

Author: Becker, Susan A.

Title: *Learning Outcomes of Students in Gender Based Classrooms*

The accompanying research report is submitted to the University of Wisconsin-Stout, Graduate School in partial completion of the requirements for the

Graduate Degree/ Major: MS Family Studies and Human Development

Research Advisor: Susan Wolfgram, Ph.D.

Submission Term/Year: Fall, 2013

Number of Pages: 45

Style Manual Used: American Psychological Association, 6th edition

I understand that this research report must be officially approved by the Graduate School and that an electronic copy of the approved version will be made available through the University Library website

I attest that the research report is my original work (that any copyrightable materials have been used with the permission of the original authors), and as such, it is automatically protected by the laws, rules, and regulations of the U.S. Copyright Office.

My research advisor has approved the content and quality of this paper.

STUDENT:

NAME:

DATE:

ADVISOR: (Committee Chair if MS Plan A or EdS Thesis or Field Project/Problem):

NAME:

DATE:

This section for MS Plan A Thesis or EdS Thesis/Field Project papers only
Committee members (other than your advisor who is listed in the section above)

1. CMTE MEMBER'S NAME:

DATE:

2. CMTE MEMBER'S NAME:

DATE:

3. CMTE MEMBER'S NAME:

DATE:

This section to be completed by the Graduate School

This final research report has been approved by the Graduate School.

Director, Office of Graduate Studies:

DATE:

Becker, Susan A. *Learning Outcomes of Students in Gender-Based Classrooms*

Abstract

Boys and girls are different from one another in many ways including the way they learn. If differences in learning are present, why do teachers continue to teach the same way? Boys, on average, are a year and a half behind girls in reading and writing; they are less committed to school and less likely to go to college (Sommers, 2000). This paper provides a comprehensive literary review examining gender-based instruction. The three areas of gender-based instruction reviewed were: academics; social/behavioral effects; and teachers, students, and parents' perspectives on this educational trend. A complete analysis of peer reviewed articles on gender-based instruction yielded 14 articles dated 2001 through 2011. Implications for educators include: the need for professional development, differentiated instruction techniques, and university level courses on gender differences. Future research to determine the best grade level to begin or end gender-based instruction is needed. This information would guide school districts, teachers and parents in understanding the importance of gender differences of each learner and help develop strategies to achieve student success.

Acknowledgements

I have been very fortunate to have a great deal of support as I have journeyed through the process of graduate school and the writing of this paper. I would like to thank my adviser, Dr. Susan Wolfgram. The three summers spent at UW-Stout with our cohort will always be memorable. Thank you for providing us with an encouraging environment that allowed for the development of great bonds. With the busy schedules we all have, thank you for taking the time to provide support, feedback, and encouragement in this process. I would like to thank the students and staff at Riverview Middle School. The students were willing to try new ways that lessons were presented in my classroom. Their never-ending energy kept me going with a smile. A special thanks to Mr. John Gevens, our school principal. His constant support, positive attitude, and new challenges have continued to make me strive to be the best teacher I can be. He inspired the topic for this paper and provided our staff with the information and current research on brain-based differences and gendered education.

Lastly, thanks to my family. Thank you to my mom and dad for always supporting my dreams. Thank you for the constant reminders to do my homework, and the saying that “the hassle is worth the tassel.” Thank you to my husband and girls. The summer nights I came home with hours of work and papers to write were made easier when dinner was already made. Thank you for understanding how important this dream was to me. I hope that I have been an inspiration to you in your lives that no matter what, dreams do come true!

Table of Contents

	Page
Abstract.....	2
Chapter I: Introduction.....	6
Statement of the Problem.....	11
Purpose of the Study.....	11
Theoretical Framework.....	12
Definition of Terms.....	12
Chapter II: Methodology.....	14
Chapter III: Results.....	15
Teacher and Student Perspectives on Single-gender Classrooms.....	15
Reading and Math Test Grades/Scores.....	20
Student Self-Concept/Self-Esteem.....	22
Chapter IV: Discussion.....	24
Learning Outcomes in a Mixed Classroom versus a Gendered Classroom.....	24
Math and Reading in a Gendered Classroom.....	27
Teacher, Student, and Parent Perspectives of Gendered Classrooms.....	29
Limitations of the Review.....	31
Implications for Future Research.....	32
Implications for Practitioners.....	32
Conclusion.....	33
References	35
Appendix A: Comparison of Studies on Learning Outcomes in Gender Based	

Classrooms..... 38

Chapter I: Introduction

The belief in the United States has been that public education should be available to every child regardless of race, gender, or economic status. However, discrimination in the schools on these very issues has always occurred. As public schools were being established, their purpose was to create good citizens, unite society, prevent crime, and decrease poverty (Thattai, 2001). At first, boys were the only students allowed to attend. Years later, girls were admitted to the schools; however, they were not taught the same subjects as boys. Since the 1950s, policies regarding education have addressed discrimination issues more often than educational issues. Opportunities for boys and girls in schools were unequal for many years until Congresswomen Patsy Mink drafted and introduced Title IX (Thattai, 2001).

Title IX of the Education Amendments of 1972 prohibits sex discrimination in public and private institutions that receive federal financial assistance (Satterfield, 2004). Title IX has been best known for its effect on high school and participation in college sports. Before Title IX, women and girls were treated unequally in most schools. Colleges limited the number of women who could attend, and only a few offered athletic scholarships. Even in high school, girls were discouraged from studying subjects such as math and science. Title IX's goal was to ensure that girls have the same opportunities as boys, in the classroom and on the playing field (Satterfield, 2004).

Feminists believed that Title IX was responsible for bringing girls up to equal footing with boys; others felt that this could be a reason why boys may be falling short (Walters & McNeely, 2010). Today, there are more women than men in U.S. colleges. Fewer than 30,000 women participated in college sports in 1972, but by 2003, over 160,000 college women were competing in sports (Satterfield, 2004). Now that women outnumber men in college and have

equal footing in athletics, research has indicated that boys, not girls are on the weaker side of the educational gap. Boys, on average, are a year and a half behind girls in reading and writing; they are less committed to school and less likely to go to college (Sommers, 2000). Because of those changes, gender differences regarding learning are now becoming a focus in schools today.

We are an individualistic society that values equality. Perceptions of gender inequities in the classroom are now a focus in many schools. In a study by MyHill and Jones (2006), students were asked a basic question: Do you think boys and girls are treated the same by teachers? Their answers revealed that there was a strong belief with both genders that teachers treated boys more negatively than girls. The perception by students that teachers view girls as needing to be treated gently while boys need to be treated more firmly might be seen as one way in which teacher-pupil interaction reproduces social stereotypes (MyHill & Jones, 2006). Boys are perceived as a problem, while girls are increasingly being constructed as the ideal student (MyHill & Jones, 2006).

Boys and girls are different from one another in many ways. They hear differently, play differently, see the world differently, and learn differently (Sax, 2005). Psychologists say those differences relate to how children were raised. Current research supports that boys and girls are distinct because their brains function differently (Kommer, 2006). Boys and girls create very distinct cultures; when they are in the same-gender groups, they act and play differently (Kommer, 2006). Girls are very conversational and cooperative while boys have the tendency to be competitive and physical.

This diversity needs to be researched and understood in relation to our current educational system. If children learn differently, why would our public school system try to teach children the same way? According to Sax (2005), "Good teachers and good parents both

understand that every child is unique” (p.10). Gender based classrooms embrace those differences, give teachers an opportunity to teach to each individual child, and offer a variety of ways for all students to succeed. The original purpose of single-gendered classrooms was to provide opportunities for students—principally those in middle school—to focus more on their academic learning rather than on social concerns and to provide “safe and comfortable” places where females may gain skills and confidence in the areas of mathematics, science and technology (Ferrara, 2009).

Current programming trends in gender-based instruction appear to be at the forefront of many workshops, conferences, and course work. According to Sax (2005), “Many administrators and teachers don’t fully appreciate that girls and boys enter the classroom with different needs, different abilities, and different goals” (p.9). There are distinct advantages to educating boys and girls together appropriately, for in doing so, each gender will begin to see how the other thinks, feels, responds, and reacts. Such understanding is, in itself, a major goal for gender-friendly classrooms (Kommer, 2006). Boys and girls have the ability to learn the same information equally; however, there are differences in the way the lesson needs to be presented by the teacher.

With gender-based instruction, it has been important for educators and parents to understand that it is taking what we already know about how boys and girls learn and using it for the child’s advantage. It would mean engaging girls in math, science, and technology, while promoting reading and writing with “boy friendly” literature in the classroom. Gender based classrooms are not intended to have a different curriculum for boys and girls. It is not giving preference for one gender over another and it is not segregation (Sax, 2005). The advantages and disadvantages of gender based instruction need to be looked at carefully by any district

considering implementing such a program. The program itself may be successfully implemented if teachers are willing to change their teaching strategies to meet the learning needs of boys and girls (Ferrara, 2009). Teachers who are willing to make their classroom a gender friendly space by doing something as simple as arranging the desks in a circle for girls to promote conversation or straight rows for boys to allow for competition, could make a difference in promoting learning. Teachers may help boys to learn by directing their energy toward academic focus and good character (Gurian, 2003). Girls would be given the opportunity to answer questions without the fear of ridicule from boys.

Parents also play an important role in choosing what is best for their child. Open enrollment allows a wider choice of schools. Parents who now want to choose a single-sex (only girls or only boys) education will probably need to pay for it. Many private schools offer this option, while public schools are only introducing or piloting such programs. In general, parents of girls are more likely than parents of boys to prefer single-sex schooling (Jackson & Bisset, 2005). There seems to be a common conception that co-education is good for boys but single-sex schools have advantages for girls (Jackson & Bisset, 2005). If parents choose a single-sex class, school districts should offer training in all aspects of adolescent biological development—especially brain and gender material—to aid children’s gender-based learning experiences (Gurian, 2003).

Children’s feelings about school and themselves as learners have important implications for their emotional well-being and success in school (Valeski & Stipek, 2001). In general, children who like school and are confident in their abilities to succeed should be more engaged and enthusiastic about participating in classroom activities than children who have negative attitudes about school and low perceptions of their academic competencies (Valeski & Stipek,

2001). Several studies have found that as early as first grade, boys have significantly more positive perceptions of competence in math than do girls, and girls have significantly more positive perceptions of competence in reading than boys do (Eccles et al., 1993; Marsh et al., 1991). The areas of math and reading are two main areas that gender-based instruction focuses on.

In a gendered classroom, teachers need to offer students several options to completing assignments. Engagement in school would include allowing students the freedom to choose the way they would like to complete the project portion of a lesson. In a study done by Ferrara (2009), girls tended to enjoy the project-based assignments, while boys tended to enjoy more competitive learning games and charts to show their progress. The days when all fifth graders had to write a story and every child's outline was in the same format will soon become a part of history. Some students may tell the story by using a story board, others may create a play, and some may illustrate a comic book and add the captions into bubbles above the characters heads. Students may also have the chance to use new forms of technology such as the iPad or laptops. Gender based instruction looks specifically at the needs of the learners based on gender differences and creates new ways to teach the same curriculum differently. Education is ever changing, and those working it in must be willing to adapt to the needs of the learners.

It has been the role of educators to create a society that has the courage and the wisdom to cherish and celebrate the innate differences between the sexes, while at the same time enabling equal opportunities for every child (Sax, 2005). One way many schools are trying to distinguish themselves from others is to come up with unique programs for the learner. There is a great deal of competition in the area of school choice. Anything different that would promote individuality

and personal success is seen as a positive. School climate, academic performance, and personal relationships are all important in this process.

Parents and teachers alike have understood that children are unique and have distinct differences in their learning. Gender-based classrooms have become a trend in schools all over the United States and Europe. In observations of gender based classrooms, self-esteem in students has been increasing along with students' achievement. It has been observed that girls enrolled in single-gender classrooms are less obsessed by their clothes, hair, makeup and popularity: they concentrate more on academics (Sax, 2005). As they do well in school, their self-esteem improves. According to Gurian (2003), "The ultimate classroom best fits the nature of each individual; it involves changes in school and classroom structures, functions, and emotive opportunities, how senses and physical activity are used and how parents are advised to help their children learn" (p.3).

Statement of the Problem

Boys and girls do learn differently. Research has pointed to the fact that boys and girls are distinct due to differently functioning brains (Kommer, 2006). There are consistent brain-based sex differences in how girls and boys learn geometry, and how they understand literature (Sax, 2005). Because of these differences, teachers need to understand the best way to educate each learner. It is hoped that further study will result in teachers striving to understand the different learning styles of their students, thus structuring learning environments to meet the needs of all students.

Purpose of the Study

The purpose of the review of literature was to examine the differences between mixed gender and single-gender classrooms, and their effects on the learning outcomes of students. It

was hypothesized that learning outcomes may strengthen in the single-gender classrooms versus the mixed-gender classrooms. With this practice, it was expected that self-confidence in students and excitement for learning would increase in the single-sex classroom. It was also hoped that further study would lead to teachers striving to truly understand the different learning styles of their students, and to structure their learning environment to meet the diverse needs of the pupils.

Theoretical Framework

The theoretical framework used to review the data was the biological theory. Researchers have discovered structural and functional differences in male and female brains and gender-different approaches to learning and living that result primarily from brain distinctions, not environmental forces (Gurian, 2003). Males and females have different amounts of the brain chemicals serotonin and oxytocin. Functional brain differences have shown that females use the left hemisphere of their brain more often while males use the right hemisphere. According to Gurian (2003), “Hormonal and structural brain differences have profound effects on how males and females learn, act and live” (p.15).

Definition of Terms

For the purpose of this literature review, the following terms will hold the cited meanings:

Gender-based classroom. A classroom comprised of students of only one gender, either male or female exclusively (Ferrara, 2009).

Gender differences. The range of characteristic distinguishing between male and female. Gender can also refer to the socially constructed roles, behaviors, activities, and attributes that a particular society considers appropriate. In this study the differences in genders refer to both brain operational differences and learning differences (Gurian, 2003).

Feminization of schools. The continuing under-representation of men in the teaching profession (Carrington & McPhee, 2008).

Learning outcomes. A learning outcome is the particular knowledge, skill, or behavior that a student is expected to exhibit after a period of study. Measuring learning outcomes provides information on what particular knowledge (cognitive), skill or behavior (affective) students have gained after instruction is completed (Sax, 2005).

Mixed-gender classroom. A classroom comprised of students of both genders, male and female students together (Gurian, 2003).

School climate. The overall feelings students have regarding their school: feeling safe, valued, and that their opinions are heard (Valeski & Stipek, 2001).

Self-esteem. Confidence in your own abilities that makes up your character. (Valeski & Stipek, 2001).

Students. A person(s) engaged in learning (Gurian, 2003).

Chapter II: Methodology

This literature review involved selecting studies that addressed single-sex or gender-based classrooms focusing specifically on the learning outcomes of student grades/test scores, participation in class, and self-esteem or self-confidence. Teacher and student perspectives of the classrooms were also reviewed. The main electronic search used was Ebsco-Host. Using the search terms of “single sex classrooms,” yielded 117 results dating from 1992 through 2013. A preliminary review of the literature eliminated studies that dealt with college or university classrooms and instead focused on studies dealing with elementary, middle, or high school. Refining the search further to locate scholarly and peer reviewed articles brought the number down to ten articles. Another search using the key words “teacher’s experience of single sex classrooms,” resulted in three articles—two of which were peer reviewed. The final search using the key terms “middle school single sex classes” and “self-esteem in school single-sex classes,” resulted in three peer-reviewed articles: two of which were chosen to be used in this review. A total of 14 studies were analyzed. A summary of the studies’ methodologies, purposes, grades/test scores, student participation, self-confidence/self-esteem, and teacher or student perspectives are located in Appendix A.

Chapter III: Results

When reviewing the topic of single-gendered classrooms three main areas were addressed: Teacher and student perspectives on the program, academic scores in core subject areas of either reading or math, and students' improvement in self-concept or self-esteem.

Teacher and Student Perspectives on Single-Gender Classrooms

A study by Carrington and McPhee (2008) indicated that same gender matching does not have a significant influence on children's achievement or attitudes. It was suggested that boys' attitudes to school may be more positive when taught by female teachers. It was also claimed that children tend to relate better to teachers of the same gender as themselves and vice versa. However, there was concern that the gender gap in education (boys' underachievement) could stem from the feminization of teaching. Feminization was defined as the continuing under representation of men in the teaching profession. The study found through interviews with 300 children that the teacher's gender was perceived to be largely immaterial.

When it comes to classroom management, over half of the teachers interviewed in the Carrington and McPhee study varied their teaching management style and lesson content to take account of the gender differences in children's preferred learning styles. The authors concluded teachers learned that boys preferred more hands-on activities that involved competition. It was suggested that offering professional development programs for teachers that focus on matters such as educational inequality, especially the gender gap in achievement and male disaffection for school, be continued.

Low test scores were a reason that a middle school in a Northeastern state implemented single-gender classrooms for a three-year period according to a study by Ferrara (2005). Teachers with single-gender classrooms were interviewed based on three areas: teaching

methodology, student assessment, and changes made in their teaching due to single-gender classrooms. Students in the program were also interviewed on their perceptions of single-gendered classrooms.

Ferrara also stated that in assessing their classes, “teachers found that the girls’ classes moved at a much faster rate and attained a higher overall class average than the boys” (p. 1). Teachers also reported that girls found strength and leadership; some teachers thought girls were easier to teach. Teachers did change their teaching style based on the gender in their classroom. To keep boys engaged in the lesson, teachers reported they would call on boys more often to respond to questions or to read a passage. Boys were found to prefer short, quick activities versus a long involved project. Teachers sensed that both boys and girls participated more and were less self-conscious about their work.

Over 90% of the teachers interviewed in the Ferrara study stated they would teach in a single-gendered classroom again. Before the school year begins, teachers opined that it is important to be provided with more material on brain-based research on males and females, differentiated instructional techniques, and specific articles on how both boys and girls learn.

Observations of classrooms and individual interviews with 35 teachers in an all boys middle school located in an urban area were the focus of the study by Keddie and Mills (2009). In that setting, the teachers’ main concerns were that the single sex male environment was reinforcing the feelings of masculinity and power, which resulted in the increasing potential for aggression, violence, misogynistic, and homophobic behavior throughout the school. Teachers reported that in an all male environment, students tend toward fighting much quicker than in a co-ed school. Girls in co-ed schools are often viewed as a calming influence. Male students were viewed as hyper-masculine and overly confident in their feeling of power.

Keddie and Mills also found that the environment in this school was one in which many female teachers felt threatened and devalued. The “boy friendly” classroom management approach was seen to further reinforce gender division that privileged masculinity. To make a change, teachers sought ways to broaden the boys’ way of being. In doing so, teachers had hoped the boys would become more inclusive of difference and diversity. Thus, instead of the focus of sports and competitive events, the school’s service agenda began to include working with organizations dealing with the issues of hardship and poverty.

Creating boys-only classes in co-educational schools in a study by Marino, Mills, and Lingard (2005) has been viewed as a way to control boys’ bad behavior, and attempt to raise their achievement levels. The study included 19 schools with teachers, parents, and students being interviewed. Teachers chose classroom activities that had direct connections with their students’ lives and the community. Teachers acted as role models with emotional literacy, meaning they were sharing their feelings and leading discussions centered on emotions.

A major change in the behavior of boys in this study resulted in a major change in the school. The positive effects of the boys’ single-sex class were measured by staff in terms of the reduction in behavior management problems. Some of the behavior problems exhibited in the school included drug use, assaults, truancy, and bullying. Because the “naughty boys” were no longer modeling poor behavior, the school’s atmosphere changed. The experiences in school by the boys were found to be positive when related to the single-sex classrooms. Teachers did report the need for professional development on the social construction of gender for teaching practices. The authors also found that professional learning communities in schools be committed to gender reform for both boys and girls. This could enhance the social and educational outcomes of all students.

In a study by MyHill and Jones (2006), the perceptions were that teachers treated boys more negatively than girls. Nineteen schools, specifically 144 students, and 44 teachers were interviewed. The basic question asked was: Do you think boys and girls are treated the same? There was a strong belief with both genders that teachers treated boys more negatively than girls. The perception by students that teachers viewed girls as needing to be treated more gently, while boys need to be treated more firmly, might be seen as one way in which teacher-pupil interaction reproduces social stereotypes. Some of the children viewed the teachers' attitudes towards gender with regard to their academic expectations of boys and girls, expecting boys to not work as hard as girls. Boys were perceived as a problem, while girls were increasingly being constructed as the ideal student. The authors also found that some teachers may have lower expectations of boys than of girls, and perceptions by teachers may have translated into what we now refer to as "the underachieving boy."

A study by Spielhagen (2011) explored the perspectives of middle school teachers who were hired to teach single-sex classes. This particular school district was being reorganized because it failed to meet the No Child Left Behind (No Child Left Behind [NCLB], 2002) benchmarks. Interviews and surveys were completed with 43 teachers who were asked to teach single-gender classes. A survey was taken at the beginning and the end of the same school year. Teachers reported that boys and girls do process information differently. It was shown that girls learn better in a distraction free environment; however, some teachers felt that the girls showed more moodiness with their emotions as compared to a co-ed classroom. Boys were found to be more aggressive, immature, and displayed behavior problems. However, 94% of the teachers surveyed agreed that the single-sex classroom should remain an option for students. Teachers

also reported that professional development on learning differences between boys and girls needed to be offered by a school district.

Teacher-student interactions were the focus of the study by Swinson and Harrop in 2009. Teachers from five different primary schools allowed their classrooms to be observed. The main purpose of this study was to determine the categories of teacher verbal behavior and include the pattern and quantity of off-task behavior of boys and girls. The categories for observation included approval or disapproval for academic behavior and approval or disapproval for social behavior.

The data indicated that teachers were directing significantly more approval for academic behavior and more disapproval for social behavior to the boys than to the girls. The results added support to the view that teachers give more attention to boys than to girls. Teachers are aware that girls are now tending to outperform boys academically. Teachers want to encourage boys by using approval for their academic choices. Results also showed that girls displayed more on-task behavior than boys. Approximately 66% of the girls were never off task throughout the observation sessions, compared to 50% of the boys. Not only were the boys more off task than the girls, but also once off task, they were more likely than the girls to remain that way. This may explain more teacher focus to the boys in the form of redirecting their off-task behavior.

Wills (2007) conducted a two-year observation of four different classrooms along with teacher and student surveys to determine the behavior of teachers and students in single-gendered classes. Teachers were aware that by Grade 6, boys had frequently ceased to engage with school, resulting in the classes being more difficult to teach. Students in coeducational schools may exhibit adversarial, binary, and oppositional relationships that commonly occur

between the genders and may have the potential to negatively influence learning outcomes (Thorne, 1993). However, the results at the focus of this study argued that single-gendered classes have made a positive difference in learning outcomes.

After two years of observations by Wills, classroom teachers and some parents found the single-gendered classrooms to be beneficial in positive social outcomes for the children. Parents also noted that their daughters achieved more and were more confident. School records indicated a drop in behavior issues for the boys. A notable difference in the single-gendered classrooms observed was related to increased open dialogue and a more positive classroom relationship between the teachers and the students.

Reading and Math Test Grades/ Scores

A study conducted by Che, Wiegert, and Threlkeld (2012), focused on problem-solving strategies used by middle school boys and girls in a math classroom. The students in that school were in co-ed classes; however, the math classes were all single-sex. The impacts of single-sex middle school education on math learning and math achievement determined that this type of classroom facilitates a deeper connection to, conceptual understanding of, and an interest in math.

Che et al. looked at girls and boys understanding of math problem solving on different test formats. It was shown that by the end of middle school, boys showed an advantage over girls in the area of problem solving. Most of the boys used problem solving strategies that were unconventional, and it appeared that they were more willing to make a mistake versus the girls, who liked to follow rules and thus struggled to solve open-ended problems. This should lead teachers to look beyond performance and encourage further understanding of how girls and boys approach mathematical tasks.

In a study conducted by Cherney and Campbell (2011), a math test comprised of geometry, trigonometry, and algebra was given to 209 male students and 339 female students. The students were from both coeducational and single-sex schools. Students also completed a questionnaire on math or science career choice and a survey that assessed their perceptions of their math ability and their experiences and expectations of success in math and science. The results revealed that girls in coeducational schools outperformed boys in coeducational schools and boys in single-sex schools outperformed girls in single-sex schools. For both genders, math performance in single-sex schools was significantly higher than in coeducational schools.

Cherney and Campbell also explored the role single-sex schools have in adolescents' occupational choices. Students who wanted to pursue a career in math or science had higher math scores on the test than those wanting to pursue other careers. It was shown that girls in single-sex schools had higher intrinsic motivation and higher self-esteem than males or girls in coeducational schools. Those motivational factors have all shown to be important in girl's self-efficacy and self-concept of mathematical ability, which in turn may shape occupational choices.

Reading achievement gaps were studied by analyzing ACT reading test data of eleventh grade students in a Midwestern state for three years in a study by Conrad and Curry in 2010. The data presented a pattern of reading achievement for boys and girls with or without an individual educational plan in place. From a composite standing, girls outperformed boys in all areas of reading. The measurement of annual yearly progress by the federal government indicated that one of the groups not reaching attainable levels of cognitive and academic performance were boys. The study found that active engagement in the reading lesson, which included emotions as well as problem-solving abilities, need to be used in order to improve learning for boys.

In a study by Linver and Davis-Kean (2005), math grades of 1651 students from seventh through twelfth grade were examined. The study not only looked at grades but also grades by gender, self-concept of ability, parental influences, and teacher expectations. Grades were collected from school records every semester in sixth, seventh, ninth, tenth, and eleventh grades. The study found that school grades dropped for every group between middle school and high school. In the sixth and seventh grades, the girl's grades were the highest, but then declined over the years.

Linver and Davis-Kean also found that mothers' expectations were important for adolescents' performance in school: the higher the expectations, the higher the grades. For girls, in addition to higher maternal expectations, higher teachers' expectations were also related to higher grades. Boys' grades were not as sensitive to their own self-concept of ability or interest in math as compared to girls' grades. Having interest in a particular subject may lead to doing better in the subject; however, this only related to girls. It was found that gender differences in self-concept, not in school grades, were likely to be the strongest influence on career pursuits.

Student Self-Concept/Self-Esteem

A survey given to teachers regarding their students' academic competence, cognitive abilities and socio-emotional characteristics, were the focus of a study by Todor (2010). A group of 136 teachers selected randomly from 21 public schools took the 50-question survey.

When comparing the academic abilities of boys and girls, the results indicated that in the teachers' opinions, boys—even if they do not perform better in learning as compared to girls—had strength in math and science, whereas girls' strengths were literature and artistic disciplines. Boys had better problem-solving capacities and thought more strategically. Girls, in turn,

worked more tidily and had better linguistic abilities. The majority of the teachers surveyed agreed that girls worked harder than boys.

Children's perceptions about school regarding their academic performance, teacher-student relationships, and their general attitudes toward school were the focus of a study by Valeski and Stipek (2001). The authors found that overall; children who like school and are confident in their abilities to succeed are more engaged and enthusiastic about participating in classroom activities than children who have negative attitudes about school and low perceptions of their academic competencies.

In a study by Ramey, et al. (1998), using surveys, observations, and test score data, the authors determined that girls tend to feel they have a more positive relationship with their teacher than boys. Children who were confident about their academic skills were more willing to work hard, take initiative, and persist at academic tasks. Higher perceptions of academic competence were associated with more positive attitudes toward school. According to the study, teachers who want to improve their students' academic learning clearly need to be concerned about all aspects of a child's experience in school.

Chapter IV: Discussion

Single-gender schools were once commonplace in the United States (Ferrara, 2009). The idea was to base education on the strengths of the learner, which would allow students the ability to grow academically and gain confidence. According to Ferrara, “The original purpose of single-gender classrooms was to provide opportunities for students—principally those in middle school—to focus on their academic learning rather than on social concerns, and to provide ‘safe and comfortable’ places where females may gain skills and confidence in the areas of mathematics, science and technology” (p.7).

Single-gender classroom declined in popularity during the 1980s and 1990s, but the idea of separating students in learning by gender is now becoming a way for schools to bring more students through their doors. This paper has attempted to inform readers on the advantages and disadvantages of single-gender classrooms in schools. The articles reviewed were limited to elementary, middle, and/or high schools in the United States. As a result of this author’s findings, three themes emerged: learning outcomes in a mixed classroom versus a gendered classroom; math and reading in a gendered classroom; and teacher, student, and parent perspectives of gendered classrooms. The paper concludes with a discussion about the limitations of the review, implications for future research, and implications for practitioners.

Learning Outcomes in a Mixed Classroom versus a Gendered Classroom

Student’s feelings about school and themselves as learners are connected with their emotional well-being and success in school. Numerous studies have indicated that children that like school and are confident in their abilities in the classroom, participate more and are more engaged in the lessons presented by the teacher. In a study by Valeski and Stipek (2001), children’s perceptions of competence and social connectedness were examined. It was

hypothesized that the more confident children felt with academics, the more positive their attitude toward school and their teacher. It was then predicted that the more positive their attitude was, the more engaged they would be in the lessons or activities' being presented.

A new measure was used in the Valeski & Stipek, (2001) study called Feelings About School or FAS. Questions such as "Do you like school? How do you feel when you are in school? How does your teacher feel about you? Does your teacher care about you?" were asked. The academic performance of the younger children studied indicated that they tend to have positive perceptions of their competence and their experiences in school. Girls were found to have reported more positive feelings about their relationship with their teachers than boys. Factor analyses showed that children as young as kindergarten are able to differentiate between their perceptions of competence in math and reading, their relationships with teachers, and their general attitudes toward school. At this young age, students are beginning to associate academics with their feelings about school.

It is likely that children, who enjoy school, work harder than children who dislike school, and therefore do better academically, which in turn affects how they feel about school in general. The findings in the Valeski and Stipek study suggest that poor school achievement may have a negative effect on motivation, which could then undermine learning and future academic performance. It was found that self-confidence in ability does predict a higher level of motivation, which suggests that students who are confident about their academic work are more willing to work hard, take initiative, and persist at academic tasks. The results show that building students self-confidence and self-esteem are the keys to a successful academic career. Single-gender classroom teachers understand this idea and take great steps in helping students gain the confidence they need to do well in school. According to Sax (2005), a leading child

psychologist and author on gender differences, girls in a single-gender classroom will ask more questions, do more hands on work with equipment, take more leadership roles, talk more, and learn more. Boys in a single-gender classroom will be less distracted and focus more on learning, practice social skills more comfortably, and participate more often and more freely. All of those practices lead to students having an increase in confidence and academic ability, which will lead to higher aspirations and enjoyment of school and future success.

Studies have shown that boys prefer math, science, and technology, while girls' interests tend toward literature and the arts (Todor, 2010). The interests become more and more evident as students advance in grade levels. Teachers' stereotypical beliefs and expectations may influence the students' behavior toward those subjects. Teachers interact more frequently with boys in the classroom giving them more attention to correct misbehavior or giving them feedback for their academic success, whereas the interaction with girls is complementary to their hard work and perseverance. It is during this critical time in a students' educational journey that separating the sexes may be very beneficial.

Also in the Todor study, it was shown that girls might end up falling behind in the subjects of math and science, while boys' grades begin to decline in literature. The teacher's goal in a single-gender classroom is to understand the learner and their motivations in order to help increase excitement for and enjoyment of the subject area. By the time boys reach middle school, they have stopped reading for pleasure. Separating the boys from the girls in certain subject areas such as reading, math, or science, would give teachers the ability to select specific reading texts or projects that would interest each separate learner group. Boys may then become interested in reading purely due to the book being of interest to them. Girls in math and science may feel comfortable raising their hands and asking questions without ridicule from boys. When

this is allowed to happen, self-concept and self-esteem in academics increases along with the enjoyment of school.

Cherney and Campbell (2011) compared students in a single-sex classroom to students in a co-educational classroom. The results indicated that girls in a single-sex school had higher achievement motive and higher self-esteem than those in a coeducational school. In math tests, students in a single-sex school setting outperformed those from a coeducational setting. It was predicted that based on the findings, single-sex schools may be beneficial for girls' self-esteem, intrinsic motivation, and achievement motive. The largest determinate of a girl's confidence in co-educational middle or high school is how she feels about her looks. In a single-gendered classroom, girls are less obsessed by their physical looks and popularity and are able to concentrate more on their academics. In this study, it was interesting to note that boys' self-esteem did not increase or decrease based on their classroom setting.

Math and Reading in a Gendered Classroom

Children are natural problem solvers. Each gender may go about solving the problem differently yet come up with the same answer. According to Geist and King (2008), using the approach of focusing on the process of math and problem solving rather than solely on the correct answer will allow diversity of thinking and the flowering of all sorts of mathematical behavior in boys and girls. By recognizing that boys and girls have unique differences in the way they approach math, they are still able to achieve similar levels. The essential element in gendered learning is planning a curriculum that is developmentally appropriate, individualized, and gender responsive.

One of the increasingly important educational environments pertaining to gender and math learning has been the single-gender math classroom in schools. In such classrooms, boys

may be allowed the freedom of movement that they need to learn, and they may be more willing to make mistakes and try new approaches in problem solving without girls in the classroom. By having a single-gender math-learning environment for some students, it may facilitate a deeper connection to and a conceptual understanding and interest in math (Che, Wiegert & Threlkeld, 2011). “According to the U.S. Department of Education, girls have nearly caught up to boys in math and science scores and now take more math and science than boys do. But at the top end of the scales (highest math class and physics), boys still dominate” (Gurian, 2003. p.94).

Expectations play an important role with grades in school. In a study by Linver and Davis- Kean (2005), expectations of people important in the adolescent’s life (such as mother and teacher) play a role in school grades. Regardless of math grades and attitudes, higher expectations were important for girls’ higher math grades in some groups. Boys’ math grades were not tied to their own self-concept of ability or their interest in math as compared to girls’ grades.

The emerging pattern of girls as readers of literature and boys as readers of academic content has tended to support arguments from within and beyond the U.S. regarding the feminine nature of reading (Conrad-Curry, 2011). Girls have surpassed boys in reading achievement since the documentation of standardized tests; however, boys score higher in the math portions. Research from international test results comparing boys’ and girls’ reading scores indicates that in 31 countries, female students performed better than their male counterparts in reading, resulting in boys being labeled “the new disadvantaged” (Farris, Werderich, Nelson & Fuhler, 2009). For some, it could be said that the underachievement of boys is a result from the feminization of teaching or, in other words, the lack of male role models in the classrooms. However, in a study by Carrington and McPhee (2008), it was found that the teacher’s gender

was perceived to be largely immaterial. There was no evidence to suggest that boys' academic engagement was any different in classes taught by men or women.

The process of selecting books for boys to engage and keep their interest in is important to understand. When surveyed about the act of reading, many boys will say it is a feminine activity (Farris, Werderich, Nelson & Fuhler, 2009). As boys go through school, it becomes more and more difficult to motivate them to read. Many of the English or Language Arts teachers are female and may select books based on discussion or literary circle opportunities versus nonfiction content, which is preferred by boys. A survey conducted by the State Library of North Carolina showed that boys top reading subject preferences were animals, science, sports, literature, and biography. In a single-gender classroom, boys would be directed to those subject areas to choose a book. Their responses in book discussions may increase as they find the stories applicable to life. Boys will learn better if hands-on activities are part of a literary lesson that integrates the arts, geography, social studies, and math (Gurian, 2003). Girls, on the other hand, enjoy the literature circle of discussion time without the ridicule from boys.

Teacher, Student, and Parent Perspectives of Gendered Classrooms

Since research has indicated that boys and girls learn differently, it is important to differentiate instruction. It has also been shown that middle level learning (middle school) is a critical time when students are in transition. Students are changing physically, emotionally, and intellectually faster than at any other time in their lives. It is also a time when students need to experience success and increase their self-esteem. Feminists have argued that male and female students need equal access to knowledge such as science, math, and technology. They have also argued for a variety of curriculum models that strive for excellence. This began as an outgrowth of the single-gendered classroom (Ferrara, 2005).

From the teacher perspective on single-gendered classrooms, Wills (2007) found that girls' classes moved at a much faster rate and attained a higher overall grade point average than the boys. The girls enjoyed project-based assignments and writing stories. The teachers would also allow the girls more time to talk and socialize to get their answers to questions better developed. Teachers did view girls as working harder, having better motivation, being more cooperative in the classroom, and being better organized about homework (MyHill & Jones, 2006).

Teachers found their job was made easier as a result of the gender homogeneity. The classes were more work-focused and cooperative. Students' math scores were improving along with literacy comprehension, vocabulary, and spelling. Ferrara (2005) found that students in a single-gender classroom had better attendance and fewer behavior referrals. In the study, 19 out of the 20 teachers involved in the single-gender classroom pilot program stated they would teach in the same type of classroom again. This view was found common throughout the studies. However, in an all-male school environment, especially at the high school level, administrators need to ensure that female teachers do not feel threatened and devalued in their classrooms (Keddie & Mills, 2009).

Student's perspectives on the single-gender classroom were similar in most of the studies reviewed. Students felt more comfortable in a single-gender setting. They were better able to focus, there was less arguing between students in the class, and the literature books were more suited to the interests of each group. An interesting point found in several of the studies regarding coeducational classrooms was that teachers were discovered to be talking more to boys than to girls. It could be that teachers were more likely to see boys behaving badly and girls' behaving well, regardless of what was actually happening in the classroom.

The common perception among students found in a study by MyHill and Jones (2006) was that in coeducational settings, teachers treat boys more negatively than girls. Boys suggested that teachers expected more from girls and felt themselves to be undervalued by teachers. Boys felt they were being labeled as lazy, badly behaved, and immature just because they were boys. This study also found that students are developing an awareness of different expectations of girls and boys. The perception of students that teachers view girls as needing to be treated gently while boys need to be treated more firmly, might be seen as one way in which teacher-pupil interaction is reproducing social stereotypes. Finding more negative comments being directed at boys than girls was irrelevant based on the gender of the teacher.

In a study by Wills (2007), classroom teachers and some parents acknowledged that single-gendered classes were having beneficial social outcomes for their students/children. The parents were supportive of the classroom gender separation. Many mentioned the achievements of their daughters during the year. Parents also noticed more confidence in the girls. Boys' parents noticed that they were more comfortable with school, were more interested in learning, and really enjoyed going to school. They also noticed an increase in their boys' enjoyment of reading and writing.

Limitations of the Review

There are a few limitations to this literary review. Many of the studies included interviews with teachers or students. The interviews, which were taped and then transcribed, may be limited in their accuracy. Errors could occur in the transcription process. Other interviews were conducted with groups of teachers or groups of students. This could possibly lead to one individual dominating the interview while others sat back and either nodded in agreement or disagreement with the question. If one individual takes over an interview, others

may feel their opinion doesn't matter or they may not want to disagree with what is being said for fear of having to explain their answers. Surveys were also distributed in many of the studies. The surveys were done strictly on a volunteer basis, thus not all participants' views, opinions, or experiences would have been recorded. This could lead to bias in a study if the researchers did not use a scientific method to randomize the recipients who completed the surveys. In one study, the sample size included only 18 teachers, which could be a limitation as a result of a small sample size.

Implications for Future Research

Through the legislation of No Child Left Behind, schools continue attempt to close the achievement gap, especially for those considered disadvantaged, ensuring that all students are successful in the core academic areas. Single-gendered classrooms are one way to encourage student success and help increase their self-esteem. Further research needs to be done on which grade levels and which subject areas would benefit most from gender separation. According to a presentation from Dr. Leonard Sax, single-sex education is most beneficial for girls in Grades 6-12 and most beneficial for boys in Grades K-6. It should also be reviewed as to when separating the genders no longer has a positive effect on academics or self-esteem. This could be measured through classroom surveys on climate and self-confidence along with grade reports.

Implications for Practitioners

One of the most important areas that need to be addressed with single-gendered classrooms is the provision of teacher professional development. Teachers will need to be provided with material on brain-based research on boys and girls, differentiated instructional techniques, and specific books or articles on how boys and girls learn. A school district should allow staff that pilot single-sex classroom programs to visit and talk with administrators and

teachers in their local areas in order to learn what is working and what needs to be changed. At the university level, teacher candidates should be taking courses on gender differences from both the biological and the educational aspect. There should also be the development of professional learning communities in schools committed to gender reform for both boys and girls.

Conclusion

Boys and girls do learn differently. Parents and teachers alike know that children are unique and have distinct differences. Single-gender classrooms may help all students succeed in the educational setting. These classrooms aid closing learning gaps by enabling students to learn in an atmosphere that is specifically geared for them to succeed in. Whether the differences in gender are biological or ecological, research shows the differences are present. It is up to teachers to truly understand these differences to help improve academic performance, personal relationships, and climates in school.

Teaching is vital to learning, and learning should be a lifelong journey. Having teachers understand their role in shaping the minds and attitudes of students in their classrooms is essential in starting the lifelong learning process. To create a life-long learner, teachers need to instill a love of learning and self-confidence, which leads to a desire to learn more. In this researcher's observations of gender-based classrooms, self-esteem, behavior, grades, confidence, enjoyment of school, and excitement for learning were all were increasing. Student's grades, attendance, reading scores, and the overall climate of the classroom all improved. Student self-confidence and enjoyment of school also increased. All of these improvements were recorded by various testing data such as the Standardized Test for the Assessment of Reading (STAR) reading and math assessment data and school climate surveys. It is my hope that teachers strive

to truly understand the different learning styles of their students and structure learning environments to meet these diverse needs.

References

- Carrington, B., & McPhee, A. (2008). Boys' "underachievement" and the feminization of teaching. *Journal of Education for Teaching, 34*(2), 109-120.
- Che, M., Wiegert, E., & Threlkeld, K. (2012). Problem solving strategies of girls and boys in single-sex mathematics classrooms. *Educational Studies in Mathematics, 79*(2), 311-326.
- Cherney, I., & Campbell, K., (2011). A league of their own: Do single-sex schools increase girls' participation in the physical sciences? *Sex Roles, 65*(9-10), 712-724.
- Conrad-Curry, D., (2010/2011). A four-year study of ACT reading results: Achievement trends among eleventh-grade boys and girls in a midwestern state. *Journal of Education, 191*(3), 27-37.
- Eccles, J., Wigfield, A., Harold, R., & Blumenfeld, P. (1993). Age and gender differences in children's achievement self-perceptions during the elementary school years. *Child Development, 64*, 830-847.
- Farris, P., & Werderich, D., Nelson, P., & Fuhler, C., (2009). Male call: Fifth-grade boys' reading preferences. *The Reading Teacher, 63*(3), 180-188.
- Ferrara, M. (2005). *The single-gender middle school classroom: A close-up look at gender differences in learning*. Paper presented at the AARE 2005 Conference in Parramatta, Australia, November 29, 2005.
- Foster, V., Kimmel, M., & Skelton, C., (2001). "What about the boys?" An overview of the debates. In W. Marino & B. Meyenn (Eds.), *What about the boys? Issues of masculinity in schools* (pp. 1-27). Buckingham, PA: Open University Press.
- Geist E., & King, M. (2008). Different, not better: Gender differences in mathematics learning and achievement. *Journal of Instructional Psychology, 35*(1), 43-52.

- Gurian, M. (2001). *Boys and girls learn differently! A guide for teachers and parents*. San Francisco: Jossey-Bass.
- Jackson, C., & Bisset, M. (2005). Gender and school choice: Factors influencing parents when choosing single-sex or co-educational independent schools for their children. *Cambridge Journal of Education*, 35(2), 195-211.
- Keddie, A., & Mills, M. (2009). Disrupting masculinized spaces: Teachers working for gender justice. *Research Papers in Education*, 24(1), 29-43.
- Kommer, D. (2006). Boys and girls together. A case for creating gender friendly middle school classrooms. *Clearing House: A Journal of Educational Strategic, Issue and Ideas*, 7(6), 247-251.
- Linver, M., & Davis-Kean, P. (2005). The slippery slope: What predicts math grades in middle and high school? *New Directions for Child and Adolescent Development*, 110, 49-64.
- Marsh, H., Craven, R., & Debus, R. (1991). Self-concepts of young children 5 to 8 years of age: Measurement and multidimensional structure. *Journal of Education Psychology*, 83, 377-392.
- Martino, W., Mills, M., & Lingard, B. (2005). Interrogating single-sex classes as a strategy for addressing boys' educational and social needs. *Oxford Review of Education*, 31(2), 237-254.
- MyHill, D., & Jones, S. (2006). "She doesn't shout at no girls": Pupils' perceptions of gender equity in the classroom. *Cambridge Journal of Education*, 36(1), 99-113.
- No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).

- Satterfield, K. (2004). Separated at school. *Time for Kids*, 9(21), 4-5.
- Sax, L. (2005). *Why gender matters: What parents and teachers need to know about the emerging science of sex differences*. New York: Doubleday.
- Sommers, C. H. (2000). The war against boys: How misguided feminism is harming our young men. *Atlantic Monthly*, 285(5), 59-74.
- Spielhagen, F. (2011). "It all depends": Middle school teachers evaluate single-sex classes. *RMLE Online*, 34(7), 1-12.
- Swinson, J., & Harrop, A. (2009). Teacher talk directed to boys and girls and its relationship to their behavior. *Educational Studies*, 35(5), 515-524.
- Thattai, D. (2001). A history of public education in the United States. Retrieved October, 17(2006), 2001-11.
- Thorne, B. (1993). *Gender play: Girls and boys in school*. Milton Keynes: Open University Press.
- Todor, I. (2010). Gender in education: Teacher's perspective. *The International Journal of Interdisciplinary Social Sciences*, 4(12), 45-52.
- Valeski, T., & Stipek, D. (2001). Young children's feeling about school. *Child Development*, 72(4), 1198-1213.
- Walters, J., & McNeely, C.L. (2010). Recasting Title IX: Addressing gender equity in the science, technology, engineering and mathematics professoriate. *Review of Policy Research*, 27(3), 317-332.
- Wills, R. (2007). A new and different space in the primary school: Single-gendered classes in coeducational schools. *Educational Studies*, 3(2), 129-143.

Appendix A: Comparison of Studies on Learning Outcomes in Gender-Based Classrooms

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student viewpoint
Carrington & McPhee, 2008	Qualitative study ~Teachers 25 men, 26 women. ~Teachers were selected from 24 different schools in England. ~One to one interviews with 300 pupils were also included	~Interviews with teachers to assess their responses and examine their perceptions of the benefits of same-gender matching in schools. ~Questions based on teaching style, classroom management, response rate based on gender of the pupil were some of the questions asked. ~Students asked on teacher pupil gender matching	Not reviewed in this study	~Male pupils are thought to derive greater benefits from active and experiential learning activities than females. ~Competitive activities work best for boys' participation in class. ~To encourage reading boys prefer non-fiction, girls prefer fiction	~Boys' attitudes in schools may be more positive when taught by women teachers.	~The gender gap in education (boys' underachievement) could stem from the feminization of teaching – feminization would mean the continuing under representation of men in the teaching profession. ~Boys require more teacher talk time. ~Over half of the teachers interviewed vary their teaching management style by gender
Che Wiegert, & Threlkeld, 2011	Qualitative study ~162 students (61 girls and 58 boys) ~Grades 6-8 participated in writing responses to a mathematical task	~To examine the impacts of single-sex middle-grade education on math learning, math achievement, student self-concept and perspectives of being educated in a charter school.	~The study looked at girls' and boys' understanding of math problem solving on different test formats. ~ At the end of middle school, boys tend to show an advantage over girls in the area of problem solving	~Single-gender mathematics learning environments may, for some students, facilitate a deeper connection to, conceptual understanding of, and interest in math.	Not discussed	~We should look beyond performance and further the understanding of how girls and boys approach mathematical tasks

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student Viewpoint
Cherney & Campbell, 2011	Qualitative study ~209 male and 339 female adolescents from coeducational and single sex schools participated ~Students took a math test and also completed a math and science career choice questionnaire with a survey	~The purpose was to gain information about how high school students think about themselves, their mathematics and science experiences, and their future	~Girls in coed schools out performed boys in coed schools and boys in single sex schools out performed girls in single sex schools. ~Girls math performance was significantly higher in single sex classes	~Boys in coed schools and girls in single sex schools had higher intrinsic motivation	~Girls in single sex schools boasted higher self-esteem than girls in coed schools. ~ There were no differences in boys self-esteem in either school	~Girls in single sex school did not choose to go into a STEM career area more than girls from a coed schools
Conrad-Curry, 2010	Quantitative study ~Research to analyze ACT reading test data obtained from the Midwestern State's State Board of Education. ~The study sample was a subset of 11 th grade students from one Midwestern state for the years 2007-2010.	~To examine the reading achievement gap of boys and girls by analyzing four years of ACT reading scores. ~Question asked – Is there a relationship between gender, race and ACT reading sub scores	~Girls' outperformed boys on the literature/arts reading subtest; however, boys tended to outscore girls on the social studies/science reading subtest. ~The measurement of annual yearly progress by the federal government indicated that one of the groups not reaching attainable levels of cognitive and academic performance is boys	~The conventional source of academic reading and writing instruction comes through a feminine lens. ~Teachers tend to focus on the analysis of literary texts. ~This is a passive type of participation with the absence of active text engagement	~Lagging achievement of males in high school is reflecting in college enrollments. ~Male college enrollment has shrunk from 1970-2001 from 58% to 44%. ~Boys' dissatisfaction with school could mean that boys are leaving school before graduating at a higher rate than girls do.	~Gender, male or female, impacts how teachers teach and how learners learn. ~We must recognize that underachieving boys face challenges that are both similar to and different from the challenges faced by girls.

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student viewpoint
Ferrara, 2005	<p>Qualitative study</p> <p>~A middle school in a Northeastern state.</p> <p>~ 21 out of 28 teachers responded to a survey and interview.</p> <p>~ The interview questions centered on three areas: teaching methodology, student assessment and changes made in their teaching.</p> <p>~Students were also interviewed on their perceptions of the single-gendered classrooms</p>	<p>~Because of low test scores in the four core areas, the school district implemented single-gender classrooms as a three year experiment.</p> <p>~The district was also able to determine that teachers need to be provided with awareness of gender differences in learning in the beginning of the school year to prepare for the upcoming year.</p>	<p>~The first year showed no difference in test scores with single-gendered classrooms.</p> <p>~In single-gendered classes boys enjoyed taking tests and girls enjoyed projects and writing stories and all enjoyed hands on activities.</p>	<p>~In a single-gender classroom girls moved through the curriculum at a much faster rate than boys and attained a higher class average.</p> <p>~Boys needed to be called on more to keep them engaged in the lesson.</p> <p>~Boys enjoyed three quick activities instead of long involved projects.</p> <p>~Overall boys and girls participated more.</p> <p>~Males prefer competitive learning, females prefer cooperative learning.</p> <p>~Students in single-gendered classrooms had improved attendance, behavioral referrals decreased</p>	<p>~In a single-gender classroom girls found strength and leadership.</p> <p>~ Both boys and girls were less self-conscious about their work.</p>	<p>~Teacher viewpoint – girls were easier to teach.</p> <p>~Some teachers would teach using shorter bursts of information for boys while allowing girls to socialize more to get their answers better developed.</p> <p>~19 out of 21 teachers would teach in a single-gendered classroom again</p>

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student viewpoint
Keddie & Mills, 2009	Qualitative study ~Observations of classrooms and individual interviews with 35 teachers. ~They taught at a single sex Catholic middle school in an urban area	~The single sex environment at this school is seen by teachers as reinforcing restrictive relations of masculinity and power, this could result in an increase in aggression, violence and homophobic behaviors. ~ Teachers would hope to broaden the boys' way of being to be more inclusive of difference and diversity	Not discussed	~Girls could act as a calming influence in school. ~ In an all – male school the behavior can tend toward fighting much quicker than it would in a co-ed school.	~Male students are hyper-masculine and overly confident in their feeling of power	~Female teachers felt threatened and devalued

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student viewpoint
Linver & Davis-Kean, 2005	Quantitative study ~1651 adolescents studied from grades 7 th – 12 th . ~Females were 54% of the study and 92% of the adolescents were predominantly white from working/middle class families	~To examine math grades of students from 7 th to 12 th grade. ~This study answers the three questions – what are the average school grades for students by gender, will interest and self-concept of ability help more than the influence of mothers' and teachers expectations and is this different for girls vs. boys.	~School grades declined for every group between middle school and high school. ~Adolescent females in the honors classes had the highest grades. ~Higher mothers expectations results in students achieving higher grades	Not discussed	~Adolescents' interest in math was assessed by asking, how much do you like doing math, how good at math are you?	~Teacher's expectations influenced higher grades
Martino, Mills & Lingard, 2005	Qualitative study ~Teacher, parents and students were interviewed. ~19 schools were involved. ~Students were ages 10 - 12	~Creating a boys-only class in a co-educational primary school as a way to control boys' behavior and attempt to raise their achievement levels. ~ Also studied were influences of boys' and girls' experiences in school.	Not Discussed	~A major change in the behavior of boys resulted from the single – sex classroom, which resulted in a major change in the school. ~Boys enjoyed the single sex class because it was more active. ~Boys' did well when specific steps were given for the project	~Girls' liked the single-sex arrangement because the negative influences of boys were removed	~Teachers were acting as role models with emotional literacy. ~Teachers chose activities that had direct connections with students' lives and the community. ~Teachers must be careful not to reinforce gender stereotypes.

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student viewpoint
MyHill & Jones, 2006	Qualitative study ~Students were interviewed in boy-girl pairs. ~ 15 elementary schools, 3 middle schools and 1 high school were included. 44 teachers and 144 students were interviewed	~Students were asked for their perceptions. ~The main question asked do teachers treat boys and girls the same.	~It could be said that some teachers have lower expectations of boys' than of girls'	~Girls are motivated in class while boys are likely to be a problem and need to be kept in check	~Girls confidence can increase because they get positive reactions from teachers, while boys' get negative reactions.	~A strong perception by students that teachers treat boys more negatively than girls. ~Teachers were also viewed as treating boys' less favorably than girls.
Spielhagen, 2011	Quantitative and Qualitative study ~Completed in three phases ~43 teachers involved ~Phase 1 – interview with teacher who teach single sex classes ~Phase 2- collect quantitative data from survey at beginning of the year ~Phase 3 – collect survey at the end of the year	~Explored the perspectives of middle school teachers who were hired to teach single sex classes. ~This school was reorganized and restructured because it had continued to fail to meet the No Child Left Behind benchmarks.	Not discussed	~Girls were noisier in an all- girl's classroom and showed more moodiness. ~Boys were more immature and not better behaved	~Girls were found to learn better in a distraction free environment	~Teachers agree boys and girls process information differently. ~ 94% of the teachers surveyed agreed that the single sex classrooms should remain an option

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student viewpoint
Swinson & Harrop, 2009	Qualitative study ~18 teachers from 5 different primary schools allowed their classrooms to be observed. ~Teacher pupil interactions were observed for 45 minutes during each session.	~To determine the categories of teacher verbal behavior and include the pattern and quantity of off task behavior of boys and girls. ~Categories for observation: approval or disapproval for academic behavior, approval or disapproval for social behavior.	~Teachers are aware that girls are now tending to outperform boys academically so they may have wanted to encourage boys using approval for academic choices.	~In a mixed sex classroom boys receive more attention from than teacher than girls	~Girls received more praise than boys. ~ Greater use of criticism to individual boys. ~Teachers directed more approval for academic and more disapproval for social behavior to boys	~Boys received more overall verbal communication than the girls. ~ Boys were also less on-task overall than girls.
Todor, 2010	Qualitative study ~Questionnaire survey of 136 teachers from 21 public schools. ~Ages of the participants were between 30 – 56 years. ~ Of the total number of participants only 13 were male.	~The items of the survey included questions in the categories of academic abilities, cognitive abilities and socio-emotional characteristics	~Boys perform better in math and science as compared to girls. ~Girls have better linguistic abilities. ~Boys are good at problem solving and strategic thinking	~Boys have better management of time. ~Girls work harder. ~ Girls pay equal attention to all subjects whereas boys choose the classes that they have interest in to excel in.	~Girls are more sensitive to other's needs, whereas boys were shown to be more aggressive	~Studies have shown that teachers' explicit and implicit beliefs impact the students' evaluation regarding their academic abilities, personal competence, self-worth and influence their attitudes, performance and motivation in learning.

Study authors	Methods	Purposes	Grades/Test scores	Student participation in class	Student self-confidence/self-esteem	Teacher/Student viewpoint
Valeski & Stipek, 2001	Qualitative study ~225 Kindergartners (119 girls, 106 boys) and 127 first graders (56 girls, 71 boys) from 138 different schools. ~Also 170 teachers with 1 – 40 years of experience. ~Classroom observation and questionnaires	~The study focused on children's perceptions of competence and social connectedness	~Children who are confident about their academic skills are more willing to work hard, take initiative and persist at academic tasks	~Children who like school and are confident in their abilities to succeed are more engaged and enthusiastic about participating in classroom activities	~As early as first grade, boys have more positive perceptions of competence in math and girls have more positive perceptions in reading.	~Girls reported more positive feelings about their relationships with teachers than boys'.
Wills, 2007	Qualitative study ~Observation once a week for over two years in a four different classrooms. ~ 76 boys and 112 girls. ~ Teacher and student surveys, and tape recordings	~The behavior of teachers and children in single-gendered classes was the principal focus of the study	~At times the oppositional relationships that occur between the genders, as seen in coeducational classrooms, could negatively influence learning outcomes. ~Math scores, literacy comprehension, vocabulary and spelling scores all went up	~By 6 th grade, boys had frequently ceased to engage with school, resulting in classes being difficult to teach. ~After observations, there was a marked improvement in boys behavior in single-gendered classes	~Single-gendered classes were acknowledged by teachers and parents as having a beneficial social outcome for the children	~A teachers job is to encourage children to develop to their fullest capacity