

Same-sex Schooling versus Co-educational Schooling
and Their Effects on Achievement, Assessment and Gender Bias

by

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ABSTRACT

This paper examines the effects of same-sex schooling and co-educational schooling on elements of students' achievement, socialization such as self-esteem and peer relationships, differences in students' and teachers' perceptions based on gender and issues related to race and socioeconomic status. It also examines performance on assessments and how this relates to the two types of schooling and what, if any, relationships there are to race and gender. The findings of the research reviewed have mixed results. Some studies pointed to differences in gender and stated the benefits of same-sex schooling for girls. Other studies saw benefits for both boys and girls, although they still focused more on the benefits for girls. The relationship of achievement and teachers' assessment was the topic of a large majority of the studies. Teachers' and students' perceptions of the two types of schooling were also explored. Teachers' bias related to gender equity were often based on stereotypical norms related to expectations of girls and boys. A major weakness in most of the studies was the lack of socioeconomic and racial diversity of the students involved in the study.

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CHAPTER ONE: INTRODUCTION

Introduction

This paper examines the effects of same-sex schooling and co-educational schooling on elements of students' achievement, socialization such as self-esteem and peer relationships, differences in students' and teachers' perceptions based on gender and issues related to race and socioeconomic status. It also examines performance on assessments and how this relates to the two types of schooling and what, if any, relationships there are to race and gender. Strengths and weaknesses of the current literature available about this topic are explored as well as the possible differences between boys and girls, related to educational needs.

Same-Sex Schooling

Same-sex schooling is defined as schools attended by exclusively boys or exclusively girls. These schools appear to have many benefits for boys and girls because the different learning styles between boys and girls could be more specifically addressed in a same-sex environment. Additionally, same-sex classrooms would include only boys or only girls but within a co-educational school. Gurian stated that boys need more physical activity than girls in order to learn (Gurian & Stevens, 2005). What seems to be the biggest indicator of the benefit of same-sex education for girls is the opportunity to be in an educational environment where they would not be competing with boys for the teacher's attention. Orenstein described the "hidden curriculum" where girls are treated differently from boys by their teachers (2000). The "hidden curriculum" is the

unintended education teachers give to students through their actions as compared to their specific verbal instruction. This form of implicit instruction tends to favor boys' education over girls'.

The socialization of boys and girls can be seen as a positive or a negative effect of same-sex education. One might argue that because boys and girls co-exist and need to interact with each other in society it is important for them to be schooled together to learn how to socialize and work together effectively. One question regarding this issue is, "does same-sex schooling have the potential to give boys and girls the skills that they need to socialize in society?" Another question is, "will a same-sex environment eliminate the negative aspects of the socialization that occurs when boys and girls are together in a co-educational environment?" Negatives that can be seen include the competition that tends to cause girls to be almost invisible in the classroom when teachers favor the male students and also the sexual and dating behaviors that occur with boys and girls. If the co-educational school setting is truly providing the foundation for social skills and the education needed for the student to be a productive member of society, then same-sex schools may put students at a disadvantage because they are not given the opportunity to socialize and learn with the opposite sex. However, if same-sex schools are able to give boys and girls educational opportunities that provide them with strong life skills and an education that prepares them for their work in their communities then the social skills that they need to interact with the opposite sex may already be in place and could be

practiced and strengthened through extra-curricular activities that involved both boys and girls.

Co-educational Schooling

Co-educational schooling is defined as schools where both boys and girls attend together. The positive aspects of co-educational schooling appear to be the opportunity for students to have an educational foundation where they are in classrooms that are more representative of the communities that they need to interact effectively in society. Do co-educational schools provide more educational and extra-curricular opportunities than single-sex schools? Because boys and girls need to learn skills to positively interact with each other, do co-educational environments give them more opportunities to do this? Schools with a focus on life skills that teach students how to interact respectfully with each other, as well as teachers whose main goal is to ensure that he/she is having a positive impact on all of the students' learning could have a positive educational effect on students. This could be created by giving every student an opportunity to participate and contribute to individual learning as well as to the learning of all the students in the classroom. Co-educational school environments could be beneficial to boys that dominate the classroom environment when they are taught that everyone's voice matters through the practice of girls being given an opportunity to share ideas as often as boys. The literature reviewed showed that boys tend to dominate the classroom more often than girls because girls have a tendency to be more passive than boys (Orenstein, 2000). There is a significant amount of literature that discussed the differences in achievement between boys

and girls. Sax (2005) suggested that boys do better on timed tests than girls and that the “moderate” stress that a timed test produces in boys actually improves their performance while the stress of the time constraint actually lowers girls’ test scores (p. 92). He pointed out that girls, on average, do not do as well as boys on standardized tests such as the Standardized Achievement Test (SAT) when comparing their test score to their grades in school. Girls who have straight A’s do not always get a high score on the SAT, whereas boys whose highest grade in their classroom work is usually a B, score much higher on the SAT (Sax, 2005, p. 92). Sax’s research is one of many that reviewed differences in boys’ and girls’ achievement as well as educational environments and how these appear to affect boys and girls differently.

Rationale

This paper will examine the differences in boys and girls and will critique these differences by relating them to the benefits and disadvantages of same-sex schooling and co-educational schooling. It will also examine whether or not same-sex schooling provides more opportunities for girls to excel academically. Same-sex schooling is defined as schools attended by exclusively boys or exclusively girls. Co-educational schooling is defined as schools where both boys and girls attend together. Socialization is defined as the teaching of societal norms that define masculine and feminine gender roles. Stereotypical masculine roles are often seen as dominant, a connection to physical activity such as sports, non-academically orientated and less emotive. Stereotypically feminine roles are often seen as more passive, less physically active, more academic and

emotive. The word “sex” will be used to describe the biological difference between boys and girls and the word “gender” to refer to the social characteristics of boys and girls (Salomone, 2003). An additional question that this paper will explore is what are the effects of same-sex schooling and co-educational schooling on boys and girls? The research reviewed has shown that there are differences in the ways that boys and girls learn as well as differences regarding self-esteem. These differences may affect the ability of boys and girls to learn effectively. Self-esteem is a topic that has focused on girls and the ways in which it affects their academic performance as well as their overall well-being and success in life. Peer relationships are connected to self-esteem and identity because of the relative importance of peers to adolescent gender identity. This paper will attempt to examine these issues as they relate to boys and how they are affected educationally and emotionally by gender issues that are related to the way that boys and girls are socialized in our society.

Delpit stated that Latino girls have difficulty speaking out or showing strong academic skills in a mixed-gender setting. “They will often defer to boys, displaying their knowledge only when in the company of other girls” (Delpit, 2006, p. 170). This appears to be a case where a same-sex classroom or school could benefit these Latino girls.

The research articles explored will include the United States as well as other countries such as Wales, Hong Kong, Australia, Norway, New Zealand, Scotland, Belgium, Canada, Germany and England in order to explore the questions posed more thoroughly.

Limitations

A weakness of this paper is that there seems to be more research and literature on same-sex education as it is related to the schooling of girls. The majority of the articles studied focused on white, middle- to upper-class students. There was very little socioeconomic or racial diversity in the research studied.

Statement of Purpose

This paper examines the research literature concerning the co-educational schooling and same-sex schooling experiences of children and youth. The focus is on how these two types of schools affect gender differences, achievement, peer relationships, self-esteem, assessment as well as students' and teachers' perceptions of these related to race, gender and socioeconomic status.

Summary

The findings of the research reviewed include mixed results. Some studies pointed to differences in gender and stated the benefits of same-sex schooling for girls. Other studies saw benefits for both boys and girls, although they still focused more on the benefits for girls. The relationship of achievement and teachers' assessment was the topic of a large majority of the studies. Teachers' and students' perceptions of the two types of schooling were also explored. Teachers' bias related to gender equity were part of the articles that discussed gender beliefs and perceptions. A major weakness in most of the studies was the lack of socioeconomic and racial diversity of the students involved in the study.

CHAPTER TWO: HISTORICAL BACKGROUND

Introduction

The history of schooling in the United States shows the changes that have been made related to the education of boys and girls. The biological evidence suggests that there are innate differences between the ways that boys and girls see, hear and feel.

Much has changed in education since colonial times; however, because the foundation of public school education was based on such inequalities, it seems that there are still more changes needed to transform schools into ones that nourish and develop the minds of all children and give them the skills to become interdependent members of their communities.

Schooling

A review of the history of schooling shows that girls, in colonial times, were taught only basic reading, writing, and arithmetic (Spring, p.38, 2008). Spring described women as being considered “the weaker sex” even though they had roles as teachers within their families and then later on in “dame schools” (one of the original types of colonial schools). This led to careers as educators and began their “dominant role as teachers in public schools in the late nineteenth and twentieth centuries” (2008, p.38). Although this shift in the work of women started them on the road to more equality and rights, women today continue to make less money than men for the same amount of work. It can be argued that these historical and current facts affect the schooling of boys and girls and continue to put girls at a disadvantage to boys, because of the unequal

treatment between men and women. It seems important to look at the history of schooling and the treatment of boys and girls to see how this affects the self-esteem of both genders and how this relates to different types of schools that they attend. Spring's description of the child as subordinate to his/her parents in colonial times appears to be an important factor when looking at how children see themselves (2008, p. 38).

Private schools in the United States have dominated same-sex schooling. Even with the changes that were made in the 1960's and 1970's with *Brown v. Board of Education* and Title IX, many same-sex private schools remained open. In 1955 the U.S. Supreme Court desegregated schools through the decision made during the segregation suit known as *Brown v. Board of Education of Topeka*. The Supreme Court decided that "separate educational facilities are inherently unequal" (Spring, 2008, p. 424).

The National Organization for Women (NOW) was organized in 1966. The legal actions of NOW and other women's organizations, brought about the passage of Title IX of the 1972 Higher Education Act (Spring, 2008, p. 446). Title IX legislation stated, "No person in the United States shall, on the basis of sex, be excluded from participation in, or denied benefits of, or be subjected to discrimination under any educational program or activity receiving federal assistance" (<http://www.american.edu/sadker/titleix.htm>). It was the first federal law that prohibited sex discrimination against students and employees of educational institutions.

Despite these legal changes in the United States, The National Coalition of Girls' Schools has 94 private day and boarding schools and the International Coalition of Boys' Schools has 114 schools in the United States, several of them connected to churches. Even though these schools attempted to gain a more racially and economically diverse student body, most of them are composed of an elite, white and privileged group of students, particularly those at independent schools. Many of these schools help students gain access to influential colleges and universities (Salomone, 2003, p. 7).

The shift from same-sex schools to co-educational schools had a large impact on public schools, especially those that were part of the large city school systems that had many same-sex schools. In New York City, in 1947, there were 14 same-sex junior high schools and 11 vocational schools in the borough of Manhattan. In 1970 there were two same-sex junior high schools and eight vocational schools. By the middle of the 1980's there was only one school in each of the five boroughs that was run through the Pregnant and Parenting Teens Program, though these schools were open to teen fathers as well. However, they were and are now schools that pregnant girls choose to attend (Salomone, 2003, p. 7).

Same-sex schooling for girls has been seen as deficient when compared to same-sex schooling for boys. Salomone states that "efforts to establish programs for inner-city minority boys have met the strongest resistance, unable to shake the legacy of white male privilege historically associated with all-boys' schools, and even worse, the memories of racially segregated schools" (2003, p.

8). Three urban school districts have been steadfast about the positive impact of same-sex schooling for adolescent girls. In 1996 the Young Women's Leadership School was opened in New York City despite civil rights groups making legal threats against it. The opening of this school was a huge step forward for single-sex education and was a turning point for single-sex schooling to become part of educational reform. Two all-girls' public schools that were founded in the 1840's, the Philadelphia High School for Girls and Baltimore's Western High School, survived multiple changes in legislation, demographic and social changes that have occurred in the more than 150 years of their existence. The students of these schools have transitioned from a white merchant class to a racially and ethnically diverse population that is increasingly poor. They were founded at a time period when girls were not included in esteemed all-boys' schools that later became co-educational schools (Salomone, p. 8). The Young Women's Leadership School, the Philadelphia High School for Girls and Baltimore's Western High School accepted students from a variety of different backgrounds and abilities.

Research into biological differences explored possible scientific explanations for differences between boys and girls. These included anatomic differences in the brain, eye and ear.

Biological Differences

Sax examined research based on the biological differences between boys and girls (Sax, 2005, p. 11). In 1964 Herbert Lansdell reported that there were anatomic sex differences in the way female and male brains are organized. The

left hemisphere of the brain is the area of language functions in men. Research on people who have had a stroke provided further support for the idea that male and female brains are differently organized. Functions were more “compartmentalized in male brains and more “globally distributed” in female brains (Sax, 2005, p. 12). If a man’s left hemisphere was damaged he lost a large portion of his language abilities. If his right hemisphere was damaged his language ability was not affected. Women, however, were different in that they used both hemispheres of their brain for language. Men who suffered a stroke involving the left hemisphere of their brain, on the average, showed a drop in their verbal IQ of about 20 percent. Men who suffered a stroke that affected the right hemisphere showed “virtually” no drop in their verbal IQ (Sax, 2005, p. 12). Women who suffered a stroke that affected the left hemisphere of their brain showed a drop in their verbal IQ of about nine percent. Women who suffered a stroke in the right hemisphere of their brains showed a similar drop in verbal IQ of about 11 percent (Sax, 2005, p. 12).

In 2004 a team of 14 neuroscientists from the University of California, the University of Michigan and Stanford University published their findings showing a different “expression of proteins derived from the X chromosome and the Y chromosome in human female and male brains” (Sax, 2005, p. 14). In men’s brains many areas were “rich” in proteins that were coded directly by the Y chromosome. These proteins did not exist in women’s brain tissue. Women’s brain tissue was “rich” in X chromosome-coded material. These particular

“transcripts” of the X chromosome did not exist in men’s brain tissue (2005, 14-15).

Pediatric audiologists Barbara Cone-Wesson, Glendy Ramirez and Yvonne Sininger have done studies based on the hearing of newborn babies (Sax, 2005, p. 17). When babies, children, or adults heard a small sound their brains had an immediate reaction that was called an “acoustic brain response” (Sax, 2005, p. 17). Cone-Wesson and her colleagues studied the acoustic brain response of more than 60 newborn girls and boys. A 1,500 Hz (hertz) tone is the range of sound that is critical for understanding speech. When a 1,500 Hz tone was played to the right ear, they found that the average baby girl had an acoustic brain response of about 80% greater than the response of the average baby boy (2005, p.17).

A professor at Louisiana State University named Jane Cassidy used a technique known as “transient evoked otoacoustic emissions”. All mammals hear because small “hairs” on cells in our inner ear are sensitive to sound. These “haircells” move when they detect a sound. This movement “generates a subtle acoustic response, which is the transient evoked otoacoustic emission” (Sax, 2005, p. 17). Professor Cassidy studied 350 newborn baby girls and boys. She found that the girls’ hearing was significantly more sensitive than the boys’, especially in the 1,000-to 4,000 Hz range (significant range for speech discrimination). Sax suggested that based on the research of hearing differences between boys and girls, girls learned better in a classroom that is quieter and free of “extraneous noise” (2005, p.18).

Sax described the sex differences in the anatomy of the eye (2005, p.19). The part of the eye that converts light into a neurological signal is the retina. The retina has layers, including one layer that contains the photoreceptors called the rods and cones. Rods are sensitive to black and white and are color-blind. Cones are sensitive to color. The rods and cones send signals to the next layer called ganglion cells. Magnocellular ganglion cells are very large and parvocellular are small. These are most often referred to as M and P ganglion cells. M cells are wired to the rods in the retina and receive little information from the cones. Sax described them as simple motion detectors that gather information about movement and direction (Sax, 2005, p. 19-20). M cells are located across the retina and can track objects anywhere in the visual field. P cells are connected to all three varieties of cones and have less input from the rods. P cells are located in and around the center of the field of vision. P cells gather information about texture and color (2005, p. 19-20).

Anatomist Edwin Lephart and his associates found that the male retina is significantly thicker than the female retina (Sax, 2005, p. 21). The male retina has mostly the larger, thicker M cells and the female retina has mainly the smaller, thinner P ganglion cells. Sax claimed the differences between male and female retina's give an explanation for why girls tend to prefer a textured doll as compared to boys' preference for a moving truck. The P cells that girls have more of an abundance of detect color and texture best and answer the question, "what is it?" (2005, p. 22). The M cells that boys have more of an abundance of detect location, direction and speed and answer the questions, "where is it now?"

Where is it going? And how fast is it moving?” (Sax, 2005, p. 22). Sax explained that researchers who have studied the pictures drawn by young children found that girls typically draw pictures of people, pets, flowers or trees that are arranged on the page “more or less symmetrically, facing the viewer” (2005, p. 24). Girls usually use many colors in their pictures (ten or more) and are more likely to use colors such as red, green, beige and brown. Boys “typically draw *action*: a rocket hitting its target, an alien about to eat somebody, a car about to hit another car” (2005, p. 24). Boys typically use six colors at the most and these colors are often shades of blue, gray, silver, and black. Boys also are more likely to draw from a “third-person perspective, looking at the action from a remote vantage point rather than from a perspective facing the vehicle or the animal actually doing the action” (2005, p.24). Sax claimed that these differences have nothing to do with the socialization of boys and girls and are specifically linked to the differences between male and female retinas.

More differences related to gender were found in the following report. This report, which addresses specifically girls, appears to be the most recent of its kind and there was no similar report found related to boys.

The American Association of University Women Report

The American Association of University Women (AAUW) published a report called *How Schools Shortchange Girls* in 1992. The report was prepared by the Wellesley College Center for Research on Women. The report documents the ways in which the public school system “short changes girls” (AAUW, 1992, p. 3). The research is based on the accomplishments, behaviors, and needs of

girls from preschool through high school. The report includes recommendations for improving education for both boys and girls. These recommendations support a “vision of schools and students as integral parts of wider communities” (p. 3). Research done in this report showed that issues related to sex and gender equality continued to be issues in which many educators needed a better understanding. The research also suggested that in-service training on equity issues could increase awareness as well as provide specific tools that could bring about a more equitable educational environment. The report also stressed that attention to and “vigorous enforcement of Title IX must be a top priority for everyone concerned with the quality of public education in the United States” (p. 8).

AAUW report’s section on gender roles had a footnote that stated that the research done was primarily on White middle class girls and boys. It also explained that “the effects of race, ethnicity, and socioeconomic class on gender development have not been studied adequately” (AAUW, 1992, p.10). This was a weakness of this report.

Children aged six to seven usually had concrete ideas about gender that were based on what was role-modeled to them in the world around them. Both girls and boys tried to conform to gender-stereotyped roles and preferred to play in groups of the same sex (AAUW, 1992, p.10). Children aged eight to ten were more open to occupational roles for men and women that were not gender stereotyped, although they continued to prefer to spend their time with friends of the same sex. In elementary school, girls were equally likely to report “feelings of

sadness, self-derogation, and physical complaints” (p. 10). On the other hand, boys reported having problems with behavior and relationships with other children. Young boys reported feelings of anger and hostility more often than young girls (p. 10).

During early adolescence, the research revealed that boys and girls show more adherences to gender roles. Adolescence is a transition period for both boys and girls; however, research demonstrated that it can be a difficult time for girls. The experience of moving from a “young girl” to a “young woman” involves trying to fit into a culture that idealizes as well as exploits young women’s sexuality, while at the same time “assigning them roles that are clearly less valued than male roles” (AAUW, 1992, p. 11). The start of menstruation in girls provides a specific transition point for changes in their bodies. On the average, girls were ending their pubescent period at the same time that boys were beginning it (p. 11). Girls who matured early tended to be heavier than their classmates, had more eating problems than those that matured at a more average age (12.8 in the United States) or those who matured late, and were at greater risk for depression (p. 11).

The AAUW report also claimed that it was more important to adolescent girls that they were liked by those of the same sex than it was to boys. Adolescent girls tended to have friendships with other girls that had a greater degree of intimacy than the friendships that boys had with each other (AAUW, 1992, p. 11). Girls who were in sixth and seventh grades “rate being popular and well-liked as more important than being perceived as competent or independent”

(AAUW, 1992, p. 11). Boys were more likely to rank independence and competence as important. Large-scale empirical studies, public opinion polls, and in-depth clinical studies that followed individual girls through school all showed that girls' self-esteem and self-confidence lowered as they transition from childhood to early adolescence. This is based predominantly on White middle-class girls (p. 12).

The AAUW commissioned a nationwide survey in 1990 and found that "on average 69 percent of elementary school boys and 60 percent of elementary school girls reported that they were 'happy the way I am'; among high school students the percentages were 46 percent for boys and only 29 percent for girls" (AAUW, 1992, p. 12). This same survey showed clear differences in the self-esteem among girls of different racial and ethnic groups. "Among elementary school girls, 55 percent of White girls, 65 percent of Black girls, and 68 percent of Hispanic girls reported being 'happy as I am'. But in high school, agreement with the statement came from only 22 percent of the White girls and 30 percent of the Hispanic girls, compared to 58 percent of the Black girls" (AAUW, 1992, p. 12-13). However, the Black girls surveyed did not have high levels of self-esteem in academic areas related to school (p. 13).

Research showed it was beneficial to girls' self-esteem when they transitioned from a school encompassing kindergarten through eighth grade to a traditional high school. Having two transitions, the first from elementary to middle school or junior high school and, second, to high school was more damaging to girls' self-esteem (AAUW, 1992, p. 13).

The AAUW report suggested many intervention strategies to encourage girls to succeed in math and science. Special math and science programs have increased girls' interest in these academic programs. "Three years of follow-up of an annual four-week summer program on math/science and sports for groups of 'average' minority junior-high girls found the girls increased their math and science course-taking plans an average of 40 percent and are actually taking the courses" (AAUW, 1992, p. 29). This section of the report on gender differences in achievement and participation concluded with the statements that girls and boys should be given equal attention when it came to teaching them reading and writing skills, girls needed to be encouraged to read more nonfiction and boys should be encouraged to read more fiction. There is less of a gender gap in math achievement as compared to science achievement. Teaching methods that help eliminate the gender gaps in math and science exist. For example, a structure that allowed all students to answer questions, ask questions, and receive answers as opposed to one that emphasized "target" students or those who call out answers loudest, increased the opportunities for girls as well as their interest (p. 30-32). The AAUW report claimed that girls responded positively to math and science programs where they worked cooperatively in a "relaxed atmosphere" and "hands-on" experiences were more successful for girls than lectures (p. 32). These experiences must give girls the time and opportunities they need to reach the same level of academic performance that teachers tend to expect from boys (p. 32).

In regards to race, sex, socioeconomic status (SES), and academic achievement the report stated that there was little published recent data that allowed an examination of student achievement by sex, race or ethnicity, and SES. Also, there is little information on sex differences and gender issues in important programs funded by the U.S. Department of Education (AAUW, 1992, p. 33). The report suggested that more research was needed in this area and the sample sizes must be larger, particularly for Asians and American Indians, in order to more accurately reflect those groups. Within-group diversity related to sex and SES must be accounted for in future research.

Summary

The history of schooling in the United States began with separation of the genders. Over time, and as a result of legislation that forced education to be more inclusive, many same-sex schools became co-educational facilities. There is scientific evidence that explains biological differences between the sexes, including the different ways boys and girls access areas of the brain, as well as vision and hearing. The AAUW report showed that there were significant differences in the ways boys and girls experienced schooling. Changes need to be made in order to progress toward gender, race and class equity.

CHAPTER THREE: CRITICAL REVIEW OF THE LITERATURE

Introduction

Chapter one explained the rationale of this paper as examining the effects of same-sex schooling and co-educational schooling on elements of students' achievement, socialization such as self-esteem and peer relationships, differences in students' and teachers' perceptions based on gender and issues related to race and socioeconomic status. Chapter two focused on the historical background of education and same-sex versus co-educational schooling and the beginnings of both in the United States, as well as biological differences. The AAUW report showed that there were significant differences in the ways boys and girls experienced schooling. Chapter three reviews the available research to examine the questions introduced in Chapter one.

Chapter three is divided into subheadings on the topic of the articles summarized: Gender, Racial and Class Equity and Achievement; Gender Identity; Student's Perceptions of Learning in Co-educational versus Same-Sex Classes; Co-educational and Same-sex Classrooms and Achievement; Gender Differences in Math Achievement in Elementary School; and Same-sex versus Co-educational Classrooms.

Gender, Racial and Class Equity and Achievement

In a mixed qualitative study, Myhill and Jones (2006) examined whether or not teachers treat boys and girls the same. They investigated 40 teachers and 144 pupils taken from 36 classes with four students drawn from each class. The students were taken from the first, fourth, fifth, eighth, ninth, and tenth grades.

The identified students represented both a high- and low-achieving student population. Six grade schools, three middle schools and one high school were included in the study from both urban and rural areas. The sample was predominantly White and middle class although some students represented the lower socioeconomic groups and were affected by rural isolation.

Using a semi-structured interview schedule, teacher and pupil interviews examined perceptions of learning, behavior, and achievement in relation to gender. Pupils were interviewed in mixed gender and same-ability pairs to encourage exploratory discussion.

This study found that students perceived teachers as treating boys more negatively than girls: 62 percent of comments on this issue stated that boys were unfavorably treated by teachers while only eight percent thought girls were treated unfavorably by teachers and 30 percent thought both genders were treated the same. A majority of the negative comments were made by boys, with 61 percent identifying teachers' behavior towards them as negative. 39 percent of responses of negative treatment of boys were from girls. The underachieving girl is least likely to see girls as being favored over boys and a small number of girls feel that boys receive more favorable treatment. The expectation that boys are treated unfairly increases with age and this is believed to be related to greater awareness of gender identity among older students.

The strengths of this article lie within the researcher's identified critical paradigm as guiding their research with the intention to create change at the end of the programs. They acknowledged potential sources of confusion in the

research regarding the interview process. One weakness was that the gender of the teachers was undisclosed. The researchers report attempting to eliminate biased stereotyped responses during mixed-gender interviews but did nothing to measure this and to account for these biases actually being present. The researchers did not identify the measures used to identify low-achieving versus high-achieving boys and girls or compare the genders when discussing what is high-achieving versus low-achieving.

In a comparison ethnographic, qualitative study, Herr and Arms (2004) explored an experiment with same-sex classrooms in a California public middle school and how the results of a program focused on achievement affected the education of the students. The researchers examined how students and teachers reacted to the same-sex classes, whether the same-sex classes created essential learning environments, if these classes spoke to issues related to gender equity, and how the teachers' beliefs about gender affected their teaching.

SSA had a student body of 1,100 girls and boys in grades six through eight. 95 percent of these were minority students: 44 percent Latino (many who were English Language Learners), 28 percent African-American, 22 percent Asian-American (mostly of Cambodian descent), and six percent White. About 80 percent of these students came from lower-socioeconomic-status households and received free or reduced priced lunches. All students in the district were qualified to apply to the school. However, the majority of students enrolled came from the surrounding neighborhood.

The data for this study came from teacher interviews, classroom observations, and student interviews done in a two-year period. Eighteen core teachers were interviewed and 36 classrooms were observed. Six teachers from each grade level (sixth, seventh, and eighth) made up the 18 interviewed. Nine were English/history core teachers and nine were math/science core teachers. Most of these teachers were White, although there were two Latino and four Asian-American teachers.

The students were mainly interviewed in the classroom. The usual number of students in each class was 35. More than half of these were interviewed in each class. The students were interviewed in pairs because the researchers thought they this would make them more comfortable. The students interviewed were Latino, Asian-American, African-American, and Anglo-American.

The teachers were asked questions that related to their professional experience and staff development on the various reforms implemented at the school and their impact on curriculum and instruction. Students were asked questions related to their experiences in the same-sex classrooms compared to their previous co-educational classroom experiences.

The researchers used the “constant comparative method of returning to the data again and again” and found that the classroom curriculum and teaching were focused on standardized test preparation at SSA (Herr & Arms, 2004, p. 539). The result of this was classrooms where the teaching styles were teacher-centered and focused on curriculum drawn from *Test Best*, a Stanford 9 test preparation curriculum and then in the second year, a packaged reading program

called *Soar to Success* that was for students in grades 3-8 who were reading considerably below their grade level. The researchers noted that even though the Stanford 9 tests took only a few days in the spring, the emphasis on raising students' scores permeated the classroom lessons throughout the year. Therefore, the teachers spent much less time on creative and more hands-on types of classroom lessons.

The Stanford 9 tests emphasized English and math skills, so often other subjects were ignored or given very little time (Herr & Arms, 2004, p. 541.) Teachers were concerned that by using prepackaged test-preparation curriculum they were "giving up" their own lesson planning and struggled with the "realization that they were losing the purposes and joy of teaching" (Herr & Arms, 2004, p. 542.) Both teachers and students recognized and were upset by the shift in the classroom environment and had the perception that test preparation had become more important than other teaching styles.

The interactions with students were more "scripted" and classes were focused on learning skills and memorization. Behavioral issues arose that seemed based on student boredom. The behavior in the all-boys classes was seen by the teachers as worse than the all-girls classes. Boys were seen as students who could not control themselves, but rather needed to be controlled. "Teachers anticipated student resistance and simplified course content, demanding little from the students and reducing knowledge to a list of facts to memorize for tests" (Herr & Arms, 2004, p. 545.) Teachers found themselves in an environment where they had very little time or space to be creative or nurture

the learning of their students. Teachers tended to take on a more authoritarian approach with the boys, but then had a more relaxed teaching approach with the girls.

The girls' classrooms were rarely seen as unmanageable. The researchers did not see any evidence of new and creative teaching that might encourage leadership skills in girls. Based on the good behavior of the girls (listened in class, finished their assignments, and handed in homework), teachers thought that the SSA was benefiting the girls.

The study found that based on raised test scores the SSA was successful, however as far as being a school where stereotypical gender roles are changed based on student and teacher interactions, SSA has a lot of work to do. Herr and Arms (2004) stated that the implications of their study were that SSA was a school that had multiple reforms that were based on standardization and student and teacher accountability. These reforms did not take into account gender and racial beliefs that guide the efficacy of teacher instruction and student learning. They claimed that poor, urban adolescents were at higher risk for dropping out of school and these underrepresented students "need, relevant, engaging, lessons" (Herr & Arms, 2004, p. 550-551). They suggested that without a focus on race, social-class and gender relations in the classroom and the school, same-sex programs may perpetuate stereotypes and damage students' educational and future opportunities. They suggested that future same-sex programs address issues of equity and that this would guide the curriculum, assessment and teaching styles (Herr & Arms, 2004, p. 552).

Strengths of this study were the racial diversity of the student body. Comparisons were made between student and teacher perceptions. The data was triangulated because it was drawn from multiple sources and perspectives and they used multiple methods of data gathering. They employed member checking throughout the study.

Weaknesses of the study were that the observations made may have been biased against standardized tests which could have affected the objectivity of the observations, “when standardized tests are the indicators of success, and curriculum is crowded out by skill-and-drill types of pedagogy, the positive possibilities of single-sex schooling are compromised” (Herr & Arms, 2004, p. 532). The total amount of students interviewed was not provided.

In a comparison quantitative and qualitative study Dee (2005) examined the effect on the teacher’s subjective evaluations of the student’s behavior and performance when student and teacher had similar demographics. (Dee, p.158). The study is based on a nationally representative survey called the National Education Longitudinal Study of 1988 (NELS: 88). The researcher was able to use the data to identify how two demographically different teachers evaluated the same student (Dee, 2005, p. 159). Questionnaires designed by the NELS: 88 were completed by the teachers who taught the selected students in two of four academic subjects: mathematics, science, reading and social studies. The final data is based on 42,648 observations based on teacher-student pairs (Dee, 2005, p. 160).

The teacher survey included questions regarding the teacher's perceptions of the student's classroom performance and personal characteristics. The data focused on three negative teacher assessments: was the student perceived as frequently disruptive (DISRUPT), consistently attentive (INATTEN), or rarely completed homework (NOHWK). The researcher found that students' performance was considerably lower on subject tests when the teacher for that subject had a negative perception of the student. These students were less likely than other students in their school to take Advanced Placement courses and more likely to drop out of high school (Dee, 2005, p. 160).

Students and teachers who participated in the NELS: 88 were identified as being White (non-Hispanic), Black (non-Hispanic), Hispanic, and "all others" (Dee, 2005, p. 160). Six percent of White non-Hispanic student observations were with teachers who were not White non-Hispanic. In comparison, sixty-seven percent of the Black students and eighty-nine percent of the Hispanic students were with a teacher who was not the same race or ethnicity as the student.

The researchers found that a teacher who was not of the same race or ethnicity was thirty-three percent more likely to see the student as inattentive and twenty-two percent more likely to perceive the student as rarely completing his/her homework. A student who is of a different sex than their teacher is nineteen to thirty-seven percent more likely to be seen as inattentive or disruptive and the teacher was fifteen percent more likely to report that the student rarely completes his/her homework. Students with low socioeconomic status were thirty-five to fifty-seven percent more likely to be perceived negatively when

evaluated by a teacher of another race. In contrast, even though similar negative perceptions were made of students with high socioeconomic status, the results were “consistently smaller and statistically insignificant” (Dee, 2005, p. 162).

The study concluded that racial, ethnic and gender differences between students and teacher had significant effects on teachers’ perceptions of their students’ performance. The researcher suggested that alternative policies that improve teacher effectiveness for all teachers would be one way to close gaps in achievement. Research on appropriate teacher training related to the specific aspects of the student-teacher dynamics would be helpful to use as a guide to change public policy related to the demographic relationship between student and teacher (Dee, 2005, p. 164)

Strengths of the study were that controls were used to prevent biased results based on the unobserved demographic patterns between student and teacher. The sample size was large and the data was drawn from many schools in the United States (Dee, 2005, p. 162).

Weaknesses of the study were that the racial categories are limited to four and have a broad category of “all others”.

In a comparison qualitative study related to gender identity and achievement, Jones and Myhill (2004) examined teachers’ perceptions of how gender identity was observed to influence levels of achievement. The study built on the findings of a commissioned study called Project JUDE which investigated the underachievement of boys. The sample in Project JUDE was self-selected (the schools had initiated the study) and was made up of six first schools (years

1-4), three middle schools (years 5-8) and one high school (years 9-13). The schools were both rural and urban. The socio-economic student make-up was mainly White and middle class although some of the schools had a more diverse socio-economic student population. The schools had a range from 14 percent to 40 percent of students with special educational needs.

Thirty-six classes were included in the study; six classes each in years 1, 4, 5, 8, 9, and 10. The class teacher for each class was interviewed. All the teachers in the English Department as well as a volunteer sample of four teachers from other subject areas were interviewed at the high school. There were 40 teacher interviews and 144 children (36 in each group) who were interviewed in pairs. In each class, four children were chosen by their teacher for the observation and interviews. These four children included a high-achieving boy and girl and an under-achieving boy and girl. There were 36 sets of classroom observations.

The majority of the data was obtained from the semi-structured teacher interviews. Teachers were asked to describe the four focus children in their class and to explain why they felt the two under-achievers were under achieving and how representative these children were of boys and girls in general.

The study defined underachievers as exhibiting one or several of these criteria: "a child who is not achieving in academic tests but who: has oral abilities that are better than their reading or writing; has good general knowledge; grasps ideas and principles quickly; challenges viewpoints or sees things differently from others; or seems unmotivated but capable (Jones & Myhill, 2004, p. 551-552).

The interviews provided teachers explanation for their assessment of their students as underachievers. Eighty percent of the teachers said that they expected boys and girls to be able to achieve the same results. However, the researchers found that the teachers interviewed repeated many common gender stereotypes such as “girls settle down and get on with it” and “boys don’t like writing” without recognizing that these perceptions do not portray an equitable view of their students (Jones & Myhill, 2004, p. 551-552). The data showed that teachers made 54 positive comments about girls and 22 negative comments. Thirty-two positive comments were made about boys and 54 negative comments. Boys were seen in terms of the things “they cannot, will not and do not do.” Girls are seen in terms of the things “they have achieved and in terms of compliant behavior” (Jones & Myhill, 2004, p. 553). The dominant response was that girls have a tendency to be high-achieving and boys have a tendency to be underachieving. A high-achieving boy was “atypical” of boys. The high achieving girl was the most engaged in the classroom and the low achieving boy was the least engaged.

The study concluded that the observation data suggested that levels of achievement were a more significant predictor of students’ behavior and interactions in the classroom than gender was. The underachieving boy was more clearly defined than the underachieving girl. Underachieving boys may be different from underachieving girls mainly because their teachers see them that way. When the patterns of underachievers were viewed separate from gender, both boys and girls who were underachievers had similar qualities: persistently

disengage from classroom activities, were loud, disruptive and attention-seeking. The teachers' perceptions seemed to be constructed on their ideas of gender identity that were influenced by the typical "norms" of the underachieving boy and the high-achieving girl. This perception may influence teachers' expectations of boys' and girls' ability to achieve even though they claimed a belief in an equal achievement result. The researchers suggested the tendency to connect all boys with underachievement and all girls with high achievement does not serve the needs of individual students (Jones & Myhill, 2004, p. 560).

Strengths of the study were the interviews with teachers as well as students. Weaknesses of the study were the lack of racial diversity among participants. The student interviews were not a significant part of the findings. More comparison between students' perceptions and teachers' perceptions may have increased the validity of the study.

In a comparison qualitative and quantitative study, Tiedemann (2002) explored teachers' gender stereotypes based on their perceptions of their students' competence and effort in mathematics. The subjects included 288 students from 48 randomly chosen German town and country elementary schools. The students were from predominantly White, middle-class backgrounds. 144 of the students were boys and 144 were girls; 126 were third grade students and 162 were fourth grade students (this was the end of elementary school in Germany). 96 students belonged to the high achievement group (48 girls and 48 boys with math grades 1 or 2; these are the upper performance level grades in Germany). 96 students were from the medial

performance level (math grade 3) and 96 students were from the low performance level (math grade 4 and 5).

There were 48 elementary school teachers who participated in the study. Most of the teachers were women (only three were men), who had from five to 27 years of teaching experience. All of the teachers had instructed their classes since the beginning of their students' first school year. Each teacher filled out questionnaires for each of six students; two from the high achievement group (one boy and one girl), two from the medial group and two from the low achievement group. The teacher filled out two questionnaires to describe the learning abilities of the student, "Mathematical abilities" and "Effort resources". Each teacher filled out one questionnaire based on assessing the teacher's own gender role stereotypes (Tiedemann, 2002, p. 53).

The gender stereotypes questionnaire contained four bipolar ratings related to the ways in which men and women were viewed in math, for example "Males are much more talented in math than females vs. females are much more talented in math than males" (Tiedemann, 2002, p. 55). The bipolar ratings (five points) were scored and summed so higher scores reflected a traditional stereotypical male gender role based on males being better at math than females. The higher score would be above 12 points and was categorized as "traditional gender stereotype". The scores below 12 points were categorized as "nontraditional" (Tiedemann, 2002, p. 55). The teachers also put the child's math grade received in the last report on the questionnaire. Data was analyzed using MANOVA (Multivariate analyses of variance) tools.

The study found that girls and boys in the sample did not have a significant difference in their performance in math. Boys were perceived to have higher mathematical abilities than girls. “Traditional” teachers attributed higher mathematical abilities to their male students than to their female students. “Non-traditional” teachers did not show a gender difference based on ability. Boys were also considered to have higher “effort-resources” in math than girls. “Traditional” teachers perceived their male students as having higher effort-resources than their female students. “Non-traditional” teachers did not show a gender difference based on effort-resources.

One strength of the study was the data related to teachers’ stereotypes of their students. A weakness of the study was the homogeneous sample of students. Also, the data provided was unclear in regards to high performance versus medial and low performing students.

In a comparison qualitative study, Garrahy (2001) investigated the ways in which three third-grade teachers “diminished or contributed to the gender-differentiated schooling experiences of girls and boys by comparing the teachers’ gender beliefs with what actually happened in their classrooms” (p. 81). The questions that guided her research were “(a) Do teachers’ instructional practices demonstrate different beliefs and expectations about girls and boys? and (b) Do teachers’ beliefs and practices enhance or impede equal educational opportunities for girls and boys?” (p. 83). The findings indicated that the teachers believed they were working from a “gender-blind position”, they believed that they did not take their students’ gender into account when they were teaching. The

results of the research show that the teachers' beliefs did not match their teaching practices (Garrahy, 2001, p. 81).

Three teachers (Mary, Brenda and Suzan) were observed and interviewed in Tucker Elementary School (pseudonyms are used for the school, community, students and teachers). This school is located in a small, primarily European-American community in a mid-western state called Ridgewood. Tucker Elementary had 426 children in kindergarten through 5th grades. The socioeconomic status of the children ranged from lower to middle class.

The researcher used multiple data-collection methods. Primary sources of data were classroom observations, formal interviews, and informal conversations with the three teachers. Secondary data sources were classroom materials and informal interactions with students. Garrahy observed in each classroom over a four month period from January through April. Garrahy completed a minimum of 12 observations totaling 36 hours with each teacher. Each of the six interviews were audio-taped and transcribed and each teacher was given a copy of her transcripts. Member checks were completed.

The "constant comparison method" was used in order to prepare for subsequent observations (Garrahy, 2001, p. 84). Individual case studies were developed for each teacher and were followed by a "concluding cross-case analysis" (Garrahy, 2001, p.84). To ensure the accuracy of the data, the researcher used several strategies: "prolonged engagement with study participants, triangulation of data sources via the use of multiple teachers and

subject matter, member checks, the use of a peer debriefer, and negative case analysis” (Garrahy, 2001, p. 84).

The results of the study showed that the three teachers believed in the existence of a “generic child”. They believed that the gender of their students did not affect their teaching when in actuality the three teachers often “favored a dominant group” (Garrahy, 2001, p. 84). The teachers’ perceptions were that they were not seeing their students as boys and girls, but rather as children and so they saw themselves as treating the children fairly and “eliminating the possibility of favoritism toward girls or boys” (Garrahy, 2001, p. 85). Mary and Brenda’s classrooms had a dominant culture that favored the needs and interests of boys. Suzan shifted between using teaching strategies that were beneficial to boys and girls and teaching behaviors that imposed expectations of gender.

Strengths of the study were that the researcher was familiar with the faculty at Tucker Elementary school because she served as a physical education consultant and conducted several in-service programs for the elementary classroom teachers in the school district.

Weaknesses of the study were that only three third-grade teachers were observed and interviewed. The interview questions varied from teacher to teacher. The population researched was not very racially diverse.

The above studies suggested that teachers do treat boys and girls differently based on their findings. Although the studies themselves were quite different based on the different perceptions of students versus the perceptions of

the teachers, they do speak to the different ways that teachers interact with boys and girls based on gender in same-sex and co-educational class settings.

These articles raised concerns that the educational experience of boys and girls amplified societal stereotypes rather than challenged teachers to create gender equity in the classroom. According to students, interaction between students and teachers seemed to support the gender stereotyping of girls as compliant and boys as challenging of authority. Teachers were perceived as having lower expectations of boys than girls. Boys were seen as under-achieving and girls were seen as high-achieving. There were also differences in teacher's perceptions of students when the teacher was of a different race, ethnicity, or socioeconomic status than the student. As children discovered their gender identity, it would appear that stereotyped behavior may be reinforced rather than challenged by the classroom teachers.

Gender Identity

In a qualitative repeat-observation study, Williams (2002) researched how “we specify ways that gendered structures shape the process of trying on gender” (p. 31). The participants of this study were twenty-six young women from two communities in New England called Greenville (N=14) and Rolling Rock (N=12). These girls were first interviewed in 1992 when they were about 13 years old with the final interview when they reached 16 to 19 years old. The majority of the girls self-identified as White with two biracial girls, one of African American descent and one of Spanish descent. One girl identified as Chinese. Using the parents' education and occupation to describe socioeconomic status, ten of the

girls from Greenville were middle-class and four were working-class. Three of the girls from Rolling Rock were middle-class and nine were working-class.

The girls from Greenville had a more structured teenage life mainly due to opportunities to participate in sports activities. They also had opportunities to participate in various extra curricular clubs and had access to community role models. Sports and camps were often subsidized by the public school as well as local taxes. The girls from Rolling Rock had fewer opportunities to participate in sports and other community programs. They had less opportunity for leisure activities than the girls from Greenville and structured work was dominated by more minimum wage, traditionally female jobs such as babysitting and fast food service or clerking.

Interview questions covered issues of “autonomy, control, influence of significant others, friendships, dating, and goals” (Williams, 2002, p. 32). The girls also finished two open-ended stories and the Eating Disorder Inventory (EDI). The EDI was used to measure girls’ “concern with dieting as well as body image, self-esteem, and efficacy” (Williams, 2002, p.32).

The narratives revealed significant differences between the two populations of girls. The girls from Greenville reported feeling encouraged to be who they were but through controlled ideas of gender appropriateness related to stereotypes around gender. They felt an inferiority to boys and at the same time tried to empower themselves by stating that girls and boys are equal. In discussions related to relationships with boys, they stated that they needed to have identities that were separate from their boyfriend. In contrast, the girls from

Rolling Rock were more willing to openly talk about sex and at age 13 could name four or five eighth-grade girls that were either pregnant or had babies. Their feelings about themselves were more related to having boyfriends and their boyfriend's feelings about them.

The resistance aspect of trying on gender roles for the girls studied related to the ways that they resisted gender typical roles. They resisted the proscribed idea of girls having to be thin and passive and thought about having jobs that were primarily more masculine such as police officers and being a member of the army. In both populations, at age 13, dieting and body-image issues were not something that the girls were overly concerned with. They had concerns about growing up and wanted independence but their narratives suggested that they were not ready for adult roles. They also discussed differences in physical ability between boys and girls related to sports and academics. They had the viewpoint that boys are physically stronger than girls and also better at math, but clarified that this did not mean that boys were better people as compared to girls (Williams, 2002, p. 33-36).

The gender identity that Williams described as "emphasized femininity" related to condoning standards of gender that are stereotypical (2002, p. 36). The data showed these to be body image, relationships with boys and compliance where the girls tended to feel that others had control over their lives. The findings of the study stated the opportunity for girls to shape an alternative to the dominant idea of femininity was narrow and that the first year of high school was a particularly influential time when girls' definition of womanhood was limited

and included “values of attractiveness, attachment to men, and compliance” (Williams, 2002, p. 47).

The strengths of the study were the narratives, the interviews and the EDI that gave the researcher detailed insight into the personal viewpoint of the girls studied. The girls studied were from different types of communities that provided them with different experiences. The weaknesses of the study were the girls included in the reduced sample were not racially diverse. The sample size was small.

In a comparison quantitative study, Ge, Conger & Elder, Jr. (1996) explored the effects of the transition into puberty on the psychological distress of adolescent girls. This was a four year longitudinal study which focused on three hypotheses related to the effects of puberty: early maturation, the impact of opposite sex versus same-sex friends and prepubescent vulnerability. The study examined girls’ psychological distress as measured by “depressive, anxious, irritable, and somatic symptoms from a prospective study of adolescent internalizing problems” (Ge, Conger & Elder Jr., 1996, p. 3389). The research design involved a three-stage sequence. For the purposes of this paper, Stage 2 is the relevant area of focus. Stage 2 examined the influence of the timing of puberty and peer relationships on adolescent psychological distress. In this stage the researchers considered whether the beginning of puberty increased girls’ emotional vulnerability to interactions with boys.

The subjects were 236 adolescent girls and their parents who participated in the Iowa Youth and Families Project (IYFP). This was a four year panel study

of 451 rural families living in central Iowa who had a seventh grader in one of 34 public or private schools in an eight county area. Families could participate in the study if their seventh grader was living with both biological parents and had a sibling within four years of her age. 216 of the 236 families continued to be part of the panel four years later. The adolescent girls lived in middle to lower-middle class White families with a median family income of \$33,700 in 1988. Family size ranged from four to thirteen, with an average of five.

At each stage of data collection (1989, 1990, 1991 and 1992), the girls in the study were asked the sex of their group of friends, specifically whether their friends were all boys, both boys and girls, or all girls. Only one girl in the study stated that all of her friends were boys. The data was put into two groups: girls who had mixed-sex friends ($n = 79$) and girls with only same-sex friends ($n = 133$). They also completed five scales from the "Symptom Checklist-90 Revised (SCL-90-R)". These scales included depression, anxiety, hostility, somatization (weakness in parts of their bodies) and seven additional psychological symptoms. These scales provided a way to measure general psychological distress. The adolescent female participants were asked to show on a five point scale ranging from not at all (0) to extremely (4), how much they experienced each of the symptoms during the week before data collection for each of the four interview periods (Ge, Conger & Elder, Jr., 1996, p. 3390-3391).

The results of the study related to the stressful change hypothesis (which predicted that the girl's distress would be greatest right after the beginning of menstruation regardless of the age when it occurs) were not statistically

significant based on the t ratios from seventh to ninth grades ($t = 1.06$). The t ratio at tenth grade was significant but negative ($t = -2.79, p < .01$). This indicates that late maturing girls had fewer emotional problems than their on-time and early maturing peers at the tenth grade.

The off-time hypothesis (which predicted that early maturing girls would have the greatest signs of emotional distress during seventh or eighth grade when they were in the minority, whereas late maturing girls would have higher levels of distress in the ninth or tenth grade when they were in the minority) was also not supported by the data. Only the “t” ratio at the eighth grade was significant and positive ($t = 3.03, p < .01$). This indicated that early maturers had the most distress during that year.

The early-timing hypothesis was supported by the data which showed that the early maturing girls showed the highest levels of psychological distress from the eighth through tenth grades (Ge, Conger & Elder, Jr., 1996, p. 3393).

The data related to peer relationships showed that girls with both male and female friends reported higher levels of psychological distress. Early maturing girls with both male and female friends reported the highest levels of distress. On-time and late maturers with same-sex friends had the lowest levels of distress. Early maturing girls also seemed to be more vulnerable to unfavorable family conditions that was indicated by the effect of fathers' hostile feelings on these girls' psychological distress ($t = 2.07, p < .01$).

Overall the results showed that the early arrival of puberty predicted greater psychological distress. The researchers suggested that the girls that

mature early deal with new stressful situations, environments, rules and expectations before they are psychologically ready for these experiences.

A strength of the study was the unique focus of puberty related to psychological distress. Weaknesses of the study were the eligibility requirements for the study were restricted to a specific demographic and the adolescent girls were not racially diverse. The full name of the “NEO-PI” was never given, so it was unclear what kind of scale it was.

In a comparison ethnography, Renold (2001) examined how dominant forms of masculinity impacted and shaped boys’ feelings towards schooling, schoolwork and academic achievement (p. 381). The study was conducted during the academic year of 1995-1996 and explored the creation of children’s gender and sexual identities during the final year of primary school, ages 10 and 11. The two primary schools studied were located in a small semi-rural town in the East of England. Tipton Primary was a co-educational “Local Education Authority (LEA)” controlled school with a decreasing student body of 248 (Renold, 2001, p. 371). Hirstwood Primary was also a co-educational LEA controlled school that expanded and almost doubled in size during the past nine years with an increasing student body of 392. The students at Hirstwood had Standard Assessment Tasks (SAT) results above the national average while the Tipton students had results below the national average. Tipton’s school population consisted of students from White working and middle class families while Hirstwood’s school population consisted of students from White middle-class families.

A Year-6 class was chosen from each school with a total of 59 children participating in the study. Each student participated in six group interviews with three to five other students during the academic year. Interviews were tape-recorded and conducted in a variety of settings throughout the schools. Data was collected through observations and “unstructured, exploratory group interviews often with students in groups with their friends” (Renold, 2001, p. 372). Student topics included bullying, homophobia, sexual harassment, boyfriends and girlfriends, schoolwork, SATs, play, friendship, music, fashion and appearance.

The research found that boys who engaged in traditional “masculine” gender roles played around in the classroom, made jokes, rocked on their chairs, and threw classroom supplies around to give the impression that they were not focused on their studies. Male students perceived as academic achievers were also seen as “feminine.” They were called “geeks” or “squares.” At the same time, a masculine gender identity included being academically superior to girls by undervaluing girls’ schoolwork and identifying girls’ achievements as “failures” (Renold, 2001, p. 381). Participation in sports, bullying and fighting were seen as more masculine and the boys studied often participated in these activities in order to appear more masculine. Boys that rejected sports or were understood as being different from the “dominant or normal” ideal of masculinity were also seen as having a more feminine and/or homosexual identity (Renold, 2001, p. 375-377).

One-third of the high-achieving boys experimented with alternative masculine identities at the beginning of the study and just over one-half of these

boys continued to refuse to participate in the dominant masculine identity at the end of the study.

Strengths of the study were the differences in the social class of students in the two schools as well as the size of student body which gave the research more subjects for comparison. A weakness of the study was that the sample of students was not racially diverse.

In a similar qualitative study, Jackson (2003) explored whether “laddish” behaviors were a way for boys to protect their self-worth and/or social worth, and examined if “laddishness” may be prompted by both a fear of academic failure and a fear of the “feminine” (p. 585). The data came from interviews with fifty thirteen-fourteen year old boys (year nine). These boys attended two different schools north-west of England. Twenty-five boys from each school were interviewed. Both schools were co-educational comprehensive, secondary schools. School A had approximately 1,400 student and a mainly White student body. A small number of students were Black-African, Black-Caribbean, Indian and Chinese. The amount of students that were eligible for free school meals was below the national average. School B is smaller than school A and had approximately 600 students. The percentage of students eligible for free school meals was above the national average. The students’ socio-economic status, according to the Office for Standards in Education (OFSTED) reporters, was below average. The percentage of students who speak English as a second language was higher than most schools.

The boys interviewed were an almost equal mix of boys from middle class backgrounds (mainly from School A) and working class backgrounds (mainly from School B). The majority of boys interviewed were White United Kingdom/Irish. The interviews were semi-structured and focused on six main areas; school performance and indicators of performance, upcoming SAT tests (standard assessment tasks), ways of reacting to failure, things that attributed to failure, pressure to achieve and pressure to work or not to work, and “laddishness” (Jackson, 2003, p. 586).

The common attributes of “laddishness” at both of the schools seemed to be the popularity of the boys and spending time with friends, participating in sports (mainly football), wearing the “right” clothes, and being seen as one who does not work hard at school work. When many of the boys were asked what a “lad” would not do, they responded by saying things that they thought girls would do; hold hands, talk about tests, potting plants, play with dolls, wear a dress and play hopscotch. These activities were referred to as “girlie” (Jackson, 2003, p. 587-588).

Almost all of the boys interviewed recognized that doing well in school was an important part of getting a job or going on to further education at age sixteen. The boys then had two identities that they were juggling; one in which they were seen as someone who did not work and then another where they actually did enough work to try and do well in school (Jackson, 2003, p. 590-592).

The findings of this study suggested that boys portray “laddish” qualities in order not to be seen as feminine and to hide effort related to achievement or lack

of achievement in school. The image that boys had and encouraged in other boys was that when they work hard in school they should do well, at the same time there was pressure to not work hard and still do well to show higher intelligence. These actions followed the dominate forms of masculinity in their schools (Jackson, 2003, p. 595).

Strengths of the study were the differences between the student bodies of the two schools gave the data several points of comparison.

Weaknesses of the study were that the students interviewed were not very racially diverse. The study focused on “claims” related to not working hard at school rather than focusing on actual ways in which some boys might avoid work in order to protect their feelings of adequacy and to portray a ‘laddish’ image (Jackson, 2003, p. 596).

In a comparison qualitative article, Martino (1999) explored the ways in which boys shape their masculine identities. The boys studied were from a private catholic, co-educational high school in Perth, Western Australia. A microanalytic focus was used for this study. The boys were categorized as “cool boys”, “squids”, “party animals”, and “poofs” (Martino, 1999, p. 240). “Cool boys” were active in football and were popular at the high school. These boys were also known as “party animals” based on their reputation for smoking marijuana and getting drunk at parties. They distinguished themselves from the “squids” who where academic achievers. The boys who chose not to play football or who displayed characteristics that could be compared to gay people (“poofs”) were targets for the “cool boys” and were ridiculed. Martino stated that the study added

to the information regarding the role that homophobia plays in the creation of certain forms of abusive heterosexual masculinity (1999, p. 240). In this study the focus was on the “cultural techniques” used by the boys to act out certain forms of masculinity in the high school setting.

The boys interviewed were mainly from White middle-class backgrounds and were between the ages of 15-17. The researcher spoke to four English classes about the study and said that it was about documenting boys’ thoughts and beliefs about school and their relationships with their peers. Twenty-five boys volunteered to participate and turned in consent forms. Each of the 25 was interviewed for about 40 minutes. The researcher had worked at the school as well as taught many of the boys interviewed.

Some of the boys in this study seemed to have a definition of masculinity that rejected what was considered to be feminine qualities, for example, showing emotions and expressing feelings. Boys were in a culture of heterosexual masculinity that avoided “feminine” and “homosexual” qualities. These boys seem to prove their masculinity by relating to other boys that were seen as different by bullying them. Bullying was seen as a display of their masculinity (Martino, 1999, p. 246). Boys who had qualities that were different than the normative masculine heterosexuality were considered outside the norm and treated as the “other” and were excluded (Martino, 1999, p. 245). Those who exhibit “desirable” masculine behavior acquired a specific status in the school and had more control over the exclusion of others. Exhibiting academic behavior such as reading a book during recess or lunchtime could make one a target for

ridicule. Being loud and disruptive in class was another show of masculinity. Even boys who were academically successful must appear to gain this success without effort or “any visible signs of excessive mental labour or studiousness” (Martino, 1999, p. 247). The boys who were skilled at playing football and/or surfed were part of the “cool” group and had the image of masculinity that was acceptable in the culture of the school.

The conclusions of the study were that it showed the role that normative heterosexism plays in establishing certain forms of masculinity in adolescent boys. Martino stated that it was important for those who worked in schools to help boys to gain an understanding of masculinity and engage them in analyzing homophobic and heterosexist versions of masculinity in schools. He further explained that encouraging boys to reflect on and recognize the behavior that leads to certain forms of masculinity will engage them in the process of critically thinking about these issues. This type of gender equity educational practice could improve the school lives of boys as well as girls (Martino, 1999, p. 260).

A strength of the study was that the researcher was familiar with the school and students which may have made the boys interviewed more willing to participate as well as be more honest with their answers.

Weaknesses of the study were that the subjects were not racially or socioeconomically diverse. The researcher may have not have been completely objective during his interviews because of his teaching relationship with many of the boys. The researcher stated the boys comfort with him may have caused

them to give specific answers to him based on their understanding of what he expects of them and wants them to talk about (Martino, 1999, p. 240).

In a comparison qualitative and quantitative study, Warrington, Younger and Williams (2000) explored the different attitudes that boys and girls have to the General Certificate of Secondary Education (GCSE) examination in England. The three year study focused on the gender gap in schools in Cambridgeshire, Suffolk and Lincolnshire.

The data was gathered from focus group interviews with groups of girls and boys in four comprehensive schools and four selective schools. Forty-one lessons were observed and each school was visited for 3-4 days. Class size varied, as well as the gender composition of the class and the year groups. The lessons observed were based on a variety related to the type of school.

The observer recorded the frequency of pre-specified types of public teacher to student interaction in year 11 classrooms. These variables were scored: "students' responses to questions put to the class; whether the responses were called out; instances when the teacher put a question to a specific student; teachers' public praise or reprimand of individuals; students' questions/requests for help; and students' public comments whether related to the subject of the lesson or not" (Warrington et al. 2000, p. 394).

Qualitative, descriptive ethnographic observations were made of the events in the classroom and were noted alongside the systematic scoring. In order to account for bias in the interpretation of the observations, the data was analyzed based on the mean levels of interaction per girl and per boy to take into

account the ratio of girls and boys who were present in each lesson. The mean analysis was done at both the lesson and school levels.

The interviews showed that both boys and girls in all of the schools felt that girls put more effort into their work. There was one group of boys that shared that they felt that girls did not work harder. Overall, according to the students interviewed, girls were seen as having more of a work ethic, were more involved in their work, better organized, more interested, conscientious and self-motivated. Teachers that were interviewed described girls as being better organized, put more time into their homework, and had more mature communication skills. In comparison, students and teachers described boys as being “more laid back”, worked less hard, were more easily distracted from the current task (Warrington et al. 2000, p. 395).

Conclusions of the study found that most girls by year 10 have realized the value of doing well on the GCSE and focus on this goal and their future. Students at this age identify most with people of the same sex. Girls who work hard were not rejected from social groups. For the majority of boys it was quite different. Acceptance by the group involved “laddish” behavior, “challenging authority”, calling attention to them and pretending not to care about work (Warrington et al. 2000, p. 405). Individually or in small groups, boys recognized that this behavior was not in their best interest, however in the school they found it difficult to stray from the “acceptable” masculine group behavior. Boys were more confident in them selves and less worried about failure and believed that they would do well on their examinations even though they did little to prepare, or

felt that some subjects were not important enough to put effort into. The researchers stated that one way to challenge the gender gap that exists in the GCSE (General Certificate of Secondary Education) work was to challenge the stereotypical image of men, encourage a work ethic in boys and make hard work acceptable in their social groups as well as actively praising and encouraging good work from both boys and girls. Also, the support of collaborative work as opposed to competition, giving boys the skills they need to make realistic plans for the attainment of future goals may also help narrow the gender gap in achievement (Warrington et al. 2000, p. 405).

A strength of the study was the effort made to account for observer bias. A weakness of the study was that the race and socioeconomic background of students was not shared. The quantitative data was not very detailed.

In a comparison quantitative study, Dubois, Burk-Braxton, Swenson, Tevendale and Hardesty (2002) explored race and gender related influences on adjustment during early adolescence of Black and White youth. The subjects were 350 Black and White youth with equal numbers of Black males and females as well as White males and females. These youth were in grades 5-8 in the public school system of a Midwestern city with a population of approximately 70,000.

The 350 youth included 170 boys and 180 girls, 160 White and 190 Black youth (89 Black males, 81 White males, 101 Black females, and 79 White females) 189 preadolescents (5-6 grade) and 161 early adolescents (7-8 grade). There were 173 youth from low-income and 177 from non-low income families.

Despite the researchers attempt to get a balanced sample of subjects with different combinations of demographic characteristics, there was a greater sample of low-income families among Black youth (n = 113 of 190; 59.5 percent) as compared to White youth (n = 60 of 160; 37.5 percent).

During a three-month period from September through December, questionnaires were completed by the students during two hour group sessions on Saturdays and in individually scheduled sessions as needed. In all of the questionnaire sessions, instructions and items were read aloud to prevent reading level from affecting the accurate completion of items.

Revised versions of the Daily Hassles Questionnaire (DHQ) and the Life Events Checklist (LEC) were used to obtain these measures of stress: “race daily hassles, gender daily hassles, prejudice/discrimination events, and general stress context” (DuBois et al., 2002, p. 1577). On the DHQ, children and adolescents were instructed to indicate whether each event or situation had occurred during the last month and then rate it on a four point scale ranging from “0 (not at all a hassle) to 3 (a very big hassle)” (DuBois et al., 2002, p. 1577). In addition, five domains of stress were assessed related to school, family, peer relations, physical appearance, and sports/athletics. The LEC assessed these same five domains related to the occurrence of major life events experienced by older children and adolescents. The student was asked if the event occurred in the previous six months and, if it did, rate the event as good or bad on a four point scale. Race and gender “daily hassles” referred to being called names,

treated unfairly, being excluded, being teased and different expectations related to sports based on race and gender (DuBois et al., 2002, p. 1578).

Racial identity was assessed using an abbreviated 12- item version of the Multigroup Ethnic Identity Measure (MEIM). Gender identity was assessed with an adapted measure that had identity items similar to those on the MEIM. Self-esteem was assessed using the Global Self-Esteem Scale of the Self-Esteem Questionnaire. Youth adjustment was assessed using the Youth Self-Report (YSR).

The study found that 59 youth reported at least one prejudice and/or discrimination event on the LEC. Black youth reported more of this type of event than White youth: Black males: n = 17, 19.1 percent; White males: n = 6, 7.4 percent; Black females: n = 27, 26.7 percent; White females: n = 9, 11.4 percent (Dubois, et al., 2002, p. 1578).

The conclusions of this study were that socio-environmental experiences such as stress and psychological characteristics such as identity connected to race and gender were related to emotional and behavioral adjustment in early adolescence. There was a strong connection between prejudice and discrimination events and race daily hassles for Black subjects. Black males and Black females exposure to events that were perceived as involving prejudice or discrimination was linked to emotional problems. Most of the Black youth who reported prejudicial or discriminatory events experienced at least one of these events at school. There was a limited population of Black students in the

participating schools and their teaching and support staff were predominantly White (Dubois, et al., 2002, p. 1586).

Racial identity related positively to self-esteem among both male and female Black youth. A corresponding relationship was found between gender identity and self-esteem for both White and Black females. Black youth had significantly more positive levels of racial identity than White youth. Females had less positive levels of gender identity as compared to males. Compared to the other youth, White males appeared to have experienced less stress related to race and gender issues, for example fewer events related to prejudice and discrimination and “race daily hassles” compared with Black youth and less exposure to “gender daily hassles” compared to females. Black females reported having a less positive gender identity than males in the early adolescent part of the sample. Black females from low-income backgrounds who were older reported high levels of stress and low overall self-esteem.

A strength of the study was that Black students from low socioeconomic backgrounds were included. A weakness of the study was that the statistical data presented was confusing with unclear tables and figures. Also, qualitative sources of data could have been useful to provide specific information related to the major life events that involved prejudice and discrimination that was reported by the youth (Dubois, et al., 2002, p. 1589).

The above articles show a pattern of struggle that boys and girls have with their gender identities. The majority of the articles studied predominantly White working and middle class students. The commonalities of the articles describe

adolescence as a time when puberty, race, peer relationships and perceptions, teacher's perceptions and stereotypical norms proscribe the gender identities and self-esteem of adolescent boys and girls. Girls were seen as more organized, hard working, and cooperative as well as resisting stereotypical feminine gender norms that equate them as less than equal to boys. Boys were seen as working less hard on academics in order to maintain a "cool" image for their male peers. Boys seen as having "feminine" qualities that ranged from being visually academic, to showing emotions and expressing feelings, and being uninterested in sports were bullied or ridiculed by boys who were strongly maintaining a more "masculine" image. Boys also seemed to be torn between valuing academics in order to prepare for their futures and appearing to be uninterested in academics. The article by Ge, Conger & Elder Jr. (1996) explored the onset of menstruation and how this affected the stress level of adolescent girls and connected distress to peer relationships; same-sex versus opposite-sex. The one article by Dubois et al. (2002), explored differences between Black and White youth that delved more deeply into identity issues related to stress caused by discrimination based on gender and/or race. The students' perceptions of their identities were based on their experiences within the classroom as well as in their communities.

Students' Perceptions of Learning Experiences in Co-educational versus Same-Sex Classes

In a qualitative study, Jackson (2002) researched the effects of single-sex classes within co-educational schools on girls and boys learning experiences.

The research was done at a co-educational secondary inner-city comprehensive school located in the south-west of England. The school had approximately 500-550 students in years 7-11. The children were mainly White and had working-class and middle-class backgrounds. Same-Sex math classes began for year 7 students in 1994. These classes were started with the goal of improving each student's self-image regarding their abilities in math. The head of mathematics was mainly concerned with increasing the girls' confidence in their mathematics abilities.

Students filled out a questionnaire at the end of year 7. The total number of questionnaires filled out by girls was 79-40. The total number from boys was 39. Interviews were also conducted with 11 students, five girls and six boys, during the summer term of year 8 when they had been in co-educational math classes for approximately three months (Jackson, 2002, p. 41).

Eighty percent (n=32) of girls stated that they were more confident in same-sex classes as compared to co-educational classes. 65 percent (n = 26) indicated that same-sex classes helped their improvement in math. 55 percent (n = 22) said that they enjoyed mathematics more in same-sex classrooms. 38 percent (n = 15) of the girls said that the main differences between the two types of classes were that in the same-sex classes they were not teased for getting an answer wrong and they did not feel ashamed for getting a low grade. The majority of the girls studied (n = 32) wanted to continue with same-sex groups after year 7. 15 percent (n = 6) of the girls in the study enjoyed co-educational classes more than same-sex ones (Jackson, 2002, p. 41-42).

In comparison, 59 percent (n = 23) of boys in the study felt that same-sex classes did not change their progress in math. 33 percent (n = 13) stated that they did not feel as confident in boys-only classes. 64 percent (n = 25) did not want to continue in same-sex math classes after year 7. The majority of the boys (72 percent, n = 28) stated that they enjoyed co-educational classes more than same-sex classes. They stated reasons that were mainly related to their behavior; getting punishments more often and “fighting and roughness” occurring more frequently in the boys only classes (Jackson, 2002, p. 42).

This study was one part of the debate regarding same-sex classes in co-educational schools. The author stated that the introduction of these classes into co-educational schools had the goal initially of helping girls in specific subjects where boys tended to have a higher academic performance than girls. The findings of this study showed that same-sex classes did not seem to be as helpful for boys and that their behavior was worse in all boys’ classes. The author concluded that same-sex classes for boys needed to shift from the regular curriculum and focus on challenging boys to rethink their ideas of gender related to traditional masculine roles.

Strengths of the study were that it looked into the perceptions of boys as well as girls and compared their experiences of single-sex classes. Weaknesses of the study were that the students studied were not racially diverse. The number of questionnaires completed by girls was confusing; 79-40 is a wide range and it was unclear how many were actually completed. Although the statistical data was not clear, quantities for “n” and percentages were given without any clear

explanation. The specific number of students involved in the study was never given.

In a comparison quantitative and qualitative study, Brutsaert (1999), explored the way secondary students perceived their gender identity in co-educational or same-sex schools and whether their perceived gender identity was consistent with their classroom behavior. Data was collected from 68 university preparatory secondary schools in Flanders, Belgium. Twenty-Five schools were co-educational and forty-three were same-sex (21 girls' and 22 boys' schools). The students who participated were 2,228 girls and 1,972 boys from the same-sex schools, and 1,142 girls and 1,085 boys from the co-educational schools. They were third year students, 14 and 15 years old. This age group was chosen because of the combination of early adolescence, biological development and socialization that occurs at this age usually leads to more gender specific types of behavior (Brutsaert, 1999, p. 346).

Schools were considered co-educational if they had at least 24 percent of one sex as opposed to at the most 76 percent of the other sex. Socioeconomic status (SES) was calculated by the collected students SES scores and finding the average for each school. The parental socioeconomic status was based on the father's occupation.

The data was collected during the 1995-1996 school year using written class-administered anonymous questionnaires. A self-report scale was used to measure gender identity. A four-point response format was used where students

would choose these possible answers: “very true of me, mostly true of me, little true of me, not at all true of me” (Brutsaert, 1999, p. 347). The items related to “femininity” included: “considerate, emotional, affectionate, compassionate, tender, sensitive to the needs of others, eager to help others.” Items related to “masculinity” included: “self-confident, competitive, liking to be in charge of things, ambitious, self-reliant, dominant, mastery-oriented” (Brutsaert, 1999, p. 347). Inhibition in classroom situations was measured with a five-point Likert scale that contained eight items, for example: “I leave it to my classmates to take initiatives; all by all it’s better for you to keep a low profile; I like to make myself heard in the classroom; even when convinced to have the right answer I’ll never raise my hand” (Brutsaert, 1999, p. 347).

Parental support was calculated based on the student’s feeling of being encouraged and respected by his/her parents. This was measured using a four-point Likert scale with nine items. For example: “my parents (father and/or mother) trust me; my parents do encourage me whenever I am making plans; when I am busy, often one of my parents will come and meddle; my parents are really proud of my accomplishments” (Brutsaert, 1999, p. 347-348). The data showed that on the average, girls identified themselves more strongly in terms of their gender in co-educational schools as compared to same-sex schools ($p < 0.001$). Although they scored slightly higher on the masculinity scale, same-sex school girls showed significantly less inhibited classroom behavior than the co-educational school girls ($p < 0.001$). In comparison, boys’ average score was only slightly higher on the femininity scale and lower on the inhibition scale in

same-sex schools, but they did not seem to describe themselves as having more masculine traits in co-educational schools (Brutsaert, 1999, p. 348).

A two-level Hierarchical Linear Modeling (HLM) statistical program was used. This model was used to estimate the effects of the individual student as well as the effects of the type of school. According to this analysis girls did perceive themselves as having more traditional feminine traits in co-educational schools as compared to same-sex schools ($p < 0.05$). Neither individual socioeconomic status (SES), nor academic achievement and school SES influenced the girls' perception of their feminine traits. Girl's perception of their parents encouragement had a significant effect on their perception of their feminine traits ($p < 0.001$). Similarly, boys were significantly affected by parental support related to their masculinity and inhibition in the classroom ($p < 0.01$). In general, for the girls studied masculinity was positively associated with SES ($p < 0.01$), academic performance ($p < 0.01$), curriculum enrollment ($p < 0.05$) and parental support ($p < 0.01$). The boys masculinity was only affected by their SES ($p < 0.01$) and parental support ($p < 0.001$). However, boys' academic achievement was not related to masculinity (Brutsaert, 1999, p. 349-350). Girls ($p < 0.01$) and boys ($p < 0.001$) who had lower socioeconomic status, scored higher on inhibition in the classroom.

The study concludes by stating that girls' gender identity was not only affected by their early socialization, but also seems to be dependent on the boy/girl composition of the school that they attend. Girls were also more likely to have a more defined "feminine" identity in co-educational as compared to same-

sex schools. However, the girls at the co-educational school tended to describe themselves more strongly in relationship to “masculine” traits. The researcher suggested that this was due to masculine qualities being related to academic success and teachers’ expectations of students’ behavior. Girls’ compliance with traditional female roles in co-educational schools seemed to be related to acceptance from peers, whereas their identification with masculine traits could be seen as an academic survival skill in relationship to their teachers (Brutsaert, 1999, p. 351). On the other hand, boys identity related to their gender did not seem to be affected by the type of school that they attended.

Strengths of the study were that the sample size was quite large.

Weaknesses of the study were that the gender composition of the school staff was not used as a variable. The researcher did not clearly define the study’s definition of masculine and feminine. The study was confined to early adolescents who attended university preparatory secondary schools. The process of identity formation may be different for older adolescents and/or schools with different curriculum ((Brutsaert, 1999, p. 351).

The above studies described the differences between the perceptions of boys and girls towards same-sex classes. The majority of girls had positive reactions to same-sex classes, whereas the majority of boys had negative reactions to same-sex classes. Same-sex classes did not seem to be as helpful for boys as they were for girls. Girls’ gender identity was affected by co-educational schooling in which they were more likely to have a more stereotypical feminine identity. However, girls also described themselves with

“masculine” traits which could be related to academic success and teachers’ expectations of students’ behavior in co-educational schools. Girls’ compliance with traditional female roles in co-educational schools seemed to be related to acceptance from peers. Boys’ gender identity did not seem to be affected by school type. Gender differences related to boys’ and girls’ achievement can also be seen in their experiences of same-sex and co-educational classrooms.

Co-educational and Same-sex Classrooms and Achievement

In a quantitative study, Singh, Vaught and Mitchell (1998) investigated the effect of co-educational versus same-sex classes on low-socioeconomic status (SES), inner-city African-American students’ academic achievement. Participants were drawn from two, low-SES, inner-city public schools in the mid-Atlantic region of the United States. The two schools were within three miles of each other. Both schools had grades kindergarten through fifth grade and used identical grading scales and instructional materials. Both were “community or target” schools because the median income of families in the schools’ neighborhoods was about \$8,000 a year. 99 percent of the residents of the communities around the schools were African-American. 95 percent of the students at School A and 98 percent of the students at School B qualified for the free or reduced-price lunch program. 468 students were enrolled at School A and 415 students were enrolled at School B. The majority of the students at both schools had attended several schools. Students at School A were taught in co-educational settings while boys and girls at School B were grouped into same-sex classrooms.

In the quasi-experimental research study, the participating sample of African-American students (N=90) were drawn from four fifth-grade classes; two co-educational classes from School A and two single-sex classes from School B. All of the students in the four classes were considered to be average learners by their principals and teachers. All were the appropriate age for their class and none were identified as special education students. The principals of the teachers of all four classes identified them as highly competent teachers. An African-American female teacher taught one of the co-educational classes at School A; the other class was taught by a European- American female teacher. At School B, an African-American male teacher taught the same-sex class for males while a European-American female taught the same-sex female class.

Data on the sampled students' achievement and daily attendance were collected and compared using the Iowa Tests of Basic Skills (ITBS) which consisted of fifth-grade scores (by percentiles) in reading, mathematics, science, and social studies. The students' fourth-grade ITBS percentile scores were used to control for differences in prior achievement. The second source of data for students' achievement was their fourth and fifth-grade final grades in the four subject areas given by their teachers who used the school system's standard grade scale. Participants' daily attendance in fourth and fifth-grades, recorded by their teachers, were reviewed to check for differences in rates of absence in the four classes (Singh, Vaught and Mitchell, 1998, p. 162) .

Even though the participants in the study were non-randomly assigned to the co-educational and same-sex classes and intact classes were used, Analysis

of Covariance (ANCOVA) was used in the study based on the similarities between the groups in terms of school demographics and prior achievement. The achievement variables and attendance were analyzed separately and independent variables were class arrangement and gender.

The researchers found that neither class organization nor gender had a significant effect on boys' or girls' ITBS reading scores. The difference between girl's scores in the same-sex class as compared to the co-educational reading class was small and therefore reading achievement did not appear to be affected by the ways in which classes were arranged by gender.

The patterns of significance were inconsistent. In same-sex classes for boys or girls, girls achieved significantly higher scores, $p < .05$ on mathematic scores. Boys on the other hand scored the lowest in mathematics. For science girls scored lower ($p < .01$) on the ITBS but scored the highest on their class scores. Co-educational classes were inconsistent with regards to social studies and showed no significant findings, although the scores in the co-educational classes were higher than those of the same-sex classes.

Attendance was significantly higher in same-sex classes ($p < .05$). An average of 9.24 days in co-educational classes were missed versus 5.73 days missed for same-sex classes, with females missing fewer days in both groups than boys.

The findings overall showed that the achievement results for boys in co-educational classes were found to score in higher test percentiles on the ITBS for

math, science and social studies. Reading test scores showed no difference. However, girls' classroom scores were higher in math and science.

The strengths of this research article stemmed from the rigorous analytical methods that were used. The sample was matched and was representative of the area. The weaknesses in the research were that same-sex classes in school B had only been in place for one year. The sample size was small with only four classes, two of each type. Teachers' effects and factors were not taken into account. It is difficult to generalize beyond the sample due to the limitations in size. There was no explanation given for the difference found between "in class" performance and scores versus ITBS scores.

In a comparison quantitative study, Daly and Defty (2004) investigated the differences in 16 year old students' achievement scores in mathematics, attitude in mathematics and the relationship of same-sex schooling to achievement and attitude. The subjects included 42,000 pupils in 294 Welsh and English state-funded secondary schools. The students were 15 and 16 years old.

A multilevel modeling design (hierarchical social data, an advanced form of regression analysis) was used. A professional survey was used to collect the data. The findings for achievement were that males scored slightly higher than girls (1.5 percent of a standard deviation, statistically, $p < .05$). The strongest predictor of achievement of math at age 16 was math at age 14, estimated at 0.969 units of standard deviation (SD). The father's job had an influence of 0.064 SD. Academic environment measures were 0.215 SD units.

The study found that girls who attended same-sex schools had better attitudes towards mathematics than girls at co-educational schools, although only a modest increase. Boys' attitudes towards mathematics were not increased by their attendance in same-sex schools. Girls' performance in mathematics increased by one-third of one grade on a eight grade scale and similar rates were established for science as well. Since the increases were small, administrators may see them as negligible.

A strength of this study was the wide range of student's ability levels. The study showed weaknesses based on the lack of information investigated regarding ethnicity, levels of parental support or social development. Schools chosen were not a random sample. Independent schools and boys' schools were under represented. The number of boys in the study was reported to be too small; (n=9) to support claims adequately compared to the number of girls (n=32).

In a comparison quantitative and qualitative study Shapka and Keating (2003), researched whether or not girls who experienced same-sex math and science classes in 9th or 10th grade, or both, achieved at a higher rate than their co-educational classmates after they returned to the co-educational class environment. They also explored whether girls were more likely to enroll in advanced-level math and science classes when they were no longer required and did these girls have more positive attitudes towards math than girls in co-educational classes. They examined if these attitudes were predictive of engagement in math and performance and if attitudes towards math affect the

relationship between class conditions and math engagement and performance. The study was longitudinal and quasi-experimental.

The subjects of the study were drawn from an ongoing longitudinal study of two public high schools (grades 9-13) in Ontario, Canada. The target school had a same-sex program in which a group of girls were taught ninth and tenth grade mathematics and/or science. This group of girls took all of their other courses in the main co-educational classes and re-entered co-educational math and science classes after tenth grade. The control school was demographically similar to the target school. Both schools were located in the same suburban area, were in the same school board jurisdiction and had students mainly from middle or upper-middle-class white families.

Enrollment in the all-girl courses was voluntary, although girls who participated had to have at least a seventy percent average in their seventh and eighth-grade math courses to be in the program. The first part of the study was done in 1993 when all the students were in ninth, tenth or eleventh grade. The second part of the study was done in 1995 when all the students were in grades 11, 12, or 13. The sample of students was homogeneous in that all of them were in university preparatory, advanced level math and science classes. The final longitudinal sample of students included 1993 questionnaire data and school record data as well as 1995 questionnaire data. The data was gathered from girls and boys attending co-educational schools and girls from same-sex classes in the co-educational schools.

There were no mean differences in the amount of effort spent on math, $F(4, 172) = .32, p = .87$. There was a significant difference in math anxiety when comparing groups, although this was a difference related to gender which was expected with this age group, $F(4, 209) = 3.44, p < .01$. There was also a significant difference for perceived math competence, $F(4, 209) = 7.00, p < .001$. These differences were also based on gender. Both groups of co-educational boys had higher perceived math competence ratings than girls in the same-sex classes and girls from the control school. The girls in the same-sex classes had significantly higher scores on these four outcomes as compared to co-educational girls. They achieved higher rates in math and science and took more math courses and more science courses (Shapka & Keating, 2003, p. 946).

The study concluded with mixed results. The experience of being taught in at least one same-sex math or science classroom for grades 9 and/or 10 had a significant positive effect on girls' math and science performance and persistence. The results of the math attitudes show that the same-sex classes did not affect the girls' feeling towards their math abilities. The researchers suggest that this may have been due to the time period that the girls were in the same-sex classes. The amount of time may not have been long enough to affect the established math "self-constructs that had been socialized over several years, at school, at home, and by media messages" (Shapka & Keating, 2003, p. 953-954).

Strengths of the study were that specific variables were controlled for, specifically; "parental education, perceived parental expectations, perceived

teacher effectiveness, school and pre-high school math achievement” (Shapka & Keating 2003, p. 936) A comparison control school was used in the study due to the increased male to female ratio in the math and sciences in the target school because of the separation of a group of girls for the same-sex classes. The sample size was large.

Weaknesses of the study were that no qualitative or observational data were collected regarding the quality of instruction in the co-educational and all-girl classes. Without observational data, the researchers do not know whether or not teachers practiced unique teaching styles in the all-girl classes. The all-girl classes were more homogenous because of the non-random assignment and the requirement of a seventy percent average in pre-high school math. It is possible that the results of the same-sex classes were due to the absence of low achieving students and not the absence of boys (Shapka & Keating, 2003, p. 955).

In a comparison qualitative and quantitative study Van de Gaer, Pustjens, Van Damme and De Munter (2004) researched the effects of same-sex versus co-educational classes and schools on boys and girls progress in language and mathematics at the end of the second year of high school in Flanders, Belgium.

Data from the “Longitudinal Research in Secondary Education (LOSO)” project was used. This study focused on the mathematics and Dutch achievement (native language) of students at the end of their second year of secondary education (age 13-14 years). The subjects for the Dutch achievement data-set were 4,131 students (1,973 boys and 2,158 girls), 327 classes (198

same-sex classes), 181 Dutch teachers and 53 schools (21 same-sex schools). For the mathematics data-set the subjects were 4,109 students (1,974 boys and 2,135 girls), 329 classes (184 same-sex classes), 180 mathematics teachers and 54 schools (20 same-sex schools).

Classes that had 80 percent or more girls were considered to be girls' classes and classes that had 20 percent or more and less than 80 percent girls were considered to be co-educational classes. Classes that had less than 20 percent girls were considered to be boys' classes. The researchers decided on these percentages because they wanted to have the maximum number of classes in the study and they assumed that one to three students of the opposite sex in a class with an average of 20 students could be thought of as a same-sex class rather than a co-educational class.

The study found that girls did not make more progress in girls' classes than in co-educational classes, neither in language (Dutch), $p = 0.299$ or in mathematics, $p = 0.964$. Boys made significantly more progress in language in co-educational classes than in same-sex classes, $p < 0.001$.

For girls, the researchers found no difference in achievement between the girls' schools and the co-educational schools, neither for language (Dutch), $p = 0.341$, nor for mathematics, $p = 0.173$. Also for boys, no difference in language, $p = 0.292$ and mathematics, $p = 0.119$ achievement were found between the boys' schools and the co-educational schools.

The gender composition of the classes seemed to be more important than the gender composition of the schools. The researchers stated that it made no

difference whether same-sex classes were in same-sex or in co-educational schools. The results showed no evidence of an advantage of same-sex classes or schools for boys.

A strength of the study was that the researchers investigated the effectiveness of same-sex classes in same-sex schools as well as same-sex classes in co-educational schools and compared the two. A weakness was that pupil intake characteristics were not clearly defined.

In a comparison quantitative study, Gray, Peng, Steward and Thomas (2004) examined the progress of students in co-educational secondary schools in England from Key Stage 3 to GCSE (General Certificate of Secondary Education). They explored school effectiveness related to the progress of boys and girls. The data for this study was obtained from a larger data set that was constructed by the Department of Education and Skills. The students who took GCSE exams in 2001 were matched with their KS3 scores (from two years previously) as well as other background information. The subjects were 452,310 students who attended 2,693 co-educational secondary schools.

Multi-level modeling was used for the statistical analysis. The modeling was done in two stages. The first stage established schools' overall levels of "effectiveness". The outcome measure used was the "Total GCSE/GNVQ Points Score" which was predicted from KS3 performance that was averaged across the three main subjects assessed (Gray et al., 2004, p. 537). The model produced "school level residuals" which indicate the level of overall "effectiveness" for the typically performing KS3 student in each school. The school-level residuals were

categorized into three separate groups: “those performing significantly above expectations; those performing around expectations; and those performing significantly below expectations” (Gray et al., 2004, p. 537-538). The standard deviation was 3.26. The mean was $-.0$ and $n = 2,693$. About a third of the schools in the study went into these three categories: 32.5 percent of all schools performed above expectations, 32.8 percent below expectations and 34.7 percent around expectations (Gray et al., 2004, p. 538).

The second stage of the statistical modeling examined the gender differences related to performance at the school level. The schools were categorized into three groups: “schools where girls were significantly outperforming boys in terms of progress made; schools where girls and boys were performing similarly in terms of progress; and those where boys were significantly outperforming girls” (Gray et al., 2004, p. 540). The standard deviation was 1.75. The mean was 2.73 and $n = 2,693$. In 51.8 percent of the schools girls were making significantly greater progress than boys. In 48.2 percent of the schools the progress of boys and girls was approximately equal. In just 0.1 percent of the schools, boys’ progress was significantly greater than that of girls. This was in two of the 2,693 schools studied.

The conclusions of the study were that the English secondary schools were not making progress towards narrowing the gender gap in achievement related to boys’ making more progress than girls. However, in just under half of the schools both boys and girls appear to be making similar levels of progress. In schools that performed below expectations the performance of both boys and

girls was likely to be seen as a problem. Based on the data, the researchers stated that the overall performance of the schools would improve by implementing strategies to increase the performance of both boys and girls. There were only two groups of schools (who performed “above” or “around” expectations) where the girls were making more progress than the boys. The researchers claimed that examining the reasons for the boys’ lack of progress would be beneficial to improving these schools’ results (Gray et al., 2004, p. 543).

A strength of the study was the large amount of subjects examined. A weakness of the study was the numbers of boys versus girls used in the study was not given. The researchers used acronyms; GCSE, GNVQ, KS3 whose full names were never given or defined. The demographics of the students were not given. Differences between schools related to the progress of boys versus girls were not examined.

In another comparison quantitative study Tinklin (2003) researched factors related to high attainment and examined whether there were differences for males and females. The study also explored whether males and females progressed at different rates through school. The data came from the Scottish School Leavers Survey carried out in the spring of 1995 by the National Centre for Social Research. The data was based on a sample size of 3,107 respondents.

Multilevel models allowed the examination of hierarchical data. The individual school leavers were grouped by school attended. The study found that

more females than males left school with four or more higher grade passes of A-C in 1994, 28 percent of females and 24 percent of males. This difference was statistically significant, $p < 0.01$, using a chi-squared test.

A two stage analysis was performed to examine whether boys and girls progressed at different rates between the ages of 16 and 18. Boys and girls with equivalent standard grades were equally likely to become high achievers later on in school. The data showed that social class, parental education, type of school (independent or local authority), and type of housing influenced students achievement at later stages even when their standard grade attainment was held constant (Tinklin, 2003, p. 314).

In general, girls were more likely than boys, who had equal qualifications, to continue in school. Students who had a more advantaged social background (a father in a non-manual occupation, larger number of educated and home-owning parents, and attendance in an independent school) were more likely to continue in school than others with equal qualifications.

A strength of the study was the range of socioeconomic background variables examined. A weakness of the study was that the race of the students was not a factor in the data.

In a comparison quantitative study, Harker (2000) explored whether or not there was a difference in outcome on selected academic criteria between boys and girls, differences in outcome between girls at same-sex schools compared to girls at co-educational schools, differences in social background and measured ability between the student intakes of two school types, and what effect would

adjusting for differences in social background and measured ability have on differences in outcome on academic criteria between girls at same-sex schools compared to girls at co-educational schools.

The “Progress at School” project was a longitudinal study of 5,300 students in 37 secondary schools in New Zealand. Data from this project was used in this study as well as national-level data from the Ministry of Education and the National Qualifications Authority (NQUA). The analytical techniques used were simple means analysis with t-tests and hierarchical linear modeling which allowed for the simultaneous control of variables of the individual student (such as prior achievement, socioeconomic status (SES) and ethnicity) and data totaled at the school level (such as school type).

The differences in achievement between boys and girls were first examined through the results of the year nine tests and year ten School Certificate results. The girls achieved significantly higher results than the boys in English (girls = 69.32 and boys = 66.17 in the year nine tests and the School Certificate examination results (girls = 55.10 and boys = 51.00). In mathematics the boys did better than the girls. There was only a minimal difference in science for the year nine tests, but a larger difference in the School Certificate examination results (boys = 55.31 and girls = 53.47).

The study examined students’ progress in school and found that after enrolling in a subject, the percentage of students that received high grades was somewhat greater in same-sex schools as compared to co-educational, particularly for boys as compared to girls. This data reflected the oversampling of

boys. The percentage of high achievement for girls in co-educational schools was 34.0, in same-sex schools it was 39.1. The percentage of high achievement for boys in co-educational schools was 26.1, in same-sex schools it was 49.8. The researcher stated that it was important to recognize that in all cases students who attended same-sex schools were at a higher prior level of achievement than students in co-educational schools (Harker, 2000, p. 210). The study concluded that the difference in the average academic achievement of girls who attend same-sex as compared to co-educational schools was not significant.

Strengths of the study were that it compared socioeconomic background, ethnicity, achievement as well as school type. A weakness of the study was that the boys were oversampled due to two elite boys' schools that were used in the study whose drop out rates are very low and almost all students continue and take out a Sixth Form Certificate. A clear definition of this type of certificate was not provided. An additional weakness was the specific number of boys versus girls used in the study was not given. Also, data was more thorough for girls than for boys. Finally, the study focused on academics and could have had very different results if variables such as students' self-concept, confidence, drop-out rates, social maturity in addition to many other social and gender identity aspects of schools (Harker, 2000, p. 216).

In a comparison longitudinal, quantitative study Wong, Lam and Ho (2002) examined the gender differences in educational achievement of secondary school students in Hong Kong. The study was based on a sample of more than 45,000 students from over 400 schools. A multilevel analysis was used. The

students took the Hong Kong Certificate of Education Examination (HKCEE) in 1997. All students who were graduating from secondary school take the HKCEE, therefore the sample used for the study represents almost all students who finished their secondary education in 1997. Almost one-tenth of the public schools in Hong Kong were same-sex schools. These schools are open to the general population rather than just upper-class or religious-oriented families.

The dependent variables of the study were the students' achievement on the HKCEE (similar to the British GCSE). The independent variables of the study were the gender of the student, the type of school (same-sex or co-educational), and the curricula students were "tracked" into at Secondary Four (science stream or arts/social science stream).

The covariate was the prior achievement of students before entering secondary school that was based on a scaled score from an aptitude test called the Academic Aptitude Test (AAT). The scaled score was called the Secondary School Places Allocation (SSPA) score. In order to examine the effects of schools on gender differences at the completion of secondary school the SSPA score was used to ensure that the boys and girls studied were at an equivalent level of achievement at the start of secondary school (Wong et al., p. 832).

The study found that boys did better on the SSPA than girls. Boys had a mean score of 538.3 and girls had a mean score of 522.4. However, girls did better on the HKCEE than boys. Girls had a mean score of .22 and boys had a mean score of .06. Students who were in the science stream did better than those who were in the arts stream. Girls in same-sex schools had higher scores

than those in co-educational schools, whereas boys had higher scores in the co-educational schools. The adjusted HKCEE mean score for girls at the same-sex schools was .61 in science and .43 in the arts. For boys the adjusted HKCEE mean score for science at the same-sex school was .14 and $-.14$ for the arts. At the co-educational schools the girls mean HKCEE score in science was .43 and .31 for the arts. For boys the mean score was .31 in science and .08 in the arts. Boys had the lowest score for the arts. This was a subject area that was considered to be stereotypically less “masculine”. The researchers proposed that boys who were unable to win a place in the science stream (the more “masculine stream”) would feel academically incompetent by being in the more “feminine” arts stream. Though, the exact reason for the boys’ low scores in the arts was unclear (Wong et al., 2002, p. 837-838).

The findings of the study concluded that boys perform on the average better on the Secondary School Places Allocation (SSPA) exam when entering secondary schools in Hong Kong. After five years of secondary school, girls do better than boys in almost all subjects on the Hong Kong Certificate of Education Examination (HKCEE).

A strength of this study was the large sample of students and schools used for the data. A weakness of this study was that socioeconomic factors were not considered. Also, an analysis of boys self-concept related to the arts stream may have provided more insight into boys’ low scores in the arts.

The above articles showed many different aspects of academic achievement related to co-educational and same-sex classrooms. One

mentioned low-income African-American students and concluded that girls achieved higher math scores in same-sex classes, whereas boys had the lowest math scores in same-sex classes. Boys' scores were higher on the Iowa Test of Basic Skills in all subject areas; however girls' classroom scores were higher in math and science (Singh, Vaught & Mitchell, 1998). The results of this study point to possible differences in class room work as compared to standardized tests. Another study found that girls who attended same-sex schools had better attitudes towards mathematics than girls at co-educational schools, although only a modest increase. Boys' attitudes towards mathematics were not increased by their attendance in same-sex schools. Whereas, a different study found that the same-sex classes did not effect the girls' feeling towards their math abilities. The gender composition of the classes seemed to be more important than the gender composition of the schools. The researchers stated that it made no difference whether same-sex classes were in same-sex or in co-educational schools. However a different study found that girls in same-sex schools had higher scores than those in co-educational schools, whereas boys had higher scores in the co-educational schools. Overall, it seemed that the majority of results stated same-sex classrooms had more advantages for girls' achievement than boys. Math achievement also was explored in primary schools where differences in gender were studied.

Gender Differences in Math Achievement in Elementary Schools

Manger and Gjestad (1997) in a quantitative study explored the relationship between mathematical achievement and the ratio of boys to girls in

third-grade students in Norway. The study was part of a larger project whose purpose was to assess achievement differences in Norwegian primary school classes.

Forty-nine third-grade school classes were randomly selected in the city of Bergen during the spring term of 1992. The 49 classes included 924 of the 2,346 third graders in Bergen during that term. Students in Norway start school at age seven and the average age of the third-grade participants was ten when the data was collected in May 1992. The participants were 440 girls and 480 boys.

A 100-item mathematical achievement test was designed for the study and was based on the Norwegian national school curriculum. The test was given in two parts to prevent students from getting tired. The first part of the test contained 49 items and was given in one lesson. The second part contained 51 items and was given in a lesson a few days later (Manger and Gjestad, 1997, p. 195-196).

The students were divided into three groups according to the ratio of boys to girls in the classes: 30.4 percent of the students were in classes having more than 60 percent boys, 22.6 percent were in classes having more than 60 percent girls, and 47 percent were in classes having between 40 and 60 percent boys or girls ("mixed classes"). Girls in classes with more than 60 percent boys had a mean score of 67.2 ($n = 90$). Girls in "mixed" classes had a mean score of 66.7 ($n = 193$). Girls in classes with more than 60 percent girls had a mean score of 69.3 ($n = 138$). Boys in classes with more than 60 percent boys had a mean score of 70.5 ($n = 172$). Boys in "mixed" classes had a mean score of 69.8 ($n = 218$).

Boys in classes with more than 60 percent girls had a mean score of 72.6 ($n = 63$).

The mean values for both boys and girls were a bit higher when they were in classes with a majority of girls. Both boys and girls had the lowest scores when they were in “mixed” classes (Manger and Gjestad, 1997, p. 196-197). A two way ANOVA was conducted to analyze the effect of gender on achievement, the effect of the ratio of boys and girls in the classes, and the effect of the interaction between boys and girls and the ratio of boys and girls in the classes. The results showed that gender had a significant effect on achievement ($F = 6.69, p < 0.01$). There were no significant effects of the ratio of boys and girls in the classes and the interaction between boys and girls and the ratio of boys and girls. There were significant differences in classes with a majority of girls in multiplication and division problems ($F = 7.25, p < 0.001$ and fraction problems ($F = 21.50, p < 0.001$). No interaction effects were found which indicated that neither girls’ nor boys’ achievement was affected by the number of boys or girls in the class (Manger and Gjestad, 1997, p.197).

Multiple regression analyses were conducted to test the relationship of the ratio of boys to girls in the classes to mathematical achievement. The results suggest that there were group differences related to the ratio of boys and girls in the classes. The study concluded that there was a significant effect of gender that favors boys in mathematical achievement in third grade Norwegian primary school children. However, when there was a majority of boys or girls in classes it did not affect the achievement of either sex (Manger and Gjestad, 1997, p. 199).

Strengths of the study were that there was a somewhat large sample of students. Many variables were examined based on the ratio of boys and girls in the classroom.

Weaknesses of the study were that no racial or socioeconomic information was provided on students. The quantitative nature of the study did not take into account teaching and learning styles within the classroom.

In a comparison qualitative and quantitative study Carr, Jessup and Fuller (1999) explored how parents and teachers influence the growth of gender differences in strategies used in mathematics in the first grade. Gender differences were examined in this study with the assumption that parents' and teachers' beliefs and reported actions relate to gender differences in children's use of strategies and metacognitive knowledge of strategies. The researchers examined how parents instruct and respond to their children's early mathematics activities. Parents' and teachers' beliefs were assessed through children's perceptions of these beliefs (Carr, Jessup & Fuller, 1999, p. 23).

Ninety-two children were recruited for this study, including four children (two girls and two boys) from each of 23 first-grade classrooms. Their teachers randomly selected the participants and permission letters were sent to parents with a description of parental involvement. The average age of the children when they started the study was six years and five months. The children were from low, middle and upper middle class socioeconomic families. 21 percent were African American, 74 percent were Caucasian and four percent were from other groups (mainly Asian). The schools were located in northern and central Georgia.

The teachers had been teaching for an average of 12.5 years and had taught first grade for an average of 8.92 years. Teachers' experience ranged from one year to 26 years, all were female and certified to teach first grade.

Classroom instruction varied within and across schools. All of the teachers used manipulatives to teach mathematics. The students were interviewed individually outside of the classroom three times during their first grade year (October, January and April). The interviews were videotaped in order to record both verbal and nonverbal responses. Students were interviewed by only one of the two researchers. The purpose of the interviews was to discover information about student's strategy use and metacognitive knowledge about strategies as well as perceptions of parents' and teachers' beliefs about strategies.

The students were asked to solve 10 addition and 10 subtraction problems. They were told to do their best and that they could use the counters available. The researchers told them that they would be asked questions about how they found their answers. When the students were done with the problems they were asked how they had solved the problems. The student's responses were compared to the observed activity (Carr, Jessup & Fuller, 1999, p. 24-25).

Strategies were categorized as being "overt, covert or retrieval" by two raters who decided how many problems each child had performed each strategy correctly (Carr, Jessup & Fuller, 1999, p. 25). Overt strategies were visible to others such as when the children used the counters or counted on their fingers. Covert strategies were ones where no manipulatives were used and the child described counting numbers in his/her head or the strategy could not be

observed. Strategies were categorized as retrieval if the child described remembering how to do the problem or the strategy “just popped” into his/her head. Retrieval strategies were separated from covert strategies based on the amount of time it took the child to solve the problem. A child who solved the problem quickly was seen as using a retrieval strategy (Carr, Jessup & Fuller, 1999, p. 25).

Children’s metacognitive knowledge about the use of mathematics strategies was assessed during the time they were solving the addition and subtraction tasks. Children were asked why they used a specific strategy and when did they use a specific strategy to figure out math problems. After the children had finished all of their math problems they were asked about the strategies that they had not used and why they chose not to use them.

A repeated measures ANOVA was used for three analyses. In the first analysis showed that girls increased their overt strategy use during the school year more than boys, $F(2, 172) = 8.02, p < .01$. The second analysis showed that boys consistently used retrieval correctly more than girls and all of the children increased their correct use of retrieval during the school year, $F(1, 86) = 7.58, p < .01$ and $F(2, 172) = 70.83, p < .01$. In the third analysis no gender differences were found related to covert-strategy use, although during the school year children improved in their ability to correctly use covert strategies, $F(2, 172) = 14.75, p < .01$ (Carr, Jessup & Fuller, 1999, p. 29).

The study concluded that much of strategy use instruction seems to benefit boys. Both teachers and parents directed boys to use overt strategies and

by the end of the year boys successfully used this strategy. Teachers were more likely to direct boys as compared to girls to use retrieval strategies during the second half of the school year. Parents affected boys' strategy use through boys' perceptions about their parents' beliefs about strategies. The researchers suggested that boys' strategy use was developed partly through adult intervention. In several instances girls seemed to be "hurt" by their interactions with teachers and parents and did not benefit much from their instruction on retrieval or overt strategies. Girls were not helped with their use of overt strategies when adults provided metacognitive information about the use of the strategy. The researchers suggested that "how adults influence boys' strategy use and why parents and teachers do not influence girls' strategy use in the same way" could be examined further (Carr, Jessup & Fuller, 1999, p. 42)

A strength of the study was that the participants were from varied socioeconomic backgrounds. Weaknesses of the study were that results were limited to parents' and teachers' reported instruction and children's perceptions of adults' beliefs about their metacognition and ability. The researchers stated that "actual strategy instruction and adult-child instructional interactions were not assessed." Observation of parent-child interactions during problem-solving situations would provide information about what parents actually say and do when they interact with their child in an instructional manner (Carr, Jessup & Fuller, 1999, p. 43).

The above articles both focused on gender related to math achievement. One showed a significant effect of gender that favors boys in mathematical

achievement in third grade Norwegian primary school children. The other showed evidence of parents and teachers support with mathematics as more beneficial to boys as compared to girls. The following articles examined the effects of same-sex versus co-educational classes and issues related to gender, parent and student preference and positives and negatives for boys and girls.

Same-Sex versus Co-Educational Classrooms

In a qualitative and longitudinal quantitative study, Younger and Warrington (2002) researched the long-term effectiveness of same-sex classes on students' learning at Essex school. This school was a co-educational school that has had single-sex classes since 1970.

Achievement levels were analyzed for students 16 years and older over 12 years from 1988-1999. The General Certificate of Secondary Education (GCSE) examination was introduced in 1988. The school serves students from a mixed socio-economic area and has always had single-sex classes. Students in years 7-9 have single-sex classes. Years 10 and 11 have single sex classes for English, math and science. Co-educational classes were taught for years 10 and 11 for the "foundation" subjects and "Personal, Social and Careers Education (PSCE)" (Younger & Warrington, 2002, p. 355).

Two male researchers studied classroom interactions by observing lessons that were done from January-May of 1999. Both researchers had teaching experience. Year 9 same-sex classes were observed in mathematics (core subject) and geography (foundation subject). Year 10 same-sex mathematics and year 10 co-educational geography lessons were observed as

well. The research focused on the comparison of classroom interactions of same-sex girls' classes to same-sex boys' classes in mathematics and geography in year 9, and the classroom interactions for same-sex math lessons in year 10 with those of co-educational geography lessons in year 10. A total of thirty-six math lessons were observed. Twenty year 9 same-sex classes and fifteen year 10 co-educational classes in geography were observed. Thirteen teachers were observed, each of them at least twice and most observed between four and six times (Younger & Warrington, 2002, p. 361-362).

The observations were both quantitative systematic observations and qualitative ethnographic notes. The observations focused on the questions that students asked, how often they asked for help, teachers questions of students, the ways in which teachers reprimanded or praised students, and the behavior of students and ways in which they conducted their work (Younger & Warrington, 2002, p. 362).

The quantitative data showed that in all single-sex classes teachers often asked more questions in the all boys' classes than in the all girls' classes. In the year 9 math class for girls the mean number of questions asked by the teacher was 27 as compared to the mean number of 34 in the year 9 all boys' class. In year 9 geography the mean number of questions asked by the teacher in the all girls' class was 8.9 as compared to 17.6 in the all boys' class. The year 10 geography class had the opposite result; the teacher asked a mean number of 21.1 in the all girls' class and a mean number of 11.7 in the boys' class (Younger & Warrington, 2002, p. 363).

Girls' participation in the lessons was more active than the boys in the co-educational classes as well as the same-sex classes. In the co-educational classes girls' participation often dominated that of boys. In some of the same-sex lessons, the researchers found that teachers were trying to engage the boys to be more active in their learning experience by asking boys more questions than were asked of girls in their similar same-sex classes.

The qualitative data showed that the teaching styles were similar for the lessons taught to girls compared to the lessons taught to boys. The lessons that were seen to be most effective by the researchers were well-timed with various activities. The teachers interacted in a proactive manner with the students and seemed to focus on keeping the students motivated. The classroom environment was supportive of students' learning and had an atmosphere of trust and belief in students' achievement (Younger & Warrington, 2002, p. 364).

However, the study showed that there were differences as well in the teaching styles in same-sex lessons based on the learning needs of the students. Boys' lessons were often more structured than girls' lessons, had more of a variety of activities and more teacher motivation. Girls' lessons were less structured, had more possibilities for independent learning, and longer activities requiring continued attention. Girls appeared to be more self-motivated and able to stay focused on their own learning for longer periods of time. Boys needed more direction from teachers, more urging and more encouragement.

The qualitative data also showed that girls were more cooperative and collaborative and gave each other more peer support in their lessons as

compared to the boys' lessons. In the year 10 co-educational class teachers' expectations seem to depend on many girls who were very active and confident in the classroom. The boys tended to be much more passive and did not participate as often. Teachers expectations of the boys seemed to be lower based on this behavior.

Strengths of the study were that the school researched had a history of same-sex classes which made the longitudinal analysis possible.

Weaknesses of the study were that it was unclear how many students participated in the study. The way the school was organized made it difficult to compare the same teacher's teaching style with an all girls' class as compared to an all boys' class because only four teachers taught both types of classes.

In a comparison quantitative and qualitative study, Jackson and Bisset (2005), investigated what factors were important to parents when choosing an independent and same-sex or co-educational independent school for their children in the United Kingdom. Data was gathered from 225 responses from questionnaires in March 1999 and semi-structured interviews with 15 sets of parents. The goal of the questionnaire was to determine the priorities of parents when choosing independent schools and specifically whether or not availability of a same-sex school influenced their decision.

The researchers asked about family background; age of child, previous school attended, other children in family, ethnicity of parents, whether or not parents were educated in same-sex schools; other schools considered when present school chosen, reasons for choice of school, advantages and

characteristics of same-sex or co-educational schools, and willingness of parents to be interviewed.

Three schools were included in the data with students that were all juniors and seniors. They were all faith based schools and had competitive admittance procedures through examination. Schools were of identical size and the grounds were of comparable age and structure.

The researcher found during this investigation that the reputation of the school and exam results were major influences for parents. There was a prevailing view that same-sex education had advantages for girls and co-educational education had advantages for boys. 45 percent of those families who chose same-sex schools, indicated that same-sex was a reason for their choice of school. For the majority of parents (55 percent), a same-sex school was unimportant. 37percent of parents of boys and 54 percent of parents of girls indicated availability of same-sex schools as important to their decision of their choice of school.

Parents who chose co-educational schools (52 percent parents of girls, 66 percent parents of boys) believed availability of same-sex schools as important to their decision of their choice of school. Parents choosing same-sex schools for their daughters regarded schools ability to cater to needs of girls as the most important factor sought from the school.

For junior and senior girls, parents ranked awareness of the particular needs of the child as most important. The presence of many female teachers was strongest for juniors in contrast to seniors. For seniors the teaching of

science was more strongly emphasized than for juniors as was the absence of distractions from boys, and for both juniors and seniors a strong emphasis on games was least important.

For junior boys a strong emphasis on games was most highly ranked, a strong emphasis on the teaching of science, the facility to address the weaknesses that boys have in English, the presence of male teachers as good role models, an awareness of the particular needs of boys and the absence of distractions from girls in class. For senior boys the strongest was the teaching of science followed by the presence of many male teachers as role models. Third was no distractions from girls followed by the facility to address the perceived weaknesses boys have in English. A strong emphasis on games was ranked sixth and the emphasis on arts was last.

The strengths of this article were that all the schools by definition qualify as “respectable private” schools. The weaknesses were that no single parents were interviewed in the study and there were too few people in the sample from minority ethnic groups – the study cannot be generalized to a more diverse population.

In a comparison qualitative, ethnographic, anthropological study, Hubbard and Datnow (2005) examined whether same-sex schools improved the education of low-income and minority students. The subjects were low-income, minority boys and girls who attended three all-boy and three all-girl academies within California’s public school system.

The three schools included in this study were Evergreen Elementary, Pine Middle School and Palm High School. Evergreen Elementary was in a small rural Northern California town. Pine Middle School was located in Northern California in a predominantly poor and racially dominated district in an urban area. Palm High School was a same-sex alternative high school in an urban area in Southern California. A total of 88 interviews were conducted with boys (38 at Evergreen, 27 at Palm and 23 at Pine). 83 interviews were done with girls (41 at Evergreen, 27 at Palm and 15 at Pine).

Students in the study were all low-achieving and in some cases were two grade levels below the national average. The districts closed all same-sex schools in this study so no additional data on achievement was available.

The data was collected from 1998-2000. The method used by the researchers focused on day to day interactions of teachers and students in the context of the same-sex school setting and in the context of students' lives. Interviews were with students and teachers at the same-sex academies and with district officials.

The findings were based on field notes of observations of the same-sex classrooms and interviews done with teachers and students. They showed three important interrelated conditions that contributed to the positive experiences of low-income and minority students: the same-sex setting, financial support from the state, and the presence of caring, proactive teachers. School administrators supported this non-traditional curriculum, found resources that would benefit the non-traditional student body, and allowed more open in-class discussions about

the personal and practical as well as academic. The organization of the schools was helpful to the students and the resources and caring teachers were integral components of students' success.

Findings in this study assumed that students benefited from same-sex arrangements, but due to the short term arrangement of the same-sex schools in California, complete data was not available. The study suggests that the same-sex classrooms offered fewer social distractions to the students as compared to co-educational programs. Smaller class size, access to curriculum and academically and socially enriching experiences (due to excess state funding) also contributed to students' level of comfort and willingness to have personal conversations with their teachers.

A strength of the study was the racially diversity of the subjects. A weakness of the study was the possibility of philosophical and structural differences between the middle schools with same-sex classrooms (called academies) and the high school could have had an affect on the results. Also, the middle schools were co-educational with same-sex classrooms as compared to the same-sex high school. An additional weakness was that the data was inconclusive; the study discussed the importance of caring teachers and the struggles of low income students, but it did not conclusively address any concerns or benefits regarding same-sex education.

In a quantitative and qualitative study, Parker and Rennie (2002) researched whether gender-inclusive science instructional strategies were put

into practice more willingly and were more effective in same-sex or co-educational classrooms.

The data used for this study was obtained from qualitative data from teachers' perceptions that was triangulated with quantitative and qualitative data obtained from students' perceptions as well as further qualitative data from visits to two case study schools. Data related to students' perceptions were obtained through questionnaires designed to provide information about important science variables associated with gender-inclusivity, such as: attentiveness, teacher interaction, participation, student support and harassment (Parker & Rennie, 2002, p. 887). Students were also asked in open-ended questions to write something important to them about their same-sex and their co-educational classrooms. The data from this study is based on the questionnaire responses from students from six of the Single-Sex Education Pilot Project (SSEPP) schools; 409 students (173 males and 236 females). These students had experienced both same-sex and co-educational science classrooms at some point in 1993 and 1994.

Qualitative data was gathered from the observations of two individual schools in semi-structured classroom observations and interviews with students, parents and school staff.

The study found overall, teachers preferred same-sex classes for girls and co-educational classes for boys. Students, mainly girls, preferred same-sex classes although there was a variation among students' preferences as compared to teachers. In same-sex classes, girls were observed and perceived

themselves to participate more often, be more outgoing, interact more with the teacher and be harassed less from other students as compared to co-educational classes. Students' questionnaire responses on the "Student Support" section indicated that girls in the same-sex classes perceived that they received significantly higher levels of support from other students than they did in co-educational classes, or than boys did in either type of class (Parker & Rennie, 2002, p. 889). Teachers also perceived girls working together more collaboratively and cooperatively in same-sex classes.

There were fewer management problems in girls' same-sex classes, therefore teachers had more opportunities to introduce topics and context which were more significant to girls and improved their problem-solving and risk-taking strategies as well as the ability to solve open-ended problems.

Boys perceived themselves as receiving more encouragement from teachers and were able to talk more about personal matters in same-sex classes. The same-sex boys' classes created initial management problems for the teachers and in a few schools this problem continued throughout the project and some teachers were unwilling to teach all boys' classes. However, as the project continued, most of the boys' classrooms became increasingly "productive and constructive learning environments" (Parker & Rennie, 2002, p. 891). Two major issues that teachers were able to address were harassment and communication skills. In their questionnaires, boys from same-sex classes reported the most harassment from any group in the study, although this was from a small number of students.

Boys' communication in the same-sex classrooms were a concern for some teachers who felt that boys' classes required teaching strategies more typical of primary children where they needed many different activities. Other teachers saw the all boys' classes as an opportunity to concentrate on what was seen as "weaknesses" for boys, such as "task-oriented written and oral communication skills" (Parker & Rennie, 2002, p. 892). Several of the teachers worked on the development of the boys' communication skills through co-operative group work.

This study concluded that same-sex classrooms provided environments in which teachers could use gender-inclusive science instructional strategies more readily and effectively than in co-educational classrooms. In same-sex classrooms teachers were able to work more with students on weaknesses such as the low quality written and oral communication of boys and the limited experience of girls with "hands-on" activities and open-ended problem solving. The strategies were more successful when there were less management issues. The girls' classes had much fewer management problems than the boys' classes and the co-educational classes. Therefore, in the girls' classes there was more time for applying gender-inclusive strategies that involved cooperative group problem solving, projects that focused on daily issues, and collaborative practical work.

A strength of the study was the inclusion of students' and teachers' perceptions of same-sex and co-educational classes. Also, the gender-inclusive

training the teachers received seemed beneficial to their instructional strategies in their classrooms.

A weakness of the study was that specific demographics of students and teachers were not given. Also, specific statistical data were not included.

In a comparison qualitative study, Warrington and Younger (2001), investigated the rationale behind the original decision to put into practice same-sex classrooms, analyze the curriculum and discuss the strengths and weaknesses of same-sex classrooms from the perspectives of parents, students and teachers.

The school examined for this study was a co-educational comprehensive school in England founded in the early 1970s. Students were taught in same-sex classrooms for all lessons from Years 7 to 9. Boys and girls remain in same-sex classes for the core subjects and tutor sessions in Years 10 and 11, but were taught together for the “Foundation Subjects” and for “Personal, Social and Careers Education (PSCE)” (Warrington & Younger, 2001, p. 342). Early in the 1998-99 school year parents who attended a Year 7 “Open Evening” were asked to fill out a questionnaire survey. 136 responses were received, 75 from parents who had girls in Year 7 and 61 from the parents of boys. Of the 87 total parents that responded, 64 percent felt that both girls and boys benefited from same-sex education. The parents felt that the main advantage of same-sex classrooms were its effects on the learning environment. 53 percent of parents felt that there were less distractions in the classroom which allowed students to concentrate and focus on their work more easily (56 percent of these parents had a daughter

at the school). 20 percent of parents thought that same-sex classrooms recognized that boys and girls mature and develop at different rates and that specific teaching strategies could be implemented to meet the different learning styles of boys and girls. 15 percent stated gender advantages, such as for boys in English and girls in science, or differences in behavior related to boys being noisier and girls being able to calm down in class better without the distracting behavior of boys. Other parents suggested that boys have to participate more and work harder in all boys' classrooms. 89 percent of the parents shared that they would be "unhappy and have serious misgivings" if the school changed its same-sex class policy for the lower grades (Warrington & Younger, 2001, p. 345).

The students were interviewed in focus groups with six same-sex groups of Year 9 students and six same-sex groups of Year 10 students. By Year 9, almost all the students felt that there were advantages to same-sex classes. Both boys and girls felt that they could concentrate more effectively, had more confidence in themselves (girls shared this view more often), and that it was easier to contribute to discussions and ask questions without fear of being teased from the other sex (Warrington & Younger, 2001, p. 346). Several students recognized that they felt more comfortable in same-sex groupings with supportive friendships (especially the girls) which were conducive to a more supportive learning environment. Girls felt that they cared more and took more pride in their work. They felt they could more freely show their feelings related to hormonal changes, emotional ups and downs away from the negative reaction of some

boys. There was also a feeling from both boys and girls that they got better grades in same-sex classes. Boys mentioned that they felt that the competition was more equal in same-sex classes; they were less likely to feel failure when they did not do well in the same-sex classes as compared to the co-educational classes.

Interviews were conducted with the head teacher, two deputy heads, seven long time members of the staff, five more recently appointed staff members, and with the Chair and Vice-Chair of the Governing Body. The majority of the teachers agreed that same-sex teaching had academic advantages to same-sex schooling because students could socialize during the school day and in extra-curricular activities. They focused on the possible benefits of teaching and learning for girls. Girls were thought to do better academically without the “distraction” of boys seeking attention or engaged in off-task behavior. Girls were also thought to be less intimidated, ask more questions and less likely to worry about the possible reaction of boys. Also, girls were seen to benefit because of their greater maturity, their ability to stay focused on their learning and be self-motivated. Boys were seen as a disruption to learning because of their need for attention (Warrington & Younger, 2001, p. 349).

Some staff saw classroom management and student motivation to be easier in same-sex classes, although staff reiterated that this had as much to do with grouping students by ability as it did with grouping them by sex. However, most staff suggested that any differences in their teaching style that occurred with girls’ classes and boys’ classes were not pre-planned, but rather a reaction

to students during the lesson. Overall, teachers felt that they attempted to teach the students equitably and only responded differently to boys or girls in specific situations.

The study concluded that both parents and students recognized the advantages of the same-sex classes. Girls and boys felt that it had advantages for both sexes and that these advantages were greater than any social disadvantages. However, most staff recognized the benefits for girls, but did not see as many benefits for boys. There was little consideration for ways in which same-sex classes could be advantageous for boys. The same-sex classes were considered to be part of the “culture of the school” and as a consequence few staff recognized that same-sex classes included students with wider ranges of ability in comparison to the co-educational classes. Staff did very little to plan lessons that accounted for different learning styles or used explicit teaching styles and strategies which could benefit boys-only or girls-only classes.

The strength of this study was the comparison of same-sex to co-educational classes and the shared perspectives of teachers, parents and students. The weaknesses of the study were that the total number of students, teachers and parents included in the study was unclear and the interviews with teachers seemed to focus on the teaching and learning of girls rather than both boys and girls.

The above articles explored same-sex versus co-educational classrooms. There was a common perception that girls’ participation in the classroom was more active than the boys in the co-educational classes as well as the same sex

classes. In some studies girls' participation often dominated that of boys in co-educational classes. Few of the studies reported teaching styles which changed in same-sex classes based on the learning needs of the students. Boys' lessons were often more structured than girls' lessons, had more of a variety of activities and more teacher motivation. Girls' lessons were less structured, had more possibilities for independent learning, and longer activities requiring continued attention.

In the many of the studies girls were reported as more self-motivated and able to stay focused on their own learning for longer periods of time. Boys needed more direction from teachers, more urging and more encouragement. Girls also gave each other more peer support, were more cooperative and collaborative.

A study in which the subjects were more racially diverse, suggested that the same sex classrooms offered fewer social distractions to the students as compared to co-educational programs. Smaller class size, access to curriculum and academically and socially enriching experiences also contributed to students' level of comfort and willingness to have personal conversations with their teachers.

Another conclusion was that parents felt that same-sex education had advantages for girls and co-education had advantages for boys. Teachers preferred same-sex classes for girls and co-educational classes for boys. Students, mainly girls, preferred same-sex classes although there was a variation among students' preferences as compared to teachers. In same-sex classes,

girls were observed and perceived themselves to participate more often, be more outgoing, interact more with the teacher and be harassed less from other students as compared to co-educational classes. Girls in the same-sex classes perceived that they received significantly higher levels of support from other students than they did in co-educational classes, or than boys did in either type of class. Teachers also perceived girls working together more collaboratively and cooperatively in same-sex classes.

Summary

These articles raised concerns that the educational experience of boys and girls amplified societal stereotypes and gender role conformity rather than challenged teachers to create gender equity in the classroom. There were fewer management problems in girls' same-sex classes; therefore, teachers had more opportunities to introduce topics and context which were more significant to girls and improved their problem-solving and risk-taking strategies as well as their ability to solve open-ended problems.

The above articles show a pattern of struggle that boys and girls both have with their gender identities. The majority of the articles studied predominantly White working- and middle-class students. The commonalities of the articles describe adolescence as a time when puberty, peer relationships and perceptions, teachers' perceptions and stereotypical norms dictate roles that are considered "feminine" and "masculine" which proscribe the gender identities of adolescent boys and girls.

The majority of girls had positive reactions to same-sex classes, whereas the majority of boys had negative reactions to same-sex classes. Overall, it seemed that the majority of results stated same-sex classrooms had more advantages for girls' achievement than boys'.

CHAPTER FOUR: CONCLUSION

Introduction

Chapter one explained the rationale of this paper as examining the effects of same-sex schooling and co-educational schooling on elements of students' achievement, socialization such as self-esteem and peer relationships, differences in students' and teachers' perceptions based on gender and issues related to race and socioeconomic status. Chapter two focused on the historical background of education and same-sex versus co-educational schooling and the beginnings of both in the United States, as well as biological differences. The AAUW report showed that there were significant differences in the ways boys and girls experienced schooling. Chapter three reviewed the available research to examine the questions introduced in chapter one. Chapter four examines the questions raised, summarizes the findings from chapter three and suggests classroom implications as well as implications for further research.

Summary of Findings

The studies showed that teachers do treat boys and girls differently based on their findings. Although the studies themselves were quite different based on the different perceptions of students versus the perceptions of the teachers, they do speak to the different ways that teachers interact with boys and girls based on gender in same-sex and co-educational class settings.

These articles raised concerns that the educational experience of boys and girls amplified societal stereotypes rather than challenged teachers to create gender equity in the classroom. According to students, interaction between

students and teachers seemed to support the gender stereotyping of girls as compliant and boys as challenging of authority. Teachers were perceived as having lower expectations of boys than girls. Boys were seen as under-achieving and girls were seen as high-achieving. There were also differences in teachers' perceptions of students when the teacher was of a different race or ethnicity than the student. Also, students who had low-socioeconomic status were perceived more negatively when the teacher was of a different race or ethnicity. Gender, race and class affected the perceptions of classroom interactions between students and teachers. As children discovered their gender identity it would appear that stereotyped behavior may be reinforced rather than challenged by the classroom teachers.

Other articles researched show a pattern of struggle that boys and girls have with their gender identities. The majority of the articles studied predominantly White working and middle class students. The commonalities of the articles described adolescence as a time when puberty, peer relationships and perceptions, teacher's perceptions and stereotypical norms proscribe the gender identities of adolescent boys and girls. In many of the articles girls were seen as more organized, hard-working, and cooperative as well as resisting stereotypical feminine gender norms that equate them as less than equal to boys. Boys were seen as working less hard on academics in order to maintain a "cool" image for their male peers. Boys seen as having "feminine" qualities that ranged from being visually academic, showing emotions and expressing feelings, and to being uninterested in sports were bullied or ridiculed by boys who were

strongly maintaining a more “masculine” image. Boys also seemed to be torn between valuing academics in order to prepare for their futures while, at the same time, appearing to be uninterested in academics. The one article by Dubois et al. (2002), explored differences between Black and White youths that delved more deeply into identity issues related to stress caused by discrimination based on gender and/or race. The students’ perceptions of their identities were based on their experiences within the classroom as well as in their communities.

Some of the studies described the differences between the perceptions of boys and girls toward same-sex classes. The majority of girls had positive reactions to same-sex classes, whereas the majority of boys had negative reactions to same-sex classes. Same-sex classes did not seem to be as helpful for boys as they were for girls. Girls’ gender identity was affected by co-educational schooling because they were more likely to have a more stereotypical feminine identity. However, girls also described themselves with “masculine” traits which could be related to academic success and teachers’ expectations of students’ behavior in co-educational schools. Girls’ compliance with traditional female roles in co-educational schools seemed to be related to acceptance from peers. Boys’ gender identity did not seem to be affected by school type. However, many articles suggested that boys’ behavior was more manageable in co-educational classes due to the influence of girls who were more motivated in the classroom.

The findings of the research reviewed have mixed results. Some studies pointed to differences in gender and stated the benefits of same-sex schooling

for girls. Other studies saw benefits for both boys and girls, although they still focused more on the benefits for girls. The relationship of achievement and teachers' assessment was the topic of a large majority of the studies. Teachers' and students' perceptions of the two types of schooling were also explored. Teachers' bias related to gender equity were part of the articles that discussed gender beliefs and perceptions.

Overall, in the articles studied, the academic success of boys and girls showed no significant difference between same-sex and co-educational schools. The significant differences were students' perception of their academic success as well as teacher's and parent's perceptions. The differences in the socialization, peer relationships and self-esteem of boys and girls appeared to be significant.

A major weakness in most of the studies was the lack of socioeconomic and racial diversity of the students involved in the study. Several of the studies had confusing data in which the total number of subjects studied was unclear. Another major weakness in the majority of the studies that focused on same-sex versus co-educational schooling included schools that did not participate in adequate training for teachers on gender equity, peer relationships related to gender, classroom practices and curriculum that was gender inclusive as well as training on teacher bias related to gender. These are all aspects of teaching training and education that should be a mandatory part of teacher education programs as well as continuing professional development.

Classroom Implications

Racial, ethnic and gender differences between students and teachers have significant effects on teachers' perceptions of their students' performance. Alternative policies that improve teacher effectiveness for all teachers would be one way to close gaps in achievement (Dee, 2005, p. 164). Martino stated that it was important for those who worked in schools to help boys to gain an understanding of masculinity and engage them in analyzing homophobic and heterosexist versions of masculinity in schools. He further explained that encouraging boys to reflect on and recognize the behavior that leads to certain forms of masculinity will engage them in the process of critically thinking about these issues. This type of gender equity educational practice could improve the school lives of boys as well as girls (Martino, 1999, p. 260).

Some of the researchers stated that one way to challenge the gender gap that exists in the General Certificate of Secondary Education (GCSE) work was to challenge the stereotypical image of men, encourage a work ethic in boys and make hard work acceptable in their social groups as well as actively praising and encouraging good work from both boys and girls. Also, the support of collaborative work as opposed to competition, giving boys the skills they need to make realistic plans for the attainment of future goals may also help narrow the gender gap in achievement (Warrington et al. 2000, p. 405).

Herr and Arms claimed that poor, urban adolescents were at higher risk for dropping out of school and those underrepresented students "need relevant, engaging, lessons" (2004, p. 550-551). They suggested that without a focus on

race, social-class and gender relations in the classroom and school, same-sex programs may perpetuate stereotypes and damage students' educational and future opportunities. (Herr & Arms, 2004, p. 552).

I plan to use these ideas for my elementary and middle school classrooms in order to provide an equitable environment for all students irregardless of race, gender or class.

Implications for Further Research

Research on appropriate teacher training related to the specific aspects of the student-teacher dynamics would be helpful to use as a guide to change public policy related to the demographic relationship between student and teacher (Dee, 2005, p. 164) Future same-sex programs should address issues of equity and this would guide the curriculum, assessment and teaching styles (Herr & Arms, 2004, p. 552). Further research related to gender differences should include the examination of teaching and learning processes, curriculum and assessment, teacher-student interactions, parental attitudes, post-school opportunities, social class and ethnicity (Tinklin, 2003, p. 322-323).

Longitudinal analysis based on qualitative and quantitative data was the most thorough and conclusive with its results. More research studies using this methodology would be helpful in further studies that focus on gender differences and types of schooling. Also, studies using a more diverse group of subjects would make the studies applicable to a wider variety of people.

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