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Devin M. Demaske
Cleveland State University

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THE DIFFERENCES BETWEEN HOW BOYS AND GIRLS LEARN AND THE
BENEFITS OF SINGLE GENDER SCHOOLS

DEVIN M. DEMASKE

Bachelor of Science in Secondary Education Social Studies

Edinboro University of Pennsylvania

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Thesis Supervisor _____ Date _____

Second Member _____ Date _____

Third Member _____ Date _____

Department Chairperson _____ Date _____

Associate Dean _____ Date _____

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ABSTRACT

A developing trend in the world of education is separating students by gender via single gender schools, classrooms, or separation for certain subjects. The goal is finding out whether or not this segregation is beneficial to student achievement, if boys and girls learn differently, and whether or not these differences are biological or due to socialization. It is important to find these answers for educators to best serve their students. The approach was a review of the available literature, analyzing the studies involving student achievement at single gender schools, and studies about the differences in between the male and female brain and how the structure relates to their behavior. The research findings determined that there are significant differences in how boys learn versus girls. It happens extremely early on in life, if not prior to birth. There is compelling evidence for both biological and sociological influences. It is inconclusive to what extent each factors in to the equation. The research indicates that single gender schooling may be most beneficial for students in certain circumstances. Single gender schools have produced great gains in student achievement in areas with a disproportionately high population of “at risk” children. However, the study is limited in the lack of history for these programs, and the amount of variables involved. Schools that implement single gender programs may also have other distinct features that contribute their success such as more professional development for teachers, more community support, or a number of other factors. This remains a crucial topic for further

research. It is essential to improve in the field of education to adapt to the needs of the constantly changing world.

TABLE OF CONTENTS

ABSTRACT.....	iii
I INTRODUCTION.....	1
II HISTORICAL AND LEGAL ISSUES	4
III BIOLOGICAL FACTORS.....	8
IV SOCIAL FACTORS.....	15
V SUCCESSFUL SINGLE GENDER PROGRAMS.....	24
VI DISCUSSION.....	27
VII CONCLUSION.....	32
VII REFERENCES.....	35

CHAPTER I

INTRODUCTION

Education has always been a controversial topic in American society. The role that gender plays in learning, and single gender schooling have become important issues in educational reform. The topic of single gender schools is intriguing, and many single gender programs have emerged nationwide, especially in large urban districts. The trend began in 2006, and has become a growing national movement. School officials and educational leaders have discussed the need for teachers to implement classroom teaching methods that were advantageous specifically to how both genders learn the best.

There have been many types of reform over the past twenty years, and creating single gender classrooms and schools has become increasingly popular in recent years. Although it has been a growing trend lately, the concept of single gendered education is not a new one. As a society, we have almost come full circle on this issue. Single gender private and boarding schools have been around for centuries in the United States and around the world. Single gendered public schools were common in the United States prior to the passing of Title IX in 1972, which prohibits discrimination on federally funded activities in educational programs. However, the reason behind these single sex

arrangements, historically, have been primarily of moral or religious traditional values and not based on the best educational practices. In the case of health and physical education, separation was implemented to save teachers and students of potentially embarrassing sexual discussions, and physical contact considerations.

The past few decades have seen tremendous changes in the world of education, for example charter schools, year round schools, differentiation of instructional strategies, various specialty schools, and a number of others new concepts. According to Michael Gurian and Kathy Stevens (2009), the resurgence of single gender education is one of the most critical changes in the past ten years. Although it seems counterintuitive, the goal of single gender education is equality. Recent research on the human brain and behavior suggest that boys and girls develop and learn in different ways, and separation is beneficial for both sexes. Sometimes equality is not necessarily achieved through identical treatment, but from giving people the best opportunity to succeed given individual circumstances. What may work for one group, may not for another (Gurian & Stevens, 2009).

The increasing trend of single gender schools and single gendered classrooms is the focus of this paper. Unlike the past, where morality or religion served as the rationale for single gender schooling, current reform and extensive research regarding to the effect of gender on children's learning drive this more recent reform. This topic assumed personal importance when my career path as a teacher in a single sex school combined with my desire for a deeper analysis of gender relations in American society and our current educational system. It raised some research questions worth taking a more in depth look at. Is there a difference in how boys learn versus how girls learn? In what

subjects are boys or girls more successful? What instructional techniques are better for boys? How successful have single gender schools/classes been in regards to academic achievement? Under what circumstances has single gender education been most advantageous? One overarching theme is the philosophical nature versus nurture argument, which is impossible to answer with absolute certainty. If boys and girls learn differently, is it due to biological or sociological factors? The short answer to the last question is that it is both. This research will provide more evidence to support this answer, along with the other questions.

CHAPTER II

HISTORICAL AND LEGAL ISSUES

Between the years of 1972 (the passing of Title IX) and 2006, single gender classes were only permitted for physical education and sex education. In October of 2006, the U.S. Department of Education amended Title IX to allow for single sex instruction if the situation is believed to improve student achievement, and if equal programs are available to the other gender, either in single sex or co-educational settings. (Gurian & Stevens, 2009) Secretary of Education Margaret Spellings said “research shows that some students may learn better in single-sex education environments,” and the amendment called for communities to be allowed to establish single sex public schools of choice, as long as substantial co-educational opportunities are available. (<http://www2.ed.gov/news/pressreleases/2006/10/10242006.html>).

Rosemary Salomone (2003) analyzes some of the legal precedence for single gender education. In 1996, the Supreme Court ruled against the Virginia Military Institute operating as an all male school, but shortly after allowed for the opening of an all female public school in New York City (Young Women’s Leadership School). Those against single gendered public schools have taken a conservative stance, or a literal

translation of the law, citing the *Brown vs. Board of Education* (1954) decision that separate but equal is not equal. (Salomone, 2003) The rationale for the Brown decision came out of the equal protection clause of Amendment XIV to the Constitution. Each state is required to provide individuals in its jurisdiction equal protection under the law. It took on a different interpretation in *Plessy vs. Ferguson* (1896), where the court decided that segregation was permitted as long as facilities were equal. The new interpretation in *Brown vs. Board of Education* determined that even if facilities were equal, segregation itself was harmful. (US Constitution, amendment 14)

In this sense equality is viewed as identical treatment. A more liberal interpretation, or open ended legal translation, suggests that different treatment based on what is in the best interest of a particular group is true equality. If both groups benefit from separation, then it should be implemented. Although, single gender schools have been on the rise, co-educational environments have maintained favor in American society, both culturally and legally. In general, supporters would argue that free choice offers the best option for education. (Salomone, 2003).

Karen Stabiner (2002) points out the positive impact of the Bush Administration's policy of endorsing single gender public schools. She says single gender education creates an "alternate parallel universe where smart matters more than anything, good looks hold little currency and a strong sense of self trumps a date on Saturday night." She does concede single sex schooling is not for everyone "single sex education matters, and it matters most to the students who historically have been denied access to it." (<http://www.washingtonpost.com/ac2/wp-dyn?pagename=article&node=&contentId=A3895-2002May10¬Found=true>) In the

past, mainly wealthy people have enjoyed the privilege of single sex schools, yet it may be most beneficial for poor and minority students. The legislation to allow for single gender education was a bipartisan effort to pass Bush's Education Reform Bill, sponsored by Senators Kay Bailey Hutchison (R) and Hillary Rodham Clinton (D). Support for the bill was based on brain research concluding that boys and girls process information in different ways (Stabiner, 2002).

Before we can determine whether or not boys and girls learn differently we have to look at how any individual learns. It is necessary to analyze the learning process and examine whether or not learning is taking place. Defining what learning and knowledge is, can often taken for granted and is a complicated task. The word know, defined as "to have understanding of or skill in as a result of study or experience" (Neufeldt, p.748, 1997) and learning as "the acquiring of knowledge or skill" (Neufeldt, p. 769,1997). Educators have the daunting task of dissecting the learning process, and providing evidence that it is and how it is taking place with their students. Some look at learning as a process that is linear and students master skills in an orderly fashion. This commonly accepted way of determining learning goals and outcomes is illustrated well via Bloom's taxonomy. It is a classification system that ranks different forms of learning in a hierarchy: knowledge, understanding, application, analysis, synthesis, and evaluation. Knowledge, or fact recall, is the most basic form of learning. For an educator this is a useful tool to build upon with students, like climbing up a ladder. One cannot reach the top without mastering the bottom (Bloom, 1956). Another more useful way of looking at learning, which is more relevant to this research is Howard Gardner's idea of multiple intelligences or abilities, in which he categorizes knowledge into distinct sets that are not

hierarchical in nature: visual/spatial, verbal-linguistic, logical-mathematical, bodily-kinesthetic, musical-rhythmic, interpersonal, intrapersonal, existential, and naturalistic.

When it comes to gender stereotypes, the central categories of interest are visual-spatial, logical-mathematical, and bodily-kinesthetic, which are usually attributed to be the strengths of boys; and verbal-linguistic that is often linked as a strong suit for girls (Gardner, 1983).

CHAPTER III

BIOLOGICAL FACTORS

Mulvey (2010) backs up the claims for nature with some biological evidence using brain imaging. The area that connects the two hemispheres of the brain tends to be approximately twenty five percent larger in girls than boys, allowing them to grasp details better, specifically in language acquisition and vocabulary. Beyond the immediate deficiencies, this can lead to a frustrating situation for boys, behavior problems, and a cause for falling further behind. In a classroom experiment in New York, the boys and girls sixth grade math class was segregated by gender and it proved to be beneficial for both sexes. The girls were taught verbally and cooperatively and the boys were taught utilizing competition and more abstractly, with the same objectives in mind. In a related study, Mulvey mentions the boys were allowed to create picture stories which led to improved traditional writing.

Abigail James (2007) goes more in depth in analyzing the differences between the male and female brain. For the most part the brains are similar, with the male brain being slightly larger. The size is not shown to have any effect on intelligence. She is consistent in reporting that females do have more connectors between the brain hemispheres. This

makes the girls more balanced in their academic abilities, and the earlier brain development, specifically with the prefrontal cortex could be the source of better self control for girls. There are also some gender differences in senses and how we gather information. Boys have a higher tolerance for noise, better vision for both stationary and moving objects, higher tolerance for cold and pain, girls hear better and respond faster to sound, and girls prefer more color and light. Brain pathways for boys are more active for cool colors, like blue and similarly warm colors, like pink, for girls. Yellow produces neutral effects, and this can be useful educationally when it comes to selecting colors for highlighters and visual aids. This information shows some key biological differences, but does not determine if there are differences in the thinking processes. James also reinforces that boys are more successful with kinesthetic activities, visual, spatial relationships, and competitive activities, while girls are better with verbal/linguistic activities, and auditory learning (James, 2007).

Matt Ridley (1993) approaches the gender differences in a scientific approach, with a philosophical twist. He draws the analogy of a brilliant student who is unable to pass a test, to an animal with the perfect traits for survival in nature, except fertility. In the end, that animal will be useless if it cannot reproduce and pass on those genes. This is the groundwork for the evolutionary argument, in regards to human behavior. The most important trait is reproduction, and those that possess the traits of the desire and ability to do so will survive. The common denominator among all people is that they are all a descendant of other fertile humans. There is a human nature of traits that most members of the species possess, but humans are more individualistic than any other animal. There are actually two distinct human natures, that of male and female. Human

behavior has evolved with different evolutionary goals. Men are more aggressive to compete for the attention of females. Females are monogamous by nature, and seek out men with good genes to pass on to potential offspring. This holds true for bodies and minds. Women's bodies are evolved for taking care of children, having babies, and gathering plant food. Men have evolved to rising in a male hierarchy, fighting, and obtaining meat for their family. Both the male and female minds have evolved to achieve the same purposes. The reason for this is the different evolutionary demands for the sexes. Ridley notes, many people refuse to believe the differences, because it can be used to justify discrimination in society. However, wanting males and female minds to be identical will not make it true. One glaring example of this is that men are much more violent than women. This fact is usually undisputed even by people who argue for the identical mind, and boys usually have violent tendencies despite it being socially unacceptable (Ridley, 1993).

Another reason to believe that differences in the mentalities of men and women is that it occurs in all other mammals, and similar behavior patterns in apes. Human beings also are unique in their sexual division of labor. Historically, men have been responsible for providing meat, while women have acquired the plant food. There are four areas where these differences have been most consistent. Girls are better at verbal activities, boys are better at mathematical tasks, boys are more aggressive, and boys are better at some visuo-spatial tasks and girls at others. Men are better at mental rotation, which is the main skill behind map reading and women are better at remembering landmarks. This could be explained by men patrolling territory of their "wives" and hunting, and women recalling landmarks for stationary food sources. He also points out the Baldwin

Effect in regards to people's propensity to specialize in what they are good at. He says that nurture always reinforces nature and it seldom fights it. The explanation for the differentiation is hormones not genes, specifically male hormones. He believes that the "normal brain" is female until it is acted upon by hormones. (Ridley, 1993)

Moir and Jessel (1989) blame the radical feminist political movement of the 1970's to explain the misconception society has about men and women's minds being identical, and scientists downplaying research findings out of fear from public reactions. Over the years, the research has become increasingly conclusive. They begin by saying "Men are different from women. They are equal only in their common membership of the same species, humankind. To maintain that they are the same in aptitude, skill or behavior is to build a society based on a biological and scientific lie." (Moir & Jessel, 1989, p. 5). The main reason between the differences in the sexes can be found in the brain. Male and female brains process information differently, resulting in different behaviors, which have consistently been proven over a multitude of studies across several disciplines. For a long time behavioral differences have been explained by social conditioning, but the biological evidence cannot be ignored. Some of the consistent strengths of males have been found in studies involving map reading (spatial rotation), and females possess superior social and verbal/linguistic skills. One of the most glaring differences is the inherent aggression that is seen in males. Moir and Jessel credit hormones as the responsible factor for shaping the brain. They believe that people have been reluctant to subscribe to the biological theories, because humans want to have control over their destiny and do not want to admit that what we are is dictated by our biology. The authors argue coming to grips with the facts of nature will allow us to have

better understanding of ourselves and form better relationships with the opposite sex (Moir & Jessel, 1989).

Prior to the feminist movement, the some of the differences between the sexes were perceived as obvious, but today if those differences are pointed out it is considered sexist. To illustrate the difference, the authors pose the question “how did the male sex manage so successfully, in virtually every culture and society in the world, to contrive a situation where the female was subordinate?” (Moir & Jessel, 1989, 10). People have been operating with two contradictory processes: scientific research and political denial.

The first scientific tests to examine sex differences were conducted in the late 1800’s finding that men had the advantage in strength of grip, ability to work under pressure, a preference for red over blue and abstract thought. In the study women had less tolerance for pain, better hearing, and preferred blue over red, and preferred practical and individual tasks. Many subsequent tests held similar results. It is important to note that in these tests, the average male and females are the subject of this comparison and overlap does occur. An example of the male superiority in mental rotation is the way men dominate the game of chess. Sociologists would argue that boys are encouraged to play the game more by society, but it is evident that it is not socialization even in the former USSR where men still perform better overall, where both sexes are highly encouraged to participate. Women also hold a great advantage in having a wider range of sensory information, creating personal relationships, peripheral vision, and verbal/communication skills. What causes the brains to differentiate is exposure to hormones, and it begins about six to seven weeks after conception. “We share the same sexual identity for only the first few weeks after conception.” (Moir & Jessel, 19, 1989).

Hormones have two effects. They are responsible for the way the brain structure is set up, and the structure is the reason for differences in behavior (Moir & Jessel, 1989).

As a child develops, the differences in sex continue to diverge. At four months old, girls can usually distinguish people they know from a stranger in photographs and distinguish the cries of other babies, while boys cannot. A common myth is that mothers treat babies differently because of the gender, when studies have shown that the mothers are actually reacting and responding to the needs of the baby. One reason girls have an advantage in reading early on in life is that the key component is hearing, rather than identifying symbols. Boys, however, usually do close the gap verbally later in life. According to the authors, girls do not catch up in mathematics, but they have historically lacked the encouragement and have closed the gap since this book was written. Early on, schools discriminate against boys and later they tend to discriminate against girls (Moir & Jessel, 1989).

Gurian and Stevens (2005) focus on a combination of biological and sociological approaches in their analysis of gendered learning. They also implement methods for best practices in a real school setting. One of the main problems that they see is that the whole educational system is not boy friendly, and boys are faced with a situation that sets them up for failure. One of the major factors in the differences between boys and girls, is that boys are lacking in the ability to sit quietly and perform verbal exercises. This is the predominant instructional technique that has been used in schools over the last hundred years. They argue that boys learn things better by doing, and performing hands-on activities. They believe that boys and girls are not the same internally, and the research proves that physiologically, biochemically, and neurologically there are some significant

differences between the sexes. In fairness to the social theorists of the past, they did not have the technological tools to perform brain imaging tests that are now available (Gurian & Stevens, 2005).

The three forces at work in shaping the brain are nature, nurture, and culture. Boys possess energy where they prefer to move around. They tend to be more impulsive and also learn by trial and error. They make connections through the movement. Girls, on the average, have a 25% larger corpus callosum, which allows them a greater ability to multitask. Girls are also more auditory, while boys are more tactile. The female brain also does not rest like the male brain does. From birth, girls use more eye contact and boys use more physical aggression. These differences are innate, and as a society we have changed the system to help girls, but in reality the boys might need some help (Gurian & Stevens, 2005).

CHAPTER IV

SOCIAL FACTORS

Much of the societal stereotypes tend to focus on how girls are discriminated against in education, but according to Janet Mulvey (2010) boys have been falling behind severely in the last decade. She draws information from a study by Gurian and Stevens, showing that boys make up a severely disproportionate amount of poor grades (D's and F's), disability diagnoses, and an overwhelming amount of discipline referrals. In a study of thirty five industrial nations, girls outperformed the boys across the board. Supporting the stereotypes in regards to Gardner's (1983) learning styles, Mulvey (2010) believes that girls are not as active and learn well in cooperative settings, while boys are more suited to playing with blocks, manipulatives, and are more active in nature. Boys are ill-equipped to handle a traditional learning environment, as their development tends to lag a few years behind their female counterparts. Mulvey (2010) recommends allowing different forms of assessment for girls and boys due to their different learning styles; of course both forms should be available for both sexes so it would not be considered discriminatory (Mulvey, 2010).

Christine Skelton (2001) found that boys' recent underachievement academically was a result of having an overwhelming majority of elementary school teachers that are female. This goes against the grain of much of the existing research showing a bias towards boys in the amount of attention they receive compared with girls. She believes that the classroom management techniques and teaching styles are preferential to how girls learn. This provides a strong argument for why boys are being left behind, if it is true that they are not wired to be able to sit still and perform as well as girls biologically (Skelton, 2001).

Christina Sommers (2000) confirms Mulvey's argument in *The War Against the Boys*, that although many argue that females are at a disadvantage in school, it is in fact the boys that lagging behind. Sommers argues that recently women have taken strides in the academic and athletic arenas, while the Columbine shootings have come to symbolize boys in the American educational system, and the view of being troubled and violent. On the average boys are a year and a half behind girls in reading and writing, are overall less committed to school, and less likely to go to college. In 1997, full time college enrollment was 55% female and 45% male, and the U.S. Department of Education predicts that the gap will widen. In Great Britain, this problem was identified in the late nineties, and literacy programs and male friendly classroom activities were introduced to help boys close the gap. There were no advocates in the United States, because of the misconception that girls were not achieving academic success at the same rate as their male counterparts. One reason girls were seen as struggling is that boys tend to test better, and more girls will show up to take the tests. This skews the data, because the tests are taken by far more "at risk" girls, while most of the "at risk" boys will not even

show up. Boys are more violent by nature and must be able to express themselves towards other boys aggressively. Another example of boys not being treated with the same respect as girls in education is the Supreme Court Case of *Davis vs. Monroe County Board of Education* in 1999. Boys get harassed much more often than girls in school and are typically treated more violently, but when an incident involves a female it becomes sexual in nature and involves litigation. The court voted in favor of the fifth grade female student being harassed by a classmate, but boys are usually expected to just deal with bullying on a day to day basis. She also brings up the VMI decision (where it was ruled that girls could not be denied admittance to the elite military university), and the double standard that it is fine to have an all girls school, but discriminatory to have an all boys school (Sommers, 2000).

In a study of pre-kindergarten schools, Early (2010) discovered some similar findings. The study intended to find out if there were differences in how pre-school age students spent their time, according to gender, ethnicity, and income. The students had to spend a certain amount of time in routine and teacher led activities, but when students were allowed their choice of activities there was a significant difference in gender. Boys had a propensity to choose activities that involved gross motor skills, blocks, sports, action figures, and for academic subjects they leaned towards science and social studies. Girls chose activities that involved fine motor skills like drawing, and verbal/language arts activities. According to the researchers, it was determined that the teachers involved in the study did not encourage any gender stereotyped behavior, however, it was not clear whether the children's preferences were biological or had been socialized at an extremely young age (Early, 2010).

First grade boys also have a harder time adjusting to the traditional school model, than girls do. Ponitz (2009) claims that girls fit into the student role better than boys based on how they are socialized and expected to act. This fits in to West and Zimmerman's (1987) theory in regards to "doing gender," where people tend to act a certain way based on the expectation of the situation. Her study is consistent with others in that girls enjoyed more fine motor activities; boys were more aggressive and required more assistance with reading and writing. Not surprisingly, based on the stereotypes, boys received more attention from the teachers both positive and negative (Ponitz, 2009).

One of the most common stereotypes in education is that boys are better in the areas of math and science. Women are extremely underrepresented in career fields that involve math and science even in the present day. In the past, women pursuing education and careers in these areas were simply unheard of, but today they are still rarely involved in high mathematical, scientific, and technological fields even though the opportunities are there. This example provides some compelling evidence for socialization. In a study by Davis-Kean (2007), it showed that boys received more support in math and science than girls did. The study measured gender stereotyped attitudes of fathers, and found that is was directly proportional to the success of their child in math and science. For example, boys with fathers that had strong masculine attitudes did better and daughters did worse. Whereas, fathers that were less traditional in their views, the daughters were much more interested and successful. (Davis-Kean, 2007) This is some evidence for the importance of the role socialization has in the involvement of certain subject areas. In some countries the disparity among math and science career paths does not exist like it does in the United States, and these countries are usually those that generally have more

gender equality. When it comes to standardized test scores in the United States girls now are on equal footing with the boys. Although, still far from being equal, mathematical doctorates are up fifty percent among females in the past decade. The major factor in why such inequalities exist is cultural attitudes in gender relations and overall academic abilities. Americans tend to think that mathematical skills are inherent and to some degree they are, while many other cultures view mathematical success as something that is acquired as a result of hard work and effort. (Mertz, 2009) These attitudes can be heard on a day to day basis in the classroom with students, and even among fellow educators and across college campuses. People will shrug off math work, by simply declaring they are no good at it, and put forth little effort. These attitudes can be applied to other content areas as well, but it seems to be most common in math. Obviously, some things do come easier to others, but if one already has a defeated attitude the chances of success will be greatly diminished. Going a step further with this point McGowan (2009) observed a trend in which high school girls became disengaged with science. The largest discrepancy occurred in their ninth grade year, where girls tended to withdraw from science due to boredom, stress, and self-doubt. Even though many times girls had good grades, girls lacked the self confidence of the boys and were put off by a challenge compared to the boys who rose to the occasion. The nature of the classes caused the shift in girls' attitudes. They did not enjoy public displays of knowledge (labs and presentations) like the boys, and preferred lecture formats. This could in part be due to the extra attention the boys received from their teachers. Interestingly enough, girls did close the gender gap in the later high school years, probably because of their increased confidence and improved attitudes (McGowan, 2009).

Huebner (2009) elaborates on this subject of gender differences in math and sciences confirming that the achievement gap is closed when it comes standardized testing in math and science. The theory that there are biological differences between males and females later in life has proven to be completely false, when it comes to males dominating math and science. Although overall progress has been made females need encouragement to enter fields of math and science, and their reason for being left out may be due to lack of encouragement and the absence of successful female role models in these fields. While test scores have equalized, females tend to rate their mathematical abilities lower than boys do. Girls' perceptions of their abilities are a major obstacle in their career choices. If they have low self efficacy, they are going to shy away from math and sciences even if that is not the reality of the situation. Huebner notes that one way to remedy the problem is to have teachers make a conscious effort to give specific, constructive feedback and positive reinforcement to all students, especially girls. Most studies have concluded that boys do receive more attention than girls in school, so teachers should be more cognizant of this fact and bring more attention and encouragement to girls even if it means being somewhat lopsided in their favor to get girls on a more level surface.

In studies of racial effects on education (specifically African American males), a consistent theme that can be applied generally to the gender issue is that of the importance of role models. It is beneficial for African Americans to have role models of the same race that they can relate to (Holliday, 2007). The same can be true for women. Historically, women have been shut out of the math and science industries, and if they have more females in these fields to model themselves after the trends will shift. The

process begins with educators taking a multicultural attitude, and bringing specific attention to females that have had success in math and science. Even a male teacher can encourage females to pursue these career paths. Then if more females do get more related jobs, especially as educators, the trends will be perpetuated via modeling. My school is an example of how even teachers are segregated by gender in subject areas. Surprisingly, the math department is split, but the science department is entirely male, while the language arts department is predominantly female. When there are more female math and science teachers, they will be able to better encourage girls to follow suit, and simply by being there makes their claims more legitimate.

Another reinforcing factor prohibiting academic success for females is being underrepresented in leadership positions in school administration, doctoral programs, and as university professors. Young (2010) discovered that equal opportunities did not exist in an educational leadership programs. Although it is noted that only one program was studied and admittance does not always lead to graduation, however getting into the program is a necessary step towards the degree. The motivation behind the study was that most of the current research excludes admission to the program and focuses on graduates, but one cannot graduate without successfully entering the program. This is a way that women and certain minorities could be discriminated against at the graduate level. (Young, 2010) These types of discriminatory practices can hold back further advancement for women, and keep them out of the higher levels of education. This could lead to discouraging future generations of women from becoming leaders and marginalizing them. This is another way in which socialization and society has created disparity in the academic success of boys and girls. (Young, 2010)

Women have proven to be of different but equal intelligence to men, but may at times be held back in their progress by other sociological factors. A perfect example of women being kept out of the highest positions is illustrated by Christine Lepkowski (2009). Women now earn fifty eight percent of bachelor's degrees and forty five percent of doctoral degrees, however they only account for twenty three percent of college presidencies and only about fourteen percent at schools with doctoral programs. The reason tends to be different career aspirations between men and women. Most women had goals of mid-level positions in academia, which could be a result of lack of confidence, as a result of socialization or prioritizing family. Women and men were perceived to have different leadership styles, but it was women who were seen as harder working and more effective leaders. In career commitments women leaders had a higher tendency to be less selfish in their reasons for wanting higher level positions such as development of faculty and helping the university, where men tended to list such reasons as financial gain, power, and control. Overall the study concluded that women's lower career goals were not the reason for the gender gap in university leadership. The only viable reason for the disparity that could be proven was that women generally felt constrained to personal variables, such as commitments to family obligations and inability to move geographically. (Lepkowski, 2009)

A different perspective offered by Katty Kay and Claire Shipman acknowledges the struggle of females to maintain their family and still hold down a meaningful, fulfilling career. Recently, women have become a valuable asset in the workplace, because of the strength of their ability to multitask better than men. Women have been

able to demand new terms from their employers to accommodate their lifestyles. (Kay & Shipman, 2009)

CHAPTER V

SUCCESSFUL SINGLE GENDER PROGRAMS

Gurian, Stevens, and Daniels (2009) advocate single gender education in certain circumstances to achieve gender equality. It offers opportunities to enhance learning by specifically catering to the needs of individual students. Teachers can deal with students, as a whole group, since, the authors note, the students are more similar in their learning styles and are progressing at a more similar emotional and cognitive level of development. It can eliminate sexual distractions and increase student engagement, allow boys and girls to feel more comfortable making comments in class, reduce students focus on appearance, increase boys' and girls' willingness to be open to try new things, and provide literacy support for boys. Recently schools have implemented single gender education using a few different approaches: single sex academies, single sex just for core classes, and single sex only for certain grade levels (Gurian, Stevens, & Daniels, 2009).

The authors give several examples of successful single gender schools. A public school in Atlanta created two single sex academies: B.E.S.T. Academy @ Benjamin Carson for boys and the Coretta Scott King Young Women's Leadership Academy for girls, both of which opened in the fall of 2007. The staff of the boys school focus on

improved literacy and the staff of the girls' school focused on increasing the use of technology in the classroom. The results were a 74.2% increase in student achievement. Woodward Avenue Elementary School in Florida, implemented single gender education for certain grades, with planned instruction based on brain research. Parents chose the program, and both boys and girls benefitted, outperforming the coeducational options in the same district, along with producing fewer office referrals. A public middle school in Oklahoma City separated the sexes for math, language arts, and technology. Both sexes increased their overall achievement, and they closed the gender gap from 17% to 9% in all subject areas. Wolfe Middle School in Michigan tried separate classes for boys and girls in the core classes (math, language arts, science, and social studies). Students achieved much higher scores in both language arts and social studies. At Hope High School in Arkansas 12% of the student body failed all four of their high school courses. After implementing single gender classes, no students failed all of their classes, only two students failed two courses, and only eleven failed one. In addition, attendance increased by 15% and behavior referrals declined by 35% (Gurian, Stevens, & Daniels, 2009).

One of the common themes to contribute to the success of these single gender schools is the way they trained the staff on gendered learning differences, and how to incorporate best practices for their students in to their day to day lessons. These schools also created positive mentoring relationships, a new energy for the teachers, and an overall better school culture and climate. Teachers reported more bonding in their classrooms, healthy competition and internal encouragement to reach "team goals." Other teachers describe the students (especially boys) having overall more enjoyment at school, more excitement, and more risk taking for girls. One teacher used a wagon train

analogy to express the differences between boys and girls. The boys liked to explore and scout, while the girls were meticulous in their preparation and planning (Gurian, Stevens, & Daniels, 2009).

CHAPTER VI

DISCUSSION

The liberal perspective is the most logical in regards to the legal questions raised in single gender education. Some argue that segregating on the basis of sex is no different than segregating on the basis of race prior to the *Brown vs. Board of Education*. Single gender education has been proven to be beneficial based on biological evidence, whereas no differences in learning abilities or benefit have been proven for racial segregation. Overall, the current policies allowing single gender education as long as there are coeducational options are fair. People should have as much choice as possible, if the resources are available. Parents and students will have a better educational experience if they choose the program they are most comfortable with.

Mulvey's use of brain imaging is a great tool for demonstrating different gendered reactions in the human brain. However, it is difficult to determine exactly how this relates to their behavior. James adds to the biological differences with information that was consistent with other studies, with a few exceptions. Boys have a higher tolerance for pain, which is disputed by those that would argue that females go through childbirth that involves pain unrivaled by any that males will encounter in their lifetime. She also

claims that boys prefer blue and cool colors, while other studies show that boys have a preference for red over blue. It is also possible that with the brain being stimulated by the different colors could be a socialized reaction due to early exposure. The studies were conducted with infants, but most expectant parents have colors for the nursery selected well before the child is born. She also gives boys credit for having better vision for moving and stationary objects, while some research shows that women see stationary objects better and have superior peripheral vision.

Matt Ridley provides some interesting perspective that is more philosophical than biological in nature. His argument deals with how humans and their brain differences have come by means of evolution. One major problem is his biological position that men are more violent than women naturally, even though they are socialized not to be violent. Although in many circumstances society does not condone male violence, it is much more acceptable relative to females. For example, the military and sports are accepted avenues for violence that are both dominated by men. Overall, Ridley makes large, sweeping generalizations without providing much hard evidence.

Moir and Jessel make a great point in their argument that the womens' rights movement did not allow research to surface about the differences in male and female brains. Every individual has certain talents, as men and women generally do. One is not superior over the other, but differences do exist. They trace back some of the first gender difference studies back to the late 1800's to show the development, of course many of the results are outdated. The differences in tolerance for pain and color preference were two areas that had mixed results. An important point about their research findings are the way the human brain continues to become more different throughout its development. In

some ways this may be accurate, but in certain instances, like language, the gender gap closes as people age. They do attempt to explain this by attributing this phenomenon to the procedures of the school systems.

Gurian and Stevens provide a balanced approach to analyzing single gender education. The most important aspect of their work is the inclusion of practical applications to reinforce the research findings.

Janet Mulvey demonstrates how boys begin school at a disadvantage, and the educational system is set up for them to fail. Other studies show that in addition to being behind academically, boys also exhibit more behavior problems. Christine Skelton also does an adequate job of showing how boys are disadvantaged in school early on compared to girls, in the way that the majority of elementary school teachers are female. This point makes sense, even if it is not done intentionally. Even if those teachers give more attention to the boys, they would have a tendency to teach how they learn the best, generally favoring the girls. Christina Sommers offers a similar perspective. Her results are consistent, in that boys are subject to discrimination despite the widespread attitudes that girls are at a disadvantage. A key component is her comparison of the improvement for boys in the British educational system when confronted with the problem, as opposed to the ignorance of American society. She also uses a few examples of court cases to prove how boys and girls are treated differently in educational settings. Her argument falls short in her position that boys are represented by the Columbine shootings. This is way too broad of a generalization, and it is a stretch to think that the general public shares the same opinion.

Early provided more proof for both biological and social factors in student activity choices. Ponitz is consistent with this research in the study of what educational activities boys and girls have a tendency to choose. It is difficult to determine whether the choices were caused by biological or social forces, even though they made a point that there was no teacher influence on activity choice.

Davis-Kean demonstrated the importance of parental support in the choices that students make. This study, combined with overall attitude shifts in society is evidence that men are not superior in all areas of math and science. One of the issues is that many cultural attitudes are just beginning to change, so the process takes time. It is important to note that several authors on this topic have proven different educational engagement levels depending on a students' grade level and the amount of teacher and parental support.

Holliday makes the case that African American males need African American role models. If this is true, the same can be said of women. However, this needs more research and is highly controversial. Students of all gender and race will achieve their highest potential based on the quality and character of their teacher, not their race or sex. One reason why this phenomenon may be perceived is because of teachers and students sharing a common background and experiences, which leads to better rapport and ability to relate content to experience. However, highly effective teachers will take on the challenge of getting to know their students and integrate themselves in the community to best serve their children. Related to this topic, is women being left out of leadership positions, in the past. This is a trend that is changing, although many feminists would argue that it is not progressing rapidly enough. Overall, vast changes have taken place in

recent years, and women are no longer held out of the highest positions, except by their own family choices and desires. This point has been driven home by Kay and Shipman to the extent that in many circumstances women's professional strengths outweigh that of their male counterparts, that employers are willing to make concessions to accommodate their lifestyle, allowing a more family friendly work environment.

With the successful single gender schools section, it must be noted that this is just a small sample of what is out there. There are many more examples. Also, other factors present in the school may account for some of the success rates. Some examples would be, but are not limited to

: student selection, home environment/family support, uniforms, staff/faculty, leadership/administration, and professional development.

CHAPTER VII

CONCLUSION

The results of the research brought more clarity to the differences in the educational process for both boys and girls. Further investigation of the literature confirmed what I thought to be true. Boys and girls certainly do learn in different ways, whether it is socialized or biological. Based on the research findings, biology has a stronger influence than society, but it is impossible to determine to what extent. I think some people want to apply labels and neatly categorize causes for why people behave the way they do, but the world is not that simple. Socialization begins the second a child is born, if not before birth; therefore we cannot always see what particular force is acting upon a child's behavior. It is impossible to factor out socialization, because interactions are so pervasive and so much socialization occurs when we are not aware of it. Even when attempts are made at gender neutral child rearing, there are too many signals coming from the media and other outside sources. The most powerful source of evidence for the biologists is the study of brain images. That is enough proof that there is at least some biological component to gender differences in learning.

The most startling factor, in regards to stereotypes, is that most of the recent research suggests that it is the boys that are at a disadvantage, at least early on in school. Girls are performing equally or better across all levels of education. As a practical application to this study, teachers should encourage girls more to pursue math and science areas specifically. Beyond that, leadership programs should be implemented in schools to strive for the highest positions across all academic disciplines. By doing this it would help alleviate some of the disparities in certain fields. It would also help secure some of the top positions in each field for women, along with eliminating the gender pay gap. For example, women dominate the field of education, but not as principals and professors. For both boys and girls, it looks like the single gender classes and schools may be a trend that should continue to grow. Different teaching strategies can be used to best suit both sexes. It is important for educators to get to know the learning styles of each of their students anyway, to differentiate instruction and maximize learning. If boys and girls can be taught the same way, it will make the teachers' jobs that much easier to not have to diversify as much by having to focus on just one gender.

In co-educational environments boys should receive some additional support in the language arts. All students should get a variety of assessments and in certain instances assessments by choice. In the past, the field of education was about knowing a particular subject and passing along that information to students. Now, the most important aspect for educators is not necessarily to know the content but how their students learn. Educators need to continue the trends in research to determine the most effective methods to foster learning. With the easy access to information today, we do not need teachers telling information that can be easily retrieved by a variety of media.

Instead what we need are teachers who understand how each child processes that information the best. Teachers have to be on the cutting edge in what the needs of society are, and how to produce students who are critical thinkers and productive citizens of the world.

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