



RESEARCH CAPSULE

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Christie Blazer, Sr. Research Analyst

SINGLE-GENDER SCHOOLING

AT A GLANCE

With the U.S. Department of Education's relaxation of regulations governing the operation of single-gender schools and classrooms in U.S. public schools, many public school districts around the country have begun to offer single-gender educational opportunities to their students. The School Board of Miami-Dade County has authorized the Superintendent to open an all-girls leadership academy and will consider a request to authorize a young men's preparatory academy at the January 2006 Board meeting. This information capsule discusses the advantages and disadvantages of single-gender education and summarizes research that has been conducted on the effectiveness of single-gender schools and classrooms. Most of the studies reviewed in this Capsule found that single-gender schooling has a positive impact on students' academic performance, behavior, and attitudes; however, additional research is needed to clarify if the benefits derive from factors other than the single-gender environment and if results obtained in other countries and in U.S. private and parochial schools can be replicated in U.S. public schools.

Five years ago, fewer than 12 public schools in the U.S. offered single-gender educational opportunities. During the 2005-06 school year, 193 U.S. public schools are providing gender-separate schools and classrooms. Forty-two of the 193 schools are completely single-gender in format. The remainder are coeducational schools with single-gender classrooms (National Association for Single Sex Public Education, 2005). For over 30 years, public schools accepting federal funds were prohibited from operating single-gender classes or schools by Title IX of the federal Elementary and Secondary Education Act of 1972. In March 2004, in compliance with provisions in the No Child Left Behind Act of 2001, the U.S. Department of Education issued new regulations that loosened restrictions on school districts seeking to operate single-gender schools and classrooms (Howell, 2005; American Civil Liberties Union, 2004).

Single-gender schools were originally designed to minimize distractions so students could focus on academic learning rather than on social concerns. Single-gender schools, especially at the secondary level, were believed to be more serious and studious climates that allowed students to pursue their studies, classroom discussions, and school activities without needing to be confronted on a daily basis with male-female socialization issues (Sax, 2005a; Ferrara and Ferrara, 2004; Mael, 1998; Lee and Marks, 1990).

In recent years, some studies have suggested that boys and girls are treated differently in coeducational classrooms and that they are encouraged to pursue interests and behave in ways that are considered "typically male" or "typically female." For example, researchers have observed

that boys are often encouraged to answer more questions than girls and are expected to excel in mathematics and science classes. Girls are expected to be better behaved and pursue more artistic and verbal interests such as literature and music (Glasser, 2004). The U.S. General Accounting Office (1996) reported that girls defer to boys in coeducational classrooms, are called on less than boys, and are less likely than boys to study advanced mathematics and science.

The growing recognition that girls and boys learn differently has increased the interest in single-gender educational opportunities. Experts are beginning to recognize that, while there are no differences in what girls and boys can learn, there are big differences in the best way to teach them. Studies have shown that males and females process information, listen, read, and experience emotion in very different ways and that various areas of the brain develop in a “different order, time, and rate” in girls, compared to boys (Sax, 2005a).

Areas of the brain involved in language and fine-motor skills, such as handwriting, mature about four years earlier in girls than in boys. The areas of the brain involved in geometry and spatial relations mature about four years earlier in boys (Sax, 2005a).

One of the most consistent findings in educational research is the different reading preferences of boys and girls. Girls prefer short stories and novels that focus on relationships and allow them to analyze the characters’ motives and behaviors. Boys are more likely to choose factual accounts of real events (such as battles, sports, and adventures) or illustrated descriptions of the way things work (for example, spaceships and volcanoes) (National Association for Single Sex Public Education, 2005; Sax, 2001).

Girls and boys respond to stress differently. Stress enhances learning in males, but impairs learning in females. Girls tend to generalize their failures, while boys see their failures as relevant only to the specific subject area in which they failed. Girls are more interested in pleasing their teachers than boys are. Girls thrive in noncompetitive, collaborative learning situations, while boys are motivated more effectively by competitive environments with clearly defined winners and losers (National Association for Single Sex Public Education, 2005; Sax, 2005b; Sax, 2001).

Howell (2005) discovered that middle school boys learn best when the room temperature is at 69 degrees and they can stand up and move around. Girls do their best work in warmer rooms of 75 degrees. By age 12, the average girl has a sense of hearing that is seven times more acute than the average boy’s hearing. Girls are distracted by extraneous noises (for example, another student tapping a pencil) at sound levels 10 times lower than those that distract boys. Teachers speaking in a loud voice are perceived by girls as shouting. Boys tend to disregard those who speak in softer tones (Howell, 2005; Sax, 2005a).

Proponents of single-gender education maintain that single-gender schools and classrooms create an environment that reduces distracting behavior, improve students’ academic performance, provide students with more exposure to same-sex role models, reduce sex-role stereotyping, and provide students with socioemotional benefits that contribute to increased levels of self-esteem and reduced absenteeism and dropout rates. Advocates contend that girls in single-gender settings are more likely to explore nontraditional subjects, such as computer science, mathematics, physics, and woodworking, and boys feel freer to follow their interests and talents in what are traditionally regarded as “non-macho” pursuits, such as music, drama, and art. Single-gender classrooms allow teachers to custom tailor learning and instruction to topics that interest either boys or girls and to teach those topics in ways that will keep students engaged (National Association for Single Sex Public Education, 2005; Mael, 1998).

Opponents of single-gender education contend that separating the two sexes in public schools is unwarranted. They claim that the commonalities between boys and girls far exceed the differences and that it is incorrect to assume that all girls learn one way and all boys learn a different way (Snyder, 2005). Both the American Civil Liberties Union (2004) and the National Organization for Women (2004) believe that single-gender schools deprive students of the opportunity to interact and compete with students of the opposite sex. The National Organization for Women (2004) contends that coeducation prepares students for cross-gender interactions and integration into society and helps them learn how to avoid falling into traditional or stereotypical roles. The American Association of University Women (2004) states that the past has proven that separate education is never equal,

whether in the context of race or gender. They claim that single-gender schools undermine the principles upheld in *Brown v. Board of Education*, provide opportunities for discrimination, and exacerbate inequities between boys and girls.

Many educators believe that, whether a school is single-gender or coeducational, boys and girls will succeed when elements of a good education are in place. They contend that students' success does not depend solely on the type of school they attend, but is effected by many other factors, including the academic curriculum, class and school size, the skills and expertise of their teachers, and the abilities and attitudes they bring to the classroom (American Association of University Women, 2004; Sharpe, 2000; Dollison, 1998).

Limitations to the Research on Single-Gender Education

Coeducational and single-gender schools have been compared and evaluated in terms of students' academic performance, attendance rates, disciplinary referrals, attitudes toward academics, attraction to nonstereotypical coursework, educational aspirations, and levels of self-esteem; however, inconclusive results have left educators wondering if single-gender educational opportunities really benefit students and, if so, in what ways. Although it seems clear that single-gender schools benefit some students in some settings, researchers have yet to determine what types of students benefit, if the benefits derive from school factors other than the single-gender environment, or if the positive results found in other countries and in private and parochial schools can be replicated in public schools in the U.S. (American Association of University Women, 2004; Mael, 1998). Some of the reasons studies have produced inconclusive or conflicting findings include:

- Most single-gender public schools in the U.S. were established recently. There has not been a comprehensive national study comparing U.S. public school students' academic performance in single-gender and coeducational schools (Conrad and Lufkin, 2004; Mead, 2003).
- Many studies fail to take into account other factors that might explain the differences between students' performance in single-

gender and coeducational schools, such as smaller class sizes, more rigorous curricula, school location, more available resources, and student body characteristics. In addition, more studies that control for preexisting factors, including family background and students' academic ability level, are needed (American Association of University Women, 2004; Mael, 1998).

- Researchers have not demonstrated if the outcomes achieved in single-gender private and parochial schools can be replicated in U.S. public schools. Most private and parochial schools admit only high-achieving students and expel students who perform poorly or misbehave. Students at these schools tend to come from privileged backgrounds. Research has shown that children from affluent and educated families are likely to do well in whatever type of school they attend. It has also been suggested that parental involvement and expectations, which are often higher in private and parochial schools, may be more critical factors in predicting academic outcomes than school environment (National Association for Single Sex Public Education, 2005; Bronski, 2002; Dollison, 1998).
- Many studies have been conducted in single-gender schools in other countries, where schooling traditions are often very different from those in the U.S. It has not been determined if these findings can be generalized to public schools in the U.S. (Mael, 1998).

Keeping these limitations in mind, a sampling of research conducted on single-gender schools and classrooms follows.

United States Public Schools

- California was one of the first states to experiment with single-gender public education by opening single-gender academies for both boys and girls in 1997. After three years of operation, five of six districts closed their single-gender academies. A three-year longitudinal study of the academies concluded that the success of the program was undermined by implementation challenges, including short

time lines to establish the academies, a lack of legislated funding, high levels of staff and leadership turnover, and the enrollment of predominantly low-achieving, low-income, troubled youth in the academies. The longitudinal study focused primarily on the question of how single-gender education affected gender bias and stereotypes. Findings indicated that, while educators ensured that equal resources were offered to boys and girls, traditional gender stereotypes were often reinforced (National Association for Single Sex Public Education, 2005; Datnow et al., 2001a; Datnow et al., 2001b).

- The Long Beach, California Unified School District established a middle school that educated boys and girls separately. School officials reported that there were fewer disciplinary referrals for classroom behavior, but just as many for hallway, lunchroom, and recess infractions. Test scores rose dramatically, compared with students' scores before the school was reconfigured; however, the school's comprehensive reforms, not just the single-gender class format, may have contributed to higher test scores (Educational Research Service, 2003).
- The Young Women's Leadership School in East Harlem, New York is a high poverty, high minority public school that teaches 400 female students in grades 7-12. The school has been showcased as a model of success in single-gender schooling. In five graduating classes, 100 percent of the students have been accepted to college. The school's 2005 graduation rate was 98 percent (compared to 60 percent at other New York City public high schools) and attendance was 95.5 percent (compared to 88 percent at other area schools) (The Young Women's Leadership School, 2005).
- Thurgood Marshall Elementary School in Seattle, Washington was a failing school in one of the city's poorest neighborhoods until the principal reconfigured the school as a dual academy, with all-girl and all-boy classrooms. Boys outperformed the entire state on the writing portion of the state's standardized achievement test and their reading scores increased from the 10th to the 66th percentile.

When the school was coeducational, no girls passed the mathematics portion of the state's achievement test; after the school was reconfigured into single-gender classrooms, 53 percent of the girls passed the test. Disciplinary referrals dropped from 30 referrals per day to fewer than two per day. The school has achieved consistently positive results for four consecutive years, with all improvements occurring without any additional funding or changes in class size (National Association for Single Sex Public Education, 2005; Sax, 2005a).

- The Ellenville, New York Central School District implemented single-gender middle school classrooms as a three-year academic intervention. Parents chose whether to place their children in single-gender or coeducational classrooms. After the first year of implementation, middle school students in single-gender classrooms had higher attendance rates, fewer disciplinary referrals, and modest increases in report card grades, compared to middle school students in mixed-gender classrooms. Differences in the language arts and mathematics achievement test scores between the two groups of students, however, were not significant. Teachers reported that both boys and girls in single-gender classrooms participated more and were less self-conscious about their work (Ferrara and Ferrara, 2004).
- A senior high school in Maine offered one of its grade 9 Algebra I sections as a girls-only class. Girls in the single-gender classroom scored lower than boys on the mathematics portion of the state's achievement test, but the achievement gap between girls' and boys' scores decreased from 72 to 16 points. Girls who enrolled in the single-gender class reported that they would take more mathematics and science courses throughout high school and would be more likely to enroll in college mathematics courses and consider a career involving mathematics (Durost, 1996).
- Perry (1996) reported that grade point averages at a middle school in Virginia were higher for both boys and girls in single-gender mathematics and science classes than in mixed gender classes. Teachers reported

fewer discipline problems in their single-gender classrooms and indicated that more girls participated in class discussions and that boys enjoyed not feeling pressured to perform for girls.

United States Private and Parochial Schools

- A study of students in private middle schools across the U.S. attempted to determine if there were differences between the mathematics performance and attitudes toward mathematics of girls who attended single-gender and coeducational schools. No significant differences were found in the mathematics achievement, quantitative ability, or attitudes toward mathematics of girls in single-gender and coeducational schools. The researchers suggested that academically focused and supportive families may play a more important role in students' success than attending a single-gender school (Gilson, 1999).
- Lee and Bryk (1986) found that high school students in single-gender Catholic schools had higher levels of academic achievement, more positive attitudes toward academics, and higher levels of self-esteem. Boys at single-gender schools scored higher in reading, writing, and mathematics than boys at coeducational schools and girls at single-gender schools scored higher in science and reading than girls at coeducational schools. The single-gender environment had a greater impact on female students, with girls enrolling in more mathematics and science courses, and reporting that they had more confidence in their abilities, were more interested in nontraditional college majors and/or careers, and had more positive attitudes toward academics. Boys who received single-gender instruction did not display more stereotypical views of girls, suggesting that stereotypical attitudes are not an inevitable consequence of the all-male environment. A follow-up study by Lee and Marks (1990) found that both male and female graduates of single-gender schools were more likely to go to college and more likely to aspire to attend graduate or professional school.

It should be noted that the Lee and Bryk (1986) and Lee and Marks (1990) studies did

not control for background differences that existed before students entered high school, resulting in an inability to differentiate between true school effects and preexisting characteristics. Using the same data set, but controlling for 17 background variables, Marsh (1991) found that family background variables greatly diminished the school effect.

- LePore and Warren (1997) used a data set that followed a cohort of Catholic school students over a six-year period and factored in a variety of variables, including family background, peer relationships, school structure, student achievement, and student attitudes. The researchers theorized that achievement test gain scores would increase with each passing year if the school environment had a significant effect on academic achievement; however, analyses found no significant differences between the gain scores of students attending single-gender and coeducational high schools.
- Riordan (1990, 1994, and 1998) compared single-gender and coeducational Catholic schools, controlling for socioeconomic status, ethnicity, and ability at time of school entry. He reported that students in single-gender schools had higher academic achievement levels than students at coeducational schools, but that the effect was much smaller for boys than for girls. Riordan also found that the positive impact of single-gender schooling was more dramatic for African-American and Hispanic students, lower and working class students, and at-risk students, whether male or female. These students scored almost a year higher on standardized reading, mathematics, science, and civics achievement tests than similar students in coeducational settings and demonstrated higher levels of leadership behavior in school, did more homework, took a stronger course load, had higher educational expectations, and were less likely to engage in sex-role stereotyping.

England

- The National Foundation for Educational Research studied 2,954 high schools throughout England, where single-gender public high schools are widely available, and

found that girls exhibited higher performance when they were enrolled in single-gender schools, regardless of their academic ability level. The benefits of single-gender schools were only evident for boys with lower ability levels. The type of school (single-gender or coeducational) higher-achieving boys attended had no effect on their academic performance (Spielhofer et al., 2002).

- A study of 30 single-gender and coeducational schools in England found that the academic advantages of single-gender schooling were greater for boys than for girls. This conclusion directly contradicted the findings of the National Foundation for Educational Research study, as well as the common belief that boys do better in the classroom when girls are present to set a good example (Gordon, 2000).
- The British Office for Standards in Education analyzed test results from 800 single-gender and coeducational public schools and determined that students attending single-gender schools earned higher test scores, regardless of their socioeconomic status (Dean, 1998).
- Researchers at Manchester University assigned students at five public high schools in England to either single-gender or coeducational classrooms. Sixty-eight percent of the boys assigned to single-gender classrooms passed a standardized test of language skills, compared to 33 percent of boys assigned to coeducational classrooms. Eighty-nine percent of the girls assigned to single-gender classrooms passed the test, compared to 48 percent of the girls assigned to coeducational classrooms (Henry, 2001).
- Shenfield High School in England was reconfigured as two single-gender academies under one roof. After three years, boys' and girls' standardized achievement test scores had risen by 26 percent and 22 percent, respectively (O'Reilly, 2000).

Canada

- Five years ago, an inner-city Montreal high school converted from coeducational to single-gender classrooms. Since the

reconfiguration, absenteeism dropped from 20 percent to seven percent. The percent of students passing their final exams increased from 65 percent to 80 percent. The rate of students attending college nearly doubled (National Association for Single Sex Public Education, 2005).

- A study of two public high schools in Ontario found that the experience of being taught in at least one single-gender mathematics or science classroom at grades 9 and/or 10 had a significant, positive effect on girls' performance and persistence in mathematics and science, but did not have the same positive influence on their attitudes toward mathematics and science. Girls in single-gender classrooms had higher levels of mathematics and science achievement and enrolled in more mathematics and science courses through the rest of high school, but they did not report significantly higher levels of perceived mathematics competence. Their reported levels of mathematics anxiety were similar to those of girls in coeducational classrooms and higher than those of boys. Findings held true even when researchers controlled for preexisting characteristics, including grades 7 and 8 course grades, perceived teacher effectiveness, parental education, perceived parental expectations, and expected educational attainment (Shapka and Keating, 2003).

Australia

- The Australian Council for Educational Research compared the performance of students ages 12-16 at single-gender and coeducational schools. Their six-year study analyzed the performance of over 270,000 students in 53 academic subjects. Results of the study indicated that boys and girls who enrolled in single-gender schools scored, on average, 15 to 22 percentile points higher than boys and girls enrolled in coeducational schools. Students at single-gender schools exhibited higher levels of academic performance, regardless of their socioeconomic status. Both boys and girls in single-gender schools exhibited better behavior and reported that they found learning more enjoyable (Rowe, 2000).

In summary, most research found that students who attended single-gender schools or classrooms exhibited higher levels of academic performance, as measured by standardized test scores or course grades, than their peers who attended coeducational schools and classrooms; however, some studies concluded that both girls and boys benefitted, others concluded that single-gender environments benefitted girls more, and still others concluded that boys benefitted more. Additionally, studies demonstrated that performance differences decreased when factors such as family background and socioeconomic status were taken into account. Riordan's studies of students in Catholic single-gender and coeducational schools indicated that the benefits of single-gender educational experiences were greatest for African-American and Hispanic students, at-risk students, and students who came from low or working class families.

Most studies reviewed in this Capsule found that students in single-gender environments had higher attendance rates, fewer disciplinary referrals, a preference for nontraditional subjects, more positive attitudes toward school, higher educational aspirations, and higher levels of self-esteem. Conclusions regarding sex-role stereotyping were mixed, with some studies finding increased sex-role stereotyping and others finding less.

Future Directions for Research on Single-Gender Education

More research is needed to clarify why studies comparing single-gender and coeducational schools and classrooms have produced mixed results. In order to more fully understand why some, but not all, schools achieve positive results when they begin offering single-gender educational opportunities and to determine if single-gender schools provide better academic opportunities for students, future research should focus on the following areas:

- Additional research is needed to determine if the academic outcomes achieved at successful single-gender schools are due solely to their segregated environment or if they can be attributed to the implementation of sound educational policies often present in single-gender schools, including a rigorous

curriculum, high standards, small class sizes, quality educators, adequate school resources, and parent and community involvement. Researchers must also clarify if the advantages of single-gender schools are independent of preexisting variables, such as family background and students' academic abilities (American Association of University Women, 2004; Mael, 1998).

- Although no conclusive evidence exists that single-gender education is better or worse than coeducation for all students, researchers should attempt to clarify what types of students will benefit from a single-gender environment and what types of students are more suited to a coeducational environment. For example, research should be conducted on the type of schooling most appropriate for gender-atypical children (the loud, unruly girl who dislikes the quiet classroom most girls prefer or the shy boy who is uncomfortable in the noisy classroom where most boys thrive) (Sax, 2005a; Salomone, 1999; Mael, 1998).
- Researchers should determine to what extent outcomes from other countries, as well as from private and parochial schools in the U.S., can be replicated in U.S. public schools. Countries outside of the U.S. often have different educational traditions, socialization patterns, and cultural influences. Many private and parochial schools in the U.S. differ from public schools in that they admit only high-achieving students and expel poorly performing or misbehaving students. Furthermore, private and parochial school students tend to come from higher income families and their parents are frequently more involved in their children's education and have higher expectations for their educational development (Bronski, 2002; Mael, 1998).

Until further studies clarify which students or target populations will gain the most from single-gender schooling, researchers have suggested that single-gender education in public schools remain voluntary. Parents, in consultation with teachers, should make the final determination as to whether the single-gender format is right for their child. Allowing parents a choice between single-gender and coeducational environments is likely to yield the best results for all children (Sax, 2005a; Mael, 1998).

On A Local Note

The School Board of Miami-Dade County, Florida has authorized the Superintendent to establish a Young Women's Leadership Academy. The academy, scheduled to open in the 2006-07 school year, will initially serve female students in grades 6-10, with enrollment increasing to 500 female students in grades 6-12 by the 2008-09 school year. At its January 2006 meeting, the School Board will consider a request to establish a Young Men's Preparatory Academy. If approved, the academy will open in the 2008-09 school year for boys in grades 6-10. A grade level will be added in each subsequent school year, with enrollment increasing to 500 male students in grades 6-12 by the 2010-11 school year.

The academies will be designed to provide students with single-gender public school options that offer unique opportunities for educational success. The design of the facilities and the curricular programs will reflect the biological, emotional, and cultural needs of the academies' single-gender populations. Parent and community involvement, extended learning opportunities in the community, and business-community partnerships will be integral components of the educational program. Enrollment will be on a voluntary basis and will likely be structured like magnet schools that draw students from across the county.

Summary

During the 2005-06 school year, 193 U.S. public schools are offering gender-separate educational opportunities to their students. Educators now recognize that girls and boys learn differently and that, although there are no differences in what girls and boys can learn, there are big differences in the best way to teach them. Most research reviewed in this Capsule has found that students who attend single-gender schools or classrooms exhibit higher levels of academic performance, higher attendance rates, fewer disciplinary referrals, a preference for nontraditional coursework, more positive attitudes toward school, higher educational aspirations, and higher levels of self-esteem; however, some studies have shown that differences between students educated in single-gender and coeducational environments decrease when factors such as family background, socioeconomic status, and student ability level are taken into account. Although it seems clear that single-gender schools benefit some students in some settings, researchers have yet to determine whether students with particular characteristics will benefit, if the benefits derive from school factors other than the single-gender environment, or if the positive results found in other countries and in private and parochial schools can be replicated in public schools in the U.S.

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