle grade years via grade reconfiguration has led to a wide variety of school configurations enumerated on their respective websites. Charter Schools, privately operated schools, and 6-12th grade schools have all appeared on their websites along with requests for proposals for plans to improve failing schools. A request on the New York City website to design what they are calling "Renaissance Schools" to improve student achievement is a good example. There is a great deal of discussion in the popular press but little research-based material.

As the Policy Statement on Grade Configuration of the National Forum to Accelerate Middle Grade Reform based stated, it is what goes on inside each middle grade school that is important for the education of young adolescents. The Forum recommended focusing attention on school improvement rather than on grade reconfiguration (The National Forum to Accelerate Middle Grade Reform, 2008).

Carnegie Reports "Turning Points" 1989 and 2000

The impetus for grade configuration came about because of the dissatisfaction with current middle school outcomes, as described above. By the mid-1980s, the general dissatisfaction led to a major Carnegie Council study of middle school education, presented in the 1989 document, "Turning Points." The study examined all aspects of middle schools and proposed eight major recommendations to transform them. It did not, however, propose reconfiguring the middle grades and establishing K-8 schools.

Paramount among the recommendations was the creation of smaller learning communities, the development of a core academic program, improved teacher education, and connecting schools with communities. These recommendations emphasized reaching out to the middle grade students and creating a network of mutually supportive relationships between students, faculty and communities. A major restructuring of the middle schools so that students would be prepared for high school and the 21st century was recommended in the report. The structural changes including how schools are organized were implemented, but the core changes in curriculum, instruction and assessment, which were key recommendations, have failed to gain a foothold (Jackson & Davis, 2000).

In Turning Points 2000 (Jackson & Davis, 2000), these recommendations were expanded with an additional focus on diversity, language difference and cultural competency. Turning Points 2000 reexamined the recommended changes and the impact of the recommendations of Turning Points 1989 and concluded that while there was significant impact, a great deal still remained to be implemented. Funding for the development of revised curriculum and assessment resulted in change, while a lack of funding to implement the revised curriculum and assessment significantly hampered new development (Mertens, Flowers, & Mulhall, 1998). The poor quality of middle grade education has been most apparent in urban centers (Balfanz & Mac Iver, 2000).

Students with disabilities were also challenging and many students with disabilities ended in the juvenile justice system rather than in the middle schools (Leone, Christle, Nelson, Skiba, Frey, & Jolivette, 2003).

The issues that transformed the K-8 schools to junior high schools, then junior high schools to middle schools, and now the middle schools back to K-8 schools have remained static: the nature of early adolescence, academic challenges, and preparation for high school. In addition to academic concerns there are often behavioral issues that impact learning. The schools with the poorest academic performance were often the same schools with the highest incidence of disciplinary issues (Shann, 1990).

Research on Structural Issues

Research on school organizational structure has focused on different variables over time. The Northwest Regional Educational Laboratory (NWREL) examined the research on grade configuration and came to the conclusion that there was little evidence that there was a relationship between grade configuration and student achievement (Klump, 2006). Examining the literature they found that by 2005 there had been no large-scale studies that examined the effect of reconfiguring grade placement on student achievement (McEwin, Dickinson, & Jacobson, 2005). Many of the existing studies did not control for the variables of school size, school achievement, socioeconomic status or prior achievement. Most of them were case or correlation studies and rely on data self-reported by school districts (Klump, 2006). Research regarding what configuration is best, K-8 vs. middle school, is still unsettled and inconclusive (Viadero, 2008). Further, there is no evidence concerning how grade configuration affects students with disabilities.

For example, Mertens, Flowers, and Mulhall (2001) looked at self-study data including questionnaires and surveys collected from 140 middle grade schools, 2000

teachers and 30,000 students in the Michigan Middle Start Consortium and found that consistent with the findings of Jackson and Davis (2000), smaller seemed better when it came to middle grade education, regardless of configuration. They found that schools with fewer than 750 students self-reported the greatest success in parent involvement, positive school climate and teacher-team classroom practices. Students in the schools with between 500 and 749 students reported slightly higher self-esteem and academic achievement and lower levels of behavior problems and depression. Students and staff in the larger schools reported more behavior problems and a more negative school climate. However, this was not an experimental design; the data were all self reported, there were no controls in place for socio/economic status, minority representation or urban/suburban/rural school configurations, and they examined school size across middle and K-8 configurations.

A review of empirical research follows, focusing on comparisons of K-8 and middle school configurations, particularly in urban districts. One of the earliest studies was conducted by Simmons and Blyth (1987), who carried out an extensive study of a group of 621 students in the Milwaukee school system from 1974 to 1979. The study was a quasi-experiment design which used a cluster randomized sample that built on a natural experiment using the two types of school configurations (junior high schools and K-8 schools) that existed in Milwaukee for middle grade students. While this is a comparison of junior high and K-8 schools, it is relevant here. They used several indicators to assess differences between the students assigned to the different configurations. They examined school achievement and adjustment in the 7^{th} grade students across the two settings. Their outcomes were calculated using a Linear Structural Relationships Analysis (LISERL VI) that allowed the examination and testing of many relationships simultaneously and allowed correction for measurement error. (HLM was not yet widely available to account for the clustering of students within the school organizations)

The three main outcomes Simmons and Blyth (1987) assessed were achievement, self-esteem and victimization. Overwhelmingly, the 7th grade students in the junior high school did not do as well in achievement (either GPA or standardized tests) as the students in 7th grade in the K-8 schools. The difference was significant at the .01 level. Students in the K-8 schools in the 7th grade manifested higher self-esteem than their 7th grade peers in the junior high schools. The difference was significant at the .01 level.

The strength of the study was the statistical design. It used structural equation models to analyze the data. It followed the same cohort of students from the 6th grade to the 7th grade in each of the settings. A major weakness of the study was that though Milwaukee's population was 20% minority students, they were not included in the study. The authors explained that their sample selection was impacted by the small number of minority parents who agreed to participate. In addition, there was no attempt to examine special education students.

Offenberg (2001) used a quasi-experimental design utilizing multivariate regression to examine K-8 schools and middle schools in Philadelphia. He focused on the variations between schools rather than the individual students within the schools. He studied between 37 and 42 middle schools and 40 to 43 K-8 schools during the 1996, 1997, 1998, and 1999 school years. Results indicated that achievement outcomes in the middle grade years in K-8 schools were significantly better than achievement outcomes in middle schools in reading and math on the Stanford Achievement Test, significant at the .01 level. In addition, GPA scores in 9th grade for students in Philadelphia high schools who had matriculated from K-8 schools were significantly higher (.01 level) than students matriculating from middle schools. In his analysis, Offenberg (2001) controlled for poverty, minority enrollment and special programs. He did not control for prior achievement or school level achievement. The data indicated that K-8 schools were more effective in increasing achievement in middle grade students than were middle schools

regardless of the variables of poverty and race. Offenberg stated that the demographics of the K-8 schools were different than the demographics of the middle schools and thus the data were inconclusive. While Philadelphia had significant issues regarding special education (Mac Iver & Mac Iver, 2006), they were not addressed in the Offenberg study.

Other research has shown what seemed to be promise for the K-8 schools (Mac Iver & Mac Iver, 2006), but has also been inconclusive. Mac Iver and Mac Iver examined the effects of ten years of reform in the Philadelphia Public School System that included the establishment of K-8 schools. They followed longitudinal math achievement data on the Pennsylvania System of Student Assessment (PSSA) for two cohorts over two different three-year periods, 1999-2003 and 2000-2004. The PSSA is given in the spring of fifth grade and in the spring of eighth grade. They used multilevel change models to estimate the effects of the K-8 reforms on student achievement in high poverty schools. Their report on the achievement of 8th grade students in the K-8 schools showed scores a third of a standard deviation higher than the students in middle schools. However, they cautioned that demographics in Philadelphia showed that the older more established K-8 schools were in more affluent neighborhoods. They also emphasized that the older more established K-8 schools had more certified teachers. The authors did not examine the effects for students with IEPs as a separate population. They also cautioned that their study left many unanswered questions about the true effect of grade configuration on achievement.

Another evaluation of the Philadelphia reform efforts conducted by Byrnes and Ruby (2007) was a natural experiment that examined 40,883 8th grade students in five cohorts from 95 schools from the 1999-2000 school year to the 2003-2004 school year to see what effect different school structures have on achievement in mathematics. This study compared middle schools to established K–8 schools, as well as to newly configured K–8 schools that were part of a K–8 conversion policy (many of these K-8

schools were being run by a private educational agency). The analysis used multilevel modeling to account for student, cohort, and school-level variation, and it included statistical controls for both population demographics and school characteristics.

Their findings were similar to Mac Iver and Mac Iver (2006). They found that students performed better in the K-8 schools, but that other variables, such as socioeconomic levels, class size and teacher demographics, also contributed to the improved performance. The results indicated that older K–8 schools performed significantly better than middle schools, and this advantage was explained by differing student and teacher populations, average grade size, and school transition. Newer K–8 schools did not enjoy the same advantages despite having smaller grades and lower transition rates, due to their more disadvantaged populations. Many of the early K-8 schools in Philadelphia were not in the more disadvantaged areas and other school reform efforts were taking place simultaneously. The study did not address special education students.

A quasi-experimental study of archival achievement and attendance data in conjunction with parent and teacher self-report data was conducted by Connelly et al. (2002) in Baltimore. MANCOVA and least squares techniques were used to analyze the Terra-Nova (educational) data and the attendance data. In addition, they reported on a parent and teacher satisfaction survey. The cohort of students used for the study were those who had entered the BCPS as first graders during the 1993-1994 school, remained in their school through fifth grade and then stayed in the BCPS as either middle school students or K-8 school students until 2001. The study used the systems data sets Pupil Identification File (PIF) and the School Administration Student Information (SASI). The study followed only those students who either stayed in the same school until the end of eighth grade or stayed through fifth grade and went on to a single middle school. The cohort was split into two parts: Group A was the group who attended a single K-5 school

and then a middle school and Group B included the students who attended a single K-8 school. This sampling technique resulted in 2,871 students in group A and 407 in group B. Their results indicated that parents and principals self reported greater satisfaction in the K-8 schools. In addition, they analyzed 8th grade attendance in the two configurations and found better attendance in the K-8 schools. Finally, they found that 8th grade scores on the CTB Terra Nova and the Maryland Functional Testing Program were better for students in the K-8 configuration for 8th grade. A limitation of the study was that the students in the K-8 schools were more affluent and ethnically different than the students in the middle schools. In addition, in spite of the fact that the Baltimore School System was in a consent decree for special education, they did not look at special education outcomes.

Gill, Engberg, and Booker (2005) examined the performance of middle grade students in the Pittsburgh School System to assist in planning and decision making. The study used fifth grade scores as a base line in comparing sixth grade achievement, seventh grade achievement and eighth grade achievement to the students' fifth grade achievement. They also controlled for age, gender, family structure (two-parent household, single-parent household, or no-parent household), poverty, special education status, gifted status, and English-language learner status. They felt the most important of these controls was the fifth-grade score, which allowed them to factor out students' prior achievement, thus creating a measure of the gain in achievement of each student between fifth grade and sixth grade, fifth grade and seventh grade, and fifth grade and eighth grade. The additional controls helped to account for the possibility that student background characteristics affected achievement.

Gill et al. (2005) developed an instrument to assess school performance that they named the index of Average School Achievement (ASA). This instrument produced a snapshot of student achievement in each school. They then developed a School

Performance Index (SPI) that uses multiple regression techniques to analyze each student's achievement over time in order to estimate a school's contribution to student achievement. These data were used to make decisions about school closing and reassigning of students in Pittsburgh.

An evaluation of the data found positive statistically (.01 level) significant differences in academic achievement in the 6th and 7th grades in the K-8 schools as compared to the middle schools. It was not significant at the 8th grade level. This is compatible with the data of Alspaugh and Harting (1995) who found that scores always dropped during transition years and then grew closer together as the students progressed in the grades.

Several findings emerged from the Gill et al. (2005) study. They found that achievement gains in the K-8 schools in the middle grades outpaced achievement levels in the traditional middle schools. They also found that achievement for African American students in the 6th and 7th grades in the K-8 schools was accelerated. In addition, they developed an instrument to analyze school performance that could be used in decision making. They did not examine the impact of grade configuration on students with disabilities receiving special education services. They did not account for any school level variables other than grade configuration and did not measure the impact of school level achievement.

Other studies have been done in non-urban school districts. In an examination of eighth grade achievement in 163 schools in Maine, Wihry, Coladarci, & Meadow (1992) found that academic achievement was significantly (.01 level) higher on the Maine Educational Assessment for students in K-8, K-9, and 3-8 schools than in schools in a middle school model (4-8, 5-8, or 6-8). They also performed better than students in a junior/senior high school model. They constructed a study of inputs and outputs in the educational setting, in which grade configuration was considered an educational input

and student achievement an educational output. They used a least squares multiple regression model to evaluate the data. They also used socio-economic status: a measure called COLGRAD was used to assess the educational attainment level of the community and a measure called INREG assessed expenditure by schools on education. School characteristics, school size, teacher attributes, such as education and longevity, and pupil staff ratio were also part of the analysis. Their conclusion was that the grade span configuration, that is, where the eighth grade is placed, influences student achievement even when SES, teacher attributes and community are considered. Students in the eighth grade in the K-8 schools performed statistically better at the .01 level in reading and math than students in the middle school configuration. They accounted for many school level variables, but did not examine student level variables. However, they cautioned that a more rigorous evaluation would be necessary before any policy decisions were made given that this was only a single study in a rural district.

Wihry's (1992) study had some good components, such as control for school level variables and significance in results at the >.01 level. However, the study was conducted in rural schools; there were no minority students, and no special education student data. Coladarci and Hancock (2002), in an "Occasional Paper" reviewing educational policy in the state of Maine, cautioned that the research on educational achievement and grade span configuration is limited and that not enough research has been completed to eliminate other factors such as quality of instruction.

Franklin and Glascock (1998) examined the effect of grade configuration on student behavior and academic achievement in a post hoc quasi-experimental design that examined a random selection of schools across Louisiana. The sample for grade 6 was composed of 76 elementary schools (K-6), 68 middle schools (7-9) and 77 unit schools (K-12). The grade seven sample consisted of 77 elementary schools, 73 middle schools, and 76 unit schools. Grades 10 and 11 each consisted of 73 unit schools and 73 high

schools (grades 9-12). The unit of measure for the study was the school, with an N of 593 schools. Schools were elementary grades K-7, middle schools grades 7-9 and unit schools grades K-12. The researchers explored the effects of grade configuration on academic achievement and on behavior in grades 6, 7, 10 and 11. Their research included middle grade years 6 and 7. In both elementary schools and in K-12 schools, students in grade 6 and 7 performed better than their middle school peers. The design did not examine special education students and was confined to rural schools.

Importance of Sixth Grade and Transition Points

Sixth grade seems to be a pivotal point for middle grade students. A pattern of behavioral infractions often starts in sixth grade for students placed in the middle school setting rather than remaining in (K-6) elementary school (Cook, MacCoun, Muschkin, & Vigdor, 2007). In a quasi-experimental post-hoc research design, Cook et al. used multi-level models to examine 243 schools with 44,709 sixth graders in 99 school districts in North Carolina and their reported disciplinary events. Their research revealed that the students in the 6th grade in the middle school were more likely to be suspended and that often the suspendable offense was violence (Cook et al., 2007).

This was a very comprehensive study that pulled a large sample out of the total data set collected by the North Carolina Department of Education. However, they used only sixth grade data and made assumptions and presumptions based on existing school data for the demographics of the fifth grade students. In addition their research question was not about K-8 versus middle school, but about whether sixth grade belonged in an elementary school or a middle school. While this study focused on behavior, they also reviewed the end of grade test scores and found that the students in the K-6 schools scored higher. The study did not include the urban districts because they questioned the quality of their data from the urban schools in their sample.

In a study of 62 African American students in a poor urban center in southeastern Michigan there was a significant decline in GPA in 6th grade which was the transition year from elementary to middle school (Gutman & Midgley, 2000). The researchers examined family involvement, teacher support, grade point averages and psychological factors. They used a hierarchical regression analysis to examine the multiple factors. Their findings indicated that teacher support, parental involvement and school configuration did not significantly affect student achievement; regardless of the supports in place, there was a decline in academic performance.

There is some evidence that transition points, such as to middle school, are especially problematic for students at risk (Greene & Ollendick, 1993). The research on middle school vs. K-8 seems to indicate that a significant correlate of the better achievement at the middle grade level in K-8 schools as compared to middle schools is a function of the difficulties connected with the transition (Alspaugh, 1998; Alspaugh & Harting, 1995; Mac Iver & Mac Iver, 2006). Franklin and Glascock (1998) found that in Louisiana the transition point was a time when students experienced greater difficulty. In Cleveland, Poncelet (2004) found that the performance of sixth graders in K-8 schools exceeded the performance of sixth graders in middle school.

Alspaugh and Harting (1995) analyzed the effect of grade level on achievement as measured across the many configurations common in rural Missouri (K-4, K-5, K-6, K-7 and K-8). They evaluated five matched sets of school districts with eight schools in each group out of the 540 school districts in Missouri. Schools were matched on size, demographics and school achievement. They were unable to account for variables such as teacher qualifications and staffing models. They used the Missouri Mastery and Achievement tests (MMAT) to measure achievement. They found that scores in reading, math, science and social studies were consistent across the various grade configurations with one notable exception. Whatever the grade configuration, the scores would drop

significantly during the transition year to a new school setting. This is a significant finding as other researchers have not had this variety of configurations to examine in their experimental design. The K-8 schools did not have a transition year and did not experience a drop in scores. They concluded that this was a major advantage of the K-8 school.

School Organizational Structure for Students with Disabilities

Few studies exist on students with disabilities in examining school organizational structure. Special education has been neglected in the research about school configuration. However, special education is an important issue in urban centers across the country. Many urban centers including Baltimore, Philadelphia, Boston, Chicago, Los Angeles and New York have been operating under special education consent decrees because they have not provided mandated services to special education students.

Student achievement is a major parameter of the NCLB legislation. Successful academic achievement of students with IEPs is a federal requirement both for NCLB and IDEA. Across the country schools are being evaluated on their students' performance on academic measures, behavioral issues, and attendance. Special education students are included in every measure including in the Annual Yearly Performance (AYP) indices.

One related study did examine grade configuration on low performing students. Greene and Ollendick (1993) examined a group of 66 low-performing students who attended school in a southwestern Virginia County. While the focus was not on students with disabilities, the low-performing students all displayed a marked decrease in GPA in middle school. Greene and Ollendick (1993) compared the low-performing students with a contrast group of students who had a good adjustment to middle school. They found that many problems such as poor study habits, need for teacher intervention and support, and difficulty functioning independently, were exacerbated by the transition, and that

intervention including additional teacher support and mentoring when entering sixth grade significantly ameliorated the symptoms of unacceptable behavior and poor academic performance.

In the Baltimore City Public Schools students with IEPs were suspended and expelled more often and retained more often at all grade levels, but at an even higher rate in middle school. Students with IEPs often drop out as soon as they reach age 16. For special education and low-achieving students this event often occurs in middle school (Baltimore City Schools disengagement data, 2004).

Students with disabilities have a more difficult time with transitions, although it should be noted that in one study of 12 Hispanic students with and without learning disabilities, little difference was found in the ability to transition to middle school. It was equally difficult for both groups (Forgan & Vaughn, 2000).

The studies cited above, however, have not examined the effect of grade configuration for the middle school years for students with IEPs. Studies of middle school students with IEPs have examined the success or failure of inclusive practices in middle school but not grade configuration (Fox & Ysseldyke, 1997; Sindelar, Shearer, Yendel-Hoppey, & Libert, 2006). The extensive Michigan Middle Start initiative did not separately examine students with IEPs (Mertens, Flowers, & Mulhall, 1998).

Summary of Research Findings

Research on school organizational structure has focused on many different variables over time. There had been few empirical, large-scale studies that examined the relationship between grade configuration and student achievement for regular education students and there have been none for special education students. Many of the existing studies did not control for the variables of schools size, socioeconomic status or prior

achievement. Most of them were case or correlation studies and relied on data self-reported by school districts (Klump, 2006).

Research regarding what configuration is best, K-8 vs. middle school, has been inconclusive. Authors of every study that was reviewed talked about the need for further research. The authors of the extensive Philadelphia studies (Mac Iver & Mac Iver 2006; Offenberg, 2001; Byrnes & Ruby, 2007) limited their own findings, stating that the impact of privatization and the socioeconomic status of the early K-8 schools impacted the results. The researchers emphasized that there were inconclusive data to warrant extensive changes in school configuration. Several of the studies (Alspaugh, 1998; Franklin & Glascock, 1998; Mertens, Flowers & Mulhall, 2001) emphasized the effects of school size. Green and Ollendick (1993), Alspaugh (1998), Alspaugh and Harting (1995), Franklin and Glascock (1998), and Mac Iver and Mac Iver (2006) focused on the transition year and found that that was a significant issue in students' performance. Cook et al., (2007) using a large sample from the school districts in North Carolina looked at behavior and achievement in sixth grade. Because they found the data sets from the urban centers questionable, urban schools were not included in the study. While the results were significant for sixth grade Cook et al. did not look at what happened to the students in the 7^{th} and 8^{th} grade. In addition, a comprehensive study of the literature revealed no studies that had looked at the effect of grade configuration on middle grade students who were receiving special education services.

Statement of the Problem

The present study examined the effect of grade configuration in the middle grade years on selected educational outcomes in an urban school system across three grades. This study followed a cohort of fifth grade students as they progressed through the middle grades in either a K-8 or a middle school setting. It examined the effect of grade

configuration on achievement in reading and mathematics for regular education students as well as the effect of grade configuration on students with IEPs in the 6th, 7th and 8th grade in a K-8 or middle school as measured by the Maryland Student Assessment (MSA). The study also examined the effect of grade configuration on attendance rates for the regular education students and students with IEPs in grades 6, 7 and 8 in the K-8 school or in the middle schools. The cohort of fifth grade students included all students that participated in the (MSA). It did not include students who participated in ALT MSA (about one percent) who have been excused from the MSA because of their very significant disabilities. While there has been some research on grade configuration for students, including urban students, no research has been found that addresses grade configuration for urban students with IEPs.

Many other factors, including demographic features such as race, FARMS, school size and prior achievement, affect middle grade performance (Lee & Loeb, 2000). In addition, school size seems to have an effect on performance (Alspaugh, 1998; Franklin & Glascock, 1998; Mertens, Flowers, & Mulhall, 2001). Because schools may differ in terms of some of these key variables, multilevel evaluation is necessary to partial out their effects to determine the effect of grade configuration.

The following questions were addressed:

Achievement

1. What is the effect of school grade configuration on general education 6th through 8th grade student achievement in reading and mathematics as measured by the MSA?
2. What is the effect of school grade configuration on special education 6^{th} through 8^{th} grade student achievement in reading and mathematics as measured by the MSA?

Attendance

3. What is the effect of school grade configuration on general education 6th through 8th grade student attendance rate?

4. What is the effect of school grade configuration on special education 6th through 8th grade student attendance rate?

CHAPTER II

METHOD

This chapter describes the sample, instruments, procedures and data analysis used to examine the effects of school configurations (K-8 vs. middle school) on student achievement, and attendance. The research question is whether grade configuration makes a difference for urban students in the middle grades in regular or special education.

Participants

The study was conducted in Baltimore City Public Schools (City Schools). A cohort of fifth grade students in City Schools was followed as they moved through the middle school years. Outcomes for students who have been in either middle school or K-8 were compared in 6^{th}, 7^{th}, and 8^{th} grade by their performance level on the outcome measures.

While researchers such as Cook et al. (2007) or Mac Iver and Mac Iver (2006) looked at many additional variables in constructing their research, this school system did not have as many variables that differentiated among the schools. It is all urban, it does not have more affluent schools, is overwhelmingly one race (90%) and mostly entitled to FARMS (84%). At the time of this study it had only one "outlier" school that was dropped from the study because it did not meet the criteria as either a middle school or K-8 schools and was the magnet school for the middle grade gifted program. Also at the time of this study, the district had not yet developed the range of school configurations that currently exists. In addition the percent of English Language Learners (ELL) students was small and they were not included in the study.

The demographics of City Schools included 82,381 students enrolled in the 2004-2005 school year. Of these, there were 30,076 students in elementary and 18,971 in

middle school (See Table 1). City Schools also used the following classifications for grade configuration of different schools. Ninety schools (grades PK -5) were classified as elementary schools, 32 schools were classified as K-8 schools, 21 schools were classified as middle schools (grades 6-8), 34 schools were classified as high schools, 6 schools were classified as alternative schools (grades K-12), and 7 schools were classified as special education schools, for a total of 192 schools. Over 84% of the students qualified for FARMS in 2004-2005. Table 1 presents City Schools demographics.

Table 1

Demographics for Cohort of Students in K8 and Middle Schools (N=5312)

	MS		K8	
	N	%	N	%
Male	1951	51.0	728	49.0
Female	1874	49.0	759	51.0
African American	3480	91.0	1294	87.0
Other	344	9.0	193	13.0
Free Lunch Status	3289	86.0	1175	79.0
Non- Free Lunch	536	14.0	312	21.0

The total number of students in this cohort was 5,312, of which 1,487, or 28%, were enrolled in K-8 while 3,825 or 72%, were enrolled in middle school (6-8). There were 2,602 males (49%) and 2,710(51%) females. About 84% (4,462) of these students qualified for free and reduced lunch (FARMS). The majority of the students (4,413or 83.1%) in this cohort were classified as general education students, while 899 (16.9%) were classified as special education students, all of those with individualized education

programs (IEPs). Ninety percent (or 4,780) of these students were African American, and 371 or 7% of them were White. English Language Learner students were .07% of the cohort. American Indian and Asian were .03% each, while 1.4% of the students were classified as Hispanic. The cohorts of students were enrolled in 21 middle schools (6-8) and 32 K-8 schools.

Measures of Dependent Variables

MSA Scores for Reading and Math

The MSA is an assessment designed by the state of Maryland to meet the requirements of the federal No Child Left Behind statutes (NCLB 2001). This test examines performance in reading and mathematics across the entire state in grades three through eight. The MSA requires students in grades 3 through 8 to demonstrate what they know about reading and mathematics in comparison to Maryland minimum competency standards. The test measures basic academic skills in reading and mathematics.

The MSA produces a score that describes how well a student masters the reading and mathematics content specified in the state content standard. Each child receives a norm-referenced score and a scaled score in each content area used to indicate level of performance, such as basic, proficient, and advanced. The test is both a norm-referenced and a criterion-referenced test developed by Maryland State Department of Education (MSDE) in partnership with a committee of state teachers and prominent test developers, including Harcourt Assessment, Inc. and CTB/McGraw-Hill LLC.

When a new version of the Elementary and Secondary Education Act **(**ESEA**)** known as No Child Left Behind (NCLB) became law in 2001, MSDE had little time to construct a new assessment instrument to replace Maryland State Performance Assessment Program (MSPAP), which existed prior to NCLB legislation. As a result,

MSDE consulted Harcourt and CTB McGraw-Hill. Together they created MSA, which was administered for the first time in 2003, as a requirement for NCLB.

MSDE adopted questions on the norm-referenced section of the mathematics test from the Terra Nova Second Edition (CTB/McGraw-Hill, 2003). Questions on the norm-referenced portion of the reading test were adapted from another test, the Stanford 10 Assessment (CTB/McGraw-Hill, 2003). The criterion-referenced items were developed by MSDE and a committee of state teachers. The MSA test includes multiple-choice questions and questions requiring written responses. Students take the test for approximately 90 minutes each day over four days: two days are spent on reading and another two days are spent on mathematics. The MSA score shows how well students learn the reading and mathematics skills in the voluntary state curriculum. A norm-referenced score is provided to show how well a student is doing in comparison with his/her peers across the nation. Level results from MSA are posted on the Maryland State Department of Education (MSDE) website.

The items on the MSA reading and mathematics tests are believed by MSDE to be significantly positively inter-correlated, each contributing to overall internal consistency. MSA tests in reading and mathematics are believed to be valid and highly reliable by MSDE and have been used since 2003 as achievement tests that meet the requirements of No Child Left Behind Legislation (CTB/McGraw-Hill, 2003). Each company maintains a separate testing manual for its portion of the test. The criterion referenced items are also significantly positively inter-correlated as reported in the technical manual provided by MSDE annually (Maryland School Assessment Technical Report, 2003; CTB/McGraw-Hill, 2003).

The MSA is an accountability tool used to determine if schools meet adequate yearly progress (AYP) as prescribed by NCLB. The State uses adequate yearly progress as a measurement tool to track academic progress and to make accountability decisions

for each school and the school district. AYP indicates the movement towards rigorous proficiency goals set by MSDE as required by NCLB.

The major criteria for measuring school success in the state is student performance on the MSA reading and mathematics tests by school, by identified sub-groups, and by the actual participation rate. The use of the MSA as an assessment instrument to measure performance in the state makes it a viable and appropriate instrument suitable to evaluate the effects of school/grade configuration on student achievement in middle grades.

Maryland Alternative Assessment (Alt MSA) was not used in this study. Alt MSA is a state test that is used for the 1.0% of the student population who are so limited in their cognitive skills that they are not pursuing a regular Maryland state diploma. Because these students are assessed on functional skills only, they were not included in this study. Both general and special education students selected for this study were expected to take the MSA in reading and mathematics.

Attendance Data

The additional NCLB criterion, along with the achievement tests, is student attendance in the elementary and middle school grades. Attendance data were based on the school system's archival information known as the SASI system. This system was used as a data warehouse for student enrollment and the annual special education child count, which were critical in determining federal and state funding levels for City Schools. Student attendance data is collected at individual schools and transmitted electronically to the Information Technology Department in Central Office. Student attendance data represents the number of days present for each student in a given school year (the maximum number of days that schools are open for attendance is 180 days (See Table 2).

Table 2

Descriptive Statistics for 6th Grade Students in K8 and Middle School 2004-2005 (N=5312)

Variables	MS		K8	
Student Level	Mean	SD	Mean	SD
6th grade MSA Reading	365.80	43.01	392.54	36.93
6th grade MSA Mathematics	352.65	53.48	387.44	46.26
6th grade Student Attendance	87.50	52.20	90.10	45.00

Note 1: Average attendance is based on number of days that schools are open in a school year. The 87 % indicated that average attendance for the middle grades in a given school year was 158 days out of a total of 180 days in the middle school. The 90.1% indicated that average attendance for the middle grades in a given school year was 162 in the K-8 schools

Predictor Variables

School Characteristics

Two types of schools were used to test the effect of school configurations on student achievement in reading and mathematics as well as attendance rates. The first set of schools comprised schools configured as K-8. These were schools with elementary grades that extended into middle school grades (grades 6-8). The second type of school was those classified as middle school (grades 6-8). These were schools with a middle schools grade span of 6 through 8. Only one school that served middle grade students was not included in the study, as it met neither the criteria for a K-8 school nor the criteria for a middle school; it was a magnet school for gifted students. Students in City Schools were assigned to schools based on their residential zoning address in the city. As a result, students were not assigned randomly to attend either a K-8 school or the 6-8 model. For

the purpose of this study, schools classified as K-8 were coded as 1 and those classified as middle schools were coded as 0. School configuration constitutes the key predictor variable in this study.

Free and Reduced Price Meals (FARMS): Student level variables include free and reduced price meals (FARMS). This was derived from parent or guardian income as reported in the student administrative data base. For the purpose of this study FARMS status was coded as 0 for those receiving free lunch and 1 for those students who pay for their lunch.

Race/Ethnicity: Race/ethnicity was derived from students' racial category as reported in the student administrative database. For the purpose of this study, Race/ Ethnicity is coded as 0=African American and 1= "other" (including Hispanic, White, American Indian and Asian).

Gender: Gender was derived from students' gender category as reported in the student administrative database. For the purpose of this study Gender is coded as 0 for male and 1 for female.

Student Reading Achievement in Grade 5: Academic background in reading was derived from the composite score of three subscales of reading in the MSA in reading for grade 5 in 2003-2004 as provided by MSDE).

Student Mathematics Achievement in Grade 5: Academic background in mathematics was derived from the composite score of five subscales of mathematics in the MSA for grade 5 in 2003-2004 as provided by MSDE.

Student Attendance in Grade 5*:* Attendance background was derived from the total number of days that students in fifth grade in 2003-2004 attended school.

Procedures

Prior to the beginning of the study, a research application was submitted to the Institutional Review Board (IRB) at the University of Maryland, College Park for approval. Following the receipt of an IRB approval letter, an external research application packet was submitted to the Department of Research, Evaluation, Assessment, and Accountability (DREAA) at the school district headquarters. The approval letter from the school district's office granted the researcher the permission to request school and student level data files for analyses from the district. The researcher provided the school district with an assurance of maintaining confidentiality of student records at all times and destroying the data files once the study is completed. Lists of requested data elements were submitted to the school district headquarters.

Archival data are maintained on a regular basis by the school district's Information Technology Department (ITD). Data are available in the school system's data base from 1993 through 2008. Achievement data files were received from MSDE to indicate students' performance on the MSA. Attendance data were electronically collected at the schools and transferred into the Central Office student data base. Student-level data were collected from the district's School Administration Student Information (SASI).

Data on all 5th grade students who were active in the school district's database at the end of the school year 2003-04 were collected to form the 5th grade cohort. These students were given a unique identification number that was used to link them to their sixth grade cohort as they transitioned from grade 6 through 8. Students transferring from a middle school to a K-8 or vice versa were dropped from analyses. Students who transferred into grade 6 from outside the school district were excluded from this study as well because there were no data sets for them from fifth grade. See Figure 1 for a flow chart of the process.

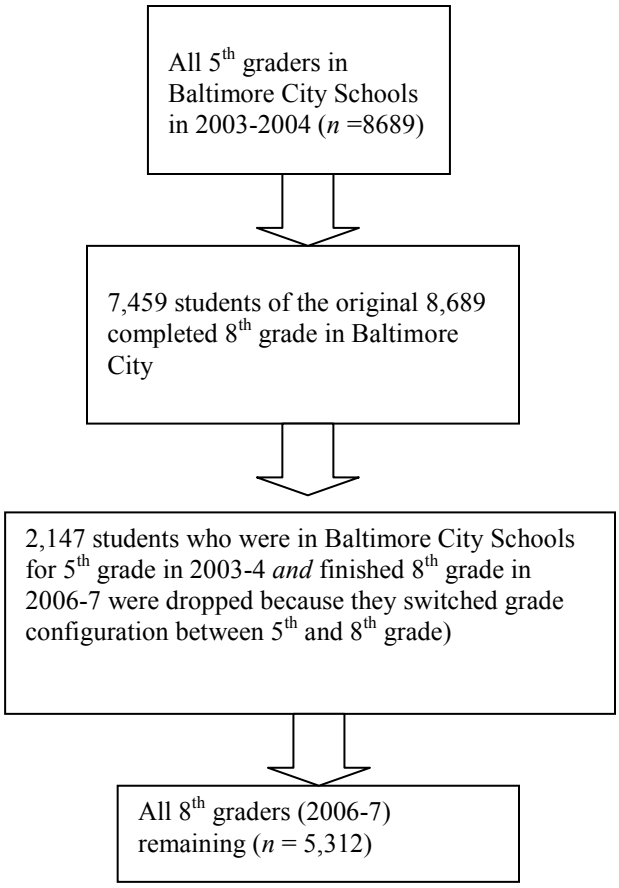

Figure 1. Flow chart of cohort selection

Data on student enrollment, student characteristics, attendance, and achievement were extracted from existing files in the district's SASI Database, as described above. Once the files were collected, they were edited and cleaned to ensure data integrity and eliminate data anomalies such as duplicate records, multiple identifiers, and invalid student ID numbers. An analytical file was created by linking data elements from different databases.

The average scale scores in reading and mathematics were calculated by grade based on scaled scores provided by MSDE (See Table 3). They were calculated for general education students and students with IEPs respectively using the Statistical Program for Social Sciences (SPSS). Likewise, proficiency levels scores in reading and

mathematics by grade were calculated for general education students and students with IEPs respectively using the SPSS program (See Table 3).

Table 3

Student-Level Variables (Grades 5, 6, 7, & 8)

Student Reading Achievement	Maryland State Assessment (MSA) scale score in Reading
Student Math Achievement	Maryland State Assessment (MSA) scale score in Math
Student Attendance	The total number of days student attended school in a school year
Baseline Student Reading Achievement	Maryland State Assessment (MSA) Proficiency Level in Reading in Grade 5, representing academic background in 2003-04
Baseline Student Math Achievement	Maryland State Assessment (MSA) Proficiency Level in Math in Grade 5, representing academic background in 2003-04
Baseline Student Attendance	The total number of days student attended school in grade 5
FARMS	Whether student received free or not free meals coded as (0=Yes, 1=No).
Race	Student Ethnic Background coded as (0=African American, 1= Other, including American Indian, Asian, White, and Hispanic).
Gender	Whether student is male or female coded as (0 = Male and 1 = female).
	School–Level Predictors (Grades 6, 7, and 8)
School Type	School Type K-8 or Middle School Grades 6-8 coded as (1 = K-8 and 0 = Middle School 6-8).
School-level Aggregate	School average for each of the outcome variables (i.e., reading and math achievement and attendance).

Data Analysis

This study attempted to examine the effects of a policy decision that had already been implemented, so the study of intact groups was required. It was not possible to assign subjects randomly to groups. Advantages of this non-equivalent comparison group (with pre-test) design include greater validity and more feasibility than a post-test only or non-comparison group design, given time and logistical constraints. Limitations include difficulty in controlling many variables when drawing a conclusion. The addition of controls that are thought to also relate significantly to the outcome variables (e.g., FARMS and gender) attempted to address some of the limitations of this design.

The independent variable of interest for this study is school configuration or school type (K-8 vs. middle school). The study examined the effects of grade configuration on student achievement in reading and mathematics, and attendance for special education and general education students. Dependent variables include student performance scores on the MSA reading and mathematics tests and student attendance.

Attrition reduced the sample as students changed schools during the middle grades or left the school system. Attrition occurred for two reasons. The first group was students who left the school system after the fifth grade. The second group was students who transferred between K-8 schools and middle schools during their middle grade years. Of the 7121 regular education students who completed 5th grade during the baseline year, 6349 completed 8th grade. Of that group 4,413 remained in either a middle school or K-8 school for the three years. Of the 1,568 special education students who completed 5th grade during the baseline year 1110 completed 8th grade. Of that number, 899 completed all three grades in either a middle or K-8 school with their grade. Much of the attrition was caused by school reconfiguration rather than student issues. To limit the attrition the study maintained students who went to a different school but not a different type school.

The analysis was conducted using Hierarchical Linear Modeling (HLM) as described by Raudenbush and Bryk (2002). Prior to conducting the HLM analyses, collinearity diagnostics were run at both student and school level using SPSS; no concerns of multicollinearity were identified. Tolerance results were close to 1 and the Variance Inflation factor (VIF) scores were all below 2.

The hierarchical structure of the data with students nested within classrooms required a form of regression analysis that takes into account the two separate sources of variations attributable to pupils and to schools caused by school characteristics. The analyses proceeded through three stages for each of the outcome variables: (a) specification of models with no predictors, which yielded baseline empirical evidence about the amount of variation at each level; (b) specification of a model which included the relevant covariate; and (c) specification of a model for each of the key predictors.

HLM equations looked at the effect of school grade configuration on each of the variables in each of the three years of the study: Reading, math, and attendance in 6^{th} 7^{th} and 8^{th} in K-8 for regular education students; reading, math, and attendance in 6^{th} 7^{th} and 8^{th} grades in K-8 for students with IEPs; reading, math, and attendance in 6^{th} 7^{th} and 8^{th} grades in middle school for regular education students; and reading, math, and attendance in 6^{th}, 7^{th} and 8^{th} middle school for students with IEPs. There were a total of 18 equations. If the number of students in a school was smaller than five they were dropped from the model. The only demographic that met that criterion was the students with English Language Learners (ELL). The number of students identified as ELL students was so small that they were not included in the analysis.

A sample HLM equation to examine the effect of school configuration on reading is displayed in Table 4. In Equation 1, Y_{ij} represents the outcome variable (i.e., 2006 reading scale score on the Maryland State Assessment [MSA], or math MSA, or attendance). β_{1j} (X_{1ij}) represents the regression weight and the uncentered gender

covariate, β_{2j} (X_{2ij}) represents the its regression weight and the uncentered ethnicity covariate, β_{3j} (X_{3ij}) represents the regression weight and the uncentered FARMS status covariate, β_{4j} (X_{4ij}) represents the regression weight and the uncentered baseline (i.e., grade 5 MSA scale score in reading, or math, or, or attendance) covariate, and r_{ij} is an error term in the within-school model. u_{0j} is an error term in the level-2 model for the intercept in the level-1 equation, γ_{00} represents the average for the outcome (e.g., achievement, suspensions, or attendance), γ_{01} represents the average treatment effect or the average difference in the outcome for K-8 versus 6-8 middle schools (W_{1j} is the treatment indicator, coded 1 for K-8 schools and 0 for traditional middle). In Equation 2, γ_{02} represents the average effect of the school-level mean on the outcome (e.g., for the reading outcome, the school's average reading achievement), and γ_{10} through γ_{40} represent the average slope for each individual-level covariate (i.e., gender, ethnicity, FARMS, and baseline). Each slope is fixed so therefore, no error terms are present (i.e., u_{1j} through u_{4j}). The analyses were conducted using the 18 HLM equations that had been developed (each grade and special or regular education was run separately for each of the three outcomes).

Table 4

Specification of Model with Predictors and Relevant Covariates

Level One (Individual)	
$Y_{ij} = \beta oj + \beta_{1j}(X_{1ij}) + \beta_{2j}(X_{2ij}) + \beta_{3j}(X_{3ij}) + \beta_{4j}(X_{4ij}) + r_{ij}$	(1)
Level Two (School)	
$\beta_{0j} = \gamma_{00} + \gamma_{01}(W_{1j}) + \gamma_{02}(W_{2j}) + u_{0j}$	(2)
$\beta_{1j} = \gamma_{10}$	(3)
$\beta_{2j} = \gamma_{20}$	(4)
$\beta_{3j} = \gamma_{30}$	(5)
$\beta_{4j} = \gamma_{40}$	(6)

Chapter III

RESULTS

This study investigated the effect of school configuration (K-8 vs. traditional middle schools) on student achievement and attendance for middle grade students in either regular or special education. The results are presented below, grouped by student achievement in reading and math, and school attendance. Summary tables are provided in the chapter. Complete HLM outcome tables for each model are in the appendix.

Effect of Grade Configuration on Achievement

Two research questions were directed at student achievement:

1. What is the effect of school grade configuration on general education 6th through 8th grade student achievement in reading and mathematics as measured by the (MSA)?
2. What is the effect of school grade configuration on special education 6th through 8th grade student achievement in reading and mathematics as measured by the MSA?

Reading Achievement

Holding constant both individual characteristics and demographics (i.e., gender, FARMS status, race/ethnicity, and prior achievement) as well as school-level prior achievement, both general education and special education students tended to achieve at higher, although only on one occasion significantly higher, levels on the reading MSA in K-8 schools than in 6-8 middle schools. Specifically, special education students in the 6th grade achieved statistically significant gains on reading assessments in K-8 schools (Coefficient = 15.93, p = .01). In 7th and 8th grades there were no statistically significant differences on the Reading MSA for special education students. For regular education

students, there were no statistically significant differences in any grade. Table 5 presents the findings.

Table 5

Outcome Summary Table for Reading Across Grades and Education Status

Variable	6 RE	6 SE	7 RE	7 SE	8 RE	8 SE
School Level						
Treatment status (1 = K8, 0 = MS)	0.72	15.93**	0.10	0.17	0.27	0.20
MSA School Average Reading	0.74**	0.50**	0.70**	0.89**	0.73**	0.89**
Student Level						
Gender (0 = male, 1 = female)	2.89**	3.36	3.04**	3.90	4.10	7.20
Ethnicity (0 = African American, 1 = Other)	6.24**	6.27	8.25**	2.93	6.71**	2.99
FARMS (0 = Free, 1 = non-free)	2.31**	5.02	3.40**	5.57**	3.10**	1.65
Grade 5 MSA Reading Achievement	30.16**	22.13**	24.70**	10.94**	22.51**	10.00**

Note: Numbers in column headings stand for grade-levels (e.g., 6 equals 6th grade); RE represents "regular education" and SE represents "special education." Two asterisks indicate that the results were statistically significant at the .01 level.

Math Achievement

Holding constant both individual characteristics and demographics (i.e., gender, FARMS status, race/ethnicity, and prior achievement) as well as school-level prior achievement, both general education and special education students tended to achieve at similar levels on the Math MSA in K-8 schools and in middle schools (i.e., grades 6 to 8). Regular education students in the 6th grade did achieve statistically significant gains on

math assessments in K-8 schools (Coefficient = 3.45, p = .01). This was not the case for special education students in 6th grade. In 7th and 8th grades there were no statistically significant differences on the Math MSA. Table 6 presents the findings.

Table 6

Outcome Summary Table for Math Across Grades and Education Status

Variable	6RE	6SE	7RE	7SE	8RE	8SE
School Level						
Treatment status (1= K8, 0=MS)	3.45**	1.99	1.05	-0.53	0.25	0.48
MSA School Average Math	0.73**	0.67**	0.71**	0.91**	0.80**	0.94**
Student Level						
Gender (0=male, 1 female)	4.14**	8.32**	3.81**	1.85	1.62	1.60
Ethnicity (0 = African American, 1 = Other)	5.59*	6.83	8.40**	-2.13	9.59	4.82**
FARMS (0 = Free, 1 = non-free)	1.64	10.93*	3.85**	3.18	2.51**	0.84
Grade 5 MSA Math Achievement	43.34**	31.19**	27.79**	12.79**	23.84**	7.96**

Note: Numbers in column headings stand for grade-levels (e.g., 6 equals 6th grade); RE represents "regular education" and SE represents "special education. Two asterisks indicate that the results were statistically significant at the .01 level. One asterisk indicates that the results were statistically significant at the .05 level.

Effects of Grade Configuration on Attendance

The last two research questions addressed attendance.

3 What is the effect of school grade configuration on general education 6th through 8th grade student attendance rate?

4. What is the effect of school grade configuration on special education 6th through 8th grade student attendance rate?

Holding constant both individual characteristics and demographics (i.e., gender, FARMS status, race/ethnicity, and prior attendance) as well as school-level attendance, both 6th grade general education and special education students showed trends of higher levels of attendance in the sixth grade in K-8 schools, but not for grades 7 and 8. More specifically, general and special education students in the 6th grade achieved statistically higher attendance rates in K-8 schools (Regular education Coefficient = .03, p = .02; Special education Coefficient = .01, p = .01). Though significant, the size of the coefficients is very small. However, in 7th and 8th grade there was no statistically significant difference between K-8 and middle school, and in fact, the magnitude of the school effect was essentially zero. Attendance is measured as days present in the school year. Table 7 presents the findings.

Table 7

Outcome Summary Table for Attendance Across Grades and Education Status

Variable	6RE	6SE	7RE	7SE	8RE	8SE
School level variables						
Treatment status (1= K8 0=MS)	.03*	.01**	-.02	-.01	.01	.01
School Level Average Attendance	1.17**	.74**	.74**	.96**	.96**	.93**
Student level variables						
Gender (0=male, 1 = female)	.07	.01	0.13*-	-.04	.02	-.01
Ethnicity (0=African American, 1= Other)	.01	.02	-.01*	-.02	-.01	-.01
FARMS (0=Free, 1=non-free)	-.17**	-.16**	.02*	-.04	-.06	.-.13**
Grade 5 Attendance	.11**	.12**	.07**	.11**	.08**	.10**

Note: Numbers in column headings stand for grade-levels (e.g., 6 equals 6th grade); RE represents "regular education" and SE represents "special education. One asterisk indicates that the results were statistically significant at the .05 level. Two asterisks indicate that the results were statistically significant at the .01level.

Impact of Other Individual Predictors on the Outcomes

At the student-level, there were also significant predictors of achievement and attendance. For example, female students, "other" students, and those who did not receive free meals (e.g., students of a higher economic status) tended to have higher achievement than males, African American students, and those receiving free lunch. These findings were not always statistically significant, however. No demographic was consistently significant across both math and reading, or across group (regular and special education), or grade level. As expected, prior achievement was a significant predictor of achievement in all cases.

Attendance data suggested few clear trends. Gender and race were non-significant in almost all cases, and the coefficients were close to zero. In one case each (7^{th} grade regular education), data showed that female students and "other" students had better attendance than males and African American students. The effect of FARMS was more consistent, such that those not receiving free meals had better attendance than those receiving free lunch. These findings were not always statistically significant, however. No demographic was consistently significant across group (regular and special education) or grade level. Better attendance in grade 5 was a significant predictor of better attendance in middle grades.

Impact of School-Level Achievement and Attendance On the Outcomes

In general, students in higher achieving schools achieved at higher levels in either regular or special education, holding constant their own individual risk factors. Coefficients for school impact for Math ranged from 0.67 to 0.94, and were significant at the .01 level for all grades, grade configuration, and groups (regular or special education). Coefficients for school impact for Reading ranged from 0.50 to 0.89 and were all significant at the .01 level for all grades, grade configuration and groups (regular or special education).

Despite this phenomenon, students in K-8 schools still demonstrated greater achievement. In other words, students in middle schools with high achievement on the MSA had higher achievement than those students in schools with low achievement means. Students in K-8 schools with high achievement scores had higher achievement than students in schools with low achievement. However, overall students in K-8 schools performed slightly better, but not at a statistically significant level except on the regular education 6^{th} grade math MSA and the special education sixth grade reading MSA.

In general, students in middle or K-8 schools with better attendance attended more regularly in either regular or special education. Coefficients for school impact for attendance ranged from coefficient 0.74 to 1.17 with significance at the $p = .01$ level. Students in middle schools or K-8 schools with better attendance had better attendance than students in schools with poor attendance.

In summary, there seems to be a "climate" effect such that students with the same baseline or demographics (e.g., gender, race) that might put them at risk for poorer achievement or poorer attendance have improved outcomes on these outcomes because they are in a school with a better average performance on the indicator.

Chapter IV

DISCUSSION

Many school systems across the country including Cincinnati and Cleveland, Ohio; Minneapolis, Minnesota; Philadelphia, Pennsylvania; Memphis, Tennessee; and Baltimore, Maryland have been in the midst of a move to reconfigure schools as K-8 rather than middle schools (Connolly et al., 2002; Mac Iver & Mac Iver, 2006; Pardini, 2002) without the benefit of sufficient empirical data to support their decision. While there have been some post hoc, quasi-experimental design studies to examine the effect of grade configuration on students in regular education, there have been no studies that also examined the effect of grade configuration on students in special education. The purpose of this study was to examine the effect of grade configuration on outcomes (i.e., achievement and attendance) for regular and special education students in the middle grades.

This study looked at the effect of grade configuration-on a cohort of students who were followed through the sixth, seventh, and eighth grades and for whom there was baseline information regarding their performance on these outcomes in fifth grade. The key outcomes for students included: (1) achievement: ability to read and perform mathematical operations; and (2) attendance: how many days students actually come to school. An earlier study of regular education students found that grade configuration produced an effect in the transition year (Alspaugh, 1998; Alspaugh & Harting, 1995). Another study of regular education students found that there was an effect on behavior in sixth grade (Cook et al., 2007). Other studies have been done, but most of them concluded that there were many variables that impacted the results. Many researchers (e.g., Byrnes & Ruby, 2007; Mac Iver & Mac Iver, 2006; Wihry, Coladarci, & Meadow, 1992) recommended further study before their results were used for decision-making and

policy. The National Forum to Accelerated Middle grade reform cautions that it is not grade re-configuration but quality of education that matters (National Forum, 2008).

Effect of Grade Configuration on Achievement

The results for achievement indicated a general trend in which students in the K-8 schools performed better than students in the middle schools, regardless of whether they were regular or special education students. This higher performance only reached significance in two analyses: 6th grade regular education math and 6th grade special education reading. This is consistent with other studies that found gains for K-8 schools in the transition year (Alspaugh, 1998; Alspaugh & Harting, 1995).

Two factors with a consistently large impact on performance were scores in 5th grade and the mean score of the school. Unsurprisingly, greater baseline performance (i.e., fifth grade performance) was associated with greater current performance in all cases, which supports the need to intervene before middle school grades. A study of school level factors that impacted the performance of students with disabilities in Maryland found that the performance of the general education students on the state assessments had predictive value for outcomes for special education students as well (Malmgren, McLaughlin, & Nolet, 2005). In the current study, schools with greater overall performance predicted higher levels of achievement for regular or special education, despite students' individual risk factors. In other words, students with equally poor baseline achievement perform differently on math and reading assessments based on the overall achievement level of the school. This important finding means that while prior achievement impacts present performance, the effect of a good school can boost performance and improve outcomes for students even with less positive past test scores. This finding has significant implications for improving results for urban students, as it supports the need for whole school improvement. That the effect also was seen for

students in special education is a critical finding, given the inclusive nature of most special education programs.

Other individual demographics were less consistently significant in their impact on achievement across grade span. In comparison to the school level and early achievement findings, individual demographics proved to be less powerful as a predictor of grade 6-8 outcomes. No demographic was consistently significant across both math and reading, or across group (general and special education), or setting (K-8 vs. middle school). For example, female students and those not receiving free/reduced cost meals tended to have higher achievement than males and those receiving free/reduced cost lunch. However, these findings were not always statistically significant. It should be noted that differential achievement based on demographic factors is likely taken into account by the baseline (i.e., the demographics are likely predictive of baseline performance).

Effects of Grade Configuration on Attendance

Two factors with a consistently large impact on attendance were attendance rates in 5th grade and the mean attendance rate of the school. Demographics such as FARMS, gender, and ethnicity had few statistically relevant effects. No demographic was consistently significant.

Better attendance in 5th grade was associated with meeting attendance standards in 6th, 7th and 8th grade. Schools with overall better attendance predicted better attendance for regular or special education students, despite students' individual risk factors. In other words, a school with good attendance rates has a positive impact on the attendance of even those students with poor attendance in 5th grade.

Limitations

There were several limitations to the study. First, students were not randomly assigned to groups. The treatment group was selected by where they enrolled rather than by any random selection procedure. Second, there was the unexpected attrition of the sample on the MSA. The sample remained intact as evidenced by the attendance data, but there were students, both regular and special education, who did not take the MSA each year. More special education than regular education students did not take the test, even though their IEP did not exempt them. The reasons, such as absence, spoiled tests, problem behavior, and accommodations that invalidated the results, were reported by the school district to the Maryland State Department of Education (MSDE). Similar issues were reported by other counties in the state.

Implications for Policy and Practice

Educating our children has been a national priority. Across the United States, children are required to come to school and there is no charge for attending public schools. Yet education has rarely depended on research or research outcomes to determine educational policy. NCLB 2001 addressed the issue of research and research outcomes by requiring evidence-based research and practice in the implementation of programs to meet the requirements of the new law (NCLB 2001). To support quality research the U.S. Department of Education has developed a "What Works Clearinghouse" to provide a trusted source of evidence based practices for school level decision making. This is a welcome development, but conducting research can take many years. Schools that are required to implement NCLB have a short time to implement evidence-based practices and show improvement. An encouraging trend is the linkage of IDEA and NCLB to provide evidence-based practices in the implementation of programs for students with disabilities.

In spite of a lack of supportive research, the middle school grades 6-8 have been in flux around the nation. As reported in the earlier literature review, many cities have begun to move from middle school to K-8, yet another change in how schools are configured. Building availability, labor needs, and a need for change have fueled many trends, including readjustment of grade configuration over the years.

The purpose of this study was to examine whether this change being currently implemented, that is, placement in a K-8 school rather than a middle school for grades 6-8, would actually demonstrate a positive impact. This study was also a first attempt to examine the effect of grade configuration on special education students. For this reason, the analyses were run separately for students in special education and regular education. In addition, the size of the sample, the ability to track a cohort through three grades, and the fact that there were baseline year data available on all of the outcome variables make this a contribution to the K-8 versus middle school discussion.

Implications for All Students

The results of this study do not support reconfiguration as a strategy for better outcomes. In sum, the findings were congruent with other studies that found an effect for students only during the transition year (Alspaugh, 1998; Alspaugh & Harting, 1995). There was some impact that was statistically significant for 6th grade regular education math, 6th grade special education reading, and 6th grade attendance for students both in regular and special education. Yet, by 7th grade, the differences had disappeared.

However, there were more salient outcomes of the research. One was the expected predictive value of the students' fifth grade performance on future achievement. The effect of previous learning and performance on achievement has been long known, but is being addressed more in current research. A longitudinal study (Mac Iver, Plank, Durham, Farley-Ripple, & Balfanz, 2008) conducted in Baltimore examined 6th grade

achievement scores, attendance and suspension rates as predictors of high school completion The researchers found that only one in three students in the sixth grade in 1999-2000 graduated with their class seven years later and that poor attendance, behavioral infractions resulting in suspension and poor achievement in the middle schools were predictors of non-school completion. Zau and Betts (2008) found that achievement scores, attendance and behavioral issues as early as 4th grade could predict which students would be successful on the California High School exit exam. An early intervention model, the Maryland Judy Centers, has had an impact on preparing students for school (Fontaine, Torre, & Grafwallner, 2006). This study of middle grade configuration presented here also confirmed that prior performance is predictive of later performance, in this case, that 5th grade is predictive of performance in each of the middle grades.

The other major finding, the effect of global school achievement on all students in a school, whether regular education or special education, has profound implications for educational policy. Good schools or poor, K-8 or middle schools, have an impact on student performance whether in regular or special education. Research and funding need to be committed to studying what makes a "good school," evaluating reforms based on these outcomes, and then ensuring that all students are provided an education in schools with better outcomes. In a study of secondary schools in Chicago, Lee and Bryk (1989) found a correlation between high achievement level of schools and the performance of enrolled students. The present study's research outcomes are consistent with the Carnegie Report's (1989) recommendations for whole school improvement rather than reconfiguration and suggest that limited education resources be spent on designing effective programs for middle grade students rather than reconfiguring schools.

Implications for Special Education Students

Placement in a K-8 rather than a middle school did not generate a significant effect on achievement or attendance by the end of 8th grade for special education students, although the grade 6 reading score and attendance figures were significantly better in the K-8 schools.

Most importantly, school averages on the outcomes were significant predictors for special education students, no matter what the grade configuration and across all three grades. Special education students performed better in schools with better average performance levels. Their attendance was also better in schools with higher attendance rates. This is a critical finding as it has implications for the education of special education students. The special education students in this cohort were all students who were expected to take the MSA and were on a diploma track (i.e., the study did not address students who took the alternative MSA). Identification as a special education student is a continuum with some students having greater or lesser needs. Students in this school system receiving special education programs are most often identified as speech language disabled or learning disabled. There is a significant emphasis on inclusion, which has been intensified by the requirements of IDEA for placement of students into the least restrictive environment with their non-disabled peers. The requirement of NCLB that over 97% of the special education students are required to participate in MSA testing to meet accountability standards has increased the pressure on the school district as well. One could conjecture that students with mild learning issues would perform better in an environment where more students are being successful. Studying how these environmental factors operate on students in the special education programs is an important question for future research.

In the present study, students in special education had enhanced achievement and attendance when part of a school that had high achievement and attendance. Given the

focus on inclusion, it appears essential to consider the schools in which special education students are placed. It is likely that good schools provide better support to special education students in order for them to be successful.

Educators are seeking strategies to improve the performance of special education students. A study of performance patterns of students with disabilities conducted in Massachusetts indicated that the performance of students with disabilities lagged behind the performance of general education students on state mandated mathematics testing even though the gap had narrowed, (Buckley. Ehrlich, Midouhas, & Brodesky, 2008). There were similar findings in a study conducted in New York State where the gap between students with disabilities and the general education students had narrowed (Buckley. Ehrlich, Midouhas, & Brodesky, 2008). In both studies there was some slight evidence that better performance of the regular education population enhanced the achievement of the special education students. The current study supports the finding that special education students perfom better in high performing schools.

Implications for Future Research

Although the study addressed outcomes at the middle school level, future research should consider more long-term outcomes. For example, it would be important to know if grade configuration had an effect on high school dropout or graduation rate. It would also be important to study the effect of grade configuration on students remaining in school by 10^{th} grade, when attendance is no longer mandatory. The Head Start data indicates that there is sometimes a significant latent effect that may show up years later (Oden, Schweinhart, Weikart, Marcus, & Xie, 2000). Therefore, a longitudinal study that takes into account grades 6-12 and examined the effect of grade configuration on high school completion might address these outcomes.

Because reconfiguration of schools continues to be seen as producing desired outcomes for middle grade success, it would be important to follow through with additional studies to examine the effect of school configuration in other school systems with different demographics. Moreover, in light of all the varieties of reconfiguration for middle grade students now being implemented (e.g., charter schools, 6-12, private companies), it would be important to focus on what elements contribute to improving any type of school that serves middle grade students. Further study is needed about what contextual factors allow certain urban, otherwise high-risk, schools to have high performance. Additional study could also be focused on assessing teacher and/or principal contribution to developing effective schools and producing better student outcomes, both at the elementary and middle school levels. As has been noted previously, a better understanding of how quality schools provide a more supportive environment for their special education population is an important area for inquiry.

Conclusion

This was a large-scale study that examined several variables over time for a large cohort. Measuring the effect of grade configuration at different grade levels added to the understanding of the effect. An effect that dissipates by 8th grade is not as relevant as one that is maintained. Moreover, the study results support the conclusion that prior achievement is the best predictor of future success, and also that good schools produce better results for students. Good school climate in quality schools where students are finding success is equally important for both regular and special educations students. An environment conducive to learning is important for all students.

Often experts like to say that a better student body is the reason for outstanding achievement. One result of this study is to confirm that all types of students do better in a good school, including those who are placed in special education. These results suggest

the importance of including special education students in high-performing schools, where they will have the potential to perform at higher levels. The present CEO of Baltimore City Schools has made Great Kids Great Schools the system's logo. Great Schools produce Great Kids might be an important conclusion to this research.

APPENDIX A

HLM Outcome Tables

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 6 MSA Reading.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	362.71	1.20	50	.01*
Treatment status (1 = k-8, 0 = MS)	0.72	0.72	50	.31
MSA Reading Scale Score	0.74	0.02	50	.01*
Gender (0 = male, 1 = female)	2.89	0.94	4023	.01*
Ethnicity (0 = African American, 1 = Other)	6.24	2.66	4023	.01*
FARMS (0 = Free, 1 = non-free)	2.31	1.11	4023	.03*
Grade 5 MSA Reading	30.16	0.89	4023	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	691.19	--	--	--
Level-2 intercept	0.39	50	35.05	.56

Proportion of Variance Explained	
Proportion of tau explained	.20
Proportion of sigma-squared explained	.30

[a] A positive coefficient indicates an increase in student achievement in MSA reading.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 6 MSA Reading.

Fixed Effects				
Variable	Coefficient	*SE*	*df*	*P*
Intercept	336.20	1.93	45	.01*
Treatment status (1 = k-8, 0 = MS)	15.93	2.08	45	.01*
MSA Reading Scale Score	0.50	0.07	45	.01*
Gender (0 = male, 1 = female)	3.36	2.09	854	.01*
Ethnicity (0 = African American, 1 = Other)	6.27	3.37	854	.04*
FARMS (0 = Free, 1 = non-free)	5.02	2.69	854	.62
Grade 5 MSA Reading	22.13	2.32	854	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	763.34	--	--	--
Level-2 intercept	0.07	45	90.05	.01*

Proportion of Variance Explained	
Proportion of tau explained	.22
Proportion of sigma-squared explained	.38

[a] A positive coefficient indicates an increase in student achievement in MSA reading.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 7 MSA Reading

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	367.51	1.06	51	.01*
Treatment status (1 = k-8, 0 = MS)	0.10	0.65	51	.87
MSA Reading Scale Score	0.70	0.02	51	.01*
Gender (0 = male, 1 = female)	3.04	0.77	3733	.01*
Ethnicity (0 = African American, 1 = Other)	8.25	2.70	3733	.01*
FARMS (0 = Free, 1 = non-free)	3.40	1.09	3733	.01*
Grade 5 MSA Reading	24.70	0.95	3733	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	536.84	--	--	--
Level-2 intercept	0.07	51	31.65	.50

Proportion of Variance Explained	
Proportion of tau explained	.07
Proportion of sigma-squared explained	.84

[a] A positive coefficient indicates an increase in student achievement in MSA reading.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 7 MSA Reading

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	354.17	1.29	36	.01*
Treatment status (1 = k-8, 0 = MS)	0.17	0.56	36	.76
MSA Reading Scale Score	0.89	0.03	36	.01*
Gender (0 = male, 1 = female)	3.90	2.11	686	.65
Ethnicity (0 = African American, 1 = Other)	2.93	4.14	686	.47
FARMS (0 = Free, 1 = non-free)	5.57	2.28	686	.01*
Grade 5 MSA Reading	10.94	2.52	686	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	6098.64	--	--	--
Level-2 intercept	0.05	36	2.54	.50

Proportion of Variance Explained	
Proportion of tau explained	.05
Proportion of sigma-squared explained	.64

[a] A positive coefficient indicates an increase in student achievement in MSA reading.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 8 MSA Reading.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	379.41	1.08	51	.01*
Treatment status (1 = k-8, 0 = MS)	0.27	0.65	51	.67
MSA Reading Scale Score	0.73	0.03	51	.01*
Gender (0 = male, 1 = female)	4.10	0.97	3507	.01*
Ethnicity (0 = African American, 1 = Other)	6.71	1.39	3507	.01*
FARMS (0 = Free, 1 = non-free)	3.10	1.20	3507	.01*
Grade 5 MSA Reading	22.51	0.79	3507	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	515.79	--	--	--
Level-2 intercept	0.04	51	27.87	.50

Proportion of Variance Explained	
Proportion of tau explained	.14
Proportion of sigma-squared explained	.22

[a] A positive coefficient indicates an increase in student achievement in MSA reading.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 8 MSA Reading.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	363.36	1.80	35	.01*
Treatment status (1 = k-8, 0 = MS)	0.20	0.72	35	.77
MSA Reading Scale Score	0.89	1.03	35	.01*
Gender (0 = male, 1 = female)	7.20	3.26	615	.28
Ethnicity (0 = African American, 1 = Other)	2.99	3.46	615	.38
FARMS (0 = Free, 1 = non-free)	1.65	2.80	615	.55
Grade 5 MSA Reading	10.00	2.49	615	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	657.23	--	--	--
Level-2 intercept	0.06	35	2.49	.50

Proportion of Variance Explained	
Proportion of tau explained	.13
Proportion of sigma-squared explained	.25

[a] A positive coefficient indicates an increase in student achievement in MSA reading.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 6 MSA Mathematics.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	355.90	1.75	50	.01*
Treatment status (1 = k-8, 0 = MS)	3.45	1.42	50	.01*
MSA Mathematic Scale Score	0.73	0.05	50	.01*
Gender (0 = male, 1 = female)	4.14	1.26	4023	.01*
Ethnicity (0 = African American, 1 = Other)	5.59	2.67	4023	.03*
FARMS (0 = Free, 1 = non-free)	1.64	1.96	4023	.40*
Grade 5 MSA Mathematics	43.34	1.60	4023	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	123.08	--	--	--
Level-2 intercept	0.33	49	90.42	.01*

Proportion of Variance Explained	
Proportion of tau explained	.17
Proportion of sigma-squared explained	.35

[a] A positive coefficient indicates an increase in student achievement in MSA mathematics.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 6 MSA Mathematics.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	316.29	5.53	46	.01*
Treatment status (1 = k-8, 0 = MS)	1.99	3.81	46	.60
MSA Mathematic Scale Score	0.67	0.10	46	.01*
Gender (0 = male, 1 = female)	8.32	3.71	853	.02*
Ethnicity (0 = African American 1 = Other)	6.83	6.62	853	.30
FARMS (0 = Free, 1 = non-free)	10.93	3.89	853	.01*
Grade 5 MSA Mathematics	31.19	3.75	853	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	2388.70	--	--	--
Level-2 intercept	0.06	45	62.71	.41

Proportion of Variance Explained	
Proportion of tau explained	.20
Proportion of sigma-squared explained	.33

[a] A positive coefficient indicates an increase in student achievement in MSA mathematics.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 7 MSA Mathematics.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	365.89	1.29	51	.01*
Treatment status (1 = k-8, 0 = MS)	1.05	0.94	51	.26
MSA Mathematic Scale Score	0.71	0.04	35	.01*
Gender (0 = male, 1 = female)	3.81	1.00	3636	.01*
Ethnicity (0 = African American, 1 = Other)	8.40	2.38	3636	.01*
FARMS (0 = Free, 1 = non-free)	3.85	1.28	3636	.00*
Grade 5 MSA Mathematics	27.79	1.37	3636	.00*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	600.96	--	--	--
Level-2 intercept	3.11	51	64.53	.09

Proportion of Variance Explained	
Proportion of tau explained	.11
Proportion of sigma-squared explained	.32

[a] A positive coefficient indicates an increase in student achievement in MSA mathematics.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 7 MSA Mathematics.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	353.89	1.11	35	.01*
Treatment status (1 = k-8, 0 = MS)	-0.53	0.52	35	.31
MSA Mathematic Scale Score	0.91	0.04	35	.01*
Gender (0 = male, 1 = female)	1.85	1.85	664	.31
Ethnicity (0 = African American, 1 = Other)	-2.13	4.27	664	.61
FARMS (0 = Free, 1 = non-free)	3.18	2.27	664	.16
Grade 5 MSA Mathematics	12.79	2.20	664	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	471.71	--	--	--
Level-2 intercept	0.04	35	2.96	.50

Proportion of Variance Explained	
Proportion of tau explained	.04
Proportion of sigma-squared explained	.31

[a] A positive coefficient indicates an increase in student achievement in MSA mathematics.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 8 MSA Mathematics.

Fixed Effects				
Variable	Coefficient[a]	*SE*	*df*	*P*
Intercept	385.84	1.34	51	.01*
Treatment status (1 = k-8, 0 = MS)	0.25	1.17	51	.82
MSA Mathematic Scale Score	0.80	0.04	51	.01*
Gender (0 = male, 1 = female)	1.62	0.85	3507	.06
Ethnicity (0 = African American, 1 = Other)	9.59	2.75	3507	.01*
FARMS (0 = Free, 1 = non-free)	2.51	1.05	3507	.02*
Grade 5 MSA Mathematics	23.84	1.03	3507	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	23.36	--	--	--
Level-2 intercept	3.06	51	66.16	.10

Proportion of Variance Explained	
Proportion of tau explained	.18
Proportion of sigma-squared explained	.21

[a] A positive coefficient indicates an increase in student achievement in MSA mathematics.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 8 MSA Mathematics.

Fixed Effects				
Variable	Coefficient [a]	*SE*	*df*	*P*
Intercept	372.22	1.31	36	.01*
Treatment status (1 = k-8, 0 = MS)	0.48	0.55	36	.39
MSA Mathematic Scale Score	0.94	0.03	36	.01*
Gender (0 = male, 1 = female)	1.60	2.03	625	.04*
Ethnicity (0 = African American, 1 = Other)	4.82	3.41	625	.01*
FARMS(0 = Free, 1 = non-free)	0.84	2.37	625	.72
Grade 5 MSA Mathematics	7.96	2.09	625	.01*
Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	23.36	--	--	--
Level-2 intercept	0.04	36	1.87	.503
Proportion of Variance Explained				
Proportion of tau explained	.10			
Proportion of sigma-squared explained	.21			

[a] A positive coefficient indicates an increase in student achievement in MSA mathematics.

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 6 Student Attendance Rate.

Fixed Effects				
Variable	Coefficient	*SE*	*df*	*P*
Intercept	0.78	0.11	50	.01*
Treatment status (1 = k-8, 0 = MS)	0.03	0.01	50	.02*
School Level Attendance	1.17	0.08	50	.01*
Gender (0 = male, 1 = female)	0.07	0.02	4413	.20
Ethnicity (0 = African American, 1 = Other)	0.01	0.01	4413	.98
FARMS (0 = Free, 1 = non-free)	-0.17	0.03	4413	.01*
Grade 5 Attendance	0.11	0.01	4413	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	0.23	--	--	--
Level-2 intercept	0.04	50	79.98	.005

Proportion of Variance Explained	
Proportion of tau explained	.02
Proportion of sigma-squared explained	.23

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 6 Student Attendance Rate.

Fixed Effects				
Variable	Coefficient	*SE*	*df*	*P*
Intercept	0.75	0.13	44	.01*
Treatment status (1 = k-8, 0 = MS)	0.01	0.01	44	.01*
School Level Attendance	0.74	0.08	44	.01*
Gender (0 = male, 1 = female)	0.01	0.01	899	.50
Ethnicity (0 = African American, 1 = Other)	0.02	0.03	899	.28
FARMS (0 = Free, 1 = non-free)	-0.16	0.02	899	.01*
Grade 5 Attendance	0.12	0.01	899	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	123.08	--	--	--
Level-2 intercept	0.05	44	10.75	>.50

Proportion of Variance Explained	
Proportion of tau explained	.01
Proportion of sigma-squared explained	.21

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 7 Student Attendance Rate.

Fixed Effects				
Variable	Coefficient	*SE*	*df*	*P*
Intercept	0.82	0.01	50	.01*
Treatment status (1 = k-8, 0 = MS)	-0.02	1.42	50	.70
School Level Attendance	0.74	0.04	50	.01*
Gender (0 = male, 1 = female)	0.13	0.01	4413	.05*
Ethnicity (0 = African American, 1 = Other)	-0.01	0.02	4413	.05*
FARMS (0 = Free, 1 = non-free)	0.02	0.01	4413	.02*
Grade 5 Attendance	0.07	0.02	4413	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	0.03	--	--	--
Level-2 intercept	0.01	50	38.12	>.500

Proportion of Variance Explained	
Proportion of tau explained	.02
Proportion of sigma-squared explained	.16

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 7 Student Attendance Rate.

Fixed Effects				
Variable	Coefficient	*SE*	*df*	*P*
Intercept	0.78	0.12	44	.01*
Treatment status (1 = k-8, 0 = MS)	-0.01	0.01	44	.44
School Level Attendance	0.96	0.05	44	.01*
Gender (0 = male, 1 = female)	-0.04	0.02	899	.07
Ethnicity (0 = African American, 1 = Other)	-0.02	2.67	899	.86
FARMS (0 = Free, 1 = non-free)	-0.04	1.96	899	.18
Grade 5 Attendance	0.11	0.01	899	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	0.05	--	--	--
Level-2 intercept	0.01	44	2.97	>.500

Proportion of Variance Explained	
Proportion of tau explained	.01
Proportion of sigma-squared explained	.23

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HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for General Education Cohort Grade 8 Student Attendance Rate.

Fixed Effects				
Variable	Coefficient	*SE*	*df*	*P*
Intercept	0.83	0.01	50	.01*
Treatment status (1 = k-8, 0 = MS)	0.01	0.03	50	.29
School Level Attendance	0.96	0.02	50	.01*
Gender (0 = male, 1 = female)	0.02	0.01	4413	.56
Ethnicity (0 = African American, 1 = Other)	-0.01	0.01	4413	.61
FARMS (0 = Free, 1 = non-free)	-0.06	0.02	4413	.01*
Grade 5 Attendance	0.08	0.01	4413	.01*
Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	0.04	--	--	--
Level-2 intercept	0.01	49	9.01	>.500
Proportion of Variance Explained				
Proportion of tau explained	.02			
Proportion of sigma-squared explained	.19			

HLM Outcome Table

Estimates of Fixed and Random Effects in a Two-Level Model for Special Education Cohort Grade 8 Student Attendance Rate.

Fixed Effects				
Variable	Coefficient	*SE*	*df*	*P*
Intercept	0.79	0.01	50	.01*
Treatment status (1 = k-8, 0 = MS)	0.01	0.01	50	.87
School Level Attendance	0.93	0.06	50	.01*
Gender (0 = male, 1 = female)	-0.01	0.02	4413	.85
Ethnicity (0 = African American, 1 = Other)	-0.01	0.03	4413	.998
FARMS (0 = Free, 1 = non-free)	-0.13	0.02	4413	.01*
Grade 5 Attendance	0.10	0.02	4413	.01*

Random Effects				
Variance Component	Variance	*df*	χ^2	*P*
Level-1 error	0.50	--	--	--
Level-2 intercept	0.01	49	6.33	>.500

Proportion of Variance Explained	
Proportion of tau explained	.02
Proportion of sigma-squared explained	.22

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