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One Sex, One School, Who Wins: How Single-Sex Learning Environments Impact Educational Attainment, Socio-Emotional Health, and Ambitions

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LOYOLA UNIVERSITY CHICAGO

ONE SEX, ONE SCHOOL, WHO WINS:
HOW SINGLE-SEX LEARNING ENVIRONMENTS IMPACT
EDUCATIONAL ATTAINMENT, SOCIO-EMOTIONAL HEALTH, AND AMBITIONS

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ABSTRACT

Research on single-sex schools has covered a variety of matters regarding the effectiveness of their programs. This paper examines research on single-sex schools over the past 30 years in an effort to harmonize the past discourse with present trends. Journal articles and government research were used to synthesize the variety of methods used to ascertain whether single-sex schools have a positive influence on boys, girls, or both parties. Research trends have overwhelmingly supported all-girls schools, while remaining skeptical of any positive influence on boys. Much of the research supporting all-girls schools also suggests that single-sex schools’ benefits are applicable to traditionally disadvantaged ethnic minorities as well as students from a lower socioeconomic class.
Introduction

Over the past 30 years, a debate about the effectiveness of single-sex schools has raged within academic circles. Its advocates have long argued that single-sex schools improve student performance and reduce gender stereotypes (Bryk & Lee, 1986, p. 389; Catsambis, 1994, p. 203). Meanwhile, its opponents believe that these schools create no academic benefits for their students, stunt the social development of these students, and are generally inefficient (Datnow, Hubbard, & Woody, 2001, p. 72). As a result of this disagreement, the discussion has essentially been condensed into three primary questions. In what ways, if any, do single-sex schools foster a greater level of academic achievement? How do single-sex learning environments impact students’ academic and social experiences in high school? How do these environments affect students’ postsecondary ambitions?

Proponents of single-sex schools include educational researchers Linda J. Sax, Valerie E. Lee, and Helen M. Marks. They argue that single-sex schools promote an environment more conducive to learning than coed schools and specifically help girls’ test scores, confidence, and scholastic engagement (Sax, 2009, p. 9).
Furthermore, Fred Mael writes that such environments reduce the amount of ‘rating and dating’ and the emphasis on social standing in schools that is seen in coed environments (Mael F. A., 1998, p. 104). Many proponents also believe that having peers exclusively of the same sex will increase students’ focus on academics as there will be fewer social diversions in the classroom. These researchers feel this will create an emphasis on schoolwork and other school related activities will alleviate pressure from the opposite sex to fill certain stereotypes and create more students willing to take on leadership roles (Bryk & Lee, 1986). Those favoring single-gender schools continue by stating that having a only one gender in a classroom reduces the number of distractions for students and allows them to avoid intensified anxiety or intimidation caused by the presence of the opposite gender (Lee & Marks, 1990, p. 588).

Not all education research supports single-sex schooling. Paul LePore and John Warren found that it produces no significant impact for girls and that, while boys perform better on standardized tests, they do not necessarily learn more (Lepore & Warren, 1997, p. 505). Other critics such as Dominique Johnson question the ability of students to socialize properly with members of the opposite sex while generating unnecessary costs by requiring twice as many schools as traditional coed classes (Johnson, 2009). Fred Mael also lays out several arguments for coeducational schools, foremost being that they serve as a more accurate representation of the real world and reduce the need for students to adapt to coed environments after graduation (Mael F. A., 1998, p. 103). David Tyack and Elisabeth Hansot write that coeducation is more reasonable than single-sex schools
because girls’ schools are not as well funded as boys’ schools, thus inhibiting the growth of female students (Tyack & Hansot, 1988). Opponents also state concerns that single-sex schools promote negative stereotyping of the opposite gender and that girls in particular will have lower aspirations without their male counterparts to learn from (Johnson, 2009, p. 125). Additionally, the feminist perspective is important to consider when discussing single-sex schools as concerns have arisen that all-girls schools serve as a submission to male dominance and do not teach girls how to compete with men in the corporate environment they will experience upon leaving school (Kenway & Willis, 1986). Furthermore, parents critical of single-sex schools, along with scholars such as David Baker, Cornelius Riordan, and Maryellen Schaub debate whether students in single-sex environments see a gain in their academic achievement level. Even when improvement does occur, they question whether single-sex schools are truly what accounts for any differences in performance (Baker, Riordan, & Schaub, 1995, p. 481).

As a result of these disagreements, much research has been conducted on this issue and has produced results supporting both sides throughout the past 30 years. During the 1990s, researchers found single-sex schools have a positive impact across the board for females, while males tended to see little benefit academically or socially (Mael F. A., 1998). Findings after this point found that single-sex schools’ benefits are applicable across all historically disenfranchised groups, primarily women, ethnic minorities, and low-income students (Riordan, 2002, p. 18). However, modern research
has refuted several of the claims of success, specifically in the public sector, citing factors such as ignoring socioeconomic background and oversimplified results.

This paper expands upon these results and finds common themes that influence the impact of single-sex schools upon its students in relation to coeducational environments with regard to academic performance, socialization, and in post-secondary education. It will initially examine the research regarding males and females in single-sex schools, then progress into the social aspects of these schools, and finally their impact on students’ ambitions once they graduate. The research following the impact of single-sex schools on each gender’s academic performance on standardized test scores, socialization, and post-secondary aspirations will be followed by a discussion and analysis of the findings. Many of the issues that arise within these results require an understanding of the roots of single-sex education in the United States and how they served to create the system in place today.

**History of Single-Sex Education in the United States**

The prominence of single-sex education in the United States has been particularly volatile. From the early part of the 20\textsuperscript{th} century through the 1950s, single-sex schools were primarily Catholic. However, a decided shift began to occur after the Second Vatican Council in 1965. Vatican II eased the Catholic Church’s stance on coeducational settings due to the practical and financial concerns associated with single-sex schooling. Foremost among these concerns was the fact that single-sex schools required twice as many separate school structures as coeducational schooling as a result of dividing
students by their gender. These changes in policy lead to a sharp decline in the number of single-sex schools between 1966 and 1986. The percentage of students attending single-sex colleges and universities dropped from 25% to 6% during this time span. The decline was just as precipitous in high schools during that time as the percentage of all-boys schools dropped from 37% to 11%, the percentage of all-girls schools dropped from 24% to 12%. Meanwhile, coed schools increased their market share from 38% in 1966 to 76% in 1986 (Lepore & Warren, p. 487).

The past 30 years have seen a comparable level of fluctuation with regard to single-sex schools. The continued enforcement of Title IX contributed to the further suppression of growth for these schools during the early part of the 1990s as some single-sex schools were seen as promoting gender inequality. Furthermore, with the increase in funding for girls’ programs in coed schools, the incentive for attending single-sex schools decreased (Lee & Marks, 1992, p. 227). More recently, single-sex schools have been buffeted by the introduction of No Child Left Behind, which allowed school districts to allocate local or innovative funds in order to offer more single-sex schools and classrooms. (Riordan, et al., 2008, p. ix). In 2006, Title IX was reinterpreted by the US Department of Education to allow single-sex classes within coed schools if it was “substantially related” to achieving important governmental or educational goals (Halpern, et al., 2012, p. 1706). The goals were broadly defined as using single-sex environments in the public school system to further aid students who have struggled in traditional coed environments (Ibid). These changes have lead to an increase in the
number of public, single-sex high schools: the US Department of Education now recognizes 506 public schools that offer single-sex educational opportunities and 390 of those are coed schools that offer single-sex classrooms, up from 12 just a decade ago (National Association for Single Sex Public Education, 2011).

While significant growth has occurred in the public sector, there are still several critics of public single-sex learning environments. According to Riordan (1990), one of the primary objections to single-sex schooling is the associated cost of having two schools where only one was previously necessary (p. 11). He also cites the fact that opponents believe it fosters gender inequality. Proponents of the process, such as Bryk & Lee (1986), see the inverse of this occurring and state the belief that single-sex schools will remove stereotypical attitudes and allows a greater level of focus for students in the classroom environment (p. 389). The removal of such stereotypes is what many modern proponents believe is one of the greatest benefits of single-sex schools, as they break from the models that created disenfranchised groups, such as women and ethnic minorities, in the first place (Riordan, 2002, p. 18). In spite of this wide variance in opinion, the growth of public single-sex learning environments continues unabated.

Despite the success in the public sector, the upswing has not been reciprocated in Catholic single-sex schools as the number of such schools has dropped in unison with Catholic schools in general, leaving only 380 such schools in 2012 (McDonald & Schultz, 2012). Nonetheless, the decline in the private sector does not portend doom for single-sex education, particularly with the rapid increase in single-sex options in the
public sector. This flux has resulted in a vast amount of research that argues both sides of whether single-sex schooling produces meaningfully positive academic and social results for its students. Efforts to better understand single-sex schools have evolved from a focus on academic achievement to their social implications, ultimately seeking to explore why single-sex schools have such mixed results: an answer that lies within the broad range of studies conducted on the topic.

**Methodology**

This paper is a literature analysis on research with single-sex education and mixed-gender education environments serving as the constants within the research.

The primary source of analysis comes from scholarly articles on single-sex education and its advantages for both males and females. Due to the variety in opinions and methods of analysis on single-sex schools, a variety of research from different years was used in this paper. The primary emphasis is on peer-reviewed journal articles and published reports from the US Department of Education after 1980 so as ensure the greatest level of consistency. These sources provide the paper with the data necessary to show the evolutionary trends in single-sex education research. With single-sex and mixed-gender environments as the mediating variables it analyzes previously conducted studies for a causal relationship between achievement and single-sex learning. Specifically, there are three outcome variables by which researchers have determined the effectiveness of single-sex schools.
Some authors, such as Bryk & Lee (1986) have focused on single-sex education’s impact on students’ test scores. Others like Lee, Marks, & Byrd (1994) have examined the social effects single-sex education, particularly the nature of sexism and gender roles students encounter. Finally, recent research, particularly from Sax (2009) has begun to emerge regarding the impact single-sex schooling has on students after they leave high school. While these factors have been examined individually, the way in which they interact with one another to create learning environments is thus far unexplored.

Given the varied results of studies revolving around these variables, combing through the mechanisms provide further insight into the impact of single-sex schools: the ultimate goal of this paper. While examining this data for overarching themes that may emerge from the selected research, basic trends in the overall composition of American education must also be considered so as not to skew the data. Particularly with regard to examining collegiate ambitions, it is examined through the lens of modern college enrollment figures with relation to those at the beginning of the range selected.

**Article Selection and Evaluation Criteria**

This study’s data comes from existing literature using the past analyses they have conducted on the attitudes of students toward both single-sex and mixed-gender education. Several articles consist of both quantitative and qualitative data, including some with interviews of students in both coeducational and single-sex schools. The opinions of students are used to supplement the other data regarding student performance
and their experiences to form a comprehensive picture of the trends and effectiveness of single-sex education.

The criteria used to determine the trends in these studies are threefold. First, articles that examine student performance in math and science of students in single-sex schools are used to frame the arguments that such schools are either effective or ineffective in promoting learning. This data is then parsed for patterns that single-sex schools create in the socialization of their students: particularly with regard to stereotyping, as well as how they are treated by peers and teachers. Finally, research conducted about the future ambitions of students are discussed to add further support to these arguments. As a result of this discussion, tendencies emerge that signal commonalities in the successes and failures presented by the prior research.

Only studies published between 1980 and the present day are used in this paper. Those few studies published prior to 1980 found these schools beneficial for females, but these findings were generally from small sample sizes and originated from outside the United States. In order to whittle the field of viable studies and articles down to a manageable level, only research from peer-reviewed journals and books from major publishers are used to create and highest level of authenticity in the findings of this paper. Approximately 60 articles were considered for inclusion in this paper, but several were excluded due to redundancies with other, more prominently cited articles. Those that were included served as the benchmark for several other articles in their focus on single-sex students’ academic performance, socialization, and postsecondary ambitions. They
also represented the widest possible berth of research trends within single-sex education. These studies were primarily from the academic journal indexes JSTOR and the Education Resource Information Center (ERIC). The actual journals used cover a wide range of subjects, but the most prominent journals are the *American Education Research Journal*, *Journal of Educational Psychology*, *Journal of Sociology*, *Sociology of Education*, *Comparative Education Review*, and *Review of Educational Research* as well as published reports from the US Department of Education. The US Department of Education reports are particularly relevant as a result of their renewed policies favoring single-sex education as it creates a baseline against which modern critiques of their policies can be viewed. Research from international sources, particularly the *British Educational Research Journal* is also used to supplement data derived from the United States. Furthermore, several researchers, particularly in the 1980s and 90s cross-referenced their findings with those in England, adding further saliency to its inclusion. However, the majority of research from outside the United States is not used in this paper as it is, by many of the authors’ admissions, not analogous to the variety of differences between the studied cultures and American education systems.

The ultimate evaluation will come in the form of synthesizing the various mechanisms at work that make single-sex learning environments unique from their coeducational counterparts. This is accomplished by contrasting findings of researchers from different years, the prior trends of schools leading up to that point, and the subsequent evolution of these findings. Combining this prior research with present trends
is an important part of this and is used to guide the discussion about the forces that have
dictated and continue to dictate policy on single-sex education. Additionally, it will seek
to determine the ultimate social factors that come into play for students in single-sex
schools and whether these schools improve the post-secondary ambitions of their
students.

**Literature Review**

The emphasis of single-sex education research over the past 30 years has shifted
dramatically to incorporate three major themes: academic achievement, socio-emotional
development, and post-secondary ambitions. The direction of research within these
themes has also shifted as time progressed with each leading to a wide variance of
gender-specific results.

Prior to the 1980s the research on single-sex schools was sparse and
largely focused solely on academic achievement. Consequently, this paper directs its
focus on research produced after 1980 and will primarily include research from within
the United States, although certain studies from England will be used to substantiate
some of these findings.

**The Impact of Single-Sex Schools on Girls’ Academic Achievement**

The earliest research on single-sex education that is seen in this sample focused
directly upon the impact that these schools had on each gender independently (Bryk &
Lee, 1986). However, as the research progressed the question being tested in these
studies shifted from, “Do single-sex schools produce greater academic achievement?” to
“Why do single-sex schools have an impact on academic achievement for some students, but not for others?” As a result, many early studies did not control for students’ socioeconomic background or prior differences in achievement between single-sex and coed schools.

The research on single-sex schools’ impact on girls’ academic achievement has followed a consistent theme since its inception. Bryk & Lee (1986) showed that both males and females in single-sex schools did more homework, but primarily saw an improvement in female students’ test scores in both reading and science (p. 377). They expanded upon these results and showed that by their senior year of high school, girls were a full year of science ahead of their coed counterparts (p. 388). This research began to transition by the end of the decade as researchers had essentially come to an agreement that girls in single-sex schools had higher test scores than coed girls (Jimenez & Lockheed, 1989; Riordan, 1990). Lockheed & Jimenez (1989) were among the first to note the selection bias that is inherent to single-sex schools. They specifically focused on the idea that single-sex schools were more likely to attract students from a higher socioeconomic background and whose parents placed a greater emphasis on education, thus leading to greater performance regardless of the school. So, Lockheed & Jimenez controlled for students’ socioeconomic status and other background factors to determine whether this changed the results. However, their research further confirmed the findings of Bryk & Lee (1986) as well as quelling some of the questions about the methodology of Bryk & Lee raised by Marsh (1989) (Jimenez & Lockheed, 1989, p. 135).
This initial shift from the analysis of only academic results to other scholastic factors continued as Catsambis (1994) found that a greater percentage of females in single-sex schools enrolled in more difficult math classes (p. 203). Perhaps of more significance was the fact that prior to high school these females had been uninterested in both math and science, something also observed in girls attending coed schools (p. 205). However, the alleged success of single-sex schools for girls’ academic success according to these early findings was thrown into question by Baker, Riordan, and Schaub’s 1995 cross-national study. Their work contradicted many of the findings claiming to eliminate selection bias in single-sex schools as they felt it was not as simple as merely accounting for the fact that higher caliber students often attend single-sex schools (Baker, Riordan, & Schaub, 1995, p. 481). While testing the impact of single-sex schools across other nations they found that, while in America such schools represent a higher level of academic excellence, this is not always the case elsewhere. Japanese single-sex schools typically enroll students who enter with a lower academic standing than the public schools, which are considered more prestigious. As a result, their findings showed that single-sex schools in Japan were producing an overall negative impact on their students’ academic achievement (p. 479).

The late-1990s marked perhaps the largest shift in the agreed upon paradigms of single-sex education for females. Lepore and Warren (1997) retested Bryk & Lee (1986) on new, yet similar data sample and found a huge discrepancy in their results (p. 505). Girls in single-sex schools showed no improvement in academic performance when
compared with girls in coed schools and, while this result was not tremendously different from the results of Baker, Riordan, & Schaub (1995), their explanation centered upon the idea that a shift occurred in the academic culture of the United States (p. 500). As previously mentioned, the number of Catholic schools dropped precipitously through the 1980s continued into the 1990s, an event that caused many researchers to consider the possibility that single-sex schools’ populations were becoming diluted. If the introduction of students who may not have otherwise chosen all-girls schools causes a decline in the findings of academic successes in these schools, it calls into question their overall effectiveness at producing scholastic achievement (p. 506). Shapka & Keating (2003) attempted to resolve this particular issue conclusively when they randomly placed girls from coed schools in single-sex classrooms in order to eliminate selection bias. This study resulted in girls seeing an improvement in their test scores, both in math and science, when compared to their scores while in coed environments. However, this improvement did not generate any new interest in these subjects for the girls (p. 953).

This period during the 1990s marked the first time in single-sex education research to this point that a consensus opinion by researchers argued against its positive impact for females’ academic achievement. This trend began to reverse as both Mael (1998) and Singh, Vaught, & Mitchell (1998) again found all-girls schools be effective in this arena. They also emphasized an important new direction for future research with their discovery that many of the positive results for females were also applicable to non-white minority groups as well as economically disadvantaged students (p. 165).
(2002) echoed this sentiment stating that while girls saw greater achievement in single-sex schools than coed environments, their positive growth had plateaued and noted that ethnic minorities saw improvement in reading, math, and science scores (p. 14). Because of these findings, he predicted, single-sex schools would ultimately be more successful in the public sector so long as they were earmarked for underrepresented students, specifically women, minorities, and poorer students (p. 18).

The relaxation of Title IX codes in 2006 that resulted in the explosion of public single-sex schools opened the door for a plethora of new research on all-girls schools. The early results from a 2008 US Department of Education study confirmed the hypothesis of Riordan (2002) by surveying primarily low-income and minority students. This research found that 35% of students in public single-sex schools saw an improvement in their math and reading test scores over students in coed schools (Riordan, et al., 2008, p. 8). Only recently has there been a new countermovement against all-girls schools, lead by Halpern, et al. (2012), who criticize the approach of the US Department of education, accusing them of purposely overlooking factors that contradict their findings, such as student background and school selectivity (p. 1707).

Of particular relevance in the research of Lee & Marks, Riordan, and others is that they began to examine what caused the positive impact of single-sex schools on females and minorities. While Riordan lists 12 primary factors, centering around the elimination of biases (e.g. – gender stereotyping of students by teachers) and a greater focus on academics (particularly creating more classroom interaction between teachers and
students), Lee & Marks (1992) states quite simply that “Boys (and their parents) who seek opportunity in single-sex schools expect to find it through the traditional structure, since the society has traditionally reflected a dominant role for males” (p. 245). This emphasis on what makes single-sex schools effective for females follows the wave of research on the social and emotional impact these schools have on them as well.

**The Socio-Emotional Impact of Single-Sex Schools on Girls**

The research on the social environment created by all-female schools again appears to move from the realm of what impact it has to how it makes that impact. Bryk & Lee (1986) were among the first researchers to show that female students in single-sex schools were less likely to fall into stereotypical gender roles. They hypothesized that the separation of students’ learning environment based upon gender fosters their growth as they can operate without any concern about fulfilling a certain archetype for behavior (pp. 389, 394). Lee & Marks (1992) expanded upon this concept as their findings supported the idea that girls who choose to go to a single-sex school do so based more so upon the social environment than the academic standing of the school. They were careful to add, however, that the destruction of gender roles is not inherent to all-female schools; they must be purposefully set up to do so (p. 245).

Lee, Marks, & Byrd (1994) takes this notion a step further and explores the prevalence of gender inequity within the classroom and the associated biases that accompanies it. Their study found that all-female schools saw instances of sexism in 45% of the classrooms they studied, primarily committed by teachers themselves. Sexism
was defined as one of six different acts: Gender reinforcement, embedded discrimination, sex-role stereotyping, gender domination, active discrimination, and explicit treatment of a male or female as a sexual object. Of particular interest to their examination, they discovered that in coed schools 60% of the sexist incidents occurred in science classes, despite only accounting for 20% of the observed classes. Examples of these incidents ranged from reprimanding girls for raising their hands to comparing certain chemistry tasks with household chores (p. 103). While the number of observed instances of sexism in Science classes was lower in all-girls schools, Lee, et al. still recorded a strong overdependence upon the teachers (asking for and receiving more assistance, excessive reassurance that a particular task was being performed correctly) and belittling of students by older teachers (p. 106). This lead for the first of many calls to ensure better, more specific training for teachers in single-sex schools (Datnow, Hubbard, & Woody, 2001, p. 72). If single-sex schools were to truly succeed in eliminating gender-based stereotypes, the teachers needed to be trained to accomplish this task. They saw several instances where girls were encouraged to be ambitious in their goals, but then were immediately praised for being feminine, acting like a lady, and completing other actions that fulfilled their gender roles. These acts were as simple as applying makeup and “looking pretty when boys are around” and served as an example of teachers’ inability to remove themselves from gender biases (Ibid). With proper training, they found teachers more comfortable talking to their students about personal issues and affecting change within their lives (p. 73). However, the primary issue with incorporating specific teacher
training into all-girls schools, and any single-sex school in general is that there is rarely enough transitory time to make such radical adjustments to a staff training regiment, particularly with the high staff turnover that occurs in schools (Protheroe, 2009, p. 34).

Datnow, Hubbard, & Woody (2001) examined students in public schools, as did the US Department of Education’s 2008 report on the recent growth of public single-sex schools. However, their research reached different conclusions while also having different reasoning for these differences. Datnow et al, while acknowledging that the sample size was still very small, believed that single-sex schools may struggle in the public sector. They were particularly concerned about the social implications inherent to single-gender classrooms. Since the buffer that exists when members of the opposite gender are present disappears, they worried it would lead to increased cattiness among girls (p. 73). Meanwhile, the USDOE’s study on public single-sex schools painted a wholly different picture, citing more positive social interactions between students in all-girls schools in addition to better classroom control by teachers, socio-emotional benefits such as increased confidence among students, and a safer overall environment as reasons for the academic improvement of the students (Riordan, et al., 2008, p. 27). Riordan (2002) built upon the direction of the earlier research as well, stating that the destruction of the inherent hierarchical social structure within coed schools creates greater learning opportunities for girls in single-sex schools (p. 12). Riordan’s explanation echoes the conclusions of researchers following academic achievement of females in single-sex
schools, stating that the culture of such schools is endemic and its separation from the norms of society is precisely what makes it so effective for females (p. 13).

This trend of research supporting the positive influence that all-girls schools have on gender roles and students’ self-image has shown signs of subsiding in recent research. A recent, widely cited, study seeks to debunk many of the past claims made by researchers on this issue. Specifically, it states that girls who spend more time with other girls create sex-typed environments and are limited insofar as the range of behaviors and experiences to which they are exposed (Halpern, et al., 2012, p. 1707). This new development stands in contrast to many of the other, more recent findings researchers have observed. While the research on the social impact that all-girls schools have on their students may be shifting and increasingly contradictory, the findings are consistent in how these schools influence girls’ future ambitions.

**The Impact of Single-Sex Schools on Girls’ Postsecondary Aspirations**

The number of studies on the long-term impact of all-girls schools has increased in recent years, but follows a few dominant trends. Tricket, Trickett, Castro, & Schaffner (1982) were the first to discover that girls from single-sex schools were more likely to be involved in social and political movements upon leaving high school, finding a high level of participation amongst these girls in the feminism movements of previous decades. Lee & Marks (1990) showed that this continued as girls from single-sex schools were more actively participating in politics once they reached college. Mael et al (2005) found that this involvement had begun to extend beyond politics and into all aspects of
extracurricular activities at college (p. 85). Citing these factors, several of the researchers also found that girls who attended single-sex schools were more likely to be satisfied with both the academic and social aspects of college (Lee & Marks, 1990, p. 585; Mael, Alonso, Gibson, Rogers, & Smith, 2005, p. 85).

The academic aspirations of graduates from all-girls schools also saw improvement over their coed counterparts. Bryk & Lee (1986) found that girls from single-sex schools were more likely to have greater college ambitions and that those ambitions begin earlier in their academic careers (p. 389). Lee & Marks (1990) echoed this sentiment, but added in the fact that these girls were now breaking into traditionally male fields of study, primarily engineering and professional careers (p. 585). These ambitions continued beyond their undergraduate careers as it was also seen that girls from single-sex schools were far more likely to attend graduate school, with an emphasis on receiving their MBA or law degree (p. 586). Research continued to show that graduates of all-girls schools performed better in sex-typed subjects, but Sax (2009) offers the explanation that it is due to the destruction of social norms inherent in a male-dominated society that girls find themselves engaged in activities traditionally reserved for males: a sentiment repeated for girls (and disadvantaged students) in single-sex schools across several measures of success (p. 62). McDaniel (2009) supported this hypothesis with her finding that gender-egalitarianism improves the academic, professional, and social expectations of girls from single-sex environments (p. 44).
It is also necessary to note that recent research on the subject has cautioned against the overgeneralization of the positive results for all-girls schools. McDaniel (2009) and Sax (2009), among others, found that students’ social background and socioeconomic status play an immeasurable role in the aspirations of girls from single-sex schools and must be accounted for before these results can be applicable across all spectrums of schooling. Lee & Marks (1990) also list several factors that influence the positive impact that all-girls schools have on student ambitions, but found somewhat different results. They found that students coming from a family with a higher socioeconomic status and that pushed going to college early in their students’ education played a major role in heightening their interest in attending college. Additionally, they found that while coming from an African-American family was a net positive for students, being of Hispanic background was a decided disadvantage when producing educational aspiration for girls in single-sex schools (p. 586). While the amount and positive direction of the research on single-sex schools for females is highly distinct, there exists far less research and agreement on the impact of all-boys schools on their students.

The Impact of Single-Sex Schools on Boys’ Academic Achievement

Research on the impact of single-sex schools on boys’ academic achievement in relation to their coed counterparts has shown less conclusive results than for girls. There is also a shocking dearth of research regarding male academic achievement in single-sex schools compared to that of females. While Bryk & Lee (1986) saw similar results for
boys as for girls in that they did more homework and rated their experience in these schools more favorably than coed students, they found boys saw no statistical gains in academic performance in single-sex schools (p. 388). These findings were retested by LePore & Warren (1997) who partially refuted these findings, show that boys from single-sex schools were scoring better than their coed counterparts, but not as a result of their time in an all-boys school. Instead, they stated that while boys in single-sex schools knew more, they were not learning more in these schools, implying that the background of the students prior to reaching high school played a prominent role in their success (p. 500). Singh, Vaught, & Mitchell (1998) also questioned the effectiveness of educating males in single-sex schools, showing that their math and reading test scores continued to skew lower. However, they found that the grades of students in all-boys schools were higher, but attributed this as a result of better class attendance (p. 164). There also exists a dissonance between the belief that boys from single-sex schools have in their academic ability compared to reality as Shapka & Keating (2003) reported that students from all-boys schools still have a greater level of confidence in math and science than do girls in single-sex schools (p. 944).

The recent rise of public all-boys schools has reversed this trend and shown that single-sex schools can have a positive impact for males under the right circumstances. Riordan (2002) hypothesized that single-sex schools would only work in the public sector if they targeted females and disadvantaged groups (p. 18). The 2008 report published by the US Department of Education concurs with this notion, finding that 35% of studies
showed students in public all-boys schools saw an improvement in their standardized test scores, compared to only 2% for coed students (Riordan, et al., 2008, p. ix). This is particularly significant as 78% of the students studied by this report were non-white, a number comparable to the 70% of non-white students from the coed schools examined (p. 18). This idea is further buffeted by the fact that the proportion of non-English speaking students in single-sex schools was nearly double that in coed schools (p. 20). However, it is necessary to curb these positive tones by noting that 65% of students from single-sex schools studied were eligible for free lunch compared to 89% in coed schools, creating greater credence for the idea that the socioeconomic backgrounds of students who attend single-sex schools skews the data in their favor (Ibid).

There have been several attempts by researchers to explain the lack of academic impact that single-sex schools have on males in private schools. Bryk & Lee (1986) were first researchers in the time period studied to do so, but others such as Lee & Marks (1992), and Mael, et al. (1998) have suggested that the structure of all-boys schools accounts for their lack of significant impact on boys’ educational outcomes. The consensus lies within the aforementioned theory of Riordan (2002) stating single-sex schools break the societal norms that initially empowered white males and gave them a more prominent place in society. The implication is that prior to this point in their education schools had primarily been set up to foster the success of white males and the four years of high school are not enough to overcome these advantages. This idea of maintaining the ‘status quo’ also has roots in perhaps the greatest public critique of all-
boys schools throughout all the years: the social attitudes they promote, particularly with regard toward woman.

The Socio-Emotional Impact of Single-Sex Schools on Boys

The issues of student bias and the reinforcement of negative female stereotypes within all-boys schools dominate the research on single-sex schooling for males. Bryk & Lee (1986) were among the first to reject the notion that all-boys schools created negative stereotypes of the opposite sex, but offered little explanation for these results (p. 389). While Bryk & Lee (1986) tested whether all-boys schools reinforced traditional gender roles to their students, such as acting as the dominant partner in their relationships with women and withholding emotions such as crying, later studies shifted their focus and found sexism to be pervasive amongst teachers. Lee, Marks, & Byrd (1994) found that male teachers in all-boys schools portrayed women as objects to be dominated and promoted a ‘clubby’ atmosphere (p. 106). These findings coincide with the numerous calls for better teacher training, particularly by Datnow, Hubbard, & Woody (2001), citing concerns that teachers in single-sex schools, primarily in the public sector, were unable to shake their traditional notions of gender. As a result, these biases make their way into the minds of the boys and create the stereotypes (and negative reputation) all-boys schools seek to destroy (p.72). Further research on public single-sex schools has found several positive results for male students in the social aspect of their learning experience. The US Department of Education’s 2008 study showed that males from single-sex schools were more likely to have positive attitudes toward women in the
workplace than those from coed schools, but still suffered from the same gender stereotyping that had been feared prior to this study (Riordan, et al., 2008, p. 8). While these results offer promise on the subject, the social journey of these boys is not complete until their lives after high school are also taken into account.

**The Impact of Single-Sex Schools on Boys’ Postsecondary Ambitions**

Research on the impact of single-sex schools on boys’ aspirations, both educationally and professionally, has shown mixed results. While researchers such as Bryk & Lee (1986) observed an increase in college ambitions for students from all-boys schools compared to their coed counterparts (p. 389), Lee & Marks (1990) also deduced that these increased aspirations were not as deeply ingrained within the males studied (p. 584). They found these results somewhat inexplicable as it showed boys ill-prepared to readjust to the coed environment found in colleges (p. 586). Boys also did not see the same success as girls in crossing over into traditionally female dominated subject areas such as English. In fact, McDaniel (2009) observed that boys who had more interaction with females at college were less likely to expect to complete their tertiary education due to an inability to properly handle the increased social expectations and competition (p. 44).

The first of the studies on post-secondary ambitions for students from all-boys schools that controlled for socioeconomic status took place outside of the United States in Seoul, Korea. Students are randomly placed in either single-sex or coeducational schools and, in this instance, boys from single-sex schools were found to have greater ambitions
of attending college than their coed counterparts (Park, Behrman, & Choi, 2012, p. 26). However, this only further exemplifies the sparseness of research on all-boys schools’ impact on postsecondary ambitions. It also makes it inherently difficult to identify a specific trajectory for research on the subject, but still offers several points of discussion, particularly for future research.

**Discussion**

This paper sought to address three questions: In what ways, if any, do single-sex schools foster a greater level of academic achievement? How do single-sex learning environments impact students’ academic and social experiences in high school? How do these environments affect students’ postsecondary ambitions?

The question of whether single-sex schools foster greater academic achievement for their students, specifically with regard to their standardized test scores, must be examined by separating the results of students from all-boys and all-girls schools. The current research evolved from a stance that unequivocally supported the idea that all-girls schools enhance students’ academic performance. Presently, the discussion is centered upon the idea that single-sex schools are effective, not merely for women, but for historically disenfranchised groups such as ethnic and racial minorities as well as economically disadvantaged students. The belief working its way into research is that single-sex schools see their advantages as a result of their divergence from the traditional, coed schools that created these social disparities in the first place. However, it is relevant to note that in the early parts of the 20th century, single-sex schools were more prevalent
throughout the country than they are today. Therefore, it is an oversimplification to say that it was a system founded upon coed schools that created the gender inequities the researchers see present in society. Consequently, it is difficult to discount the critiques that have been made about research on single-sex schools, most recently echoed by Halpern, et al. (2012) that researchers have increasingly ‘cherrypicked’ results supporting single-sex schools (p. 1706). The reasoning, at least in part, behind this notion is that government commissioned studies such as Mael, et al. (2008) are pandering to recent federal regulations that have expanded single-sex schooling in the United States’ public sector (p. 1707).

The other primary critique validated by the idea that single-sex schools do not serve to overcome the barrier between classes is that the research supporting their positive impact on females fails to properly account for the socioeconomic background of their students (Marsh, 1989; Baker, Riordan, & Schaub, 1995; Lepore & Warren, 1997). While the recent study by Park, et al. (2012) attempts to address this issue, their data comes from Seoul, Korea: an issue they even admit may preclude it from serving as an analogous case for the United States (p. 27).

What then, can be made of the research stating that males in private single-sex schools see minimal improvement in their academic performance, while those in public all-boys schools see a notable advantage over their coed counterparts? This research, in part, neutralizes the argument that students who attend private schools come from a socioeconomic background that encourages academic performance. Subsequently, as the
vast majority of males studied in public all-boys schools were non-white, it enhances the previously questioned argument that single-sex schools improve academic performance for such historically disadvantaged groups. Given the trend that research has taken of investigating how social status and background infiltrate the classroom, incorporating the social impact of single-sex schools helps paint a more complete picture than merely academic results.

Research on the social impact that single-sex schools have on the socialization of their students has evolved from investigating whether they promote sexism to a discussion about how best to create environments that most effectively promote learning. The biggest concern for years about single-sex schools is that they advance sexism amongst students and a concern which has dictated the direction of research on the topic. The rationale behind this argument was that having all-boys or girls schools would only serve to enhance gender roles. Researchers have found the opposite and feel that many students leave these schools with improved self-confidence and more respect for the opposite gender. However, one thread of conversation that has continued since the earliest days of single-sex education research is the need to improve teacher training for these schools. Bryk, Lee, & Byrd (1994) suggest that sexism is inevitable in schools, be they coed or single-sex, due to the high level of socialization that occurs prior to reaching high school (p. 115). However, the consistent level of sexism found in single-sex schools by teachers of the opposite gender remained pervasive throughout the available literature. The most prevalent suggestion by these authors centered on both improving teacher
training for single-sex schools and attempting to hire more teachers of the same gender (males for all-boys schools, females for all-girls schools). This shift is important to note as the research regarding students’ academic achievement in single-sex schools viewed the success of such schools through the lens that it was students’ background and parents that created their success. This trend in research on single-sex schools’ social environments places the burden of proof upon teachers. This echoes the sentiment that such schools can only be successful if a ‘culture’ is created in these schools that ingrains itself in both the faculty and students. If this logic is to be followed, educators must approach teaching at single-sex schools differently than coed schools and, as such, would require specific training in order to successfully teach at these schools. However, the other implication of this research on the creation of a learning experience that these researchers discuss is that coed schools using single-sex classrooms would not see the same social benefits as a school that is entirely one gender. Perhaps, the most prominent way that using a single-sex school’s culture to benefit its students is in the expectations it sets for their post-high school ambitions.

Research on post-secondary ambitions of students in single-sex schools has showed consistently positive results for students across all genders and races. However, all of this research has been laced with the same cautionary note regarding the difficulty of assessing the role that socioeconomic status plays in students’ aspirations. It is at this crossroad that Chicago’s Urban Prep Charter Academy has found itself subject to both praise and criticism. Urban Prep is a charter school that caters exclusively to black males
residing in a very low-income neighborhood, selecting its students by random lottery. The school has gained notoriety recently by not only graduating 100% of its students, but also sending each to a four year college (Urban Prep Academies, 2008). The criticism comes from researchers such as Halpern, et al. (2012) who state that graduation rates accounting for underperforming students who prematurely transfer out ultimately skew the data. That is not to say that all prior research can be immediately dismissed, particularly in light of the social impact discussed earlier. If single-sex schools are successfully creating learning environments that are both more comfortable for students and inspire greater self-confidence in students, then it is not unreasonable to assume this has an impact upon their aspirations. Additionally, research such as Sax (2009) showed that girls from single-sex schools are more likely to be more socially involved in college and politically active than those from coed environments, a phenomenon that may be a corollary of the destruction of gender barriers researchers have seen in all-girls schools.

**Conclusion**

Several obstacles exist in the path of determining distinct trends within the research on single-sex schools. Foremost among these is the constant call for the isolation of students’ socioeconomic status when studying this issue, a call that has gone unheeded. This serves as an omnipresent factor in the validity of certain results to the point that each study must end by questioning how students’ economic backgrounds might impact the results. As such, the inability of nearly all researchers to control for this factor casts an inexorable shadow over any consistent results observed. There also exists
a significant lack of research on males in single-sex schools. Without half of the potential students properly accounted for it is difficult to make an assessment on the overall impact of single-sex schools on students. This is particularly important as the existence of all-boys and all-girls schools is somewhat intertwined. Within the context of large public school systems, where the student population is much greater, having more single-sex schools of one gender would not create a significant imbalance in student numbers by gender. However, in private school systems or in smaller communities that may favor single-sex education for one gender over the other, more students of a specific gender attending single-sex schools could create new challenges for the co-ed schools. An example of this would be having a disproportionate number of girls in a private school system attending all-girls schools, thus creating co-ed schools that are heavily weighted with males and demanding new research on the matter.

Despite these obstacles, there seems to be an overwhelming consensus within the past 30 years that all-girls schools create a benefit on all levels. This is most dramatically demonstrated by the fact that even with there being some researchers who found a little to no benefit in single-sex schools for females, none saw an overall negative impact for them. Furthermore, most saw an improvement in at least one of the primary areas discussed in the literature. Systems that foster student growth cannot simply be dismissed, particularly with the recent focus on using single-sex schools to aid specific ethnic, racial, and economic groups that have been unsuccessfully targeted many times. The newfound policies which expanded single-sex education have already ignited new
research on the subject, yet critiques of methodology still abound. It is only when this research addresses the longstanding concerns of the single-sex community, particularly the lack of research on boys and the inability to fully control for students’ socioeconomic status, that the next step in its implementation will be known.
BIBLIOGRAPHY


VITA

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