

BENEFITS BEYOND ACHIEVEMENT?

A Comparison of Academic Attitudes and School Satisfaction for Adolescent Girls in Single-Gender and Coeducational Classrooms

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Overall, the research on the effectiveness of single-gender education is inconclusive. However, research also indicates that some benefits beyond academic achievement may be possible. These findings may be significant for middle school girls, who often struggle with social interactions related to adolescence that create barriers in successfully transitioning to middle school. As these issues for middle school girls are sometimes unique to their gender, advocates argue that single-gender education emerges as a possible solution. This study investigated the potential benefits of participation in a single-gender classroom for sixth-grade females over a 3-year period. A total of 109 participants were involved. Girls in single-gender classrooms were compared to those in coeducational classrooms on variables of *academic attitudes* and *student satisfaction with school*. Statistical significance using MANOVA was observed on *student satisfaction with school*; descriptive statistical data from single-gender participants indicated a high degree of satisfaction with the single-gender program. Results showed that participation in single-gender programs can produce higher levels of *student satisfaction with school* (as explored in this study).

Educational institutions that cater to females have long been a part of the American education system, but single-gender institutions have historically been found primarily in the private sector (Cable & Spradlin, 2008). However, this changed in 2001 with the passage of the federal No Child Left Behind legislation. Since then, under the umbrella of school

choice No Child Left Behind relaxed regulations regarding parent choice and same-sex schools, allowing public educational entities to create same-sex classrooms and school sites (Madigan, 2009). As a result, the single-gender education movement has gained momentum; according to the National Association for Single-Sex Public Education (NASSPE), in

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the 2011–2012 school year, at least 506 public schools in the United States offered single-gender educational opportunities (NASSPE, n.d.). About 390 of those schools were coeducational schools which offered single-gender classrooms as an option for some or all of the school day (NASSPE, n.d.).

Although a controversial topic, the advent of single-gender education may potentially be an important development for middle school educators and students—in particular, the possibilities regarding the emotional and psychological development of adolescent girls. While overall girls tend to perform better academically than boys (Tyre, 2006), there is research to indicate that girls often have difficulty with the transition to middle school due in large part to self-esteem problems and anxiety stemming from the pressures of social conformity (Grills-Tauchel, Norton, & Ollendick, 2010; Harter, 2006; Orenstein, 1994; Pomerantz & Saxon, 2002; Ryan, Sungok, & Makira, 2013). Ferrerio, Seonae, and Senra (2012) concluded that “girls outnumber boys in depressive symptoms, disordered eating, and the co-occurrence of both disturbances” (pp. 618–619). Delfabbro, Winefield, Anderson, Hammarstrom, and Winefield (2011) report that during adolescence, girls express higher levels of dissatisfaction with body appearance than boys. These cumulative pressures create possible difficulties for girls in navigating the school social environment. The transition from elementary school to middle school is when many of these social difficulties begin to emerge (Powell, 2011; Rice & Dolgin, 2005; Van Hoose, Strahan, & L’Esperance, 2005). The nature of middle school itself may lend to this difficulty, in that most middle schools begin with Grade 6, forcing children to make adjustments to a new school, new peers, and new teachers at the same time they are also facing major developmental changes. Booth, Sheehan, and Earley (2007) reported that middle school girls are more negatively impacted by the middle school environment than either middle school boys or girls who attend a K–8 school. Given the documented difficulties fac-

ing adolescent girls transitioning to middle school, exploring the option of single-gender education as a remedy to ease these difficulties would seem to be a possibility.

THE DEBATE ON SINGLE-GENDER EDUCATION

Historically, the debate on whether or not single-gender education is both appropriate and effective has been fierce. In 2004, Rosemary Salomone observed that, “next to the funding of school athletics, single-sex education is probably the most divisive issue in the modern-day quest for gender equality in education” (pp. 63–64). This continues to be the case. As the number of single-gender public classrooms has increased, so have the number of detractors. While organizations such as the former National Association of Single-Sex Public Education (renamed in 2011 as the National Association for Choice in Education) vigorously advocate for single-gender learning, organizations such as the American Civil Liberties Union (ACLU) work tirelessly against it (ACLU, n.d.). Critics of single-gender education argue any successes are not due to single-gender model, but rather of the composition of the students (usually with higher socioeconomic status) who attend many of the current single-gender programs in place (Bigler & Eliot, 2011; Patterson & Pahlke, 2011). Halpern et al. (2011) and Eliot (2013) have contested many of the brain-based claims of single-gender advocates, arguing that some of the referenced research is flawed or interpreted inaccurately. In addition, the question of how the single-gender environment impacts diverse populations, including students of color and LGBTQ students, remains highly contested (Goodkind, 2012).

However, there is evidence to indicate that the single-gender model can produce some benefits for girls beyond academic achievement. In their systematic literature review of single-gender education studies, Belfi, Goos, De Fraine, and Van Damme (2012) found sin-

gle-sex education to be more favorable for adolescent girls than coeducational environments in producing “nonachievement outcomes” such as school well-being and academic concept. Booth and Nolan (2012) reported that girls in single-gender environments were more competitive than girls in coeducational environments, theorizing that there is greater pressure for girls to maintain traditional gender identity roles when boys are present. In a study following girls in a single-sex physics classes, Kessels and Hannover (2008) reported that adolescent females were able to improve their self-concept in regard to their academic proficiency in physics by being in a single-sex classroom, in part because girls reported being less aware of being “girls” in a single-sex environment. Warrington and Younger (2003) and Salomone (2003) both reported that single-gender classrooms provide a safe space for girls because of the lack of ridicule and harassment that often occurs with boys in the room. Baron, Bell, Corson, Kostina-Ritchey, and Frederick (2011) in their discussions with girls who chose to attend an all-girl middle school reported girls enjoyed a learning environment free from the distractions offered by boys.

Despite the increasing wealth of research, overall the results on single-gender education remain inconclusive. Bracey’s (2006) meta-review of single-gender education to that point noted that it is difficult to accurately gage the effects of single-gender instruction, as many other variables are also involved. In a study of middle school teachers who volunteered to work at a single-gender academy for at-risk kids, Spielhagen (2011) observed that there may be some benefits to single-gender education but that the results depend on a variety of factors, including the level of professional development and training provided to teachers prior to beginning the initiative. Bigler and Signorella (2011) stated that “no consensus has been reached on the optimal gender composition of classrooms” (p. 659), a conclusion previously mentioned by others (Holthouse, 2010; Parker & Rennie, 2002; Protheroe,

2009). Patterson (2012) points out that the debate of late has been reframed around the issue of school choice, with inconclusive results and single-gender supporters and detractors weighing in on both sides; however, Patterson (2012) also notes an increasing positive shift toward single-gender education, as the “movement’s energy is pulling other critics into its orbit” (p. 40).

PURPOSE OF THE STUDY

Despite the best efforts of its critics, the numbers seem to indicate that some benefits to single-gender learning may exist, including the possibility that single-gender classrooms can provide a safer, more secure environment for adolescent girls than a traditional coeducational classroom. Middle school educators around the country continue to explore single-gender as a possible way to improve the middle school experience for all students. One such site is West Middle School,¹ a traditional Grade 6 to Grade 8 middle school located in the southeastern United States. Beginning with the 2010–11 school year, West Middle School piloted single-gender classrooms on one sixth-grade team as a way to possibly increase student engagement and comfort levels with the transition to middle school—specifically in regard to female middle school students. The creation of a single-gender program within a public school setting provided an opportunity to conduct a quasi-experimental research study, comparing outcomes of girls assigned to the single-gender group to outcomes of girls assigned to the coeducational group.

The purpose of this study was to compare perceptions of academic attitudes and school satisfaction among girls in sixth-grade single-gender classrooms to those in mixed-gender classrooms over a 3-year period (2010–2013). While experiences of boys were also considered in the overall project, this article focuses specifically on the girls’ experiences. The researcher theorized that if single-gender classrooms increase female students’ sense of

school well-being and comfort/security with the learning environment (as suggested by research literature), the single-gender participants in this study would be similarly influenced. The researcher addressed the following question: *To what extent is gender-based teaching associated with differences in academic attitudes and school satisfaction for sixth-grade girls?* Perceptions of girls in single- and mixed-gender classrooms were compared. The study contributes to the knowledge base by comparing a single-gender classroom setting to a mixed-gender classroom setting within the same public school over an extended period of time (3 years). In addition, the outcome variables of *academic attitudes* and *student satisfaction with school* are “non-academic” variables. As much of the current literature suggests that any benefits of the single-gender model for girls are social or developmental in nature, this study can help to further inform this phenomenon.

METHOD

Setting

West Middle School is a traditional middle school in the Southeastern United States. The school serves students in Grades 6 through 8, with a population of about 750 students (school website homepage, n.d.). According to the U. S. Department of Education, National Center of Education Statistics, it is classified by the Census Bureau as “rural fringe,” defined as “rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster” (U.S. Department of Education, National Center for Education Statistics, 2012). The student body is about 30% minority, with 20% being African American and the rest primarily Latino (school website homepage, n.d.). It is a Title I school with 55% of the students listed on the school website as “economically disadvantaged” on the end-of-year assessments for 2010–11 (Year 1 of the study). Academically,

it is considered to be a strong school; in 2010–11, the school composite was rated with approximately 80% of students at or above grade level, (school website, “Performance Data,” n.d.). All the students who attend West Middle School will also attend West High School. According to the principal via personal communications, there is a strong sense of community support and participation within the school, as many of the school parents also attended West Middle themselves.

Participants

Students. The students in this study were all sixth-grade females at West Middle School from 2010–2013 assigned to the Trailblazers team. Because the study investigated a program already in place in a regular public middle school and because the treatment (i.e., participation in the single-gender classroom) was for an entire school year, the sample selected was a convenience sample. There were 109 females assigned to the Trailblazers team during this period: 35 in 2010–11 (Year 1), 41 in 2011–12 (Year 2) and 33 in 2012–13 (Year 3). The principal assigned all students to teams for each grade level at West Middle School. In an interview, the principal stated that she assigns sixth-grade students to teams based on their IDEA/504 status, their limited English proficiency status, and any information that the home elementary school wishes to provide regarding academic or behavior performance.

Of the 109 total participants from the 3-year period, only one participant was identified as a student with disabilities under the umbrella of the Exceptional Children (EC) program; the student in question has dyslexia but only receives Exceptional Children services on a consultative (as needed) basis. None of the participants were classified as academically gifted. Four participants over the 3-year period were identified as Limited English Proficient (LEP), three from Year 1 and one from Year 3. A chi-square contingency analysis was conducted prior to the primary inferential analysis

to determine that the participant groups were appropriately equalized in terms of ethnicity.

Teachers. The three teachers for this study were assigned to the sixth grade Trailblazers team at West Middle School. According to the principal, these teachers were known for their creativity and resourcefulness in the classroom and were highly regarded as “teacher-leaders” within the school and the district. Based on observations by the researcher and confirmed by the principal, the three teachers worked extremely well together and were respectful of one another. They were strong disciplinarians, yet they each demonstrated a positive rapport with the students.

The teaching schedule on a three-teacher team means that each teacher has one class of all-boys, one class of all-girls, and one class of mixed-gender students for approximately 60 minutes each. Trailblazer teachers instruct students for the core content classes (math, language arts, and either science or social studies for alternating quarters). The classes rotate among the teachers, staying together as a group. For their elective classes, students leave the team and are integrated with other sixth-grade students in coeducational classes in another part of the building. For this study, girls from the all-girls classes were compared to their counterparts in the mixed-gender classes.

Procedure

While the principal assigns students to their teams, the teachers assign students to the single-gender or mixed-gender classrooms. Year 1 of the program (2010–11) was called a “pilot” year by the school personnel. The principal assigned students to the Trailblazers team and then parents and students were asked to complete consent/assent forms for participation in the single-gender program. Students who did not return signed parental consent and student assent forms were automatically placed into the mixed-gender classroom, while students who returned the forms were placed in either the all-boys or all-girls classroom

depending on their gender. In Year 1, twenty-five girls were assigned to the single-gender class and 10 girls were assigned to the mixed-gender class.

Beginning with Year 2 (2011–12), the Trailblazers teachers spent the first 2 weeks getting to know their students and considering who might be a good fit for the single-gender program. During these 2 weeks, all the classes were mixed-gender. At the end of these two weeks, the Trailblazers teachers collaboratively assigned the participants for this study to either the all-girls class or the mixed-gender class. According to written responses provided by teachers, the teachers considered several factors when determining who was placed in the single-gender program: (1) student/parent requests to be in or out of the program; (2) how introverted or extroverted the student was during classroom interactions; (3) whether or not the student seemed to struggle academically; and (4) how the student functioned socially with peers. Students who struggled either academically or socially were often placed into the single-gender program, barring other factors (such as parent or student requests). For the purposes of this study, all girls were in the assigned classroom environment (single-gender or mixed-gender) for at least 80% of the academic school year as verified by enrollment records. In Year 2, twenty-three girls were assigned to the single-gender class and 18 were assigned to the mixed-gender class. In Year 3, twenty-five girls were assigned to the single-gender class and 8 were assigned to the mixed-gender class.

Creating single-gender classrooms. When planning for this initiative, the teachers (with support from the principal) began by learning all they could about single-gender education. In 2009, the single-gender movement was gaining national momentum. One neighboring state, South Carolina, had adopted a statewide single-gender initiative and several professional development opportunities devoted exclusively to single-gender education were available. The Trailblazers teachers attended a single-gender education conference and vis-

ited a single-gender school. They created professional networks and asked lots of questions. In addition, they read many of the available resources on single-gender teaching and learning recently produced (see Gurian, Stevens, & Daniels, 2009a, 2009b; James, 2009; Jensen, 2005; Sax, 2005a, 2005b). Based on the collective print resources combined with advice from colleagues gained through professional development interactions, the Trailblazers team teachers collectively began designing single-gender classrooms based on what they had learned. Their intent was not just to separate boys from girls, but to teach each group differently according to their gender-based learning needs, a recommendation that single-gender advocates maintained as an essential part of successful implementation (Chadwell, 2007; Sax, 2005b).

Many of the strategies suggested and eventually used were not necessarily content specific; instead they focused on managing class time differently to better suit the perceived needs of girls. Examples of single-gender strategies developed by the Trailblazer team teachers for their female students included revising allotted instructional time to allow increased levels of class discussion; making real world connections to math and science concepts (now part of the Common Core curriculum); allowing for evolution of an assignment that may change based on class discussions; using fiction-based materials for reading assignments; developing class activities that encouraged appropriate risk-taking; giving multiple assignments and allowing girls to self-monitor work completion; increasing the variety of art supplies available in the classroom and incorporating this variety into classwork; and allowing time during the school day to discuss "girl issues."

As professionals, the Trailblazer teachers were reluctant to refrain from using good strategies with their mixed-gender coeducational classes. Therefore, any instructional strategies that the teachers believed would yield positive results were utilized with both single-gender and mixed-gender classes. Consequently,

while the use of gender-based strategies is not part of the treatment per se, the teachers and the principal indicated through personal conversations with the researcher that using these gender-based strategies created a classroom environment where sensitivity to gender-based learning was increased. The degree to which gender-based strategies could be integrated in the teachers' instructional designs was higher for the single-gender classrooms.

Instrumentation. The student survey was originally developed by the school's single-gender advisory team, comprised of the Trailblazers team, the principal, and the researcher. A Likert-type scale was used for recording student responses, with five levels of response (5 = *strongly agree*, 4 = *agree*, 3 = *undecided*, 2 = *disagree*, 1 = *strongly disagree*). No items were reverse coded. Two versions of the school-developed survey were created, one for single-gender classes and one for the mixed-gender classes. While steps were taken to ensure the content validity of the survey, the instruments had not been psychometrically evaluated prior to this study.

The finalized single-gender survey for Trailblazer team females was comprised of 23 total questions: 19 Likert-type questions, two demographic data questions, and two open-ended questions. Only the Likert responses were evaluated in this study. On the final version of the single-gender survey, Items 1 and 2 were dichotomous questions regarding student demographic information, Items 3 through 10 were Likert-type questions regarding academic attitudes toward core content classes, Items 11 and 12 asked about student behavior in the classroom and perception of classmates' willingness to learn, Item 13 was a Likert-type question about whether the student has been bullied at school, and Items 14 through 18 and 20 were Likert-type questions about the experience of being in the single-gender classroom (Item 19 did not apply to sixth-grade females). Items 21 and 22 were open-ended, asking participants to describe one or two things they liked and disliked about being assigned to the single-gender classroom. Items 23 and 24 were

Likert-type questions asking about the student's overall level of satisfaction regarding their team and school.

Fifteen of the Likert-type questions were identical on both the mixed-gender and single-gender surveys for sixth-grade females. The mixed-gender version was comprised of 18 total questions: 15 Likert-type questions, two demographic data questions, and one open-ended survey response. On the mixed-gender surveys, Items 1 through 13 were identical as the same-numbered items on the single-gender survey. Items 14 and 15 were Likert-type questions about the experience of being in the mixed-gender classroom. Item 16 was an open-ended response asking students to explain why they answered the way they did in Item 15 ("I wish I had been in the boys-only or girls-only class on my team this year"). Items 17 and 18 were Likert-type questions asking about the student's overall level of satisfaction regarding their team and school (identical to Items 23 and 24 on the single-gender survey). Again, only the Likert survey responses were analyzed in this study.

For the surveys, data collection occurred one day near the end of each school year. Students completed the survey anonymously via Survey Share, an electronic survey site. The survey was administered by the researcher. The survey took about 15 minutes for the students to complete. No make-up surveys were given to students who were absent.

RESEARCH DESIGN AND DATA ANALYSIS

The study encompassed a quasi-experimental group comparison with a posttest-only design. While the lack of randomization was a limitation of the study, preliminary statistical analyses (see below) were conducted to ensure that samples were made up of similar participants to reduce threat of internal validity. The researcher used SPSS software (2013) to record and analyze statistical patterns and trends; and, the .05 level of significance was

used for all statistical tests. For this study, the treatment (i.e., membership in a single-gender classroom) was the independent variable and *academic attitudes* and *student satisfaction with school* were the dependent variables. To determine the possible differences and relationships between the two dependent variables and also to determine if an interaction existed, MANOVA was used. The common Likert-scale survey items appearing on both surveys were used in the MANOVA calculations. Given that the sample size of the single-gender group was almost twice the size of the mixed-gender group, additional procedures to transform the data to assure homogeneity of variance and covariance as much as possible were applied. MANOVA assumes a normal distribution among dependent variables; Box's Test of Equality of Covariance Matrices was applied to determine normality of distributions.

Preliminary Statistical Analyses

Determination of revised dependent variables. Items on both surveys asked students to convey their feelings about their four core content classes with eight Likert items. This produced possibly eight variables to analyze. In addition, the researcher postulated that given the simplistic nature of the items ("_____ is an easy subject for me" and "I like my _____ class"), collapsing the variables into a smaller set was an option. Therefore, to verify the assumed number of dependent variables, preliminary statistical analyses included principal component analysis. Principal component analysis for *academic attitudes* was completed on student survey Items 3, 4, 5, 6, 7, 8, 9, and 10 on both surveys. Analysis noted that the items did not produce a high degree of reliability to one another (Cronbach's $\alpha = .47$), but the items did produce stronger levels of reliability to one another within the academic content areas used to identify each variable (i.e., math, language arts, science, and social studies). Reliability results indicated that Items 3 and 4 ("Math is an easy subject for

me” “I like my math class”) produced a Cronbach’s α level of .66. Items 5 and 6 (“Language arts is an easy subject for me” “I like my language arts class”) had a Cronbach’s α value of .75. Items 7 and 8 (“Science is an easy subject for me” “I like my science class”) had a Cronbach’s α value of .64. Items 9 and 10 (“Social studies is an easy subject for me” “I like my social studies class”) had a Cronbach’s α value of .67. Because of these results, the variable of *academic attitudes* was amended to four new dependent variables: (1) *academic attitude toward math*, (2) *academic attitude toward language arts*, (3) *academic attitude toward science*, and (4) *academic attitude toward social studies*. These variables were considered to collectively measure *academic attitudes* but the interpretive statistical analysis considered each variable separately.

To verify reliability of the items used to collectively measure *student satisfaction with school*, principal component analysis was calculated for single-gender participants by using Items 11, 12, 13, 23 and 24. For mixed-gender participants, *student satisfaction with school* was measured by using Items 11, 12, 13, 17, and 18 (Items 17 and 18 are identical to items 23 and 24 on the single-gender survey). Principal component analysis between the items produced a Cronbach’s α value of .60; however, the reliability value increased to .65 if item 13 (“I am never bullied at this school”) was not considered. This result caused the researcher to reconsider the grouping of the items. Items 11, 12, 17/23, and 18/24 was positively worded, while item 13 was negatively worded; in addition, it can be argued that the item about bullying did not fit well into the group with the other items, three of which specifically related to being placed on the team. Bullying could include a broader context that moved beyond just the team; bullying could occur in the locker room or on the school bus, and therefore may or may not actually relate to the student behaviors in the classroom. Based on these factors, Item 13 was not included in measuring *student satisfaction with school*.

The means and standard deviations for all resulting variables are found in Table 1.

Equalized participant groups. A chi-square analysis was performed on the demographic data for each group to determine if the participant groups were appropriately equalized for ethnicity over the 3-year period. In the single-gender classes, 54 (73.97%) of the participants were ethnically categorized as “White” while 19 (26.03%) were ethnically categorized as “non-White.” In the mixed gender class, 26 (72.22%) of the participants were categorized as “White” while 10 (27.78%) of the participants were ethnically categorized as “non-White.” The chi-square contingency analysis indicated that this difference was not statistically significant ($p = .85$). Based on this result, the researcher determined that the two participant groups were appropriately equalized in terms of ethnicity of student-participants.

Primary Statistical Analyses

MANOVA Results. MANOVA was used to analyze the means between the control group and the treatment group for dependent variables *academic attitudes toward math*, *language arts*, *science* and *social studies* and *student satisfaction with school* using the teacher-developed survey data. Box’s Test of Equality of Covariance Matrices was applied to determine if variance of dependent variables and was equal across groups for all variables. Box’s result was not significant [Box’s $M = 114.67$, $F(75, 5,216) = 1.27$, $p = .06$]; all assumptions were met.

For *academic attitudes* collectively, MANOVA results indicated no significant statistical differences between the groups of girls related to class assignment. Specific results are as follows: for *academic attitude toward math* related to class assignment: $F(1, 102) = 3.14$, $p = .08$, $\eta^2 = .03$. For *academic attitude toward language arts* related to class assignment: $F(1, 102) = 1.12$, $p = .292$, $\eta^2 = .01$. For *academic attitude toward science* related to class assignment: $F(1, 102) = 1.37$, $p = .24$, $\eta^2 = .01$. For

TABLE 1
Means and Standard Deviation of Resulting Dependent Variables by Year and Class Assignment
After Primary Component Analysis for Single-Gender and Mixed-Gender Participants, Years 1-3

		Academic Attitude Toward Math		Academic Attitude Toward Language Arts		Academic Attitude Toward Science		Academic Attitude Toward Social Studies		Student Satisfaction With School	
Class	n	M	SD	M	SD	M	SD	M	SD	M	SD
Year 1											
Mixed	10	3.23	.98	3.54	.99	4.27	.68	3.82	.96	3.55	.80
Single	25	3.90	.90	2.52	1.04	3.98	.71	4.00	.66	4.34	.42
Total	35	3.69	.97	3.53	1.01	4.07	.71	3.94	.75	4.10	.67
Year 2											
Mixed	18	3.36	1.01	3.43	1.07	4.25	.55	4.14	.66	3.73	.81
Single	23	3.52	1.06	3.43	.66	4.07	.72	3.87	.70	3.66	.92
Total	41	3.46	1.03	3.43	.82	4.13	.66	3.96	.69	3.69	.87
Year 3											
Mixed	8	3.75	.46	3.19	.92	4.50	.71	4.25	.53	3.97	.47
Single	25	3.93	.66	3.85	.97	4.48	.53	4.33	.58	4.38	.44
Total	33	3.89	.62	3.68	.99	4.48	.57	4.31	.56	4.27	.48
Totals (Y1-3)											
Mixed	36	3.41	.89	3.41	.99	4.31	.62	4.06	.75	3.73	.74
Single	73	3.77	.91	3.59	.91	4.17	.69	4.05	.67	4.11	.72
Total	109	3.66	.92	3.53	.93	4.21	.67	4.06	.69	3.99	.75

academic attitude toward social studies related to class assignment: $F(1, 102) = .001, p = .97, \eta^2 < .01$.

There were also no significant statistical differences between the groups of girls related to year of participation on *academic attitudes*. Specific results as are follows: for *academic attitude toward math* related to year of participation: $F(1, 102) = 1.47, p = .24, \eta^2 = .03$. For *academic attitude toward language arts* related to year of participation: $F(1, 102) = .125, p = .88, \eta^2 < .01$. For *academic attitude toward science* related to year of participation: $F(1, 102) = 2.42, p = .09, \eta^2 = .05$. For *academic attitude toward social studies* related to year of participation: $F(1, 102) = 2.18, p = .12, \eta^2 = .04$.

For *student satisfaction with school*, MANOVA analysis did find statistical signifi-

cance between the groups of girls related to both class assignment and year of participation. *Student satisfaction with school* was significantly increased for students assigned to the single-gender class, $F(1, 102) = 6.91, p = .01, \eta^2 = .06$. Significance was also determined for *student satisfaction with school* related to year of participation, $F(1, 102) = 3.65, p = .03, \eta^2 = .07$. A significant interaction was noted between year of participation and class assignment, $F(1, 102) = 3.43, p = .04, \eta^2 = .06$, meaning that students' perceptions of satisfaction were impacted by the combination of what year and class they were assigned to. Tukey's HSD method was used as a post-hoc analysis to identify where the differences existed among the groups regarding year of participation. The pairwise comparisons indicated that means for Year 2 were significantly lower than

for Year 1 ($p = .02$) and lower than for Year 3 ($p < .01$). There were no significant differences between Years 1 and 3 ($p = .54$).

A simple comparison of the means for *student satisfaction with school* finds the total group mean for the single-gender group was higher (4.11 for the single-gender group versus 3.73 for the mixed gender group). In looking at specific years, the single-gender group means on Years 1 and 3 were, respectively, .79 higher and .41 higher than the mixed-gender group means for these years. Year 2 results show the mixed-gender group average for *student satisfaction with school* was higher than the single-gender group average for that year, but only by .07. Given these collective results, the researcher concluded that *student satisfaction with school* was significantly higher for participants in the single-gender group at the .05 significance level versus the mixed gender group.

Descriptive Statistical Results. In addition to these quantitative data, descriptive statistics extracted from specific single-gender-only survey items were analyzed to provide deeper context and understanding. On the single-gender survey, Items 14, 15, 16, 17, 18, and 20 asked single-gender female participants specifically about their experiences.

The total mean for Item 14 ("Being in the boys-only or girls-only class has helped me learn better") was 4.17, with 77.3% of single-gender girls indicating that they agreed or strongly agreed that being in the single-gender program did help them learn better. The total mean for item 15 was 3.97 ("agree" = 4.0), with 70.6% of girls noting that they agreed or strongly agreed that behavior in the single-gender classroom was better than behavior in mixed-gender classrooms. Items 16 and 17 asked girls about how they would prefer the single-gender program structured in seventh grade (if it were to be expanded in the next academic year). The teachers had expressed a concern that students might prefer only part of their day to be single-gender versus having all their core content classes structured that way; the teachers attempted to ascertain student feeling on this issue through these items. Item

16 asked girls if they would like to have only their math and language arts classes as single-gender in seventh grade, whereas Item 17 asked if they preferred to have all their core content classes as single-gender in seventh grade.

Over the 3-year period, the group mean for Item 16 ("I want to be in single-gender for math and ELA next year") was 2.71, with 21.3% of girls agreeing or strongly agreeing that they preferred their math and language arts classes should be single-gender in seventh grade. This result is potentially misleading until we review the result for Item 17. For Item 17 ("I want to be in single-gender for all my classes next year"), the group mean was 3.80, and 62.6% of the girls indicated that they agreed or strongly agreed that *all* their core content classes should be single-gender in seventh grade. Collectively, these results would seem to indicate that the participants in the future would select a single-gender classroom over a mixed-gender classroom given the option, and that participants preferred most (if not all) of their core content classes be offered as single-gender. However, it is important to note that some girls still preferred a mixed-gender option based on these results.

Items 18 and 20 on the single-gender survey contributed to the general understanding of the girls' perceptions regarding the single-gender classroom in a broader context. Item 18 asked if the girls would recommend the single-gender program to incoming sixth graders ("I would tell new students to choose the boys-only or girls-only classes if they have the chance"); ostensibly, if the girls themselves felt the single-gender experience to be a positive one, they would recommend it to others. Item 20 asked girls to rate their overall level of enjoyment of the single-gender classroom ("I have enjoyed being in my boys-only or girls-only class this year"). Both items served to further establish how well the girls perceived the single-gender experience.

While group mean for Item 18 ("I would tell new students to choose the boys-only or girls-only classes if they have the chance")

was lower than Item 20 (“I have enjoyed being in my boys-only or girls-only class this year”), both items received positive ratings from single-gender participants over the 3-year period. Total group mean for Item 18 was 4.03, with 73.3% of respondents noting that they agreed or strongly agreed with recommending single-gender to new students. The total group mean for Item 20 was 4.41, higher than any other item reported in the descriptive set. In addition, 86.6% of girls responding indicated that they agreed or strongly agreed that they enjoyed the sixth-grade single-gender classroom experience.

DISCUSSION

The research question specifically queried how single-gender participants were compared to their mixed-gender counterparts in terms of *academic attitudes* and *student satisfaction with school* (*To what extent is gender-based teaching associated with academic attitudes and student satisfaction with school for sixth-grade girls?*). No statistical significance was noted between the single-gender group and mixed-gender group on *academic attitudes toward math, language arts, science and social studies*. A simple review of means yielded few insights; this was not surprising. The items used to measure *academic attitudes* were somewhat simplistic (i.e., “I like my math class,” “math is easy for me”). Revising the items or adding additional items to measure academic attitudes might be helpful in providing additional information in the future.

Statistical significance between participant groups on *student satisfaction with school* was found on comparisons of both group assignment (mixed-gender versus single-gender) and year of participation. For group assignment, MANOVA analysis indicated that higher levels of *student satisfaction with school* were noted for participants assigned to the single-gender classroom [$F(1, 102) = 6.91, p = .01, \eta^2 = .06$]. This would help to confirm the conclusion suggested in the research literature that

single-gender participants enjoyed the experience of single-gender and found benefits in program participation. Examination of the post-hoc analysis results did not yield any additional insights. Since the means for Years 1 and 3 are so similar for the single-gender class (4.34 in Year 1; 4.38 in Year 3), it would seem that whatever caused the *student satisfaction with school* mean to drop for the single-gender group in Year 2 was unexplained by these data. Additional data from subsequent years might prove helpful in determining if the *post hoc* results were indicative of other phenomenon or simply an irregularity.

Descriptive statistical data helped to verify these inferential statistical results. Over the 3-year period, 77.3% of participants indicated that being in the girls-only class had helped them learn better (Item 14) and 70.6% of respondents noted that behavior in the single-gender classroom was better than behavior in mixed-gender classrooms (Item 15). These findings would indicate that the girls perceived the single-gender classroom environment as beneficial (although the specific reasons why this is the case remains unclear from this study). 62.3% indicated that they would like to continue the single-gender program into their seventh-grade year, helping to confirm the statistically significant MANOVA results regarding *student satisfaction with school*. Eighty-six point six percent of survey respondents indicated that they agreed or strongly agreed with the statement, “I enjoyed being in the single-gender classroom this year,” and 73.3% agreed or strongly agreed that they would recommend single-gender classrooms to new students. Clearly, the single-gender experience was viewed favorably by the majority of the participants in comparison to their mixed-gender learning experiences. These data increased the researcher’s confidence in the overall results.

Finally, in considering the results of the research question, the researcher analyzed the preponderance of data related to each method of investigation. In utilizing multiple sources of both inferential and descriptive data analysis, the researcher theorized that a clearer

understanding of the possible “non-academic” benefits of single-gender education for middle school girls was possible through this approach. This assumption was confirmed. Quantitatively, the researcher determined that statistical significance was present for *student satisfaction with school*, but not for *academic attitudes* as identified in this study; in addition, descriptive quantitative data confirmed that a large majority of the students in the single-gender classes enjoyed being in the program (86.6%) and would recommend it to others (73.3%).

Significance of Findings

With the passing of No Child Left Behind in 2001, restrictions on configurations of public schools in the United States were lessened, thereby increasing the types of educational options available for parents and students (Cable & Spradlin, 2008; Madigan, 2009). Single-gender education in a public school setting is only one of these options and yet it remains one of the most controversial, with advocates and detractors on both sides. In addition, both research-based and anecdotal evidence does indicate that some positive benefits for students beyond that of academic achievement may be gained by participation in a single-gender classroom, especially for girls transitioning to middle school (Belfi et al., 2012; Booth & Nolan, 2012; Ferrara & Ferrara, 2004; Sax, 2005b). Leveraging the perceived differences between males and females and then capitalizing on those differences is the key tenet of single-gender education.

There is a well-established connection in the literature between positive peer relationships and adolescent growth/development in the middle-school years (Wang & Dishion, 2012). Middle-childhood school dislike is a risk factor for early sexual behavior (Parkes et al., 2014). A lack of positive peer relationships in early adolescence has been linked to future behavior problems (Wang & Eccles, 2012). Single-gender advocates maintain that a classroom composed of peers from the same gender

can provide a nonthreatening environment, one where girls in particular encounter a more cohesive learning experience and appropriate risk-taking is highly supported (Sax, 2005b, 2010).

In this study, statistical significance on the dependent variable *student satisfaction with school* indicated that girls in the single-gender group were more satisfied with their school experiences than girls in the mixed-gender group. Descriptive statistical data provided additional information to assist the researcher in confirming these results; single-gender girls in this study expressed a high degree of satisfaction with the single-gender classroom. Overall, this study confirms that single-gender classrooms can provide some benefits to sixth-grade females beyond that of just possible academic achievement. Regardless of whether the participants actually experienced increased academic achievement in the single-gender classrooms, they reported that they were more satisfied with the single-gender classroom than the mixed-gender classroom for sixth grade. Given the established difficulties that adolescent girls often experience in transitioning to middle school, a single-gender classroom environment where girls are comfortable and satisfied with their learning experiences may ultimately prove to be more beneficial than any instructional strategy.

However, despite these results, it is important to note that the single-gender model is not a panacea for all difficulties girls may experience in transitioning to middle school. Emotionally, the transition into adolescence is a turbulent one; as physical and cognitive changes occur, many early adolescents react to their surroundings in unexpected ways. The Association for Middle Level Education has published a series of guidelines for educators to use in building effective middle school environments. At the top of this list of characteristics is to be “developmentally responsive” to the requirements of middle schoolers (Association for Middle Level Education, 2010) and their special, unique needs. While the majority of girls who participated in this study were sat-

ified with their single-gender experience, 13.4% were not. This is a small but important distinction. The single-gender model may not be a good fit for some students (single-gender advocates acknowledge this; see Sax, 2005a, 2005b). For example, it is unclear if the single-gender model adequately addresses the potential needs of LGBTQ students for whom the middle school transition can be a time of great personal uncertainty.

In addition, single-gender critics, including classic feminist advocates, raise a valid concern in noting that “separate” is sometimes not “equal.” However, it is likewise worth noting that there is a certain comfort and security inherent in interactions within our own gender groups, especially during the early adolescent years. While single-gender classrooms may not be the most appropriate solution for all middle school students, it would seem that, at least for some girls, there are some advantages inherent in the model that provide them a secure and comfortable learning environment during an awkward and uncertain time.

Limitations and Delimitations

To summarize, the study participants included all sixth-grade females at West Middle School from 2010-2013 assigned to the Trailblazers Team. The study was delimited to examination of the extent to which these student-participants’ *academic attitudes* and *student satisfaction with school* levels differed between girls enrolled in the single-gender versus the mixed-gender classroom. The results are generalizable to sixth-grade female students enrolled in single-gender classrooms following a similar school schedule and with similar demographics to the students at West Middle School.

There are several limitations noted with the study. The study only investigated the perceptions of sixth-grade females assigned to single-gender and mixed-gender classrooms over a three-year period at one school site; the students on this team, per the principal, were con-

sidered “regular” students who did not fall under the umbrella of the Exceptional Children program; some students did qualify to receive English as a second language services, but the extent of services varied among these students. The results may not apply to students who are labeled Exceptional Children or have other documented learning disabilities. The results may also not apply to an urban population or more ethnically mixed population, although statistical analysis of participant ethnicity confirmed that the participant groups were appropriately equalized. The data collection instrument was developed by the teachers themselves and had not been psychometrically evaluated prior to this study. In addition, the instrument was a Likert-scale survey with five levels; other survey methods may provide an increased refinement of results.

Levels of teacher-fidelity regarding the use of the gender-based strategies were not observed on a daily basis; however, there is evidence to indicate high levels of teacher fidelity to using the gender-based strategies. The idea to investigate and pilot single-gender learning initiated with the teachers themselves, and therefore, teacher buy-in regarding these concepts was strong. On the recommendation of the researcher, the teachers made checklists to self-monitor how often they used certain gender-based strategies during a specified period of time, and the checklists indicated that gender-based strategies were being used on a consistent basis. Teachers regularly met to discuss the positives and negatives of their efforts and to share ideas. Through personal conversations with the researcher, the principal confirmed her belief that teacher fidelity to the concepts of gender-based teaching and learning were being maintained. The principal based this belief on her own observations of the teachers and students that occurred when she was in the classroom. Finally, the lack of randomization is a limitation of the study; this is an inherent problem in conducting true experimental research in a public school setting.

Implications for Future Research and Practice

There are several recommendations for future research based on this study. Future research studies should utilize participants from multiple classrooms in multiple schools, in order to strengthen the validity of the data results. Any attempt to replicate this study might include revision of the items used to measure *academic attitudes*, or replacement of these items altogether with a previously established valid instrument, in order to better and more accurately measure the intended variable construct. Future studies utilizing a qualitative approach may yield additional information regarding the specific nature of perceived benefits of the single-gender classroom. Longitudinal studies that established whether single-gender program participation for females yielded long-term benefits would be helpful for both parents and educators, particularly if the single-gender program was extended beyond just sixth grade. Studies that address in what ways single-gender programs impact diverse populations may further inform this question. Finally, single-gender programs may provide benefits to males as well as females. Single-gender research that focuses on possible benefits for male middle school students beyond just academic achievement may also yield significant results.

CONCLUSION

The middle school experience is a precarious and fragile time for most adolescents; females in particular face pressures that can make the transition to middle school a difficult one. Providing the option of a single-gender classroom to girls can result in increased levels of student satisfaction regarding the school learning environment. For adolescent girls who may experience high social anxiety and fear transition to middle school, single-gender education emerges as a possible balm to remedy these fears. While not a solution for all middle school girls, it presents as a real and viable

option for educators, parents, and students to fully and thoughtfully consider.

NOTE

1. Both school and team names are pseudonyms.

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