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The Impact of Single-Gender Scheduling on Students in a Title I School

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The Impact of Single-Gender Scheduling on Students in a Title I School

By
Janet L. Moss

A Dissertation Submitted to the
Gardner-Webb University School of Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Gardner-Webb University
2011

Approval Page

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Abstract

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This dissertation was designed to examine the impact that single-gender scheduling would have on students who attend a struggling Title I middle school. The importance of the middle level cannot be denied. Strong research points to this time in a student's life as the pivotal crux on which success and failure are balanced. Middle level educators are charged with the responsibility of tipping the scales in the favor of student success by arming them with the skills they will need to survive and succeed.

A middle school in the northeastern part of Mecklenburg County had the majority of its students performing below grade level on standardized tests, exhibiting poor performances in the classrooms, and high levels of behavior problems. In addressing these issues, it was determined that a need for a new approach to scheduling and teaching existed.

Based on the collection of research, if single-gender education has a positive impact, it seems to be most evident in populations similar to the demographics of this sample school. The analysis led to identifying two specific priorities: first, that single-gender classes be an integral element of the master schedule; and secondly, that training for teachers is needed, specifically in techniques of teaching and learning among specific genders. The purpose of this research was to determine the impact of the single-gender scheduling on this student population by analyzing academic evaluation data, attitudinal surveys, attendance rates, and discipline data.

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Chapter 1: Introduction

Because middle school is a relatively new entity in the realm of education, seminal research is now available to show the importance of this time in a student's development, and the impact it has on the future of that student. Just a few decades ago, many school systems included Grade 6 in the elementary setting and lumped Grades 7 and 8 into high school settings. Subsequently, most school systems separated Grades 6-8 into a unique educational setting; however, when this separation took place, university educational programs training teachers were not prepared for a middle grades specialty that focused on the challenges of teaching through adolescence.

For many years the teachers of middle school were either elementary school teachers or high school teachers who brought their practices with them; it took some time for the research and university programs to become specialized in the needs of the middle school. Currently, there is a tide of research, which emphasizes the importance of this educational period and proves it is not only pivotal, but predictive of a student's future academic and career success.

Middle school is a time of heightened vulnerability for many young people. The 3 years between Grade 6 and Grade 8 are known for an increase in disciplinary problems, motivational decline (lack of interest, increased alienation), and initiation into risky behavior; as a result, these developmental changes can directly affect how students perform academically (United Way of Greater Los Angeles [United Way], 2008). Early adolescence is characterized by accelerated movement toward reproductive maturity with sexual development prompting new physical, emotional, and social concerns for both sexes (National Middle School Association [NMSA], 2003).

The National Middle School Association (2003) pointed out that every day, 20

million diverse, rapidly changing 10- to 15-year-olds enrolled in our nation's middle level schools are making critical and complex life choices. They are forming the attitudes, values, and habits of mind that will largely direct their behavior as adults (NMSA, 2003). Young people undergo more rapid and profound personal changes between the ages of 10 and 15 than at any other time in their lives; although growth in infancy is also very extensive, infants are not the conscious witnesses of their development (NMSA, 2003). Early adolescence is a period of tremendous variability among youngsters of the same gender and chronological age; dissimilar rates of growth are common in all areas of their development; changes occur irregularly, and no two young adolescents enter puberty at the same time or progress at the same rate (NMSA, 2003).

Race, poverty, or ethnicity may play an important role, as these conditions add to the tremendous variability of students (NMSA, 2003). It is vitally important to recognize that the areas of development—intellectual, physical, social, emotional, and moral—are inexorably intertwined; therefore, with young adolescents, achieving academic success is highly dependent upon their other developmental needs also being met. Changes in middle level students' patterns of thinking become evident in the ideas they have about the world and how it functions (NMSA, 2003).

Young adolescents reveal growing capacity for thinking about how they learn, for considering multiple ideas, and for planning steps to carry out their own learning activities; however, because cognitive growth occurs gradually and irregularly, most middle level students require ongoing, concrete, experiential learning in order to develop intellectually (NMSA, 2003). It is this need that continues to challenge middle level educators.

In the most recent study, the results for the 2008 ACT-tested high school graduating class are alarming: Only one in five ACT-tested 2008 high school graduates are prepared for entry-level college courses in English composition, college algebra, social science, and biology, while one in four are not prepared for college-level coursework in any of the four subject areas (ACT, Inc. [ACT], 2008). When ACT data showed that many high school students still were not ready for college and career after taking a core curriculum, they examined the need for increased rigor in the high school core curriculum as an essential element of college and career readiness in *Rigor at Risk* (ACT, Inc., 2007).

In *The Forgotten Middle*, the 2008 research publication from ACT, research suggested that in the current educational environment there is a critical defining point for students in the college and career readiness process—one so important that, if students are not on target for college and career readiness by the time they reach this point, the impact may be nearly irreversible. ACT (2008) research showed that the level of academic achievement that students attain by eighth grade has a larger impact on their college and career readiness by the time they graduate from high school than anything that happens academically in high school. This report also revealed that students' academic readiness for college and career can be improved when students develop behaviors in the upper elementary grades and in middle school that are known to contribute to successful academic performance (ACT, 2008). Students who leave eighth grade without the essential skills they need to be on target for college and career readiness too often leave high school not ready for any kind of meaningful future (ACT, 2008).

In Table 1, the ACT research shows the relative effect of many elements

impacting a student's future. None of the historical causes even closely compare to the level of impact that achievement in Grade 8 shows.

Table 1

Relative Magnitude of Effect in Predicting Grade 11 and 12 College and Career Readiness for All Students (ACT, 2008).

All Students	Grade 8 achievement	Background characteristics	Advanced/Honors coursework	High school grade point average	Student testing behaviors
Reading	60%	5%	8%	9%	18%
Math	42%	15%	21%	12%	10%

Table 2

Relative Magnitude of Effect in Predicting Grade 11 and 12 College and Career Readiness for Ethnic Minority Students (ACT, 2008).

Ethnic Minority Students	Grade 8 achievement	Background characteristics	Advanced/Honors coursework	High school grade point average	Student testing behaviors
Reading	64%	3%	6%	10%	17%
Math	43%	12%	23%	14%	8%

In other studies conducted by the United Way of Greater Los Angeles (United Way, 2008), research revealed that students who failed even one middle school class were much more likely to drop out of high school. Less than 50% of students who failed at least one class in Grades 6-8 graduated from high school within 4 years. Unless middle school education is prioritized to prepare all students for college and the 21st Century workforce, the United States will not have the necessary infrastructure for a thriving community and sustainable economy (United Way, 2008). In addition, the high failure rate of middle schools which have a majority of low-income African American and Latino populations also leads to a growing racial opportunity gap and often seals the

students' fates to low-wage jobs and a cycle of poverty (United Way, 2008).

The importance of the middle level cannot be denied. Strong research points to this time in a student's life as the pivotal crux on which success and failure are balanced. Middle level educators are charged with the responsibility of tipping the scales in the favor of student success by arming them with the skills they will need to survive and succeed.

Statement of the Problem

A middle school in the northeastern part of Mecklenburg County had the majority of its students performing below grade level on standardized tests, exhibiting poor performances in the classrooms, and having high levels of behavior problems. In addressing these issues, it was determined that a need for a new approach to scheduling and teaching existed.

At the end of the 2007-2008 school year, this school housed 971 students; it had 68 teachers, three assistant principals, three counselors, one social worker, and 37 support staff members. Demographics are detailed in Table 3.

In the 2008-2009 school year, enrollment had dropped to 887 students, with African Americans comprising 60.9%, a drop of 2.6%, with Hispanic students rising to 31.6%, a growth of 3.2%. The percentage of economically disadvantaged children rose to 85.4% (Charlotte-Mecklenburg Schools [CMS], 2009). This drop in total population was partially due to the school district offering open choices to parents of students who wanted to attend other area schools with transportation provided, due to this school not demonstrating adequate progress; therefore, many of the higher performing students' families chose to move to other schools that were showing greater academic progress. The result of this population shift was a smaller population with a higher percentage of

free or reduced lunch recipients creating a greater concentration of children of poverty with fewer peers to see as role models of a different life possibility. Demographics are detailed in Table 3.

Table 3

Demographics for the 2007-2008, 2008-2009 School Years (CMS, 2008, 2009).

	African American	Hispanic	Other	Economically Disadvantaged
2007-2008	63.5	28.4	8.1	83.5
2008-2009	60.9	31.6	7.5	85.4

This school did not meet Adequate Yearly Progress (AYP) under the No Child Left Behind Act (2001), because it only met 15 out of its 25 goals. Under the North Carolina ABCs program, the school ranked as a priority school (second lowest rank possible) because of its 38.4% proficiency score. This school actually met its expected growth, scoring 1% above the state standard of 80%. Unfortunately, the percentage of students making or exceeding a year's worth of growth was only 54.6%, falling short of the state standard of 60%. Data indicated that this school was not closing the achievement gap because the amount of growth for students in the lowest achieving group, 77.9%, did not exceed the average growth of 81%. On student surveys, only 67.1% returned positive responses (CMS, 2008).

The decision was made to examine data from the North Carolina end-of-grade testing, discipline data, and the school retention rates disaggregated by grade levels. This examination led to focusing on the sixth grade as the target audience because it showed no growth in scores at the end of the 2007 school year, which was a drop from previous

years, and being a transition year, any changes incorporated into sixth-grade programs allowed 3 years of data collection throughout the duration of that cohort's tenure in middle school, during which we could determine the effectiveness of the changes (CMS, 2007). Any changes instituted at this school were guided by the school's Action Plan from Leadership for Turnaround Middle Schools and the School-wide Project School Summary in conjunction with the School Improvement Plan, all of which were the guideposts for change in this school.

Data were collected from the North Carolina end-of-grade testing for the 2005 through 2008 school years, which represent the entirety of this school's existence. Once the data were collected, trends were analyzed.

As shown in Table 4, the end-of-grade scores at the end of the 2005-2006 school year showed the percentage of students at or above grade level in reading at 71.5%, with the percentage of males at 66.3%, and females at 76.4%. The 2006 mathematics end-of-grade scores showed 41.9% of students performing on or above grade level, with 42.2% of males at or above grade level, and 41.5% of females at or above grade level (CMS, 2007).

The 2006-2007 end-of-grade scores showed an overall percentage of students at or above grade level in reading at 71.1%, with males at 64.7%, and females at 77.1%. Mathematics scores reported 42% overall at or above grade level, with males at 40%, and females at 43.9% (CMS, 2008).

Table 4

End-of-Grade Test Data (CMS, 2008)

	Reading Overall	Reading Females	Reading Males	Math Overall	Math Females	Math Males
2005-2006	71.5	76.4	66.3	41.9	41.5	42.2
2006-2007	71.1	77.1	64.7	42	43.9	40

The rising cohort for Grade 6 for the 2008-2009 school year was exactly 50% on or above grade level on the Grade 5 end-of-grade test in mathematics, with females scoring 3.2% higher than the males. This 50% is compared to 72.8% of rising Grade 6 students in the district on or above grade level. The mathematics scores of the 2007-2008 cohort, rising seventh graders, showed only 38% on or above grade level as compared to 65.8% for the district, with females scoring 2.4% higher than the males (CMS, 2008). This trend of males scoring below females continued throughout the data.

In addition to the data trends at the school, the decision to create a single-gender educational option is supported by the research conducted by Riordan (2002), who believed that single-sex classrooms are more effective for at-risk students from lower socioeconomic backgrounds (pp. 10-30). Considering that the economically disadvantaged population at this school was 83.5%, these findings were of particular importance, especially when coupled with the research of Sax (2006), founder of the National Association for Single Sex Public Education. Sax (2006) presented evidence in his book, *Why Gender Matters*, that newborn boys and girls process the environment differently, and that these differences continue throughout their lives, leading to his conclusion that “Human nature is gendered to the core” (p. 237). The culmination of the

research led us to identify gender-based scheduling as a priority.

According to the Education Reporter (2008), proponents of single-sex education also cite research that shows some broad differences in how boys and girls learn—differences that appear to be physiological rather than social or learned. Most classroom environments cater more to girls' learning styles and comfort, leaving many boys bored (Education Reporter, 2008). Those who favor single-sex education hope tailoring classrooms to each sex will help both boys and girls to excel and become more enthusiastic about school (Education Reporter, 2008).

The Canadian Centre for Knowledge Mobilisation commissioned a study by Thompson and Ungerleider (2004), which examined the opposing views stating that on one side “advocates of single sex schooling contend that girls and boys learn differently and should be in separate environments in order to maximize the benefits of school” (p. 42). On the other hand,

although they do not necessarily oppose single sex schools, some argue that results are misleading because they typically compare the public system to the private system. Prior achievement, socioeconomic status, parental support, school traditions, and ethos have all been demonstrated to have an effect on student performance. (Thompson & Ungerleider, 2004, p. 42)

Books written by Leonard Sax include *Why Gender Matters* (2006) and *Boys Adrift* (2007). These publications journey through the physiological, social, and emotional differences, similarities, and needs of both genders. Sax (2007) stated in *Boys Adrift*,

The neglect of gender in education and child-rearing has done real harm. The failure to recognize and respect sex differences has led to the pathologizing of

normal female and male attitudes. Restless boys are drugged with Ritalin, and shy teenage girls are medicated with Paxil. Don't tell me this doesn't happen. I see these kids every day. (p. 239)

The work of Chadwell (2009) supports that of Dr. Sax. Chadwell is the foremost expert in gender education in South Carolina and now works for the South Carolina State Department of Education to develop their statewide single-gender program. The single-gender program in this study was designed following the program designs of David Chadwell.

Many studies have been conducted to analyze single-gender education and its effectiveness in an unbiased research-based forum. The Great Lakes Center for Educational Research and Practice and Arizona State University sponsored an independent researcher, Gerald W. Bracey (2006) to conduct his review of issues and data on single-sex education. His conclusion was that as the data do not lead to easy summary statements, neither do they lead to firm recommendations.

In the study commissioned by the United States Department of Education, Mael, Alonso, Gibson, Rogers, and Smith (2005) reported that a few trends were apparent across all outcomes. The preponderance of studies yields results ranging from supporting single-sex schooling to no differences between single-sex and coeducational schooling (Mael et al., 2005). A limited number of studies throughout the review provide evidence favoring coeducational schooling (Mael et al., 2005). It is more common to come across studies that report no differences between single-sex and coeducational schooling than to find outcomes with support for the superiority of coeducational schooling (Mael et al., 2005).

However, when disaggregating the data into specific areas, these same researchers

(Mael et al., 2005) found that in terms of outcomes that may be of most interest to the primary stakeholders, such as academic achievement, self-concept, and long-term indicators of success, there is a degree of support for single-sex schooling.

The history of single-sex education and its research cannot show conclusively that single-sex education is better or worse than coeducational schooling because of all of the many factors that affect the research. This study, therefore, had a narrow focus to avoid broad comparisons that could be problematic. This study focused on a specific population of students in a specific school and only ventured comparison to coeducational classes in the same school comprising of the students' peers.

Purpose of the Study

Based on the collection of research, if single-gender education has a positive impact, it seems to be most evident in populations similar to the demographics of this sample school. The analysis led to identifying two specific priorities: first, that single-gender classes be an integral element of the master schedule; and secondly, that training for teachers is needed, specifically in techniques of teaching and learning among specific genders. The purpose of this research was to determine the impact of the single-gender scheduling on this student population by analyzing academic evaluation data, attitudinal surveys, attendance rates, and discipline data.

Chapter 2: Literature Review

The research of single-gender education is varied and has definite divisions in interpreting conclusions. All of the research is limited in some fashion, understanding that no research of a topic of this kind can account for all factors that may influence the outcome; however, even in light of this fact, there are passionate constituencies both for and against single-gender education.

There are opposing schools of thought concerning single-gender education with extremists on either side of the fence. According to the *Education Reporter* (2008), on one side there is the American Civil Liberties Union, which has filed a lawsuit challenging the constitutionality of single-sex classes in public schools. The ACLU does not believe that single-sex learning is beneficial or even constitutional (Education Reporter, 2008). The lawsuit accuses a school of offering unequal options to boys and girls and of placing students in single-sex classrooms without input from parents or students (Education Reporter, 2008). Both actions are out of compliance with the federal Department of Education's 2006 regulations for single-sex education. The lawsuit also challenges the Department's regulations, saying that they violate Title IX of the 1972 Education Amendments and the 14th Amendment's equal protection clause (Education Reporter, 2008).

On the other extreme is the National Association for Single Sex Public Education (NASSPE, 2009), headed by Leonard Sax, which promoted single-sex education, based on the many differences in the ways that males and females process their world. Because of the vast contradictions in the information available, Salamone (1999) observed,

Perhaps researchers on single-sex education have been asking the wrong questions. As the anecdotal evidence on single-sex classes demonstrates, the

focus on objectively measurable short-term outcomes in achievement score gains, for example, may simply divert attention from the real question of short-term behavioral and attitudinal changes that ultimately produce long-term effects in career choices and greater control over one's life plan. It could be that empowerment, not higher test scores per se, is at the heart of single-sex education. Unfortunately, the personal benefits that flow from empowerment are not clearly apparent or measurable in the short term. (pp. 231-235)

What research does exist seems rife with preventable methodological shortcomings, such as failing to take into account religious values, class, financial privilege, prior learning, selective admissions, ethnicity, and so on. In the recent American Institute for Research review of publications conducted for the National Center for Education Statistics, Mael et al. (2005) declared early on, "As in previous reviews, the results are equivocal" (p. 86). This same review finds *some* support for the premise that single-sex education is helpful and *limited* support that it might be harmful or that coeducational education is more beneficial. Mostly, though, "there is no evidence of either benefit or harm" (Mael et al., pp. 86-88).

For this literature review, research was gathered based on four factors: academic achievement, measures of attitudes toward education, behavior and discipline, and attendance. Because these factors intertwine and are interdependent, much of the research addresses more than one factor. Most of the research is a conglomeration of results focused on attitudinal measures and academic achievement. Rarely is attendance mentioned directly, although it is important for this study, and implied in most research. When attendance is mentioned in the research, it is usually connected to the facet of behavior and discipline as suspension days or dropout statistics.

The first section of this literature review focuses primarily on introducing the current factions of researchers and their beliefs, usually passionately for or passionately against, single-gender education; the second section of this literature review focuses on single-gender education's impact on academic achievement and associated factors. The third section focuses on single-sex education's impact on attitudinal factors, including subcategories of behavior and student discipline and student attendance.

Single-Gender Education: Current Themes in Research

There are some alarming statistics that support single-gender education. As reported in the *San Francisco Chronicle*, The Centers for Disease Control and Prevention reported that nearly 10% of boys have learning disabilities, compared with 6% of girls, and boys are 2.5 times more likely than girls to be diagnosed with attention deficit hyperactivity disorder (Gurian Institute, 2009). Roughly 66% of special education students are males. Males are 2.5 times more likely than girls to be diagnosed with attention deficit hyperactivity disorder. Women's undergraduate enrollment in college has risen three times faster than men's, compared to men's enrollment since 1970. Currently, 57% of college students are women (Defao, 2007).

Smithers and Robinson (2006) viewed the single-sex education research from a slightly different perspective than Salamone (1999). Smithers and Robinson found only small effects of separating or bringing the sexes together for education and the educational research was highly limited. They concluded that it seems unlikely that evidence will ever be obtained to cause the proponents of the opposing viewpoints to change their views (Smithers & Robinson, 2006). Smithers and Robinson further concluded that the paradox of single-sex and coeducation is that the beliefs are strong, and the evidence is weak.

Sadker and Zittleman's (2004) findings illustrated one set of beliefs about single-sex schools: that their superiority, when it exists, occurs because of pedagogical factors one would find in any effective school, single-sex or coed. The American Association of University Women Educational Foundation (AAUWEF) adopted the same position in its 1997 publication, *Separated by Sex: A Critical Look at Single-Sex Education for Girls*. It later wrote that if girls were more comfortable in single-sex classes, then something was wrong with the coeducational setting and the appropriate effort would be to attempt to right it. This is obviously a political or philosophical position, not one derived from empirical studies in the behavioral or biological sciences (Bracey, 2006).

The AAUWEF's (1997) conclusion was that assessments of single-sex education's *success* or *failure*, therefore, are contingent on the goals of the stakeholders. The indicators by which research measures effects, and schools measure success, vary accordingly.

In her work, *Is single-sex schooling a solution to the problem of gender inequity?*, Lee (1998) defined a *good* school as one that has high achievement outcomes and a low correlation of those outcomes with socioeconomic status, or high achievement outcomes and a small gender gap. Reflecting on her own work and that of colleagues, she delineated the qualities that emerged: 1) smaller school size; 2) a constrained curriculum where almost all students take the same, mostly academic curriculum; 3) more personal social relations among school members—communities rather than bureaucracies; 4) more authentic instruction that involves students in higher order thinking; 5) teaching that is more constructivist than didactic; 6) students are encouraged and expected to become actively engaged in their own learning; 7) a pattern of authentic instruction that is pervasive in the school rather than isolated in the classes of teachers who happen to teach

this way; and 8) a common willingness on the part of teachers to accept personal responsibility for all their students' learning, including a belief that all their students can learn what they are taught (Lee, 1998).

Bracey (2006) recognized a second set of beliefs about the effects of single-sex schools on academic achievement is held by those called the conditional believers. These might agree with Lee (1998) in theory, but hold that the social conditions of actual schools do not attain the desired state that Lee describes. Therefore they advocate single-gender schools under certain conditions or for certain constituencies (Bracey, 2006). Sometimes, the focus of such advocates is on the attention-getting, classroom-dominating, sexual innuendo of boys to the disadvantage of girls (Bracey, 2006). The girls, then, need single-gender schools, or at least classes, in order to have opportunities to demonstrate leadership and simply to receive their fair share of attention (Bracey, 2006). Sadker and Sadker (1994) showed that teachers were unaware of the differential amounts and kinds of attention given to boys versus girls and were shocked to see videos of themselves concentrating on boys.

Conditional believers represent a variety of stances. Some think that single-sex classes broaden the range of topics that can be discussed without embarrassment or laughter, or in the case of boys, permit attention to academic outcomes that would violate the anti-intellectual norms of coed classrooms (Bracey, 2006). Sax (2007), for example, contended that only *geeks* will make the effort to properly pronounce French words in a coed language class, but in a room with only other boys, more will compete to determine who has the best accent.

One of the most systematic conditional believers is Cornelius Riordan of Providence University. Riordan (1998) believed that single-sex classrooms are more

effective only for at-risk students from lower socioeconomic backgrounds, especially students of color, but for both sexes. He uses this contention to explain why the study he conducted did not find Catholic schools more efficacious for girls while earlier studies did: From 1972 to 1992, Catholic schools for girls experienced a *meteoric* rise in the socioeconomic status of their students. He contended, though, that even when effects show up, the effects are small compared to the effects of socioeconomic status and the type of curriculum in a school (Riordan, 1998).

There are those, the true believers, who believe that innate gender differences require separate schools because boys and girls learn differently. The most ardent advocate in this category is Leonard Sax (2006), who founded the National Association for Single Sex Public Education (NASSPE), originally called the National Association for the Advancement of Single Sex Public Education. Sax (2006) summarized his position in *Why Gender Matters*, and presented evidence that newborn boys and girls see and hear differently (pp. 14-22). Boys and girls draw differently: When asked what a drawing is, girls typically respond with nouns; boys respond with verbs (Sax, 2006, p. 23).

Linguist Tannen (2001) wrote about the great extent of differences in boys' and girls' usage of language. Tannen stated that in many ways in the usage of language, second-grade girls are more like 25-year-old women than second-grade boys.

For Sax (2006), these various biological and linguistic data lead to the conclusion that humans are gendered to the cellular level. Therefore, society should arrange schooling to take advantage of gender differences (Sax, 2006).

In addition, neurological and psychological studies focusing on responses to stress and the different physical and psychological responses in males and females are

consistently finding vast differences in the sexes. For example, Taylor, Klein, Lewis, Greunewald, Gurung, and Updegraff (2000), conducted studies focusing on stress responses and expanded the work of Cannon (1927), who coined the term *fight or flight response* in his study of male animals' hormonal response to stress and confrontation. This response was described as an increased heart rate, dilated pupils, a surge of adrenaline in the blood, all mediated by that division of the autonomic nervous system known as the sympathetic nervous system. The follow-up study done by Taylor et al. (2000) estimated that roughly 90% of all scholarly work on hormonal responses to stress has been done exclusively on male animals, including humans. These findings point out how boys will seek out stressful, timed, and high risk situations to achieve the adrenaline rush described. Many boys get a thrill from violent or quasi-violent confrontation, such as contact sports, martial arts, and other forms of play fighting. Some boys will spend hours playing video games in which their enemies are shooting at them; however, girls usually do not like these games and generally avoid or resolve these types of situations (Taylor et al., 2000).

There have been dozens of studies over the past 20 years targeting female response to stress and confrontation. According to Taylor et al.'s (2000) findings, and corroborated by research from others, such as Evans et al. (2001) and Shoemaker, Hogeman, Khad, Kimmerly, & Sinoway (2001), the female autonomic nervous system has been shown to be influenced more by the parasympathetic nervous system, which is energized by acetylcholine rather than adrenaline, and which causes an unpleasant, nauseated feeling rather than the thrill of the sympathetic nervous system. Evans et al. (2001), studying young women and young men, found a predominance of sympathetic vascular regulation in men compared with a dominant parasympathetic influence in

women. Shoemaker et al. (2001) found that men showed significantly more sympathetic nervous system activity in response to postural stress than women did.

Shors, Chua, and Falduto (2001), at Rutgers, Princeton, and Rockefeller University, demonstrated that stress improves learning in males while it impairs learning in females. Shors et al. said in her findings that exposure to the stressor had diametrically opposed effects on learning in females compared to males. She has also shown that exposure to stress enhances the growth of neural connections in the male hippocampus while it inhibits growth of connections in the female hippocampus (Shors et al., 2001). Highly competitive or high-pressure activities, and the use of timers generally impact boys' performance positively, and girls' performance negatively (Shors et al., 2001). This physiological stress response is one explanation for boys scoring higher than their grades would predict on standardized tests, and girls scoring lower than their grades would indicate to be their expected scores (Shors et al., 2001).

Various studies research physiological response differences between the genders. A music therapy study by Standley (1998) was conducted on premature babies. In this study, women hummed the Brahms' lullaby over and over to the babies. The results showed that girl babies left the hospital 12 days on average earlier than girl babies who were not hummed to, and there were no effects on the boy babies (Standley, 1998).

In two studies, pediatric audiologists Cone-Wesson and Ramirez (1997), and then Cone-Wesson, Sininger, and Abdala (1998), studied the hearing of newborn babies. When a person of any age hears a sound, there is an immediate reaction, called an acoustic brain response. These researchers found concurrently that the average baby girl had an acoustic brain response about 80% greater than the response of the average baby boy (Cone-Wesson et al., 1998).

Cassidy and Ditty (2001) did a follow-up study using a technique known as transient evoked otoacoustic emissions. They found that girls' hearing is substantially more sensitive than boys', especially in the 1,000 to 4,000-Hz range, which is important for speech discrimination, as the human voice is about 1,500-Hz (Cassidy & Ditty, 2001). The female-male difference in hearing only gets bigger as kids get older (Cassidy & Ditty, 2001).

In brain research, Hanlon, Thatcher, and Cline (1999) reported that in boys, the sensorimotor cortex and the occipital cortex mature earlier. The areas of the brain that develop early in boys control vision, touch and pressure, and gross motor control, which lead to early advancements in visiospatial processing and targeting (Hanlon et al., 1999). In girls, the superior temporal cortex and the frontal cortex mature earlier, which control speech, hearing, language, reading, and facial recognition (Hanlon et al., 1999). Their conclusions suggested that there is a different order, time, and rate of development in the brains of boys and girls (Hanlon et al., 1999).

Sax (2006) drew the conclusion that when schools fail to recognize the different timelines for brain development in children, it affects each gender at different ages. "Boys are harmed most in kindergarten and the early elementary years. For girls, the negative effects of gender-blind education become manifest in the middle school and high school years" (Sax, 2006, p. 99).

Impact on Student Academic Achievement

The National Center for Educational Statistics reviewed single-sex education research and included all correlational studies that employed statistical controls in their report (Mael et al., 2005). NCES started with 2,221 studies and ended with only 40 quantitative studies and 4 qualitative studies to be included in the review. The 40 studies

cover 33 outcomes. This means that none of the outcomes studied generated what might be called a corpus of research literature sufficiently large enough to draw conclusions with confidence. This is true even though some studies address more than one outcome and figure into the tally more than once (Bracey, 2006).

The nine studies used all-subject achievement tests (or some type of composite measure). Of these, five found positive effects for single-sex schools for girls, and two for girls in coeducational schools. Three found positive effects for single-sex schools for males. One study showed benefits of single-sex schools for females but null results for males. Of 14 studies examining only mathematics achievement test scores, eight yielded null results for all categories. Three showed mixed results. In two of these, males in coed settings scored better, while females in single-sex settings scored better. In the third, males in single-sex schools benefited, but there were no benefits for girls. Of the three remaining studies, all showed positive effects for males in single-sex settings, but not for females (Bracey, 2006).

Of eight studies looking at science achievement test scores, five showed no differences between single-sex and coed settings. Two showed females benefiting from single-sex settings, with null benefits for males. One showed a single-sex benefit for males. Of 10 studies focusing on verbal and English achievement test scores, seven generated null results. Two found a benefit for males in single-sex schools and one found mixed results. One study that examined grades in single-sex and coed Catholic high schools generated null results. One that examined high school social studies achievement found a benefit for girls in single-sex schools, and null results for boys (Bracey, 2006).

Of two studies focusing on postsecondary test scores such as the GMAT and LSAT, one generated null results and one found a single-sex benefit for both males and

females. One study examining college graduation rates and one examining graduate school attendance both generated null results (Bracey, 2006).

In a cross-national study of four countries (Belgium, New Zealand, Thailand, and Japan), Riordan, Baker, and Schaub (1995) showed that single-sex schools do not have uniform and consistent effects. The effects appear to be limited to those national educational systems in which single-sex schools are relatively rare (Riordan et al., 1995).

Schools that increase both academic achievement and equity are characterized by a set of identifiable features. In a set of studies that rest on sound theoretical and empirical grounds, Lee and Bryk (1986) identified several structural and organizational features of schools that generate increased academic achievement as well as increased equity among the students, and a decrease in the gap between racial and social class groups. Drawing upon these studies in coeducational schools and her own studies of single-sex schools, Lee (1998) argued that single-sex schools possess these same features. Riordan (2002) listed these features, and they would become *institutional characteristics* that follow upon a pro-academic choice.

Riordan (1990) said that the key measures of success in school are academic achievement and gender equity. Given that achievement and equity are long recognized as the twin goals of schooling in democratic societies, Riordan also believed cognitive achievement, however it is measured, is the defining outcome of school and that gender equity is obtained by comparing the achievement levels of females and males.

Arnot and Gubb (2001) reported on three schools with single-gender programs in a study, which explored various ways of adding value to boys' and girls' educations. The single-gender educational approach was found to be of particular benefit to underachieving boys, as it allowed teachers to reshape the curriculum and their teaching

styles to cater for their needs (Arnot & Gubb, 2001).

As reported by the National Association for Single Sex Public Education (2009), researchers at Stetson University in Florida completed a 3-year pilot project comparing single-sex classrooms with coed classrooms. All relevant parameters were matched: the class sizes were all the same, the demographics were the same, all teachers had the same training. On the FCAT (Florida Comprehensive Assessment Test), the results showed that 37% of boys in coed classes scored proficient, 59% of girls in coed classes scored proficient, 75% of girls in single-gender classes scored proficient, and 86% of boys in single-gender classes scored proficient (NASSPE, 2009). These students were all learning the same curriculum in the same school, and this school mainstreamed students who were learning disabled, or who had ADHD (NASSPE, 2009).

In one study of 2,777 English high school students, girls at coed schools were found to lose ground to boys in science and vocabulary as they progressed through high school. Exactly the opposite occurred at single-gender schools: The girls at single-gender schools outperformed both the boys at single-gender schools and the boys at coed schools. Again, this study reported the familiar pattern: girls at single-sex schools on top, followed by boys at single-sex schools, then boys at coed schools, with girls at coed schools doing the worst (Finn, 1980).

Baker et al. (1995) investigated the relationship between Grade 12 mathematics achievement and the proportion of single-sex schools in four countries using data from the International Educational Assessment's (IEA) Second International Mathematics Study (SIMS). Using achievement data from two countries that had relatively high percentages of single-sex schools, 68% and 43%, respectively, Belgium and New Zealand, and two countries that had relatively low availability of single-sex schooling,

Thailand with 19% and Japan with 14%, Baker et al. determined that systems with more even mixes of sex groupings among schools show little or no between-sector achievement differences in contrast to systems with uneven mixes. The researchers found that context also played a significant role (Baker et al., 1995). The authors noted that the higher achievement of girls educated in single-sex schools in Thailand may be due to the fact that in Thailand most single-sex schools are in Bangkok and tend to be elite schools for girls, whereas coeducational schools are seen to offer more opportunities for boys (Baker et al., 1995). This, they argued, may explain their findings of higher achievement differences for girls, but not boys in single-sex schools (Baker et al., 1995).

In contrast, while there was a significant difference in achievement between single-sex schools and coeducational schools in Japan, the effect was reversed. Single-sex schools in Japan produced significantly lower achievement scores than coeducational schools, again, particularly for girls (Thompson & Ungerleider, 2004). Baker et al. (1995) attributed this result to the context of single-sex schools in Japan, which were oriented toward traditional female roles and less toward academic achievement. The authors found no achievement differences between single-sex and coeducational schools in Belgium and New Zealand where single-sex schools were more abundant and state controlled. The work of Baker et al. indicated that variables such as SES and school context need to be considered when evaluating the effects of single-sex education.

Gilson (1999) examined the effects of single-sex classes on girls' achievement and attitudes towards mathematics by comparing single-sex and coed mathematics classes in private middle schools in the United States. All schools were members of the National Association of Independent Schools, which typically served middle to upper income families. Students completed a questionnaire designed to assess their perceptions

towards mathematics (i.e., their abilities, their efforts, their academic identities in math, and their interests in the subject) (Gilson, 1999). Test score data were also collected using the students' spring Comprehensive Testing Program III (which tests ability and achievement) results. Pearson's r was used to identify any significant correlations between achievement, ability, school type, and grade (Gilson, 1999). At $p < 0.05$, the only correlation was between ability and achievement (i.e., ability is a good predictor of achievement) (Gilson, 1999). A chi-square was used to determine whether school type affected mathematics course selection, but no association was found (Gilson, 1999). Finally, there were also no significant differences found between school type and attitudes towards mathematics or mathematics achievement (Gilson, 1999). Gilson concluded that SES and parental support for academic achievement are likely more significant influences on academic attitudes and achievement of students than the educational setting itself.

In an Australian study, Mulholland, Hansen, and Kaminski (2004) investigated a school-based initiative to provide single-sex classes to English and mathematics year 9 students to address the underachievement of boys. Students were not randomly assigned to single-sex or coeducational classes; parents were asked to discuss single-sex classes with their children and then chose the class type in which the student would enroll during the second half of the year (Mulholland et al., 2004). Seven coed and two single-sex classes were created for English and three coed and two single-sex classes were created for mathematics (Mulholland et al., 2004). Authors used a standard pretest posttest design and found that after controlling for pretest achievement, neither gender nor class type were significant factors in posttest standardized English scores (Mulholland et al., 2004). Although there was no significant interaction between gender and class type, both

single-sex girls and boys demonstrated a significant increase ($p < .05$) in achievement at the classroom level in English (Mulholland et al., 2004). Although class type was not related to mathematics achievement for either boys or girls, girls' overall performances in the math classroom increased (Mulholland et al., 2004).

Robinson and Smithers (1999) used standardized government test scores to assess any quantifiable differences in school-type effect once schools were matched for SES, selectivity and academic tradition. The authors found that overall, single-sex schools produce students with higher average scores than coeducational schools; however, when matched on the aforementioned variables, there were no significant differences (Robinson & Smithers, 1999). Robinson and Smithers also explored the differences between high performing, highly selective single-sex schools, noting a difference between those which were day schools and those which were boarding schools. Boys in selective single-sex day schools did extremely well, especially at those schools which were rich in history and tradition. The authors concluded that "the outstanding performance of the single-sex schools...has much more to do with academic selection, socioeconomic background and the standing of the school itself than with the segregation of the sexes" (Robinson & Smithers, 1999, p. 23).

Singh, Vaught, and Mitchell (1998) compared the attendance and achievement of African American Grade 5 students attending two single-sex and two coeducational inner-city schools, using both standardized tests and classroom grades. These authors were particularly interested in the benefits single-sex schooling might afford African American males. Singh et al. (1998) found that compared to their coed peers, single-sex girls performed significantly better on the Iowa Basic Skills Tests (IBST) in math ($p < .05$), but, although the girls' math grades were significantly higher than both groups

of boys, there was no significant difference between the grades earned by girls in single-sex and coed schools. Boys in the single-sex classrooms scored the lowest in math, significantly lower ($p < .05$) than the coed boys (Singh et al., 1998). In science, single-sex girls scored the lowest on the IBST, yet they achieved significantly higher grades ($p < .05$) than their coed peers (Singh et al., 1998). As a group, coed classes scored significantly higher than single-sex classes ($p < .01$) on the IBST test in science, but there was no significant differences between boys and girls (Singh et al., 1998). The coed classes scored significantly higher on the IBST social studies test, but there was no significant difference among the classes in terms of grades (Singh et al., 1998). Results of the attendance variable revealed significantly higher average attendance for the single-sex classes at $p < 0.05$, with the coed boys missing the highest number of classes overall ($p < 0.01$) (Singh et al., 1998).

Warrington and Younger (2001) and Younger and Warrington (2002), using a case study of one comprehensive coeducation high school where the majority of classes were taught in single-sex classrooms, asserted that instruction in single-sex classrooms contributes to higher achievement for both boys and girls (Warrington & Younger, 2001). Despite the fact that both girls and boys at this school achieved better results on General Certificate of Secondary Education (GCSE) examinations than the national average, Warrington and Younger found that the girls consistently outperformed the boys. Twenty-nine percent of enrolled students came from outside the school's catchment area and 74% of those students' parents said that the single-sex delivery of the curriculum had a positive influence on their choice to send their child to this particular school. Thus, the conclusions the investigators make about the effect of single-sex classrooms are likely limited because of the importance parents placed on educational achievement and their

decision to send their children to the school studied because of the single-sex classes offered (Thompson & Ungerleider, 2004). Younger and Warrington warned about the “dangers in implementing single-sex classes without coherent staff development programs which address teaching and learning strategies, and which include reflection on sex segregation and coeducation by the pupils involved” (p. 371).

Impact on Student Attitudes

David Chadwell (2009), Director for Single Gender Initiatives for the South Carolina State Department of Education, reported the following results from the annual attitudinal surveys administered to the students in single-sex education programs around the state. The survey asked participants to indicate whether single-gender education changed students’ characteristics, behaviors, and interests in the following categories: self-confidence motivation, interest in trying new ways to learn, independence, participation during class, self-efficacy, enjoyment of school, desire to follow rules, grades, desire to complete hard work, make friends, attitude toward school, complete class work, complete homework, ability to pay attention, interest in reading, interest in mathematics, interest in science, and interest in social studies (Chadwell, 2009). The results were as follows:

More than half of the students indicated that their single-gender classes were a factor in improving their behavior and interests in each of the categories (Chadwell, 2009). Less than 20% of the students indicated a decrease in categories due to being in single-gender classes (Chadwell, 2009).

Nearly three fifths of the students indicated an increase due to being in single-gender classes with self-confidence, interest in trying new ways of learning, participation, self-efficacy, grades, and making friends (Chadwell, 2009). Enjoyment of school (40%)

and desire to follow school rules (44%) were the lowest levels of increase (Chadwell, 2009). Girls tended to indicate increases at a higher percentage than boys, 50-70% and 40-60%, respectively (Chadwell, 2009). Females' highest increases were with self-confidence (65%), independence (66%), participation (66%), and self-efficacy (63%) (Chadwell, 2009). Males' highest increases were with independence (58%), self-efficacy (54%), grades (54%), and making friends (54%) (Chadwell, 2009). African Americans had the highest levels of increase in all categories, including interest in content areas, with 60-69% indicating an increase (Chadwell, 2009).

In the discussion of single-sex schools, Valerie Lee of the University of Michigan and Cornelius Riordan of Providence College posited contrasting theories for their findings of positive effects for some students in some single-sex schools (AAUWEF, 1997).

Lee (1998) credited the organizational and administrative characteristics common in single-sex Catholic schools for their success. Lee and Bryk's (1986) analysis of a random sample of students from these schools showed they produced consistent positive effects for girls on attitudes toward academics, course enrollment patterns, achievement, and educational aspirations, compared to coeducational schools drawn from the same data set (Lee & Bryk, 1986). Lee found no such differences for boys in single-sex Catholic schools. In independent schools she found no pattern of positive or negative effects in these same areas for girls or boys (Lee, 1998). "It's the organizational correlates that go with [Catholic] single-sex schools that make the difference," she argued, not necessarily the fact that they are single-sex (Lee, 1998, p. 41).

Riordan (2002) listed a dozen theoretical rationales for why positive effects occur in single-sex schools, the last four being appropriated from Lee. These rationales include

the diminished strength of youth culture values; a greater degree of order and control; the provision of more successful role models; the reduction of sex differences in curriculum and opportunities; a reduction of sex bias in teacher-student interaction; a reduction of sex stereotypes in peer interaction; the provision of greater number of leadership opportunities; the requirements for a proacademic parent/student choice; small school size; a core curriculum emphasizing academics taken by all students; positive relationships among teachers, parents, and students; and active and constructivist teaching and learning (Riordan, 2002).

Riordan (2002) claimed,

Single-sex schools are places where students go to learn; not to play, not to hassle teachers and other students, and not primarily to meet their friends and have fun.

Aside from affluent middle-class communities and private alternative schools, coeducational schools are not all about academics. (p. 20)

Riordan (2002) appeared to want schools to be more single-mindedly academic:

The problem is not just about youthful anti-intellectualism, antisocial behavior, athletics and rock concerts, sexual harassment, heterosexual attraction and subsequent distraction, and the contentiousness that comes from increased diversity in the schools; it is about all these things and more. (p. 21)

Of the 12 possible reasons that single-sex schools would prove superior to coed schools, Riordan (2002) considered the proacademic choice the most important, because it sets into motion a set of relationships among teachers, parents, and students that emphasize academics and deemphasize youth culture values, which dominate coeducation schools. The choice is not at all about sex and romance nor is it about exclusion. It is about the rejection of anti-academic values that predominates in our

culture and schools (Riordan, 2002). He contended that only single-sex schools, not single-sex classes, make a difference (Riordan, 2002). A single-sex class within a coed school environment cannot overcome the prevailing anti-academic culture (Riordan, 2002). Riordan believed that the anti-academic culture dissipates as one moves up the socioeconomic status ladder. It would seem reasonable, therefore, that single-sex classes might work for some goals—for example, enrolling more girls in science and mathematics classes (Riordan, 2002). Riordan readily acknowledged that all of the research he drew on came from private schools.

Sax (2006) of NASSPE believed that in coeducational settings, people learn the wrong things and that “in the ways that matter, single-sex schools may provide better preparation for the real world than coed schools do” (p. 243). Sax (2006) drew this conclusion after summarizing a study:

Two psychologists went to Belfast to study the self-esteem of girls at different schools. There were no socioeconomic or educational differences between the two groups. These researchers asked the girls all sorts of questions: Are you a good student? Do your parents have good jobs? Are you good at sports? Do you think you're pretty? Do you have lots of friends? The researchers then correlated each girl's answers with the girl's self-esteem as measured by a separate inventory. They found that at *coed* schools you don't need to ask a dozen questions to predict the girl's self-esteem. You have to ask only one: “Do you think you're pretty?” If she answers yes, her self-esteem is high. It doesn't matter if she is failing all her classes, if her parents are out of work, if she's no good at sports....If a girl at a coed school thinks she's ugly, then her self-esteem is in the toilet....For girls at single-sex schools...personal

appearance is in the mix but it's only one factor out of many. (p. 245)

Bracey (2006) attacks this data by saying that Sax's (2006) description of the study romanticizes the data—draws grand, strong conclusions from humble correlational statistics that appear in a 5-page report. Some of the study's characteristics might serve to diminish the strength of these conclusions (Bracey, 2006). First, no matter how clear-cut the result, the study is only one study; second, there were only two schools in the study; third, Bracey (2006) contended that Sax (2006) cannot know that “there were no socioeconomic or educational differences between the two groups” (Bracey, 2006, p. 11). The researchers quoted by Sax (2006) provided only two demographic facts: the two schools were both Protestant and in the same catchment area. Fourth, there were 171 girls at the single-sex school, 24 at the coed school. Why 24 sets of parents in the same neighborhood had chosen to send their daughters to a coed school, and what differences this choice might reflect or produce in the two groups, the researchers did not discuss (Bracey, 2006). Fifth, the researchers do not discuss how the effects of an extremely small school might differ from a small school (Bracey, 2006). Sixth, there was only one instrument, not two: the Self-Perception Profile for Children, a widely used inventory developed by Susan Harter at the University of Denver (Bracey, 2006). The inventory generates five subscales and an index of global self-worth (Bracey, 2006). Seventh, while physical appearance was the only one of the five scales that predicted global self-esteem at the coed school, it accounted for no more variance in that prediction (29%), than did behavioral conduct, the best predictor of global self-esteem for girls at the single-sex school (27%) (Bracey, 2006). Physical appearance was the second best predictor of global self-worth at the single-sex school, adding 15% to the variance accounted for. Social acceptance added another 5% of variance accounted for—meaning

that there were three predictors in play, not *many* as Sax (2006) stated. Eighth, Bracey (2006) also pointed out, despite Sax's (2005) comments on failing grades, parents being out of work, and so on, the researchers sought no information on these conditions and did not discuss them (Bracey, 2006, pp. 11-12).

In other studies, there is, however, growing scientific interest in brain differences between the sexes. As University of California neuroscientist Cahill (2005) put it:

A generation of neuroscientists came to maturity believing that “sex differences in the brain” referred primarily to mating behaviors, sex hormones and the hypothalamus. That view, however, has now been knocked aside by a surge of findings that highlight the influence of sex on many areas of cognition and behavior, including memory, emotion, vision, hearing, the processing of faces and the brain's response to stress hormones. (p. 14)

Most of the studies in this area focus on *micro* level brain activity, such as neuron density. On the other hand, one study cited by Cahill (2005) showed that young male and female vervet monkeys had similar toy preferences as young boys and girls, an outcome not likely due to gender bias in the human culture. Whether or not the differences affect such *macro* level events as classroom instruction is yet to be determined (Cahill, 2005). Moreover, given the dispersion of most traits, it could be that while boys' and girls' brains differ on *average* on some traits, the distributions for males and females largely overlap, meaning that substantial numbers of boys would be more different from other boys than from girls (Cahill, 2005).

The idea of large gender differences has been challenged by Hyde (2005), who conducted a meta-analysis of the psychological literature on gender differences. The results of the analysis led him to advance the *gender similarities hypothesis*: men and

women are more alike than different (Hyde, 2005). In addition, he found that the magnitude and even direction of gender differences depended a great deal on the social context of the behaviors in question (Hyde, 2005).

Of the studies included by Bracey (2006) in The National Center for Educational Statistics review of single-sex education research, the following results on attitudinal factors were reported:

Of seven studies measuring self-concept, four generated null results. Three studies found females benefiting from single-sex schools, and two of these found positive results for males as well. Of the six studies measuring self-esteem, three generated null results. One found an advantage for coeducation schools for males in an elementary setting. One found a positive outcome for males in a single-sex setting, another for males in a coeducation setting. Results for females were null. Complicating this already cloudy issue is the fact that researchers and theoreticians do not always agree on what the constructs of self-concept and self-esteem mean or how valuable they might be to individuals. Some argue, for instance, that high self-esteem reflects egotism and even anti-social behavior. (Kohn, 1994). Different instruments were used in the different studies and it is not clear that they can be summarized with the same categories as used for, say, mathematics achievement. (pp. 30-32)

Of five studies on locus of control, two generated null results. Two found positive effects for both males and females in single-sex settings and one found that result for females, but not males (Bracey, 2006).

The concept of locus of control refers to the degree to which people perceive

themselves as in control of events versus being at the mercy of outside forces. Fourteen studies examined students' tendencies to enroll in certain courses and their attitudes toward courses. Many of these were conducted in Australia or England. Eight generated null results. One favored coed for males, four favored single sex for females and one of these also favored single sex for males. One generated mixed results, favoring coed for males, single-sex for females. One favored coed for females but generated null results for males. This study and the study favoring coed for males were conducted in elementary schools (Bracey, 2006, p. 31).

Of three studies on college aspirations, one generated null results while two favored females in single-sex schools, but gave null results for males. Of two studies on career aspirations, both were positive for females in single-sex schools and one was positive for males as well (Bracey, 2006).

Of four studies on juvenile delinquency, two were null and two favored females in single-sex schools (Bracey, 2006). Five studies explored the relationship between type of school and attitudes toward school. One generated null results and one favored females in coed schools. One favored females, but not males, in single-sex schools. One was mixed, favoring females in coed schools and males in single-sex schools. One conducted in an elementary school favored males in single-sex schools (Bracey, 2006).

Bracey (2006) also reported one study which found that both boys and girls in single-sex schools spent more time on homework, but another study generated null results. The study showing a positive outcome used high school and beyond data, while the null results came from comparing Catholic single-sex and Catholic coed high schools (Bracey, 2006). One study found that females in single-sex schools had more accepting attitudes toward working women than females in coed schools. For males, there were no

differences between schools. In relation to work-related, sex-role stereotyping, one study found less among girls from single-sex schools, but another found less among girls from coed schools (Bracey, 2006).

Bracey (2006) reported that the New Zealand research study found that males and females in single-sex schools were more likely to complete high school:

No interaction was found between type of school and socioeconomic status, meaning that less-affluent students were as likely to complete school in a single-sex setting as in a coed setting. The same held for more affluent students. One study found Black and Hispanic students, both male and female, in more leadership roles in single-sex schools, but another study of females only found no differences. (p. 33)

In *The Future of Single-Sex Schools*, Riordan (1998) stated that there are four findings that he believed were accepted as social facts:

First, the academic and developmental consequences of attending one type of school versus another type of school are virtually zero for middle-class or otherwise advantaged students; by contrast, the consequences are significant for students who are or have been historically or traditionally disadvantaged—minorities, low- and working-class youth, and females (so long as the females are not affluent). Furthermore, these significant effects for at-risk students are small in comparison with the much larger effects of home background and type of curriculum in a given school.

Secondly, equality of treatment, access, and/or outcomes is a scarce commodity in coeducational schools. Coeducational schools are male-dominated and male-controlled cultural institutions. This dominance is not

mitigated whatsoever by the fact that females achieve higher grades, have higher educational and occupational expectations, higher reading and writing test scores, or any other benchmark indicator. Even if females had equal or higher math and science test scores than males, this is all washed away every time there is a football or basketball game, and it all culminates in the celebration of male dominance.

Thirdly, single-sex schools work for girls and boys, women and men, whites and non-whites, but this effect is limited to students of low socioeconomic status (SES), and/or students who have been disadvantaged historically—females and racial/ethnic/religious minorities (both males and females). The effects of single-sex schools are greatest among black or Hispanic females from low socioeconomic homes. These students possess three low-status characteristics: female, racial minority, low SES. Likewise, the strength of the effects diminish slightly for black and Hispanic males from low-socioeconomic homes who have two low-status characteristics. Similarly, the effects are smaller still for white middle-class females who have a single low-status characteristic. The effects are virtually nonexistent among affluent students regardless of race or gender. Over the past two decades, the data persistently confirm this educational fact. (p. 53)

Many researchers have examined the concept of self-esteem as an outcome measure. There is little agreement on what factors influence self-esteem and whether or not a school type (single-sex or coeducational) has any significant effect. The literature review by Haag (1998) confirmed this inconsistency. Haag reported that studies of

attitudinal variables yielded some consistent findings, including differences in specific domains of self-concept between girls in single and mixed-gender schools (but no overall differences), and findings that support the view that single-gender contexts foster less stereotypical views of subjects. Studies also concur that students perceive single-sex school environments to be more orderly (Haag, 1998). Studies finding positive achievement effects attributable to school type tend to view their findings as specific to certain contexts and group characteristics, including socioeconomic status (Haag, 1998). Some studies recognize that some single-sex schools are doing something different that may be reproducible in the coeducational context (Haag, 1998). Haag reported that these studies view policy and training interventions as particularly valuable. Other studies have not claimed positive achievement effects for single-gender programs (Haag, 1998). Although research finds that girls view the single-sex classroom as more conducive to learning, research fails to confirm significant gains in girls' math and science achievements in the single-gender classroom (Haag, 1998).

Another important attitudinal outcome measure of success is the degree of environmental control (locus of control). Self-esteem is an attitude that an individual takes toward oneself. Although it is surely conditioned by the environment, it is experienced by the individual as being independent of the environment (Riordan, 1998). Thus, a person may feel able to do things as well as most other people, knowing full well that there are many obstacles, or just a few, to actually accomplishing certain tasks or goals (Riordan, 1998). Feelings of high or low self-esteem are much like feelings associated with personalities such as shyness or extroversion (Riordan, 1998). A feeling of environmental control, however, is something quite different. Unlike self-esteem, it directly indicates the extent to which an individual feels that the social environment

either facilitates or hinders the undertaking and completion of tasks and goals (Riordan, 1998). Thus, an individual may possess high self-esteem and low environmental control (Riordan, 1998). This may often be the case with members of minority groups and females (Riordan, 1998).

In his research on African and Hispanic American students in single-sex and coeducational Catholic schools, Riordan (1998) found that both males and females gained a significantly greater sense of environmental control over the last 2 years of high school, even after controlling for initial scores on the attitude measure, initial test scores, and home background. This environmental control gain is entirely explained by the formal and informal single-sex school advantages; namely, higher track placement, greater homework, greater parental interest, more same-sex role models, and greater discipline (Riordan, 1998). This may be the most important effect of single-sex schools for Black and Hispanic students. Notwithstanding other gains or losses that may result, single-sex schools provide an atmosphere that empowers African and Hispanic American students (Riordan, 1998).

In *The Contexts of Single-Sex Classes*, Pollard (1997) wrote that in spite of the shortcomings of the existing research on single-sex classes, some threads seem to permeate current studies that suggest some possible positive effects of these classes for girls:

Three of these threads are, first, one finding across studies suggests that single-sex classes are useful for girls because they establish comfortable places to learn and explore the world. This is evident from the self reports in the literature about single-sex classes in math and science. This was also evident in our study of the single-sex Rites of Passage classes.

Second, single-sex classes provide an opportunity for girls to consider issues of gender identity and the varieties of roles girls and women can consider in today's and tomorrow's society. Evidence from both the literature and our research in the African-centered schools suggests that girls in single-sex classrooms can be encouraged to explore a variety of roles and options.

Third, single-sex classes may be particularly helpful to girls at the developmental level of early adolescence. This suggestion must be interpreted with caution since it could be an artifact of the large number of studies conducted at the middle-school level. Fewer studies appear to have involved secondary or elementary age students. However, consideration of the developmental changes associated with early adolescence suggests that this is a time when girls become particularly concerned about their sexual identity as they deal with the changes of puberty. Since girls tend to mature earlier than boys, single-sex classes at the sixth- or seventh-grade level may be particularly salient for girls. At the seventh- and eighth-grade levels, such classes may help both boys and girls cope with the developmental changes of early adolescence. (p. 75)

There may be an indirect positive effect for girls that could emanate from some single-sex classes for boys (Pollard, 1997). In particular, one relatively important component of the rites of passage classes for boys in the African-centered school studied has been an explicit consideration of issues of gender bias and the roles that boys and men play in contributing to the social and psychological oppression of women and girls (Pollard, 1997). At present, it is unknown how widespread these types of considerations

are in other rites of passage classes for African American boys (Pollard, 1997).

Baker (2002) performed further analysis on the same program after it had existed for 3 years. He found that of the six initial assumptions, which led to the development of the program (single-sex classes would increase girls' achievement; lead to better attitudes in math and science, greater feelings of empowerment and self-concept, more opportunities for participation and leadership), all but one were supported. Single-sex classes did not improve girls' achievements (Baker, 2002). Baker concluded that the effect of single-sex classes on boys' achievements was unclear, though he did note that the boys-only environment seemed to have a negative impact on boys' effects (Baker, 2002). The increased disruption, hostility, and discipline issues in the boys' classes were said to have an impact on decreased feelings of self-concept, empowerment and intelligence for boys (Baker, 2002). Baker was careful not to blame the single-sex environment, but suggested that further research must be done in the areas of curriculum and pedagogy in order to meet the academic and social needs of middle school aged boys.

Sukhnandan, Lee, and Kelleher (2000) reported in the National Foundation for Educational Research, strategies adopted by 19 schools across England and Wales to address gender differences in achievement. Eight of the schools had adopted single-sex classes; they found that girls felt more confident to take part in lessons, and they received more teacher attention because less of their time was spent on managing the behavior of boys (Sukhnandan et al., 2000). Sukhnandan et al.'s (2000) study also identified some disadvantages, in particular that girls missed out on the opportunity to gain the perspective of the opposite sex (p. 13).

Brutsaert and Van Houtte (2002) conducted a study for the Department of Sociology and published in the University of Ghent Journal: Research in Education

aimed at comparing single-sex and coeducational schools in terms of pupils' senses of belonging in the school community. The data were drawn from a survey of 68 academically oriented secondary schools in Flanders (Brutsaert & Van Houtte, 2002). Twenty-five were mixed and 43 were single-sex (21 girls' and 22 boys' schools). Respondents—3,370 girls and 3,057 boys—were third-year students, aged 14 and 15 years (Brutsaert & Van Houtte, 2002). A multivariate analysis was performed, adjusting for parental socioeconomic status, parental support, academic performance, curriculum enrollment, quality of teacher-pupil relations and school mean socioeconomic status (Brutsaert & Van Houtte, 2002). Brutsaert and Van Houtte's findings mainly indicated that girls, but not boys, feel better integrated in single-sex schools than in coeducational schools (pp. 48-56).

A study by Jackson (2002), which examined the impact of the introduction of single-sex mathematics classes for one cohort of students over three terms in one school, reached similar conclusions. The research, which was carried out in an English coeducational comprehensive school, found that the majority of girls favored the learning environment such classes offered (Jackson, 2002). Girls felt more confident in single-sex classes, they were not made fun of for getting something wrong, and they did not feel embarrassed for scoring a low mark. In contrast, the boys preferred mixed classes both for learning and social reasons (Jackson, 2002).

Dunlap (2002) reported on a case study designed to explore the effects of separating girls and boys for Grade 5 mathematics classes in a Christian private school. The author used her own Grade 5 class and that of a colleague's for the study. For 7 weeks, Dunlap instructed an all-boys math class and her colleague instructed the girls' math class. Prior to the division of the genders, all students completed a questionnaire

designed to assess girls' attitudes toward school subjects, school, college, and careers (Dunlap, 2002). The same survey was used in the posttest (Dunlap, 2002). Using a chi-square test, Dunlap determined that there was a significant difference between the girls' pre and posttest attitudes regarding the benefit of single-sex math classes ($p < 0.05$), indicating in their written responses that they believed the single-sex environment benefited their learning. Dunlap found no significant difference in achievement over the course of the 7-week single-sex trial, nor was there a difference in the girls' attitudes and opinions about the subject of mathematics itself.

Brutsaert and Bracke (1994) explored the effects of single-sex and coed schooling on elementary students' self-esteem, sense of mastery, stress, fear of failure, sense of belonging in school, and school and study commitment. The data used for this study were collected as part of a larger study, taking place in Belgium (Brutsaert & Bracke, 1994). The study group was a stratified random sample of 3,116 students from 100 elementary schools (Brutsaert & Bracke, 1994). Because public single-sex schools no longer existed in Belgium, the authors chose 60 private Catholic schools from within the larger sample for this particular study: 16 girls only; 16 boys only, and 28 coeducational schools (Brutsaert & Bracke, 1994). The data source was a questionnaire administered to the students (Brutsaert & Bracke, 1994). A researcher was present in classrooms to answer questions and clarify terms; however, it is unclear as to whether s/he actually administered the questionnaire (Brutsaert & Bracke, 1994). Brutsaert and Bracke concluded that there were some differences in effects for girls and boys. They noted that coed boys scored significantly lower on scales measuring self-esteem ($p < 0.01$), study commitment ($p < 0.01$), and school commitment ($p < 0.001$); and significantly higher on school belonging ($p < 0.01$) (Brutsaert & Bracke, 1994). For girls, the only statistically

significant result was that girls in single-sex educational settings tended to feel a lower sense of belonging in school ($p < .01$) than their coed peers (Brutsaert & Bracke, 1994). After examining the influence of the gender composition of staff, results indicated a negative correlation between the prevalence of female teachers and psychosocial well-being for boys, with alpha levels ranging from $p < 0.5$ to $p < 0.001$ (Brutsaert & Bracke, 1994). The authors also suggested that single-sex girls' lower scores in sense of belonging in school were negatively influenced by the preponderance of female teachers in the all-girls school environment; thus, Brutsaert and Bracke concluded that the differential effects of single-sex versus coed schools on boys' and girls' psychosocial well-beings were more a reflection of the gender makeup of the staff (i.e., mostly women) in mixed-sex schools, rather than the presence of the opposite sex students.

Granleese and Joseph (1993) sought to examine the effects of single and coed school environments on adolescent girls' perceptions of self and global self-worth. The authors administered a survey to 143 students from a single-sex Protestant school and 24 from a Protestant coed school (Granleese & Joseph, 1993). The substantially smaller coed sample was the result of efforts to minimize demographic differences (Granleese & Joseph, 1993). Participants completed the Self-Perception Profile for Children; mean scores and standard deviations were compared for statistical significance (Granleese & Joseph, 1993). Although girls from both school types scored similarly on global self-worth, the best predictors for self-worth were significantly different (Granleese & Joseph, 1993). The best predictor of global self-worth for girls attending coed schools was physical appearance ($p < 0.025$), while the best predictor for single-sex attendees was behavioral conduct ($p < 0.05$) (Granleese & Joseph, 1993). Granleese and Joseph concluded that higher scores on the behavior conduct measure by girls in single-sex

schools “suggests that they may allow themselves to engage in less rigid role requirements” than girls from coed schools, and that this may therefore lead to greater gender role flexibility later in life (p. 529). The authors indicated that their assumption that higher behavior conduct scores indicate less rigid gender role requirements may not be accurate (Granleese & Joseph, 1993).

Influenced by research indicating that girls educated in single-sex schools tended to be more likely to enroll in stereotypically masculine subjects areas, such as math and physics, Brutsaert (1999) explored the possible influence of school type on how girls and boys perceived themselves in terms of gender stereotypical traits. A total of 6,427 students aged 14 to 15 completed a questionnaire, which measured gender identity, inhibition (reflecting classroom behavior), academic performance, and parental support (Brutsaert , 1999). Having controlled for variables such as school type, school SES, parental SES, and curriculum, Brutsaert found that girls in coed schools demonstrated greater compliance with traits traditionally acknowledged as feminine when compared to their peers from single-sex schools; however, coed girls also indicated greater identification with traditionally masculine traits (p. 29). Brutsaert hypothesized that coed girls’ identification with traditional female traits and values reflected their need for acceptance by their peer group, presumably one which included boys, although this was not made clear. The author also noted that previous studies had indicated that “girls may feel that teachers consider boys to be the more valued students” and, thus, their identification with male traits may have been a survival strategy in relation to teachers (Brutsaert, 1999, p. 351).

Campbell and Evans (1997) examined math anxiety levels in single-sex and coeducational classrooms, which led them to conclude that girls flourish in single-sex

settings. Using the MARS-A (Mathematics Anxiety Rating Scale for Adolescents), the authors conducted a pretest/posttest comparison at a small Catholic preparatory school (Campbell & Evans, 1997). Students were not randomly assigned to a class; rather each chose their desired classroom composition (Campbell & Evans, 1997). Campbell and Evans found that the mean posttest score for girls in the single-sex class was significantly different from that of the coed class at an alpha level of $p < .005$. Moreover, they found that the mean anxiety score decreased for single-sex girls while it increased for the girls enrolled in the coed math class (Campbell & Evans, 1997). Campbell and Evans determined that “the presence of males in the class apparently had an intimidating affect on the females, thus contributing to their increased level of mathematics anxiety” (p. 336).

Crombie, Abarbanel, and Trinneer (2002) attempted to account for girls’ underrepresentation in computer science courses at the high school level. They compared girls’ attitudes towards computer science among those in single-sex computer classes and those in mixed-sex classes (Crombie et al., 2002). Participants included 63 girls from all-female classes, 155 boys and 32 girls from mixed classes, over a 3-year period (Crombie et al., 2002). The authors found that girls in the single-sex classes reported higher levels of perceived teacher support, confidence, and future academic and occupational intentions than girls in the mixed classes, and similar levels of perceived teacher support to that of males in the mixed classes (Crombie et al., 2002). The authors found no differences in perceived parental support or grades among any of the groups (Crombie et al., 2002). Students were not randomly assigned to class type and all students chose to enroll in computer science, indicating their affinity for the subject area (Crombie et al., 2002, pp. 385-409).

Madigan (2002) studied nine students aged 15-18, the majority of whom resided in low socioeconomic neighborhoods, to ascertain the impact of single-sex classes on the retention of Latina students in special education classes using data from a number of sources: observations; single-sex and mixed-sex focus group discussions; individual interviews with students, teachers, and an administrator; class assignments and homework; and questionnaires. The author concluded that a greater sense of safety and well-being was expressed by girls enrolled in the single-sex class (Madigan, 2002). Although no statistical data was provided, girls in the single-sex program reportedly attended school more regularly than those in the coeducational class (Madigan, 2002). Teacher characteristics may have been a confounding variable, however, especially for the girls in the coeducational class. One coed teacher was identified as having little in common with the girls and being uninformed about the Latina experience (Madigan, 2002). He was quoted as saying,

It might be stereotyping, but Latino girls wear different makeup, unbelievably sexy outfits, as though they're ready to lay down on the floor and have sex right then and there....All the girls [Latinas], I think, want to have babies, and lead their family to a better life. They are miserable at home and can't do what they want...we're talking about 14 and 15 years old. (p. 15)

This teacher taught Latinas in the coeducational special education class. The coeducational girls' absences and lower feelings of comfort, safety, and well-being, compared to those in the single-sex class, may have had more to do with teacher characteristics than it did the gender makeup of the class (Madigan, 2002).

Conclusion

The long-term impact of single-sex education on girls or boys is unknown.

According to the American Association of University Women Educational Foundation (1997), the absence of longitudinal data on single-sex education in elementary and secondary schools makes it impossible to assess the long-term harm or benefit to any groups of students.

There is no evidence that single-sex education in general works or is better than coeducation (Warrington & Younger, 2001). The success or failure of any K-12 single-sex education initiative is relative to a particular group of students in a particular setting and a given set of academic or social objectives (Warrington & Younger, 2001). Claims that single-sex education is inherently better or worse than coeducation beg the questions: What constitutes a good education? And for whom? Single-sex educational programs produce positive results for some students in some settings (Warrington & Younger, 2001). However, researchers do not know for certain whether the benefits derive from factors unique to single-sex programs, or whether these factors also exist or can be reproduced in coeducational settings (Warrington & Younger, 2001). This literature review led to the following questions to guide this study.

Research Questions

The questions that guided this research are as follows:

1. What is the impact of single-gender scheduling on students' academic progress? For the purposes of this study, academic progress was defined as a display of learning, gradual improvement, or growth that was measured through standardized testing and teacher evaluation.
2. What is the impact of single-gender scheduling on students' attitudes toward school? For the purposes of this study, attitudes were defined as complex mental states involving beliefs, feelings, and values (www.dictionaries.com), which were measured

through attitudinal surveys.

3. What is the impact of single-gender scheduling on students' attendance?

4. What is the impact of single-gender scheduling on students' behavior? For the purpose of this study, student behavior referred to disciplinary issues, which warrant an administrative referral.

Chapter 3: Methodology

Participants

The single-gender scheduling was piloted at Grade level 6. Students were randomly assigned to single-gender classes. The grade level had three teams of three teachers and two teams of two teachers. Of these teams, one of the two-teacher teams was scheduled entirely on the basis of single gender with a male cohort and a female cohort, and one of the three-teacher teams had a male cohort, a female cohort, and a mixed-gender cohort. All other teams on the grade level were mixed gender.

The second year of the scheduling moved the single-gender cohorts to Grade 7, where the first of the two teams of six teachers had four female classes and two mixed-gender classes, and the second team had four male classes and two mixed-gender classes. The single-gender scheduling in Grade 6 expanded, so the grade level consisted of four three-teacher teams, each having a male cohort, a female cohort, and a mixed-gender cohort. Students were assigned to these cohorts randomly, unless a parent requested to opt in or out of the single-gender classes.

During the third year of the scheduling, Grade 6 was comprised of one four teacher team with three male classes and one mixed-gender class; one four teacher team with three female classes and one mixed-gender class, and one two teacher team with one male and one female class. Grade 7 structure remained the same for the second year. Grade 8 had two six teacher teams, both of which had two male, two female, and two mixed-gender classes.

Instruments and Procedures

A mixed methods approach to statistical analysis was utilized. A two-way Analysis of Variance (ANOVA) to compare a number of means was used to analyze the

quantitative data, and a chi-square test was used for the qualitative surveys.

Data collection was through various sources. In answering the first research question, which addressed the impact of single-gender scheduling on students' academic progress, measured growth on state standardized test scores were used to determine academic growth of all students and subgroups within the population at large, with the understanding that the standardized testing data were the data least likely to be skewed by human biases. Using a two-way Analysis of Variance (ANOVA), this data was used to determine trends, commonalities, and disparities in the scores of students with single-gender schedules and those with mixed-gender schedules.

The data used to answer the second research question, the impact of single-gender scheduling on students' attitudes toward school, were collected through surveys replicated from David Chadwell's (2009) study of student attitudes in the South Carolina single-gender educational programs. Chadwell gave permission for his student, parent, and teacher survey to be used in this research (Appendix A); a benefit in replicating this survey was that the survey results from this site could be compared to the survey results in South Carolina to analyze for trends, commonalities, and/or discrepancies in the results. The student survey had 15 questions with a 5-point Likert scale on which 1 indicated strongly disagree and 5 indicated strongly agree (Appendix B). It also contained two open-ended opinion questions. The teacher survey had 30 questions with the same scale and three open-ended opinion questions, with some questions directly addressing behavior added to the original survey (Exhibit C). Each survey had space available for additional comments or input. The value of chi-square was calculated to obtain the probability that the null hypothesis was correct.

The third research question, which inquired as to the impact of single-gender

scheduling on student attendance, was explored through the use of attendance data collected daily by each classroom teacher for every class during the school day. The attendance secretary monitored this process, and from this database, NCWise, attendance reports were run on individual students or groups of students, and used in comparative and correlative studies to other school years or between single-gender and mixed-gender student schedules within the current school year in order to determine if single-gender scheduling had shown any impact on student attendance rates. A one-way Analysis of Variance (ANOVA) was conducted with total absences as the dependent variable and class type as the independent variable.

The fourth research question, which examined the impact of single-gender scheduling on student behavior, was answered by examining student disciplinary records. Student disciplinary referrals were recorded in a database called NCWise. This database ran reports on the student body as a whole, on individual students, and on subgroups of students within the school. These reports revealed the offenders, the infractions, and the consequences. It also ran timeline reports to determine what time of day, what month of the year, and the locations at which infractions occur. These detailed reports were used to examine student behavior in single-gender classes as compared to the student behavior in mixed-gender classes.

Since questions three and four are closely linked and yielded quantitative data, they were analyzed through a two-way ANOVA, which showed the degree of impact of single-gender scheduling on the two elements of attendance and behavior.

Limitations

The limitations of this study lie in uncontrollable variables, which affect students' academic progress and attitudes toward school. These variables can come from a plethora of aspects of students' lives, teachers' lives, and layers of school bureaucracies and can deter or enhance school performance with no regard to whether the student has single-gender scheduling or not. The most obvious uncontrollable variable is the effectiveness of the teaching style for each particular student, but in addition, other uncontrollable aspects can run the gamut from home life, physical/mental health, social support, interest/preferences, motivation/desire, educational preparedness, just to name a few, and these aspects apply to all of the parties involved in the educational process; therefore, these variables do present a threat to the internal validity of the study. In addition, this study focused on a particular group of students in a particular school. The conclusions of this study were limited in generalizability due to the specificity of its subjects.

Anticipated Outcomes

This study hopes to produce data that will give educators some insight into possibilities of single-sex scheduling that may be beneficial to their educational process. It is vital to continue educational research into the possibilities of changing the current trends and closing the educational gap between the socioeconomic groups. Single-gender education has deep roots in the world of the wealthy; it is possible that this educational concept could benefit the children of a Title I school as well.

Timeline

The single-sex program at this school was designed in the summer of 2008 and was instituted in the Grade 6 level in the 2008-2009 school year, then as this cohort of

students rose to Grade 7 in the 2009-2010 school year, the program encompassed both Grade 6 and Grade 7; in the 2010-2011 school year, these two cohorts rose to Grade 8 and 7, respectively, and all three middle level Grades, 6, 7, and 8, were included in the program. Data from these 3 school years of the program were used in this study.

Chapter 4: Presentation of the Data

Middle school is a relatively new entity in the realm of education, and at this point in its development, seminal research is now available to show the importance of this time in a student's development, and the impact it has on the future of that student. The National Middle School Association (2003) pointed out that young people undergo more rapid, conscious, and profound personal changes between the ages of 10 and 15 than at any other time in their lives. Early adolescence is a period of tremendous variability; dissimilar rates of growth are common in all areas of their development (NMSA, 2003). Race, poverty, or ethnicity may play an important role, as these conditions add to the tremendous variability of students (NMSA, 2003). It is vitally important to recognize that the areas of development—intellectual, physical, social, emotional, and moral—are inexorably intertwined (NMSA, 2003). Therefore, with young adolescents, achieving academic success is highly dependent upon their other developmental needs also being met.

ACT (2008) research honed in on a critical defining point for students in the college and career readiness process. This defining point is Grade 8. This research shows that the level of academic achievement that students attain by Grade 8 has a larger impact on their college and career readiness than anything that happens academically in high school (ACT, 2008).

The United Way (2008) studies suggested that middle school education must be prioritized to better prepare all students for the 21st century workforce, or the infrastructure for a thriving community and sustainable economy in the United States may be in danger. In addition, educational shortcomings may exacerbate the cycle of the racial opportunity gap, low-wage jobs, and poverty for socioeconomically disadvantaged

African American and Hispanic populations (United Way, 2008).

Throughout the world, single-gender education programs are being designed to address some of the problems, which seem to be worldwide, in the educational process. Many school systems are turning to single-gender education programs in order to try to meet the variable needs of the two genders. The pool of research about these programs does not offer conclusive evidence as to their effects.

The American Civil Liberties Union does not believe that single-sex learning is beneficial or even constitutional and has filed a lawsuit to that effect. The lawsuit addresses the Federal Department of Education's 2006 regulations for single-sex education saying that they violate Title IX of the 1972 Education Amendments and the 14th Amendment's equal protection clause (Education Reporter, 2008).

At the opposite end of the polarization of the controversy is the National Association for Single Sex Public Education (NASSPE, 2009), headed by Leonard Sax, which promotes single-sex education, based on the many different ways that males and females process their worlds.

Bracey (2006) conducted an extensive review of research for The Great Lakes Center for Educational Research and Practice, and his conclusion was that he could give very few strong summary statements or recommendations.

Smithers and Robinson's (2006) research outcome was similar, although they did point out that very strong opinions are held in support of and against single-gender education, most with very little evidence to support them.

Salamone (1999) suggested that research needs to focus on empowerment as the main product of single-gender education programs rather than test scores. Researchers are producing weak data because they are asking the wrong questions.

Mael et al. (2005), when disaggregating the data into specific areas, found that in the areas of academic achievement, self-concept, and long-term indicators of success, there is a degree of support for single-sex schooling.

In another vein of research, Riordan (2002) contended that only single-sex schools, not single-sex classes, make a difference because a single-sex class within a coed school environment cannot overcome the prevailing anti-academic culture.

The various research cannot show conclusively that single-sex education is better or worse than coeducational schooling because of all of the many factors that affect the research.

Statement of the Problem and Focus of the Research

A middle school in the northeastern part of Mecklenburg County had the majority of its students performing below grade level on standardized tests, exhibiting poor performances in the classrooms, and having high levels of behavior problems. A single-gender education program was implemented in 2008. This research analyzed this program in an attempt to answer four research questions as to the impact of the single-gender program on student academic progress, attitudes toward school, attendance, and behavior.

Academic Progress

The impact of single-gender scheduling on students' academic progress was the first focal point of the research. A two-way Analysis of Variance (ANOVA) was conducted with academic growth as exhibited on state end-of-grade testing as the dependent variable and the two independent variables were class type and grade. Class type had three levels: male only class, female only class, and coed class. Grade had three levels: 6, 7, and 8. An illustration of the means is found in Figure 1. Male only classes

have the highest mean ($M=0.27$, $SD=0.024$). Female only classes have the lowest mean ($M=0.22$, $SD=0.025$). Coed classes have a mean in between male only and female only classes ($M=0.25$, $SD=0.024$). Histograms of the distribution of academic growth scores by class type are found in Figures 1 through 4.

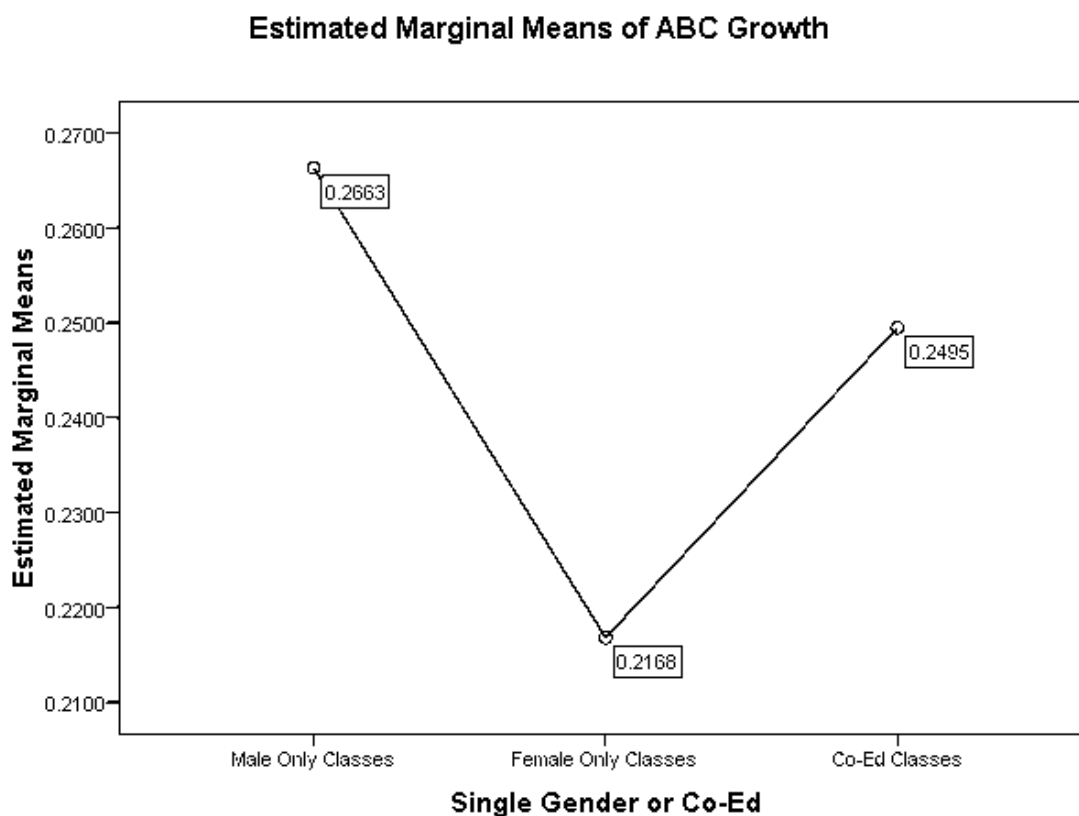


Figure 1. Means by Class Type.

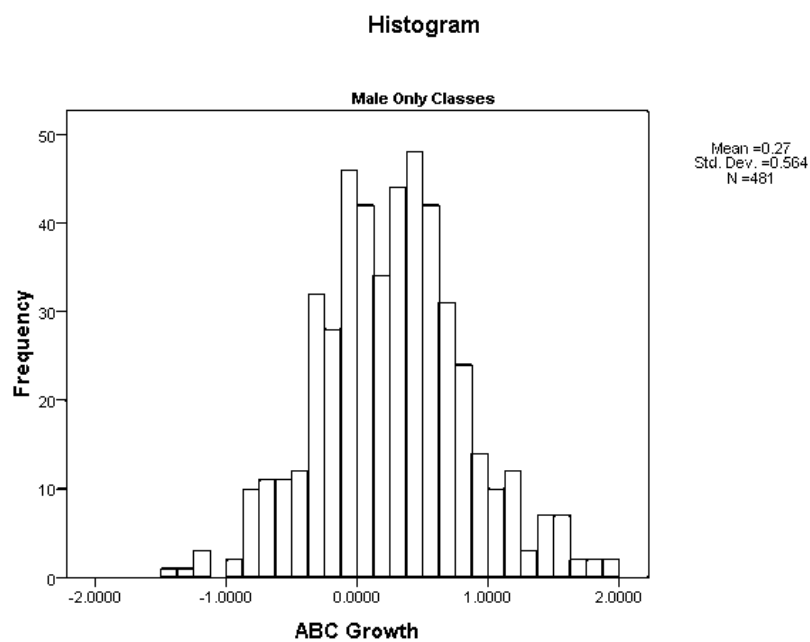


Figure 2. Histogram of Academic Growth Scores: Male Only Classes.

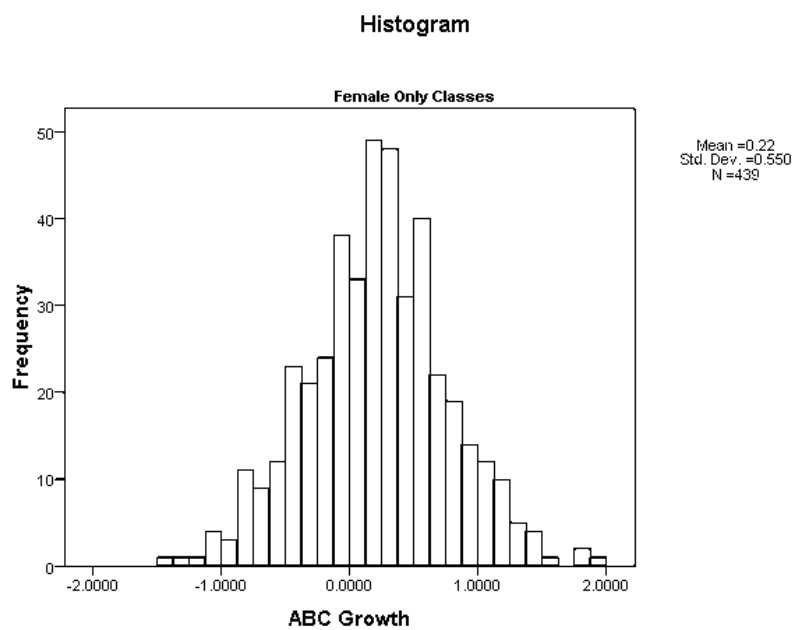


Figure 3. Histogram of Academic Growth Scores: Female Only Classes.

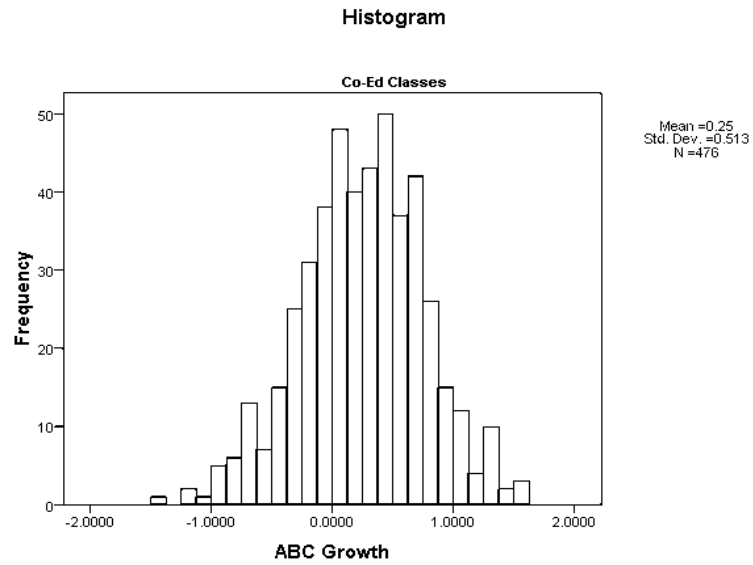


Figure 4. Histogram of Academic Growth Scores: Coed Classes.

The ANOVA found significant mean differences by grade ($F(2, 1387)=50.296$, $p<0.001$). This is to be expected as students progress through school; their growth should increase as well. There were not significant mean differences by class type ($F(2, 1387)=0.577$, $p=0.561$). There is a significant interaction between grade and class type ($F(4, 1387)=3.461$, $p=0.008$). Table 5 presents the ANOVA information.

Table 5

ANOVA Source Table

<i>Source</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P</i>
Class Type	0.316	2	0.158	.577	0.561
Grade	27.511	2	13.756	50.296	<0.001
Class Type * Grade	3.786	4	0.947	3.461	0.008
Error	379.338	1387	0.273		
Corrected Total	410.529	1395			

Pairwise comparisons using the Bonferonni adjustment (to control for Type I Error Rates) revealed that at the Grade 6 level, male only classes experienced more growth than coed classes ($M_{diff}=0.161$, $SE=0.061$, $p=0.008$). No other mean differences were significant at the Grade 6 level. At the Grade 7 level, female only classes experienced less growth than coed classes ($M_{diff}= -0.148$, $SE=0.056$, $p=0.008$). No other mean differences were significant at the Grade 7 level. There were no mean significant differences at the Grade 8 level. Descriptive statistics at the class type by grade level are found in Table 6. An illustration of these mean differences is found in Figure 5.

Table 6

Descriptive Statistics of the Interaction

<i>Class Type</i>	<i>Grade</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Male Only Classes	6	0.17	0.53	159
	7	0.19	0.56	169
	8	0.45	0.57	153
	Total	0.27	0.56	481
Female Only Classes	6	0.12	0.51	145
	7	0.13	0.51	180
	8	0.47	0.58	114
	Total	0.22	0.55	439
Coed Classes	6	0.01	0.45	139
	7	0.28	0.47	169
	8	0.42	0.52	168
	Total	0.25	0.51	476

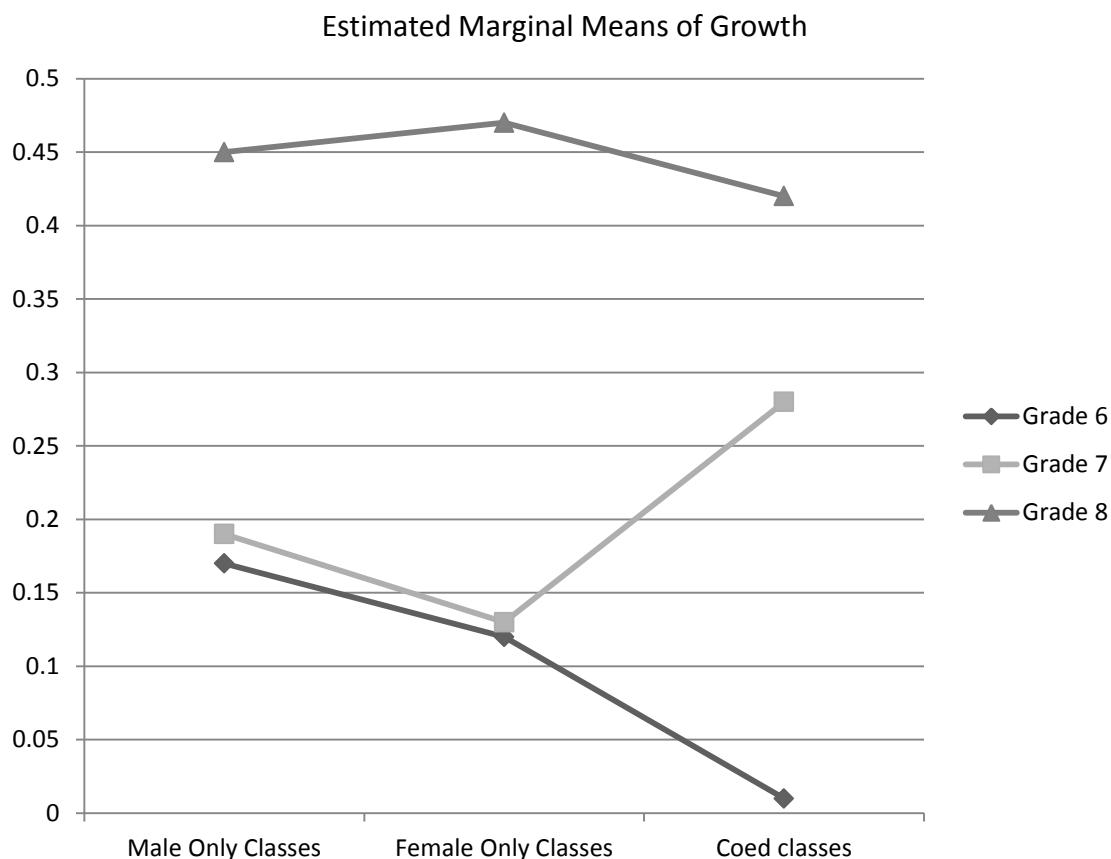


Figure 5. Mean Differences by Class Type and Grade.

Student Attitudes Toward School

The second critical question of the research focused on determining the impact of single-gender scheduling on students' attitudes toward school. A student survey was administered. Chronbach's alpha was used to validate the survey use and measure the consistency of the survey. The alpha for the student survey found good reliability (Chronbach's $\alpha = 0.920$). In the educational setting, an alpha over 0.80 is good.

For the survey statement, "The single gender classes have a comfortable learning environment," there were differences by gender ($\chi^2(4)=9.904, p=0.042$). Specifically, females on average responded more positively than did males. There were no other

differences by gender for the remainder of the survey. The percentages and frequencies of responses to the student survey appear in Table 7.

Table 7

Percent of Responses to Student Survey with Percentage/Frequency of Responses

By being in the single-gender program, I have:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
increased or improved my self-confidence.	5.7/29	9.7/49	23.5/119	34.6/175	25.5/129
increased or improved my desire to succeed in school.	4.9/25	7.9/40	24.5/124	34.2/173	26.9/136
increased or improved my interest in trying new ways to learn.	4.3/22	9.1/46	26.1/132	35.2/178	22.9/116
increased or improved my independence.	4.5/23	7.3/37	28.1/142	34.6/175	22.9/116
increased or improved my participation in class.	4.7/24	8.9/45	27.5/139	32.2/163	23.1/117
increased or improved my ability to succeed in school.	3.0/15	9.3/47	24.3/123	33.0/167	27.5/139
increased or improved my attitude in school.	8.5/43	11.3/57	29.6/150	24.5/124	22.5/114
increased or improved my behavior in school.	6.7/34	10.7/54	30.8/156	24.7/125	23.9/121
increased or improved my grades.	5.1/26	7.1/36	28.3/143	32.8/166	24.1/122
The single-gender classes have fewer distractions than coed classes.	18.0/91	17.4/88	27.1/137	23.7/120	11.5/58
The single-gender classes have fewer behavior problems than coed classes.	18.6/94	18.0/91	26.7/135	21.7/110	11.7/59
The single-gender classes have a comfortable learning environment.	9.3/47	13.2/67	28.7/145	28.7/145	17.2/87
The single-gender teachers understand the difference between boys' and girls' learning process.	6.5/33	9.5/48	28.1/142	30.4/154	22.5/114
The single-gender teachers use different strategies for boys and girls.	8.5/43	9.3/47	36.6/185	24.3/123	18.0/91

There are also differences in how teachers responded regarding female only classes and male only classes in regard to improvement of grades ($\chi^2(16)=48.600$, $p<0.001$). Specifically, fewer teachers in female only classes disagreed than in male only classes. Fewer teachers in male only classes agreed than in female only classes. Table 8 shows the percentage and frequencies of the responses on the teacher survey.

Table 8

Responses to Teacher Survey with Percentage/Frequency of Responses (behavior questions removed for separate analysis)

By being in the single-gender program,	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
my girls have increased or improved their self-confidence.	7.1/4	5.4/3	30.4/17	26.8/15	16.1/9
my boys have increased or improved their self-confidence.	8.9/5	7.1/4	33.9/19	23.2/13	12.5/7
my girls have increased or improved their desire to succeed in school.	7.1/4	3.6/2	28.6/16	28.6/16	17.9/10
my boys have increased or improved their desire to succeed in school.	12.5/7	14.3/8	25.0/14	21.4/12	12.5/7
my girls have increased or improved their interest in trying new ways to learn.	7.1/4	1.8/1	23.2/13	39.3/22	14.3/8
my boys have increased or improved their interest in trying new ways to learn.	10.7/6	10.7/6	25.0/14	28.6/16	10.7/6
my girls have increased or improved their independence.	7.1/4	5.4/3	23.2/13	33.9/19	16.1/9
my boys have increased or improved their independence.	12.5/7	10.7/6	26.8/15	28.6/16	7.1/4
my girls have increased or improved their participation during class.	7.1/4	5.4/3	25.0/14	21.4/12	26.8/15
my boys have increased or improved their participation during class.	7.1/4	12.5/7	17.9/10	28.6/16	19.6/11
my girls have improved their ability to succeed in school.	8.9/5	1.8/1	28.6/16	25.0/14	21.4/12
my boys have improved their ability to succeed in school.	10.7/6	17.9/10	23.2/13	23.2/13	10.7/6
my girls have increased or improved their grades.	8.9/5	1.8/1	30.4/17	28.6/16	16.1/9
my boys have increased or improved their grades	12.5/7	8.9/5	30.4/17	28.6/16	7.1/4
I teach the same standards, but I structure the lesson differently for my girls' classes.	7.1/4	5.4/3	17.9/10	35.7/20	19.6/11
I teach the same standards, but I structure the lesson differently for my boys' classes.	7.1/4	8.9/5	16.1/9	33.9/19	16.1/9

(continued)

By being in the single-gender program,	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I enjoy teaching more within the single-gender classes.	19.6/11	12.5/7	21.4/12	17.9/10	28.6/16
What is your gender?	Male	Female			
	28.6/16	71.4/40			
How many years have you been teaching single-gender classes?	1	2	3		
	50.0/28	30.4/17	19.6/11		
What subject do you teach?	LA	M	SS	SC	Elective
	28.6/16	26.8/15	12.5/7	12.5/7	19.7/11

Student Attendance

The third question to be answered by the research focused on studying the impact of single-gender scheduling on student attendance. For the attendance for the first year of the program, a one-way Analysis of Variance (ANOVA) was conducted with total absences as the dependent variable and class type as the independent variable. The independent variable had three levels: male only classes, female only classes, and coed classes.

The ANOVA found significant mean differences by class type ($F(2, 521)=10.814$, $p<0.001$). Pairwise comparisons using the Bonferonni adjustment (to control for Type I error rates) found coed classes had more absences than female only classes ($M_{diff}=5.046$, $SE=1.477$, $p=0.002$) and male only classes ($M_{diff}=4.992$, $SE=1.330$, $p=0.001$). There were no differences between the female only and male only classes. Descriptive statistics for the levels of class are found in Table 9.

Table 9

ANOVA Source Table 2008-2009

Source	SS	df	MS	F	p
Class Type	2884.056	2	1442.028	10.814	<0.001
Error	69205.890	519	133.345		
Corrected Total	72089.946	521			

Table 10

Mean Absences by Class Type 2008-2009

<i>Class Type</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Male Only Classes	6.72	6.58	96
Female Only Classes	6.68	6.65	74
Coed Classes	11.72	13.28	352
Total	10.09	11.76	522

The 2009-2010 and 2010-2011 school years saw the single-gender scheduling expanded to the other two grade levels. The ANOVA found significant mean differences by grade/over time ($p<.001$), class type ($p=.0085$), and the interaction of grade and class type ($p<.0001$). Table 11 shows the ANOVA results.

Table 11

ANOVA Results of Attendance Data

Source	DF	SS	MS	F	p
Grade	2	3961.850279	1980.925139	13.99	<.0001
Class type	2	1353.635189	676.817594	4.78	0.0085
Interaction	4	4394.019620	1098.504905	7.76	<.0001
Error	1592	225480.0572	141.6332		
Total	1600	234680.9019			

Scheffe's adjustment was used for all pairwise comparisons. Grade 8 saw more absences than Grades 6 and 7. Significant comparisons existed between Grade 8 and Grade 6, and again between Grade 8 and Grade 7. There were no statistical significances in the comparison between Grade 7 and Grade 6. Table 12 outlines the data results.

Table 12

Mean Differences by Grade Level

Grade Comparisons	Difference Between Means	Simultaneous 95% Confidence Limits	
8 – 6	2.4133	0.5900	4.2367
8 – 7	3.6143	1.8042	5.4243
7 – 6	-1.2009	-2.9390	0.5372

When compared by class type, male classes saw more absences than female and coed classes. Significant comparisons exist between male and female classes and male and coed classes. There is no statistical significance in the comparison of female to coed classes. Table 13 shows the mean differences.

Table 13

Mean Differences between Class Types

Class type Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
Male only – Female only	1.9101	0.1008	3.7195
Male only – Coed	1.9324	0.1998	3.6650
Female only – Coed	0.0223	-1.8132	1.8578

Using the MEANS procedure in the SAS System, attendance means were analyzed. Grade 8 had the highest mean, followed by 6, then 7 with the lowest mean. For class types, the coed and female classes were very close to each other, and the male classes showed the highest mean. Table 14 shows mean absences by grade level, and Table 15 shows mean absences by class type.

Table 14

Mean Absences by Grade Level

Analysis Variable : absent Total number of days absent					
Grade Level	N	Mean	Std Dev	Minimum	Maximum
6	554	10.6624549	10.7800532	0	108.0000000
7	572	9.4615385	10.6327118	0	88.0000000
8	475	13.0757895	14.6983216	0	101.0000000

Table 15

Mean Absences by Class Type

Class Type	Analysis Variable : absent Total number of days absent				
	N	Mean	Std Dev	Minimum	Maximum
Female Classes	467	10.2591006	11.4393014	0	82.0000000
Male Classes	585	12.1692308	14.3435255	0	108.0000000
Coed Classes	549	10.2367942	9.7579480	0	56.0000000

Student Behavior

The final question for this research focused on determining the impact of single-gender scheduling on students' behaviors. Teachers were surveyed for the behavioral data. Chronbach's alpha was used to validate the survey use and measure the consistency of the survey. The alpha for the teacher survey found good reliability (Chronbach's $\alpha=0.938$).

There were differences in how teachers responded regarding female only classes and male only classes in regard to improvement of behavior ($\chi^2(16)=30.048$, $p=0.018$). Specifically, fewer teachers disagreed in their female only classes than in male only classes. Fewer teachers agreed in their male only classes than in female only classes. There were no differences in how teachers responded regarding female only classes and male only classes in regard to distractions in the classroom ($\chi^2(16)=21.089$, $p=0.175$).

There were no differences in how teachers responded regarding female only classes and male only classes in regard to the frequency of behavior problems ($\chi^2(16)=20.504$, $p=0.198$). There were no differences in how many referrals written by teachers responded regarding female only classes and male only classes ($\chi^2(16)=0.614$, $p=0.961$).

There were no differences in the types of infractions written by teachers in their female only classes and male only classes ($\chi^2(4)=4.871$, $p=0.301$). Percentages and frequencies to the survey questions are displayed in Table 16.

Table 16

Responses to Teacher Survey with Percentage/Frequency of Responses (behavior statements)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
By being in the single-gender program, my girls have increased or improved their attitudes in school.	8.9/5	8.9/5	23.2/13	25.0/14	17.9/10
By being in the single-gender program, my boys have increased or improved their attitudes in school.	12.5/7	14.3/8	19.6/11	32.1/18	7.1/4
By being in the single-gender program, my girls have improved their behavior in school.	10.7/6	3.6/2	33.9/19	21.4/12	16.1/9
By being in the single-gender program, my boys have improved their behavior in school.	23.2/13	17.9/10	19.6/11	19.6/11	7.1/4
There are fewer classroom distractions in my girls class.	8.9/5	10.7/6	10.7/6	16.1/9	37.5/21
There are fewer classroom distractions in my boys class.	26.8/15	14.3/8	10.7/6	17.9/10	16.1/9
There are fewer behavior problems in my girls class.	8.9/5	12.5/7	19.6/11	21.4/12	21.4/12
There are fewer behavior problems in my boys class.	33.9/19	19.6/11	12.5/7	17.9/10	1.8/1
	Easier than Coed/Higher	About the Same	Harder than Coed/ Lower		
Rate the classroom management in single-gender classes as compared to coed classes.	41.1/23	26.8/15	30.4/17		
Rank the cooperation level of students in single-gender classes as compared to coed classes.	41.1/23	42.9/24	14.3/8		
Rank the level of time on task for your students in single-gender classes as compared to your coed classes.	33.9/19	37.5/21	25.0/14		

A chi-square test was performed to determine if there was a relationship between

the two categorical variables of referrals/infractions in the single-gender versus the coed classes. Results of the chi-square test indicated there were no differences in the distributions of referrals between single-gender and coed classes ($\chi^2(3)=5.6935$, $p=0.1275$), nor were there significant differences in the distributions of types of infractions between single-gender and coed classes ($\chi^2(2)=3.6439$, $p=0.1617$). Tables 17 and 18 show the statistics and Table 19 shows the frequency distribution.

Table 17

Statistics for Table of Referrals by Class Type

Statistic	DF	Value	P
Chi-Square	3	5.6935	0.1275
Likelihood Ratio Chi-Square	3	6.6075	0.0855
Mantel-Haenszel Chi-Square	1	2.5032	0.1136
Phi Coefficient		0.2340	
Contingency Coefficient		0.2278	
Cramer's V		0.2340	

Note: Effective Sample Size=104; Frequency Missing=7.

Table 18

Statistics for Table of Infractions by Class Type

Statistic	DF	Value	p
Chi-Square	2	3.6439	0.1617
Likelihood Ratio Chi-Square	2	3.7517	0.1532
Mantel-Haenszel Chi-Square	1	3.1324	0.0768
Phi Coefficient		0.1958	
Contingency Coefficient		0.1922	
Cramer's V		0.1958	

Note: Effective Sample Size=95; Frequency Missing=16.

Table 19

Frequency Distribution of Referrals and Infractions

Single-gender Referrals					
Referrals	Frequency	Percent	Cumulative Frequency	Cumulative Percent	
0-10	41	73.21	41	73.21	
11-20	14	25.00	55	98.21	
31-40	1	1.79	56	100.00	
Single-gender Infractions					
Infractions	Frequency	Percent	Cumulative Frequency	Cumulative Percent	
Insubordination	16	31.37	16	31.37	
Disruption	20	39.22	36	70.59	
Aggressive Behavior	15	29.41	51	100.00	
Coed Referrals					
Referrals	Frequency	Percent	Cumulative Frequency	Cumulative Percent	
0-10	42	87.50	42	87.50	
11-20	5	10.42	47	97.92	
21-30	1	2.08	48	100.00	
Coed Infractions					
Infractions	Frequency	Percent	Cumulative Frequency	Cumulative Percent	
Insubordination	19	43.18	19	43.18	
Disruption	19	43.18	38	86.36	
Aggressive Behavior	6	13.64	44	100.00	

The data presented for each aspect of this research is varied. The following chapter analyzes the implications of this research and offers recommendations for its use and for further research.

Chapter 5: Implications and Recommendations from the Research

This study sought to identify the effects and degree of impact that single-gender scheduling had on a particular school. From the review of literature, if single-sex education has a positive impact, it seems to be most evident in populations similar to the demographics of this sample school. The purpose of this research was to answer the following questions:

1. What is the impact of single-gender scheduling on students' academic progress? For the purposes of this study, academic progress was defined as a display of learning, gradual improvement, or growth that was measured through standardized testing and teacher evaluation.
2. What is the impact of single-gender scheduling on students' attitudes toward school? For the purposes of this study, attitudes were defined as a complex mental state involving beliefs, feelings, and values (www.dictionaries.com), which were measured through attitudinal surveys.
3. What is the impact of single-gender scheduling on students' attendance?
4. What is the impact of single-gender scheduling on students' behavior? For the purposes of this study, student behavior referred to disciplinary issues, which warranted an administrative referral.

In order to answer these questions and determine the impact of the single-gender scheduling on this student population, statistical analysis of academic evaluation data, attitudinal surveys, attendance rates, and discipline data were utilized. Based on this analysis, there were many implications and recommendations.

Academic Progress

The data showed that there was considerable significance between grade levels,

implying the effect of single-gender classes on academic growth varies by grade level. In analyzing the data for academic progress, overall, male classes showed the most growth, followed by coed classes, and female classes showed the least growth. This data based on standardized testing is contradictory to the data from the teacher survey.

Overwhelmingly, the teachers felt that the female classes were showing the most academic growth based on their classroom observations of performance and interactions. This contradiction in standardized testing performance and classroom performance may support the conclusions of the various studies conducted separately by Taylor et al. (2000), Evans et al. (2001), Shoemaker et al. (2001), and Shors et al. (2001), which all concluded that females respond to stress differently, and this stress response causes females to perform better in academic settings, like a classroom, and not as well in timed, stressful testing situations. For males, these stressful, timed testing situations may enhance male testing performance, which would actually result in higher standardized testing results than could be predicted by their classroom performance. In all of these studies, the data showed that girls who may have done well in classes did not perform as well on timed standardized testing, and boys who did not do as well in class performed better than expected on standardized testing. This physiological response is connected to the gender differences in processing stress levels and their reactions to being timed. Therefore, the possibility remains that the teachers' perceptions could be more accurate than the standardized testing.

Grade level variance was also an important aspect of the data. The significant interaction between grade level and class type ($p=0.008$) implies that the effect of single-gender classes on academic growth varies by grade level. The Grade 6 level male classes showed more academic growth than the coed classes, and in Grade 7, female classes

showed less growth than coed classes. Eighth grade showed no significant differences.

When disaggregating this data, in Grade 6, the male classes showed the most growth, followed closely by the female classes, with coed classes showing the least growth on the grade level.

In contrast, in Grade 7, coed classes showed the most growth, followed by male classes, and the least growth was shown by female classes. During the research period, there was a much higher rate of teacher turnover for Grade 7 than for either of the other two grade levels. It may be that the new teachers hired were less prepared to acclimate themselves both to a new teaching environment and to their first experience in single-gender education. This grade level was divided into two six-teacher teams; the first team consisted of four male classes and two coed classes. The second team consisted of four female classes and two coed. As the school looks at moving forward, plans for analyzing the reason for the poor growth and for restructuring or training the female team should be taken into consideration.

By the end of the school year, on the Grade 7 level, five of the six teachers on the first team were leaving the school, and three of the six teachers on the second team were leaving the school. Therefore, this school finds itself once again with an incredibly high level of teacher turnover at the Grade 7 level.

In Grade 8, female classes showed the most growth, followed by male classes, and coed classes showed the least amount of growth. The coed classes on the Grade 8 level were the students who fed into the algebra classes, which means they were the highest functioning groups of students in the school in the academic realm, but showed the least amount of academic growth on the Grade 8 level. This could mean that the groups fell into the statistical pitfall of experiencing difficulty showing growth in students

who are already working at their potential, or it could mean that males and females at this age, especially in higher level courses, would perform better away from one another.

Further research could be done specifically on algebra I being taught in Grade 8 through a gender-based program.

If this school continues its single-gender program, further implications from the academic growth data suggest that professional development efforts should be increased in order to strengthen and deepen the teachers' abilities to capitalize on the special tendencies of each gender's learning process.

Attitudes Toward School

The data show that the largest statistical significance in the attitudinal survey was that females felt that the female classes offered a comfortable learning environment. This finding connects to the conclusion previously mentioned by Pollard (1997) who honed in on three threads that seemed to permeate current studies. These threads suggested some possible positive effects of single-gender classes for girls. The first of these threads that Pollard pointed out was the finding across studies suggesting that single-sex classes are useful for girls because they establish comfortable places to learn and explore the world. Pollard reported that this trend was evident from the self-reports in the literature about single-sex classes in math and science, and this trend was also evident in the study of the single-sex Rites of Passage classes. Now, this research supports the same finding. Because this research yielded the same conclusion from the girls' experiences, this study supports Pollard's statement and further substantiates the findings of the other studies. Females' comfort levels in female only classes tend to be higher than in coeducational classes. All of these studies together, including this current research, suggest that girls are more comfortable learning in front of other girls.

In looking at the attitudinal survey data, the analysis showed that certain types of questions scored within the same range of positive or negative responses. The relationship of the types of questions became more apparent as the data was analyzed.

The first group of questions which fell into the same data range consisted of three questions focusing on increased self-confidence, increased desire to succeed in school, and improved ability to succeed in school. Although on the survey the questions were unrelated to each other, the responses to the questions were very similar, bringing to light the fact that these questions were by far the most personal and intrinsic of all the survey questions. Both genders responded with 60% or higher positive responses (agree or strongly agree). Considering that none on these questions had negative responses that even reached a combined 20%, the conclusion that can be drawn is that both male and female classes in this setting helped students feel more confident and successful. All three of the qualities of self-confidence, desire to succeed, and ability to succeed are intrinsic qualities that focus on the learner from within. Therefore, it makes sense that through a reliable survey, they came out with very closely rated responses. The implication here is that the most profound impact of single-gender classes is so personal and intrinsic that it may be very difficult to ever measure accurately.

These data results connect to the conclusions drawn in previous research. Salamone (1999) suggested that researchers were asking the wrong questions, and that short-term research cannot possibly measure the effects of single-sex programs because empowerment, not higher test scores, is at the heart of single-sex education. The personal benefits that flow from empowerment are not clearly apparent or measurable in the short term (Salamone, 1999).

The next group of questions, which all had positive rates accounting for 51-59%

of the responses, were questions that focused outside the learner to some extent and on the learner's interaction within the setting. For example, independence, participation, improved grades, and interest in new ways to learn, all depend on the functioning relationships within the class. It is logical that these questions scored within the same range, as they all draw from similar interactions and relationship aspects. The range of positive responses was still very high, and may be even more profound because these questions had elements of the intrinsic learner and the interactive relationships within the setting. These results imply that the single-gender classes support aspects of both the learner's personal education needs and the learner's role in a classroom dynamic.

The survey questions that ranked in the 41-49% positive response rate are interesting. The first is the question that asked the student directly about an improved attitude toward school. Although all of the other questions, some with very high positive responses, measured aspects of the students' attitudes toward school, this question directly asked if an attitude improvement had taken place. This change in responses means that some of the students who ranked the various facets of improved attitude with higher responses were not as willing to rank overall attitude improvement quite as high. On this survey, the broader questions received fewer positive responses. Therefore, the implication may be that the positive aspects of the single-gender classes ranked in the survey may not be enough to change attitudes about the entire school. These results may support Riordan's (2002) opinion that only single-gender schools can make a real impact, not single-gender classes within a coed school.

In addition, the question that asked if the single-gender classes improved my (the survey taker's) behavior in school, measured very closely to the same results as the attitude question. Again, this is an overarching concept of behavior rather than one facet,

and the students were not as committed to positive responses for the broad question as they were for questions that were more specific.

The third question that ranked similarly in this range focused on the teachers' use of different strategies for boys and girls. There was again less commitment to the positive answers and more neutrality on this question. It may be that students were not aware of strategies that their teachers used with other classes, which is highly possible. It may be that the relationship the students had with their teachers influenced their answers, either positively or negatively.

The group of questions that ranked the lowest on the survey, or rather with the highest negative responses, was very interesting. The questions that asked about fewer distractions and fewer behavior problems had only 33-35% positive responses. These were the only questions on the survey for which the percent of negative responses was higher than the percent of positive responses.

Notice that the impact of the single-gender classes was most profoundly positive in the most intrinsic questions that were deeply personal to the learner. The questions that focused outside the learner on the actions and interactions of other students ranked the lowest. The students may be able to see the academic worth of the single-gender approach, but are obviously in need of a higher level of classroom management from the teachers to create a more conducive environment for learning.

In addition to the student survey, analysis of the teacher survey was used to identify beliefs that were consistent or contradictory between the viewpoints of the students and teachers. In the teacher survey, 7.1%, which is equal to four individuals, is a number that appears in the strongly disagree column six out of 14 times. It is also the exact same number in the strongly disagree column for modifying the structure of their

lessons for the gender. One can only wonder if these were the same four teachers throughout the survey. If they were, and they never modified how they were teaching, it stands to reason that they would not see any benefit to the single-gender approach.

When asked about the level of enjoyment teaching single-gender classes, over 46% of the responses were positive, with 32% negative, and the remainder neutral. When looking closely at these numbers, polarization becomes more apparent. The majority of the positive responses, 28.6%, were not only positive, but in the strongly agree column, and the majority of the negative responses, 19.6%, were not only negative, but in the strongly disagree column. These extremely opposite responses imply that the majority of teachers either love single-gender structure or hate it.

In addition, two other pieces of data concerning the teachers may prove to be important. First, the responses about the boys in class were consistently more negative than the responses about girls. When coupled with the gender breakdown of the staff, 71.4% of the staff was female. Some research has stated that the gender of the teacher does not have an effect on the success of a single-gender class; however, if a staff is predominantly female, and the majority of the data concerning males is negative, then in this case, it could have been a factor. In this data there is no way of knowing the gender of the teachers who gave negative responses for the male data; however, considering that the staff was mostly female, the assumption can be made that the majority of the negative responses were also from females. This data implies that female teachers may need more extensive training in learning how to teach boys because it does not follow their natural tendencies, as teaching girls would.

The second important piece of data is that 50% of the staff was in their first year of teaching single-gender classes; 30% had taught single-gender classes for 2 years, and

only 19.6% of the staff had been teaching single-gender for 3 years. As with any new aspect of teaching, the early years show the weaknesses that need to be addressed for the next step of growth. It may be that time and experience within the single-gender structure will prove beneficial to the growth of both teachers and students.

During the years of research for this data, there was an incredibly high level of teacher turnover within this school and a reduction in force for 2 consecutive years. This extreme turnover rate works against building any capacity in the staff because the training leaves with the staff members. Professional development and capacity building become impossibilities if teacher retention is not increased. In addition to the teacher turnover, the principal received a transfer within the district.

Upon the appointment of the new principal, this school was included in the strategic staffing initiative of the district. The new principal had the freedom under the strategic staffing guidelines to replace a percentage of the staff. The administrative staff underwent an almost complete turnover and a reduction in positions. Only one member of the school administrative team was at the school for the entire research period. The change in leadership resulted, as is usually expected, in a larger staff turnover than could have been predicted at the beginning of this research. The effects of these events on the data are unclear; however, an extreme degree of transition in any setting is sure to have an impact on the success and productivity of that setting. If this school experiences some consistency and staff retention as a result of the restructuring, then it may show more success in all of its academic initiatives, including single-gender education.

The teacher survey data is extremely positive in the overall measure. Of the seven questions that focused on teachers' observations of students, all seven had positive responses for girls ranging from 42.9%-53.6%, thus implying an overwhelming amount

of positive impact on the girls in single-gender classes. The same questions addressing the boys were also positive, although not to the same extreme, with the range of 33.9%-48.2% positive responses. This range also implies an extremely positive impact on boys in the single-gender classes.

On the other end of the scale, the same questions had a range of only 8.9-12.5% of negative responses about the girls, and a range of only 16-28.8% of negative responses about the boys.

The question with the most extreme difference between girls and boys was the statement, “my girls/boys have increased or improved their ability to succeed in school.” Teachers gave girls 46.4% positive responses and only 10.7% negative responses to this statement. They gave the boys only 33.9% positive responses and 28.6% negative responses. This could simply imply that the girls are exhibiting more traditional traits that could result in academic success. On a much darker possibility, this data could be indicative of an underlying belief system that the boys will not be successful. The new principal in the school initially identified in her interactions with her new staff that there was a belief system of failure and low expectations among the staff members; this data may support that theory, at least for attitudes toward males.

Attendance

The attendance data for 2008-2009 were analyzed separately because the program was much smaller during the pilot year (N values above) and limited to Grade 6 level. The mean of absences for the male classes and the mean for the female classes were only about half the mean of the coed classes. This extreme difference in the means is probably attributed to the teachers of the single-gender pilot year developing a sense of elitism and belonging among the single-gender classes. Two leadership classes sprang from their

efforts, comprised of a boys' group and a girls' group.

These teachers created traditions with their groups, such as every Wednesday these students were excused from the school uniform, so the boys dressed in white dress shirts and blue ties, and the girls dressed in black dresses with pearls, further adding to the group consciousness. The groups stayed intact for the students' duration at the school, and were active as school ambassadors, ushers, tour guides, and various other representative roles. One of the students in this group has already won a scholarship to college. Due to the small population, and the extreme in the means, this year was isolated in its attendance data.

From the multiple sets of data throughout the research period, the conclusion can be drawn that Grade 8 males miss more days of school than other students. When this information is linked to the behavior data about boys, the implication is that this subgroup needs extra support to increase their level of success. Although teachers did not report much growth in classroom performance, the Grade 8 males did show more growth than the coed classes on standardized testing, but not as much growth as the female classes.

Grade 7 students had the highest attendance rate in the school. The worry in Grade 7 was that the females, as a subgroup, had the highest attendance rate in the school, but the lowest growth on standardized testing in the school. The challenge for the school is to target this subgroup to find out why more time in class is not helping their academic growth. The first step for the school is to establish some stability and expertise in staffing for the Grade 7 level. The school may want to consider avoiding placing Teach For America practitioners on the Grade 7 level, due the transient nature of the program, which only places teachers for 2-year periods.

The Grade 6 attendance data from 2008 to 2011 has improved overall, but the single-gender classes no longer miss half the days of the coed students. It can be concluded that once the program was expanded to include the whole school, the elitism of the Grade 6 classes no longer existed. In addition, in the Reduction In Force, two Grade 6 positions were eliminated; therefore, Grade 6 was teaching the same number of students as the other two grade levels, but with two fewer teachers. This change made the Grade 6 classes much larger than those on other grade levels, and probably had the opposite effect of the elitist feeling of privilege that prevailed in the first year of the program in Grade 6.

Even though males had the highest absentee data, the Grade 6 males still showed the most academic growth on standardized testing on their grade level. The implication is that when they were in school, their time was well spent.

Behavior

Possibly because of its highly structured procedures, this school had better behavior than many schools with similar levels of socioeconomically disadvantaged students. The number of serious offenses, which could tag the school as *dangerous* by the state, is on the decline, and during the 2010-2011 school year, only one of those incidents occurred; thus, the school is not deemed a dangerous school. The three offenses outlined in The Students Rights and Responsibilities Handbook for the school district that continue to predominate the discipline data are insubordination (Rule 7), disruption (Rule 9), and aggressive behavior (Rule 26).

On the survey statements on distractions and behavior problems, the teacher survey addressed the genders separately. The teachers agreed/strongly agreed at a rate of 53.6% (fewer distractions) and 42.8% (fewer behavior problems) for their female classes.

However, they only agreed/strongly agreed at 34% and 19.7%, respectively, for their male classes.

These results imply that the problems may be concentrated in the male classes, although referral data shows no significant difference. It may be that the males exhibit behaviors that are distracting and problems for the teachers, but are not so serious that they warrant an office referral. More strategies for male classroom management are needed for the teaching staff to help improve the environment in these classes.

In the teacher survey on behavior, the statements addressing the number of referrals written in single-gender classes versus coeducational classes were more significant than they looked at first glance. It looked as if the numbers were about the same until further analysis pointed out two vital pieces of information: The questions asked for number of referrals, not percents, and every teacher's daily schedule consisted of two single-gender classes per day and one coeducational class per day; therefore, what looked relatively even was not even at all. There were approximately twice as many single-gender students who got approximately the same number of referrals as the students in the coeducational classes. Therefore, behavior in the single-gender classes may have been much better than initially assumed.

Teachers rated the girls' behavior high, thus implying that teachers overall felt their girls' behavior improved more than their boys' behavior improved. This data mirrors the teacher's responses pertaining to improved grades, thus implying, too, that teachers felt overall that their girls improved their grades more than their boys improved their grades. It is important to note that this question asked about class grades and not the standardized testing data that was used to determine academic growth. As stated before, the implications of the two data sets were that the girls improved more in their classes,

and the boys showed more growth in standardized testing.

With no significant difference in the teachers' responses regarding disruptions in the classroom, the implication is that teachers felt the same regarding distractions towards their female only and male only classes. The implication is mirrored in how teachers felt the same regarding the number of behavior problems towards their female only and male only classes.

This implies that teachers wrote the same number of referrals in their female only and male only classes. There was no significant difference in the frequency of behavior problems, nor any difference in how many office referrals the teachers wrote. There were no significant differences in the types of infractions. This implies that teachers wrote the same types of infractions in their female only, male only, and coed classes.

Overall discipline data for the school was showing a decrease in disciplinary issues which was apparent in both single-gender and coed classes. If the school continues with single-gender scheduling, the professional development for the teachers needs to include differentiated strategies for each gender in order to support their positive trend in student behavior.

When the school began the program, the analysis led to identifying two specific priorities: first, that single-gender classes be an integral element of the master schedule; and secondly, that training for teachers is needed, specifically in techniques of teaching and learning among specific genders. After analyzing the data, the conclusions are similar. The master schedule continues to be modified to address the many needs of the school's many programs, and the professional development of an ever-changing staff is an ongoing process.

The concept for the master schedule for the school for the 2010-2011 school year

moved students as cohesive cohorts to each of their classes. The students who had homeroom together were together for every core class, and separated only for elective classes, one block of instruction each day. Although in many Grade 6 classes this togetherness created a generally positive group dynamic, on Grade 7 and 8 levels, it may have caused some negative student behaviors to intensify. Some of the negative comments that teachers gave in the survey were more directed to the students being together all day, more than their being the same gender.

The best recommendation would be to create the master schedule with student groupings different for each block of instruction so as not to create a class that creates a negative dynamic and takes it from teacher to teacher.

Because of the impact shown in many areas of the research, the school's plan for next year should continue the single-gender program. There are too many positive aspects of it to discard it at this point. The plan should continue the program as it is currently structured on the Grade 6 and Grade 7 levels, but without homogeneous cohort scheduling, making sure that different groups of the same gender meet for different classes. The Grade 8 level should stay in the pilot structure with two male, two female, and two coeducational classes per team, rather than separating into a girls' team and a boys' team, as none of the Grade 8 teachers have identified a preference for either gender, and at this point there is no teacher turnover on Grade 8 for the next school year.

For Grade 6, two positions previously lost in the RIF have been allotted back to the school; therefore, they will have three four-teacher teams once again. Only one teacher at present is leaving the school from Grade 6 for the upcoming school year. Teachers in Grade 6 have identified their preferred gender, and with that input, teams should be formed.

Grade 7 continues to pose a challenge. The core of dedicated teachers that remain each year have strong gender preferences, and they have expressed that they want to remain in single-gender teams for the next school year. All new personnel hired for Grade 7 should be interviewed using questions about single-gender education.

No matter how the schedule is structured, if it has single-gender components, the most important keystone to forward progress is ongoing and consistent professional development to coach the teachers in how to unlock the potential of each gender. During the past years, some of the professional development was required, but some was optional, and even though it was greatly needed by many, it was poorly attended. With many new members on the administrative team and teaching staff, the professional development should be required, often, and interactive.

Summary of Findings

There were many limitations to this research, and many unforeseen changes that occurred in this school during the research period that could have had profound effects on the research outcomes. This study only speaks of this setting, at this time.

Academic Progress

In answering the first research question on the impact of single-gender scheduling on academic progress, there is evidence of some positive impact in the school overall, as male classes showed the most growth; however, in the school as a whole, coed classes showed more growth than female classes.

When disaggregated by grade level, no two grade levels had the same results. Grade 6 growth was led by the male classes, then females, and lastly, coed; whereas, Grade 7 showed the most growth in coed classes, followed by males and then females. Grade 8 was led by females, followed by males, with coed showing the least growth.

Two of the three grade levels showed the least amount of growth in the coed classes, suggesting that there is a positive aspect of the single-gender scheduling in academic performance.

Attitudes Toward School

The attitudinal surveys, both student and teacher, provided the most positive results of all the aspects of this research. The most statistically significant difference between the genders was in the results to females feeling more comfortable learning in front of other females. Overall, the survey results were overwhelmingly in favor of single-gender scheduling, on all questions except the two about distractions and behavior problems.

The teacher survey also showed positive results overall, although not as extreme as the student survey. The teachers responses tended to rate the females higher than the males in every positive aspect of the survey. This tendency may indicate that the majority of female staff prefers the behavior tendencies of the gender with which it identifies.

The degree of positive data in the attitudinal surveys seemed to be limited in its correlation to the academic progress data, thus connecting to the conclusions previously made by Salamone's (1999) research, with the suggestion that single-gender education research must be long-term and focus on empowerment rather than quantitative data.

Attendance

The average daily attendance rate for the school was 96%, meaning that most students came to school most days (CMS, 2011). For the third research question, focusing on the impact of single-gender scheduling on attendance, there seemed to be no impact on attendance for female classes and coed classes, which had very similar data;

however, there was evidence of a negative impact on males. The male classes across the school had more absences.

This attendance data showed opposite results to the academic progress and attitudes toward school data of the previous two research questions. Surprisingly, at the school level, the males showed the highest absence rate, but also the highest amount of academic progress coupled with highly positive responses on the attitudinal survey. Possibly, this contradiction in the data sources may be resolved if the data were disaggregated to an individual student level; it may be that the students who were in school made enough academic growth to statistically *hide* the lack of growth made by those students who had high absence rates. Further research and analysis is needed to determine how these seemingly contradictory aspects can be attributed to the same subgroup of students.

As contradictory as this data seems when compared to the previous two research questions, this attendance data does, however, show some similarities to the behavior data in the final research question. There is a possibility that the poorer behavior reported in the teacher survey on the part of the males resulted in more absences, either on the part of the perpetrating males or on the part of the males who had to tolerate the others' behavior. The behavior data does show that there were no significant differences in office referrals, so the absences could not be explained by suspensions, but the lesser infractions of disruptions and behavior problems could have contributed to the absence rate. Further analysis of behavior and absences would be needed to determine if the attendance rate and behavior data are connected.

A stronger significance in the data was the attendance rate as compared by grade levels. The Grade 8 level showed a much higher mean of absences than did either of the

other two grade levels. There was no significant difference between Grades 6 and 7. This spike of the data in Grade 8 poses a need for further research to understand the reasons behind this increase in absences. It may be valuable to compare them to other grade levels that are deemed the *senior* levels in the schools, such as Grade 5 at the elementary level and Grade 12 at the secondary level to see if there are similarities in groups who are on the verge of transitioning to a higher or next level.

Behavior

The data for the final research question, which focuses on the impact of single-gender scheduling on student behavior, showed no significant impact when single-gender and coed classes were compared. There was no difference in the number of office referrals written or the infractions from which they were written.

There was a considerable gap of positive to negative responses on the teacher survey when comparing female to male classes. The teachers documented a much higher positive response rate to the female classes in all aspects of behavior. As previously mentioned, females tend to learn in ways closely associated with traditional schooling, in which most teachers are already well-versed. The education strategies of teaching male classes can vary greatly from traditional methods, and can, therefore, pose much more of a challenge to traditional educators, and if not done, can lead to behavior issues. In the coed classes, the females may be serving as a behavioral buffer for the teacher, and the males in the coed classes may be working against their natural learning tendencies to conform to the traditionally female methods used in the coed classes.

Because it is difficult to learn new strategies to use with males, it is possible that the male classes had more behavior issues because the methods used in the classes did not address their needs. In addition, males' natural instinct to play fight and establish

hierarchies may work against a classroom that does not allow healthy competition as a method for establishing these ranks. It is obvious that deeper and more consistent professional development is needed for the teachers to understand how to teach males to maximize their potential and harness their incredible levels of energy to promote learning instead of to create behavior problems.

For the females, the positive impact of single-gender scheduling on behavior is more evident as shown by the consistent positive responses from the teachers, especially concerning distractions to learning and behavior problems.

The strength in the attitudinal implications is increased when considered in the context of the physiological research mentioned previously. Because boys and girls process their worlds, not only differently, but on different developmental timelines, and with different routes and activity centers of the brain, it stands to reason that education must take these differences into account.

For example, with hearing acutely tuned to the human voice, girls report feeling like they are being yelled at quite often (Standley, 1998). Girls are distracted by extraneous noises, like tapping, while boys may not even notice them (Standley, 1998). On the opposite extreme, the little boy sitting in the back of the room may not have ADD; he may not be able to hear the teacher, as his hearing is focused on the noises around him.

The curriculum of kindergarten today used to be first grade. Achieving literacy and numeracy in kindergarten is a problem for many 5-year-old boys who just do not have the fine motor skills necessary to write or the language/speech development to handle the curriculum (Sax, 2006). What educators must remember is that boys begin as kinesthetic/visual learners because of the sequence of brain development, and girls begin as verbal/auditory learners because of their own sequence of brain development (Sax,

2006).

When educators become aware of the developmental sequencing, physiological differences, and psychological tendencies of each gender, they can differentiate their instruction tailored to the needs and strengths of their students. Having this information would make an educator fully aware of the multitude of nuances that must be considered for learning to occur at a deep level, and would make the educator more prepared to succeed.

Overall, it seems that the positive impacts of single-gender scheduling outweigh the negative, and the areas in which there is no impact, or negative impact, can be supported, now that they are identified as weaknesses in the program. This school should continue its single-gender program, while strengthening and deepening the staff's expertise and understanding of the purposes behind the decisions, the data driving the decisions, and the professional development that will be needed to truly provide the best educational experience for their students.

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Appendix A

Permission to Replicate Surveys

Re: Surveys for Single Gender Ed Program
 David Chadwell [DChadwel@ed.sc.gov]
 Sent: Mon 12/8/2008 1:01 PM
 To: Janet Moss

Sure - see attached. We will be revising our surveys this year as well. We plan on conducting our surveys in late March/April.

Thanks,

David

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Surveys for Single Gender Ed Program
 >>> Janet Moss <janet.moss@cms.k12.nc.us> 12/08/08 12:42 PM >>>
 To: David Chadwell [DChadwel@ed.sc.gov]

David--

I saw your presentation in Memphis, and I am conducting some research on our program here -- we have begun our initial year with 1/2 of the sixth grade in single gender classes. I would like to replicate the data you gathered using the surveys. Not only would I use this data in evaluating the impact of our program, but I will also use it to write my dissertation focusing on a program evaluation here at Martin Luther King, Jr. Middle School. Could I use your surveys so that I derive comparable data to yours? If so, could you send electronic copies of the surveys to me?
 I appreciate your consideration--

Janet Moss
 Assistant Principal
 Martin Luther King, Jr. Middle School

In compliance with Federal Law, Charlotte-Mecklenburg Schools administers all educational programs, employment activities and admissions without discrimination against any person on the basis of sex, race, color, religion, national origin, age, or disability.
 980-343-0698

Appendix B
Student Survey

Student Survey

Scale: Strongly Disagree Disagree Neutral Agree Strongly Agree

1. What is your gender?
2. By being in the single-gender program I have increased or improved my self-confidence.
3. By being in the single-gender program I have increased or improved my desire to succeed in school.
4. By being in the single-gender program I have increased or improved my interest in trying new ways to learn.
5. By being in the single-gender program I have increased or improved my independence.
6. By being in the single-gender program I have increased or improved my participation during class.
7. By being in the single-gender program I have increased or improved my ability to succeed in school.
8. By being in the single-gender program I have increased or improved my attitude in school.
9. By being in the single-gender program I have increased or improved my behavior in school.
10. By being in the single-gender program I have increased or improved my grades.
11. The single-gender classes have fewer classroom distractions than co-ed classes.
12. The single-gender classes have fewer behavior problems than co-ed classes.
13. The single-gender classes have a comfortable learning environment.
14. The single-gender teachers understand the differences between boys and girls.
15. The single-gender teachers use different strategies for boys and girls.
16. In your opinion, what is the best part of the single-gender program?
17. In your opinion, how could the single-gender program be improved?

Appendix C
Teacher Survey

Teacher Survey

Scale: Strongly Disagree Disagree Neutral Agree Strongly Agree

By being in the single gender program,

1. my girls have increased or improved their self-confidence.
2. my boys have increased or improved their self-confidence.
3. my girls have increased or improved their desire to succeed in school.
4. my boys have increased or improved their desire to succeed in school.
5. my girls have increased or improved their interest in trying new ways to learn.
6. my boys have increased or improved their interest in trying new ways to learn.
7. my girls have increased or improved their independence.
8. my boys have increased or improved their independence.
9. my girls have increased or improved their participation during class.
10. my boys have increased or improved their participation during class.
11. my girls have improved their ability to succeed in school.
12. my boys have improved their ability to succeed in school.
13. my girls have increased or improved their grades.
14. my boys have increased or improved their grades
15. I teach the same standards, but I structure the lesson differently for my girls' classes
16. I teach the same standards, but I structure the lesson differently for my boys' classes
17. I enjoy teaching more within the single gender classes
18. What is your gender?
19. How many years have you been teaching single gender classes?
20. What subject do you teach?

21. By being in the single gender program, my boys have increased or improved their attitudes in school.
22. By being in the single gender program, my girls have improved their behavior in school.
23. By being in the single gender program, my boys have improved their behavior in school.
24. There are fewer classroom distractions in my girls class.
25. There are fewer classroom distractions in my boys class.
26. There are fewer behavior problems in my girls class.
27. There are fewer behavior problems in my boys class.
28. Rate the classroom management in single gender classes as compared to coed classes.
29. Rank the cooperation level of students in single gender classes as compared to coed classes.
30. Rank the level of time on task for your students in single gender classes as compared to your coed classes.