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Upper Elementary Boys' Participation During Group Singing Activities
in Single-sex and Coeducational Classes

by

Zadda M. Bazy

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Center for Music Education Research
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Fourth and Fifth Grade

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Dedication

I dedicate this dissertation to the boys and girls in single-sex and coeducational classes at Oneco Elementary. You are truly the inspiration for this research.

Acknowledgments

To begin, I would like to thank the music teachers and administrators who participated in this study, including Helen Abernathy, Ka Cline, Doug Dupouy, Julie Hebert, Cynthia Heidel, Christy Isaacs, Marsha Perry Juday, Judy Kelley, Elizabeth Kimbrell, Jeff Lego, Helene Levin, Allison Rekow, Myra Russell, Barbara Siffermann, and Barbara Sullivan. In one way or another, each of these individuals helped with the creation and testing of the Singing Participation measure and/or participated in the study. Furthermore, I extend my gratitude to the special area teachers, homeroom teachers, staff, parents, and students at the three schools in the sample. In particular, I would like to thank the three music teachers who participated in this research. I never could have conducted this study without your dedication and support.

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Table of Contents

List of Tables	iii
List of Figures	v
Abstract	vi
Chapter 1: Introduction	1
Background	1
Rationale	4
Purpose	5
Hypotheses	5
Educational Significance	6
Single-sex Versus Single-gender	6
Definitions	7
Delimitations and Limitations	8
Chapter 2: Literature Review	11
Gender Stereotypes and Singing	11
Single-Sex Education	14
Assessing Participation	18
Conclusion	22
Chapter 3: Method	23
Design	23
Sample	24
Procedures: Quantitative	27
Procedures: Qualitative	29
Repertoire	30
Measures	31
Data Analysis: Quantitative	36
Data Analysis: Qualitative	37
Ethical Concerns	38
Validity and Reliability	38
Summary	40
Chapter 4: Results	41
Quantitative Data	41
Overview	41
Reliability	42

Descriptive statistics	44
Analysis of variance.....	55
Assumptions of the ANOVA	59
Summary: Quantitative data	59
Qualitative Data	61
Overview.....	61
Qualitative data by theme	62
Participation in coeducational classes.....	62
Participation in single-sex classes.....	64
Advantages of single-sex classes.....	64
Time	68
Behavior problems	70
Particular groupings of students	72
The impact of the research design on teachers	73
Other	75
Qualitative data by school.....	80
School 1	80
School 2	82
School 3	84
Overall	86
Summary: Qualitative data	86
Conclusion	88
Chapter 5: Discussion	90
The Research Hypotheses Revisited.....	91
Beyond the Research Hypotheses.....	94
Advantages and disadvantages of single-sex education	94
Song choice.....	96
The teacher's influence.....	97
Implications for Music Educators.....	98
Create single-sex singing opportunities.....	98
Remember that “one size” does not “fit all”	100
Choose repertoire mindfully	102
Establish a “singing culture” at the school	103
Know your students	103
Future Research	104
Conclusion	107
References	110
Appendices	119
Appendix A: Music Teacher Reflective Journals	120
Appendix B: Semi-structured Interview Guide	121
About the Author	End Page

List of Tables

Table 1: School, District, and State Characteristics.....	25
Table 2: Sample by School and Grade.....	26
Table 3: Inter-item Correlations for the Singing Participation Measure	35
Table 4: Controlling for Potentially Confounding Variables	39
Table 5: Mean Participation Totals and Interrater Reliability by Time.....	43
Table 6: Internal Consistency of the Singing Participation Measure by Time.....	44
Table 7: Song Details by Song Number	46
Table 8: Songs by School and Time	46
Table 9: Mean Participation Totals for Each Song by School and Time	47
Table 10: Descriptive Statistics for Total Scores by School and Group for Time 1	49
Table 11: Descriptive Statistics for Total Scores by School and Group for Time 2	50
Table 12: Descriptive Statistics for Total Scores by School and Group for Time 3	51
Table 13: Descriptive Statistics for Total Scores by School and Group for Time 4	52
Table 14: Correlations Between Total Scores at Each Point in Time	57
Table 15: Mixed ANOVA Results by School, Time, and Group ($N = 123$)	58
Table 16: Qualitative Data Theme 1: Participation in Coeducational Classes	63
Table 17: Qualitative Data Theme 2: Participation in Single-sex Classes	65
Table 18: Qualitative Data Theme 3: Advantages of Single-sex Classes.....	67

Table 19: Qualitative Data Theme 4: Time	69
Table 20: Qualitative Data Theme 5: Behavior Problems	71
Table 21: Qualitative Data Theme 6: Particular Groupings of Students	73
Table 22: Qualitative Data Theme 7: The Impact of the Research Design on Teachers	74
Table 23: Qualitative Data Theme 8: Other.....	76

List of Figures

Figure 1: The Gender Hierarchy of School Subjects and Activities.....3

Figure 2: Singing Participation Measure34

Upper Elementary Boys' Participation During Group Singing Activities
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Zadda M. Bazy

Abstract

As boys in the upper elementary grades become increasingly influenced by peer pressure, many are less likely to participate in singing activities because singing is considered a “feminine” activity. The purpose of this research was to explore if there was an effect on upper elementary boys' level of participation during group singing activities when they attended music classes in a single-sex setting.

This study employed a true experimental design and a mixed method. Boys ($N = 186$) were videotaped during their regular coeducational music classes on two occasions to establish baseline data. Then the students were randomly assigned to attend music classes in either a single-sex or coeducational group. Boys were videotaped again after seven music classes (approximately 9 weeks later). The videos were scored using the author-designed Singing Participation Measure, and the scores ($N = 123$) were analyzed using an analysis of variance (ANOVA). In addition, qualitative data were collected in the form of music teacher interviews and journal entries.

The ANOVA showed no statistically significant differences between groups (single-sex or coeducational) or within groups (baseline scores versus post-treatment scores). In contrast, the qualitative data showed substantial differences in most of the boys' participation in single-sex classes. The teachers reported a sudden increase in the

boys' singing participation and described numerous advantages of single-sex music education. Further research is needed. Implications for music educators suggest teachers could create single-sex singing opportunities, choose repertoire mindfully, and establish a "singing culture" at the school to increase boys' participation during singing activities. In addition, music educators are encouraged to know their students' strengths, weaknesses, interests, and needs, and to remember that "one size" does not "fit all" when it comes to what is best for developing young musicians.

Chapter 1: Introduction

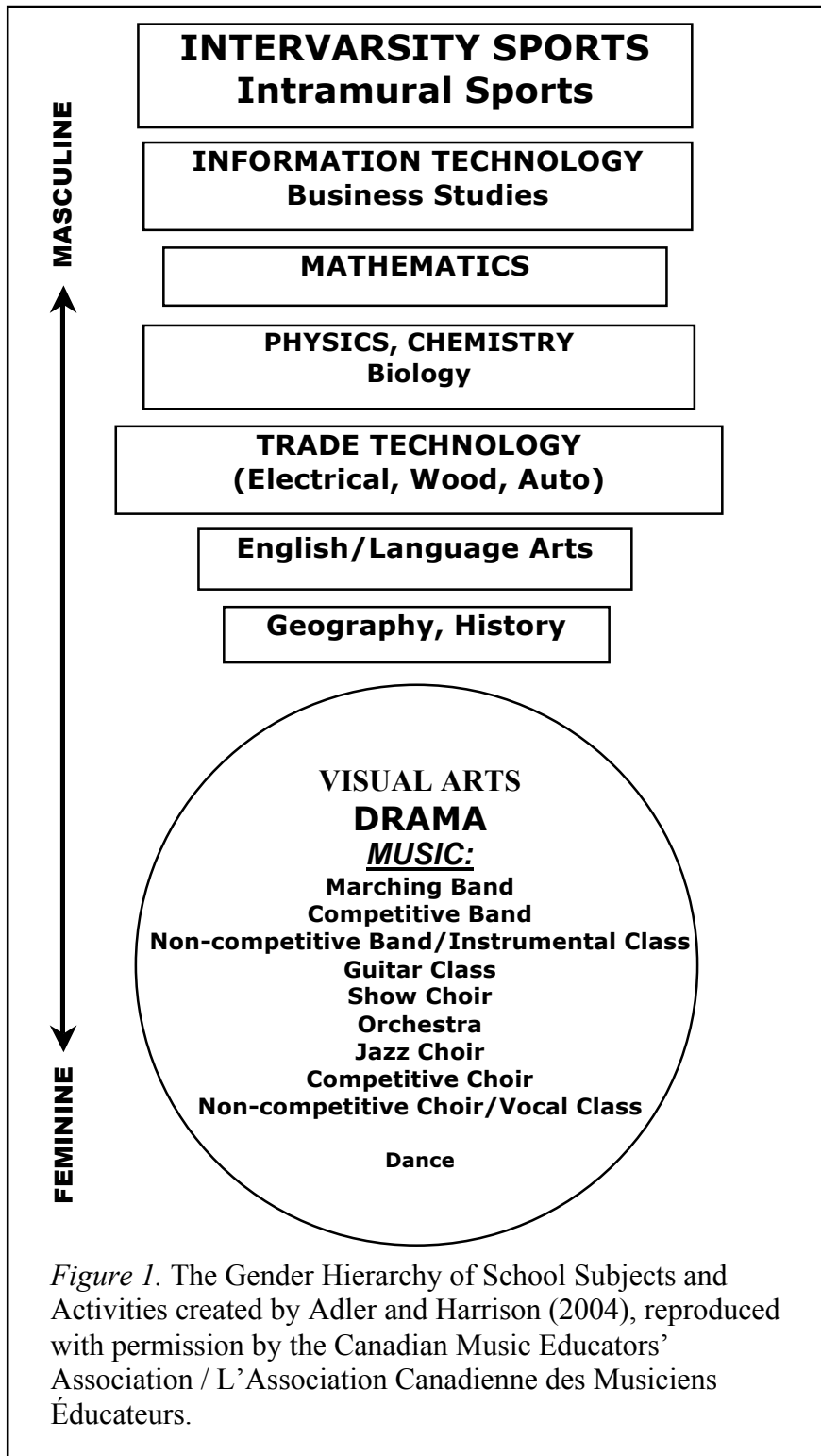
As boys in the upper elementary grades become more concerned with social appearances, many are less likely to participate in singing activities in the music classroom. In the United States, singing is typically considered to be a feminine activity (Adler & Harrison, 2004). As such, boys who hope to impress girls with their masculinity are often unwilling to sing when there are girls in the room (Demorest, 2000). However, when boys have the opportunity to attend music classes exclusively with other boys, the social dynamics change. This paper describes a research study on boys' participation during group singing activities in single-sex and coeducational settings.

Background

Many high school choral directors report more female students than male students enroll in choir. This has not always been the case. In colonial times, men participated in singing activities more than women did (Gates, 1989). Koza (1993) reviewed articles published between 1914-1924 in the *Music Supervisors' Journal* and found the "missing males" problem was evident in the early 1900s. During this period, writers of gender-related articles were concerned with the decline of boys participating in vocal music and many writers proposed that the effeminate nature of vocal music was a possible cause for this decline. Similar articles were published in the *Music Educators Journal* in the 1930s and 1940s. Damon (1936) wrote an article in which she described an eighth grade class as "the boys who did not sing." Winslow (1946) claimed, "Probably nothing perplexes the

secondary school teacher more than the vocal education of boys and young men. Many boys enter high school with negative and sometimes hostile attitudes toward vocal music...Vocal music suggests femininity to boys” (p. 58). Gates (1989) reported that in 1932 there was a balanced ratio of female to male singers in the United States, but by 1989 the ratio of female singers to males singers was 5:2. At the secondary level, when music is typically an elective class, female enrollment in choir greatly outnumbers male enrollment.

Research on student attitudes towards music shows that students in the upper elementary grades become increasingly influenced by gender stereotypes (Adler, 2002; Pogonowski, 1985; Sherban, 1995; Svengalis, 1978). Adler and Harrison (2004) created The Gender Hierarchy of School Subjects and Activities (see Figure 1). In this hierarchy, music is considered more feminine than reading, writing, or math, and vocal music is considered more feminine than instrumental music. These gender stereotypes may inhibit boys’ willingness to sing, particularly in front of girls who they might want to impress with their masculinity. In fact, boys in coeducational elementary music classes participate in singing activities significantly less than girls do (Eccles, Wigfield, Harold, & Blumenfeld, 1993; Haladyna & Thomas, 1979; Mizener, 1993; Moore, 1987; Sherban, 1995). The decline in male participation in singing activities may be due to an emphasis the United States society has placed on categorizing choral singing as a feminine activity. In recent years, males who participate in choirs are often stereotyped as effeminate and possibly homosexual. Once young boys become conscious of gender stereotypes in our culture, they may choose to avoid stereotypically feminine activities such as singing.



Rationale

One area of concern in the field of music education is the limited participation of males in singing activities once music becomes an elective course (Demorest, 2000; Koza, 1993). Music education at the elementary level may have an important impact on whether or not boys will elect to take music courses at the secondary level. Research suggests many boys become less interested in singing around the age of 8 years (Mizener, 1993; Moore, 1987; Svengalis, 1978). It is possible a change in approach to music education at the elementary level might maintain boys' interest in singing. One strategy for increasing male participation in singing activities is to allow boys to sing in a single-sex environment where the social dynamics are different and boys may feel it is safe and acceptable for them to sing.

Currently, there is a growing trend of single-sex education in the United States. When the National Association for Single Sex Public Education (NASSPE) was founded in March of 2002, only 11 public schools in the United States offered single-sex classrooms. As of April 2010, at least 540 public schools in United States offered single-sex environments, according to the NASSPE (n.d.). This increase in the number of single-sex classrooms aligns with a growing body of research exploring potential advantages for both boys and girls who attend classes with students of the same sex. Studies show that there is less gender stereotyping in single-sex environments (Colley, Comber, & Hargreaves, 1994), and students are more likely to participate in gender-atypical activities in single-sex environments (Swain & Harvey, 2002; Younger & Warrington, 2006). However, at the present time, there is little research investigating the effects of single-sex education as it relates specifically to the field of music education.

Purpose

I first became interested in this area of research when I began teaching both single-sex and coeducational classes at the elementary level. During informal observations, I noticed a striking difference in boys' participation in singing activities when there were no girls in the room. This study formally investigated to what degree, if any, this phenomenon occurred in other elementary schools with single-sex music classes. The purpose of this study was to determine if there was an effect on upper elementary boys' level of participation during group singing activities when they attended music classes in a single-sex setting.

Hypotheses

This research tested two hypotheses:

1. Boys in single-sex classes will participate during group singing activities more than boys in coeducational classes.
 - To test this hypothesis, I compared participation scores between boys in the treatment groups (single-sex classes) and the control groups (coeducational classes) within the same school site. In addition, I analyzed qualitative data from the music teacher interviews and journal entries to determine what differences, if any, the music teachers reported between the boys' participation in the two different groups.
2. Boys in single-sex classes will participate during group singing activities more at the end of the study than they did when they were in coeducational classes at the beginning of the study, and they will participate more than the boys who remained in coeducational classes.

- To test this hypothesis, I compared baseline scores for individual boys to the scores those same boys received during the single-sex treatment period. In addition, I analyzed qualitative data from the music teacher interviews and journal entries to determine what differences, if any, the music teachers reported in the participation of individual boys at the two different points in time (during the baseline data collection and at the end of the study).

Educational Significance

This study explored if the sex composition of a class significantly affected boys' willingness to sing. Studies of this kind are important because if research shows boys are more apt to participate in singing activities when they are in a single-sex environment, then music educators should consider creating opportunities for boys to sing exclusively with other boys. Such single-sex opportunities may be especially important at the upper elementary grades when many children become strongly influenced by their social environment. If boys develop a love for singing in a socially acceptable environment at the elementary level, they may choose to enroll in choir in middle school and high school when music courses become elective. This study was one of the first to specifically address the impact of single-sex education on music education at the elementary level. The findings might suggest several implications for the field.

Single-sex Versus Single-gender

The terms "single-sex" and "single-gender" are synonymous. It is common to find both terms used in the literature to describe classes of all boys or all girls. For this study, I

decided to use only one term consistently. According to *The Concise Oxford English Dictionary* (2008):

Although the words gender and sex both have the sense of “the state of being male or female,” they are typically used in different ways: sex tends to refer to biological differences, while gender tends to refer to cultural or social ones.
(p. 592)

I chose to use the term “single-sex” rather than “single-gender” because I am discussing biological differences (whether the students in the class are boys or girls) rather than the social construct of gender (whether the students in the class are masculine or feminine).

The music teachers in this study often referred to their all-boy classes as single-gender rather than single-sex. The staff at the three school sites decided to use the term “single-gender” when referring to the classes because they did not want to use the word “sex” around the students. Since the teachers were used to referring to the classes as “single-gender,” they often used this term when answering the interview questions. The only time I use the term “single-gender” subsequently in this paper is when I am quoting the music teachers directly.

Definitions

The following definitions apply to this research:

- Single-sex class: A class comprised of either all boys or all girls.
- Coeducational class: A class comprised of both boys and girls. For this study, coeducational classes were included only if at least one-third of the class was boys and at least one-third of the class was girls. While a class with 19 boys

and 1 girl would technically be coeducational, such an imbalance in sex composition would not serve the purpose of this study.

- Participation: For the quantitative portion of the study, participation was defined as, “The level of engagement during singing activities based on the movement of the student’s mouth, the focus of the student’s eyes, and the position of the student’s body including posture, body language, and/or movements.” This was measured using the Singing Participation Measure (described in Chapter 3). For the qualitative portion of the study, participation was defined as, “The degree of singing during group singing activities.” This was reported via teacher observation. Note that for both definitions of “participation” the data captured the degree to which students were willing to sing; these data did **not** refer to the **quality** of the singing.
- Group singing activities: Any activities in which the entire class was supposed to sing simultaneously. The study only included whole class activities; data were not collected during solo singing or small group singing.
- Expert elementary music teacher: A teacher who has a master’s degree in Music Education and has taught music at the elementary level for more than 10 years.

Delimitations and Limitations

This study included three delimitations:

1. The sample was limited to schools within one school district.
2. Data were only collected on boys, not on girls. The literature stated that girls show significantly more interest in singing activities than boys at all grade

levels (Adler, 2002; Haladyna & Thomas, 1979; Mizener, 1993; Pogonowski, 1985; Sherban, 1995). This study focused solely on boys' participation in singing activities.

3. Data were only collected on students in fourth and fifth grades. I chose to use students in the upper elementary grades because these students were too young to elect whether or not to enroll in music class and yet old enough to be significantly influenced by gender stereotypes. Although I collected data from students in two different grades, I neither expected nor intended to explore differences by grade level. I used two grade levels to increase the sample size, but I considered these students to be in the same category: students in the upper elementary grades. For all of the statistical analyses, I kept the scores of the fourth and fifth grade students combined.

Limitations of the study included:

1. The individuals who rated the boys' degree of participation knew if the boys were in the treatment group or the control group because the video showed whether the class was single-sex or coeducational. The only way to avoid this would have been to videotape each boy individually to ensure that the students next to him were not visible in the recording. It would have been impossible to videotape each individual boy simultaneously unless there was one camera for each boy in the classroom.
2. Students may have "faked" singing. Data were collected during group singing activities and therefore it was difficult to discern exactly which individual voices were heard. Unfortunately, individually mic-ing each student would

have caused unwanted student reactions detrimental to the study. I acknowledge that a few students may have feigned their participation in singing activities, however this limitation could not be avoided.

Chapter 2: Literature Review

This chapter includes a review of the literature related to the research question: What are the effects of single-sex and coeducational classes on upper elementary boys' participation during group singing activities? Although the literature in the field of music education does not offer many studies specific to single-sex music classes, there are a number of related research topics including gender stereotypes and singing, single-sex education in subjects other than music, and the assessment of participation in music classes. I reviewed research in each of these areas according to the relevant nature of these topics to this study.

Gender Stereotypes and Singing

Several studies indicate that boys may not sing because they consider singing to be a feminine activity. Viggiano (1941) administered a questionnaire to 200 students to assess their attitudes towards music. The questionnaire produced both qualitative and quantitative data. Viggiano reported that the qualitative data showed "It is not music so much as singing to which the boys seem to object" (p. 62). Comments on the questionnaires indicated some boys did not like to sing because they were afraid their peers would make fun of them. Children are influenced by their peers, and boys who do not feel it is socially acceptable to sing are less likely to participate in singing activities.

Sherban (1995) conducted a qualitative study in which she observed and audio recorded music classes of first grade and fifth grade students on eight occasions (four

times a week for two weeks). In addition, she interviewed eight students (2 boys and 2 girls from each grade), their music teacher, and the school administrator. The data she collected showed that boys “viewed singing as feminine” (p. 106). She explained that boys were more willing to sing popular music because it was viewed as more “heterosexual” than choral music. She attributed the lack of boys’ participation in singing activities to peer pressure for boys to conform to gender stereotypical activities. Sherban documented nine examples where “boys attempted to deliberately sabotage singing...The reason for this sabotage was an attempt to establish their identity as boys” (p. 91). In addition, the differences in the attitudes of the boys and the girls were more pronounced in the fifth grade class. Sherban reported, “Grade one boys were involved in singing. They sang with emotion and feeling. The grade five boys were divided, some participated and some did everything they could to subvert singing as a class activity” (p. 103). These data indicate sex stereotypes of singing are often developed at the elementary level, and boys in the upper elementary grades may be less likely to sing than boys in the primary grades.

Another study on sex stereotypes and singing provided similar results. Hall (2005) explored the gender stereotypes of 38 five-year-old boys. He gave the boys a pictorial survey where the boys were asked to identify sex-neutral stick figures as male or female. Each stick figure was engaged in an occupation such as computer operator, teacher, singer, etc. The majority of the boys (25 out of 34) labeled the singing figure as female. In subsequent interviews, one boy explained, “Singing is something girls do most times” (p. 13). Hall concluded that the “missing male” trend may begin in early childhood.

Adler (2002) contended boys who participate “in activities which are gender-role-incongruent may result in being labeled as homosexual” and “the primary gender-related cause to the missing males problem is...homophobia” (p. 33). In his qualitative study, Adler observed his seventh and eighth grade choral music classes and conducted both group and individual interviews with 16 boys and 2 girls over a two-month period. The data showed that the students could be grouped in five categories:

1. Jocks of Singing – These boys sang in the choir. They were socially popular and extroverted, and they asserted themselves as leaders. They were skilled in sports, labeled as masculine, and had heterosexual reputations.
2. Sensitive Boys – These boys sang in the choir. They were introverted and had an almost androgynous masculinity. They lacked sports prowess.
3. Neutral Boys – These boys sang in the choir. They were a year younger than the other boys and had not identified with a particular group yet.
4. Non-Singers – These boys did not sing in the choir. They appeared shy and nervous. They expressed concern that they might receive negative feedback from their peers if they sang.
5. Bad Asses – These boys did not sing in the choir. They were a powerful masculine force at school. Many of these boys harassed the boys in the choir.

Adler explained that the groups displayed differing degrees of masculinity. In addition, some of the groups were influenced by gender stereotypes to a greater degree. In the interviews, several of the students labeled singing as a “girl thing.” Adler concluded that the primary gender-related cause to the missing males problem was homophobia. He

predicted boys would be more likely to sing in a single-sex choir and suggested music educators should consider single-sex education.

Single-sex Education

The biological differences between boys and girls go far beyond the obvious differences in sexual organs. Male and female brain tissues are intrinsically different and the various areas of the brain develop in a “different order, time, and rate” for boys and girls (Sax, 2005, p. 93). In addition to biological and physiological differences, boys and girls are subjected to different social roles beginning as early as birth when boys are swaddled in blue fabric and girls are draped in pink. Bandura’s Social Cognitive Theory emphasizes that many gender stereotypes are tied to social roles, not biological differences (1989). Whether one considers gender differences in the context of biology or sociology, or both, it is clear that boys and girls are indeed different.

Sax, the founder and Executive Director of the National Association for Single Sex Public Education, believes many boys and girls would benefit from attending classes in single-sex settings because teachers can better address sex differences in learning styles, attentiveness, and social behaviors. Some researchers have hypothesized that single-sex classes would provide opportunities for girls to participate more in science and technology activities and for boys to participate more in the visual and performing arts and language arts.

There are many conflicting results in single-sex education research. At least three studies show that boys and girls do significantly better both academically and socially when surrounded by students of the same sex. First, Swain and Harvey (2002) reviewed the literature on the gender gap in technology and concluded that females who attended

single-sex computer classes participated more and were more likely to consider a career in technology. Second, Younger and Warrington (2006) conducted three case studies with six coeducational secondary schools with single-sex classes in the United Kingdom. They used a mixed method design; they collected quantitative data through student questionnaires and test scores and they collected qualitative data via observations. Their data showed that the students in the single-sex classes made substantial gains in achievement. In addition, many of the students felt more comfortable in a single-sex setting. One boy stated, “You say things you wouldn’t say in front of girls because you feel more confident, you know they won’t laugh at you and you don’t lose face” (p. 602). Finally, Gibb, Fergusson, and Horwood (2008) conducted a study in New Zealand with 940 students who either attended a single-sex or coeducational high school. They measured “educational achievement” by the amount of education completed at the secondary and post-secondary levels. Their data showed statistically significant differences in the educational achievement of boys and girls at the coeducational schools, but no significant differences between the boys and girls at the single-sex schools. The researchers concluded by stating, “single-sex schooling mitigates gender differences in educational achievement” (p. 315). Together, the three studies described here support the practice of single-sex schooling to promote academic achievement and socially acceptable environments for pursuing gender atypical interests.

Other studies show inconclusive results regarding the effects of single-sex education. Hoffman, Badgett, and Parker (2008) conducted a two-year study on the effectiveness of single-sex instruction on students in an urban, at-risk high school. They analyzed course grades, standardized test scores, classroom observations, surveys,

teacher interviews, and a focus group discussion. When comparing the single-sex classes to the coeducational classes, the researchers found mixed results. In some cases the coeducational classes performed better while in other cases the single-sex classes performed better. Hubbard and Datnow (2005) conducted an ethnographic study of low-income and minority students who attended experimental single-sex academies in California. These researchers found that although these schools were successful, the students' success was not necessarily related directly to single-sex schooling. The researchers found that the schools' successes were due more to the schools' organizational characteristics (such as smaller class sizes), student-teacher relationships, and resources. Salomone (2006) reviewed the literature on the "research conundrum" surrounding single-sex education. She stated that research findings that supported single-sex schooling were inconclusive and stressed the need for further research in the area of social science and single-sex schooling.

In the field of elementary music education, there is very little research on single-sex music classes. Most of the research on sex differences in elementary music includes data from coeducational classes. For example, Moore (1987) conducted time interval sampling on the attentiveness of 977 students in grade 1 through 5 and reported that boys were significantly less attentive than girls during singing activities and boys accounted for 66% of the off-task behavior observed. Several researchers have studied sex differences in the musical creativity of elementary students. Kiehn (2003), Schmidt and Sinor (1986), and Wolfe and Linden (1991) all reported that boys outperformed girls in creative tasks, however Wilson and Wales (1995) showed that girls outperformed boys. As for differences in musical achievement, three studies indicated no significant sex

differences in achievement (Cooper, 1995; Hallam, 2004; Hedden, 1982) while two studies indicated that females were more successful at vocally matching pitch than males (Howle, 1992; Welch, Sergeant, & White, 1997). Many studies showed that girls enjoy music class more than boys (Haladyna & Thomas, 1979; Mizener, 1993; Pogonowski, 1985; Sherban, 1995). In regards to self-efficacy, research by Eccles, Wigfield, Harold, and Blumenfeld (1993) indicated that girls had more positive competence beliefs and value beliefs of instrumental music than boys.

While all of these studies provided information on sex differences in music education, each of these studies focused on sex differences within a coeducational classroom. In fact, at the present time I have only found one single-sex research study in the field of music education, and this research was conducted at the secondary level. Carp (2004) surveyed 101 choral directors who taught single-sex choirs at the secondary level. Eighty-eight percent of these teachers observed differences in behavior in single-sex choir students, and the majority of the directors identified student behavior as better in single-sex environments.

While there is extensive research on sex differences in music education, currently there is very little research specific to single-sex music education. Studies on single-sex education in fields outside of music help to shed some light on possible advantages and disadvantages to single-sex schooling, however there is a gap in the literature related to single-sex music education, particularly at the elementary level. The current study helps to fill this gap in the literature.

Assessing Participation

When I first became interested in studying single-sex music education, I wanted to study boys' willingness to sing. I conducted a self-report survey with the boys in my single-sex classes, and I noticed the results of the survey were incongruent with the behaviors I saw from the boys during singing activities; the boys reported that they did not like to sing in single-sex classes, and yet the boys in my single-sex classes outperformed the boys in my coeducational classes. It was then I decided that self-report data might not be reliable and I would have to find a different way to measure the boys' willingness to sing. I began reading the literature to see how researchers defined and measured "participation" during singing activities. I believed (and still do believe) that active participation is an outward, measurable behavior indicative of learning and achieving learning outcomes. My hope was to find an established measure for assessing singing participation for the current study.

Interestingly, although many music educators issue "participation" grades as well as "skills" grades on quarterly report cards, the existing body of literature offers few research studies that directly address the assessment of student participation. There is a battery of tests for musical achievement (Music, 1988), as well as extensive research on assessing musical skills (Chiodo et al., 1998; Cooper, 1995; Hallam, 2004; Hedden, 1982; Keenan-Takagi, 2000; Moore, 1994; Taylor, 1969; Welch, 1997; in addition to many others); however, research on assessing participation in the music classroom is limited.

Many researchers have addressed the topic of participation by assessing "on-task" and "off-task" behavior. Madsen and Geringer (2000) explained, "When a task requires

an individual to attend to music in some manner, this attention occupies a high degree of participant involvement” (p. 106). Researchers have documented on-task and off-task behaviors by various methods. Many researchers employed time interval sampling in which they observed students at regularly timed intervals and documented the number of students displaying on-task or off-task behaviors (Duke, 1987; Forsythe, 1977; Madsen & Madsen, 1974; Madsen & Yarbrough, 1980; Sims, 1986; Wright & Van Der Mars, 2004; Yarbrough & Price, 1981). The majority of these studies used a dichotomous system to differentiate between on-task and off-task behaviors, however Yarbrough and Price (1981) defined the following four classifications:

1. On-Task Active – when students are supposed to be performing, they must look at either the music or teacher
2. On-Task Passive – when students are not supposed to be performing, they must be quiet and look at the music, teacher, or ensemble members who are performing
3. On-Task Other – students must follow instructions given by the teacher
4. Off-Task – students are observably not on-task

(p. 211)

Categorizing behavior in this manner offered more information on student behavior than a dichotomous system.

In addition to time interval sampling, some researchers have conducted ongoing sampling (Duke, Buckner, Cavitt, & Colprit, 1997; Jellison, 2002). During ongoing sampling, the researcher continuously documents overt behaviors rather than

documenting behaviors only at timed intervals. Jellison (2002) employed the following four categories in her study:

1. On-Task
2. Off-Task Looking
3. Off-Task Active
4. Off-Task Other

(p. 347)

Similar to the study by Yarbrough and Price (1981), Jellison's multiple categories provided more detailed data than the dichotomous systems used by many other researchers. In contrast, Jellison categorized three different types of off-task behavior, whereas Yarbrough and Price categorized three different types of on-task behavior. The variance in categories suggests a different focus for these researchers; Jellison examined different types of off-task behaviors, and Yarbrough and Price examined different types of on-task behaviors.

Another method for assessing participation included documenting the number of minutes and/or seconds a student spent on-task or off-task rather than counting the number of times a certain behavior was observed. Researchers have focused on total time on task (Brand, 2003; Standley, 1992), rather than measuring consecutive seconds spent on-task. In addition, computer software has been used to create a timeline of on-task / off-task behaviors to illustrate participation trends during music lessons (Duke et al., 1997).

In contrast to measuring the frequency of on-task or off-task behaviors or the amount of time spent on-task or off-task, some researchers have used rating scales to

document behaviors. Johnson, Darrow, and Eason (2008) used an overall rating scale of 1-100 to measure student-teacher interactions in the music classroom. Gregait, Johnsen, and Nielsen (1997) suggested physical education teachers use a participation checklist with a rating scale of 0-3 in seven different categories. Two of the observable behaviors under the “Active Listening” category on this participation checklist included “sitting up” and “eyes on speaker” (p. 29). Rating scales suggest students may participate in activities to various degrees; rather than a simple “no” or “yes” marking for on-task participation, these instruments indicate greater or lesser degrees of student participation.

In summary, the majority of research on assessment in the field of music education has focused on musical skill rather than participation. There have been some studies that measured on-task or off-task behavior, although in most of these cases the assessment of participation was not the primary focus of the research. Many studies were concerned with teacher effectiveness or rehearsal activity effectiveness, and these studies used measures of on-task or off-task behavior as data to indicate effectiveness of the teacher or the rehearsal activity (Forsythe, 1977; Johnson, Darrow, & Eason, 2008; Sims, 1986; Yarbrough & Price, 1981). One study measured student participation as it related to the proximity of “typical” students to classmates with disabilities (Jellison, 2002).

After careful review of the literature, I decided I should develop and test a measure of singing participation for use in the current study. While the literature showed that researchers have assessed participation in many different ways, the literature did not offer a consensus on how participation should be measured. Therefore, prior to beginning my research on boys’ participation in single-sex and coeducational classes, I conducted

two studies to develop and test a valid and reliable measure, titled the Singing Participation Measure. These studies are explained in detail in Chapter 3.

Conclusion

The literature shows many students view singing to be a feminine activity and this belief may be formed in early childhood. As such, elementary music educators should consider ways to challenge traditional gender stereotypes. One way to create a socially acceptable environment for boys to sing may be through single-sex education. The research findings on the success of single-sex education programs are mixed, and currently there is very little research available on single-sex music education. The current study helps fill the gap in the literature regarding single-sex music education and whether it could play a role in encouraging boys to participate in singing activities.

Chapter 3: Method

This chapter provides details on the study including the design, sample, quantitative and qualitative procedures, repertoire, measures that were used including a review of the research studies conducted to develop the measures, quantitative and qualitative data analyses, ethical concerns, and considerations related to the validity and reliability of the data.

Design

This research employed a true experimental design and a mixed method including the collection of both quantitative and qualitative data. The treatment included the manipulation of one independent variable: the composition of the class based on biological sex. I used a random digits table to assign students to either the control group or the treatment group. The control group included students who attended music class in a coeducational setting; the treatment group included students who attended music class in a single-sex setting. The dependent variable was the level of participation during group singing activities.

Participation was quantified using the Singing Participation Measure. In addition to the quantitative data, qualitative data were collected including music teacher journal entries and interviews. The qualitative data provided method triangulation by documenting the music teachers' perspectives on the results of the study. The

conscientious effort to document another perspective is an example of authenticity in this research.

Sample

The sample included fourth and fifth grade students who attended one of three elementary schools within the same school district in the southeastern United States. The sample was limited to fourth and fifth grade students because research indicates boys become less interested in singing in the upper elementary grades (Mizener, 1993; Moore, 1987; Svengalis, 1978). The selected schools were a convenience sample chosen on the basis of my professional rapport with the music teachers at these school sites, and the willingness of the administrators, teachers, and staff to restructure the sex compositions of the fourth and fifth grade classes for this study. Table 1 outlines the defining characteristics of each of the three schools. School 1 and School 2 were similar in their demographics. Both of these schools were Title I schools that had not made adequate yearly progress for 6 years. These two schools served a large number of economically disadvantaged students and had a large minority population. School 3 served students of a higher socioeconomic status and had a small minority population.

No fourth or fifth grade boy was excluded because of race, native language, cognitive or behavioral exceptionalities, or physical, mental, or health status. All 235 fourth and fifth grade boys at the three schools sites were invited to participate in the research. I was able to obtain assent and parental consent for 198 of these boys. The sample was further reduced due to excessive absences (some students were not present at school for any of the four days when the music teacher videotaped the classes) and

students transferring to new schools prior to the data collection. The final sample size was $N = 186$.

Table 1
School, District, and State Characteristics

	School 1	School 2	School 3	District	State
Title I	Yes	Yes	No		
School Grade for 2008-2009 ^a	C	B	A		
Total Number of students	380	642	587	>42,000	2,671,513
Males	53%	51%	55%	51%	51%
Females	47%	49%	45%	49%	49%
Economically Disadvantaged	89%	93%	20%	47%	50%
White	10%	10%	85%	56%	45%
Black	42%	30%	1%	15%	23%
Hispanic	46%	53%	9%	24%	25%
Asian	<1%	<1%	3%	2%	3%
American Indian	<1%	<1%	<1%	<1%	<1%
Multiracial	2%	7%	3%	4%	4%

^a The Florida Department of Education reports school performance by assigning grades of A, B, C, D, or F to schools based on the annual learning gains of students as measured by the Florida Comprehensive Assessment Test.

I collected baseline data on the boys in their regular coeducational music classes, and then I randomly assigned students to attend music class in either a single-sex or coeducational class for the treatment portion of the study. The sample included 21 classes during the baseline data collection and 15 classes (6 single-sex and 9 coeducational) during the post-treatment data collection. The 6 single-sex classes included 1 fourth grade class and 1 fifth grade class from each school site. The 9 coeducational classes that were videotaped at the end of the study served as the control groups. School 1 had 1 coeducational class at each grade level. School 2 had 1 coeducational class in fourth grade and 2 coeducational classes in fifth grade. School 3 had 2 coeducational classes at each grade level. Table 2 outlines the specific number of fourth and fifth grade boys at each school.

Table 2

Sample by School and Grade

	School 1	School 2	School 3	Total Sample
4 th Grade Boys	25	24	41	90
5 th Grade Boys	21	22	53	96
Total	46	46	94	186

I collected qualitative data from the music teachers at the three school sites. The educational background and experience of the teachers varied somewhat. The teacher at School 1 held a bachelor's degree in Music Education and had six years experience teaching music at the elementary level. She also had three years experience teaching

band, chorus, guitar, keyboarding, and music theory at the secondary level. The teacher at School 2 also held a bachelor's degree in Music Education. She had five years experience teaching music at the elementary level. The teacher at School 3 had the most training and experience. She held a bachelor's degree in Music Education and a master's degree in Educational Leadership. She had 10 years experience teaching music at the elementary level. She was certified by the National Board for Professional Teaching Standards and held Level I and Level II certifications in the Orff approach to music education as issued by the American Orff-Schulwerk Association.

Procedures: Quantitative

Students began the 2009-2010 school year in coeducational classes.

Coeducational classes were standard at these three schools, so the school year began as it normally did. The research did not begin until the third quarter of the school year, so the students were used to their daily schedules, the music teachers, and the procedures of the music classes by the time the research began.

Students were videotaped during group singing activities on two occasions prior to the treatment period to establish baseline data. The students were videotaped in their regular music classroom in an unobtrusive manner. The music teachers at each school placed digital video cameras in their classrooms at least two weeks before they recorded the students so the children had time to become accustomed to the video cameras. Two of the teachers used two video cameras, each covering half of the classroom. One teacher had to use three video cameras to record every area in her classroom. All of the video cameras were digital. The makes and models of the cameras included Canon ZR50MC, Canon ZR500, Canon ZR800, Canon ZR930, and Panasonic 3CCD. The recording light

on each camera was covered by a piece of masking tape so students could not observe when the cameras were recording. Also, the students were videotaped only when they were performing songs they had practiced previously. This was important because students who have limited reading abilities may not participate when the class is learning a new song if they cannot read the lyrics efficiently. Limiting the recording to only songs with which the students were familiar helped control for the potentially confounding variable of reading ability.

After the baseline video footage was collected, all of the students in fourth and fifth grade, both boys and girls, were randomly assigned to new classes for music, art, physical education, and other “special area” classes. Students in the treatment groups were assigned to single-sex classes. Students in the control groups were assigned to coeducational classes. Although the students in the control groups were already enrolled in coeducational classes for the first part of the school year, these students were reassigned to a different configuration of students for the coeducational classes that served as the control groups for this study. In an attempt to control for extraneous variables, all students were reassigned to new classes of students regardless of whether they were in the treatment group or the control group.

The treatment took place for eight music classes. The length of time for the treatment period varied by school because each school followed a different schedule. For example, at School 3 it took 9 weeks for each student to have music class 8 times. At School 1 it took 11 weeks for each student to have music class 8 times. At School 2 it took 11.5 weeks for each student to have music class 8 times. This amount of time was appropriate for several reasons. First, this was not a longitudinal study; all of the data had

to be collected within one school year. Second, due to unusual activities that occurred at the beginning and end of a school year, it was important to collect data during the middle of the year. The baseline data took approximately 5 weeks to collect (2 weeks of having the cameras in place and 2-3 weeks of videotaping the students on 2 occasions), and the treatment data took between 9-11.5 weeks to collect. The total amount of time required for the data collection was approximately 11-14.5 weeks, or almost half of the school year. The treatment could not extend beyond eight music classes because the data collection had to begin during the middle of the school year.

The music teachers left the video cameras set up in their classrooms for the entire study. Identical to the baseline data collection, at the end of the treatment period the music teachers videotaped the classes on two different occasions when students were singing songs with which they were familiar. Since the total sample was 186 students and each student was supposed to be videotaped at four points in time, there could have been as many as 744 scores. Due to absences, attrition, and technical difficulties, I was unable to videotape every boy four times. Some boys were videotaped at one only point in time, while others were videotaped at all four points in time. The total number of scores was 538.

Procedures: Qualitative

The three music teachers completed semi-structured reflective journal entries to document their observations of the boys' participation during group singing activities (see Appendix A). These data were extremely valuable for two reasons. First, the music teachers had an ongoing relationship with the students in their classrooms. They might have noticed changes in behavior or attitude that were too subtle to be captured in the

quantitative data collection and analysis. Second, the use of journal entries ensured that data were recorded when the information was fresh in the teachers' minds. These journal entries were opportunities for the music teachers to document specific behaviors they observed that day. Unfortunately, although the teachers were asked to complete journal entries on a weekly (if not daily) basis, none of the teachers managed to complete a journal entry every week. The teachers documented the students' participation when they observed events that were striking or poignant. Sometimes teachers completed multiple journal entries within the same week; at other times, the teachers did not complete a journal entry for several weeks.

At the end of the treatment period, I interviewed each music teacher to inquire what changes in participation, if any, the teacher observed during the course of the study. I used a semi-structured interview guide (see Appendix B). The interviews ranged in length from approximately 30-100 minutes, depending on the teacher. These interviews were recorded with a Canon ZR500 digital video camera, transcribed, and subjected to member checks to verify the accuracy of the transcriptions prior to the data analysis.

Repertoire

The music teachers at each school used different curriculums. Although the three teachers taught different lessons, each music teacher taught the same lessons to both the single-sex and coeducational classes of fourth and fifth grade students within the school. In other words, the students at each school experienced different lessons from the students at the other schools, but the students within the same school received the same lessons regardless of grade level or group (either single-sex or coeducational).

The teachers were told that they could have their students sing different repertoire during the baseline data collection and the treatment period. This was necessary because musical preference is greatest at a moderate level of arousal (Lehmann, 2007). If students performed the same repertoire for an extended period of time, their participation may have decreased simply because they were tired of the song.

I expected the choice of literature would affect student participation. For example, some boys may prefer singing an African-American spiritual to singing a lullaby. However, I controlled for changes in participation due to the style of the music by comparing the participation of the control group to that of the treatment group from the same school. For example, if the boys were unwilling to sing a lullaby, then I expected the participation scores to be lower for both the treatment group and the control group when they were videotaped singing a lullaby. Participation scores for both groups were expected to vary across the four points in time based on the repertoire the students sang; however, in my analysis I looked for significant differences between the treatment groups and control groups.

By allowing the teachers to use their standard curriculums, I maintained high levels of ecological validity in the study. If I had forced the music teachers to teach certain songs at certain points in time, the results could only be generalized to those particular songs.

Measures

Since no preexisting measure for quantifying the degree of student participation during group singing activities could be found, I conducted two phases of research to develop and test a singing participation scoring instrument.

In April of 2009, I conducted the first phase of research to explore how elementary music teachers assess individual participation during group singing activities. A focus group of six expert elementary music teachers viewed video footage of students singing and discussed the best practices for assessing singing participation. I collected qualitative data through observations and a video recording of the discussion. Overall, the music teachers felt that participation should be assessed using a rating scale rather than a dichotomous system. The focus group considered what types of items should be on a rubric used to assess participation, and the focus group discussion was videotaped, transcribed, and subjected to member checks. Then I inductively coded the qualitative data and another expert elementary music teacher coded the data to measure the agreement reliability of the codes ($r = .84$). I used the data to create an instrument for quantifying individual student participation during group singing activities: the Singing Participation Measure. This instrument measures the degree of student participation during group singing activities based on five categories: Eyes, Mouth, Voice, Body, and Overall. The focus group participants reviewed and revised the proposed scoring instrument using the Delphi technique to achieve group consensus of the most valid and reliable way to assess singing participation.

In the summer of 2009, I conducted the second phase of this research to test the reliability and determine the concurrent validity of the Singing Participation Measure. Ten music teachers viewed videos of elementary music classes during group singing activities and scored individual students using the Singing Participation Measure. For this phase, I had to alter the Singing Participation Measure. It was impossible to include the dimension “Voice” in the measure when scoring the videos since the raters could not

identify individual voices in a recording where the entire class was singing. The Singing Participation Measure was modified to include only four of the five original dimensions: Eyes, Mouth, Body, and Overall (see Figure 2).

Ten music teachers rated the participation of 17 students in 34 videos (two videos of each student performing on two different days). The raters were divided into two groups of five, and the two groups viewed and rated the videos in a different order to account for a potential order effect. Two weeks later the same groups watched the same videos in a different order. I used these data to determine the generalizability and inter-item correlation coefficients for the scoring instrument. The generalizability analysis estimated an interrater reliability of .73, an intrarater reliability of .89, and a stability of student performance of .80. The inter-item correlation coefficients ranged from .88 to .99 (see Table 3). The content validity of this scoring instrument was strong because, according to the expert music teachers who developed the instrument, the data that were collected by this rating scale were the same as the data that were collected in a typical music class setting. In addition, the use of the Delphi Technique to achieve a consensus among the experts strengthened the construct validity of the measure. Furthermore, I compared the participation scores each student received to the participation grades issued to those same students by their music teacher at the time of the video recording and calculated a concurrent validity coefficient of .90.

Based on the strength of the Singing Participation Measure's validity and reliability, I decided to use this instrument as the quantitative measure of student participation during group singing activities in the current study. Once again, I did not include the dimension "Voice" when using this measure since I rated individual students

Singing Participation Measure

Student #: _____ Total Score: _____

A. Eyes: The student's eyes are focused, looking at the director and the music (if applicable).

Never or Almost Never	~25% of the time	~50% of the time	~75% of the time	Always or Almost Always
1	2	3	4	5

B. Mouth: The student's mouth is open an appropriate amount and moving with the rhythm of the words.

Never or Almost Never	~25% of the time	~50% of the time	~75% of the time	Always or Almost Always
1	2	3	4	5

C. Body: The student's posture, body language, and/or movements indicate active participation.

Never or Almost Never	~25% of the time	~50% of the time	~75% of the time	Always or Almost Always
1	2	3	4	5

D. Overall: The student is actively and appropriately engaged in the singing activity. This may be demonstrated through facial expression or overall affect.

Never or Almost Never	~25% of the time	~50% of the time	~75% of the time	Always or Almost Always
1	2	3	4	5

Figure 2. Scoring instrument for quantifying an individual's level of participation during group singing activities.

Table 3

Inter-item Correlations for the Singing Participation Measure

Dimension	Eyes	Mouth	Body	Overall	Total
Eyes	—	.88	.93	.95	.96
Mouth		—	.89	.96	.96
Body			—	.98	.97
Overall				—	.99
Total					—

Note. $N = 17$.

during group singing activities by scoring videos and it was impossible to identify individual voices when listening to the recordings.

The Singing Participation Measure is designed to quantify an individual's willingness to sing as demonstrated by active participation during singing activities. Since the emphasis is on the student's **singing**, a child must open his mouth in order to receive scores higher than 1 in each of the four dimensions. For example, it is possible to observe a student whose "eyes are focused, looking at the director and the music (if applicable)" even though he is **not** singing. Likewise, a student may choose to participate in body percussion or other movements that go with the song without ever opening his mouth. Since the Singing Participation Measure is specific to **singing**, children who do not open their mouths must receive the lowest possible score in all four dimensions regardless of the focus of their eyes or the action of their bodies. Essentially, the movement of the student's mouth is considered a prerequisite to receiving any score higher than 1 in the dimensions of Eyes, Mouth, and Overall. For the current study, an expert music teacher scored videos in addition to myself. This second rater was trained on the correct way of scoring students using the Singing Participation Measure, including

how to score students who were focused with their eyes and/or participated with their bodies but demonstrated an unwillingness to open their mouths and sing.

Data Analysis: Quantitative

An expert music teacher and I viewed the videos and scored each student's individual level of participation using the Singing Participation Measure. Students who were not videotaped at least once during the baseline data collection and at least once post-treatment, because of absences or attrition, could not be included in the analysis of variance (ANOVA). Before the videos were rated, I trained the expert music teacher in using the scoring instrument; she and I practiced scoring footage from sample videos and discussed our scores and the best way to use the measure. We did not rate any videos from the study until we were confident in our abilities to use the scoring instrument effectively. There were 538 video clips to score. I scored all of the videos, and the expert music teacher scored a random sample of 20% of the videos, or 108 videos. We watched the videos independently, and we scored the random sample of videos in the same order. Then I calculated the interrater reliability for the scores of the 108 videos.

After determining the interrater reliability, I analyzed the 538 scores. I used descriptive statistics to report the mean, range, standard deviations, skewness, kurtosis, standard errors of the means, and effect sizes. In addition, I conducted a mixed-design analysis of variance (ANOVA) to compare the between-groups factor of class composition (single-sex or coeducational) and the within-groups factor of time (baseline scores and scores at the end of the treatment). The data were analyzed for each school site; I did not combine the data across schools since the schools had different music teachers, different curriculums, and different student characteristics.

Data Analysis: Qualitative

The qualitative data included the music teachers' reflective journal entries and the transcriptions of the interviews with the three music teachers. These data were used to triangulate the quantitative data. Patton warned, "The credibility of qualitative methods...hinges to a great extent on the skill, competence, and rigor of the person doing the fieldwork" (2002, p. 14). I was highly qualified to conduct this study for many reasons. First, I hold a master's degree in Music Education and am currently pursuing my doctorate in Music Education. In addition, I am trained in both qualitative and quantitative research methods and analysis, and have experience in conducting both qualitative and quantitative research. Also, I have taught elementary general music for 12 years and have experience teaching both single-sex and coeducational classes.

For the qualitative data analysis, I began by coding the data from the interview transcriptions and the music teacher journal entries. I established preliminary codes based upon the interview guide and my research hypotheses. For example, I expected to code the data according to the observations of the single-sex classes, coeducation classes, group differences, individual differences, advantages and disadvantages of single-sex education, and possible reactivity caused by the research. As I reviewed the data, I established more codes inductively. This step was necessary to accurately classify the data. I judged the codes by assessing the internal homogeneity and external heterogeneity of the data within each code. I systematically analyzed the classification system by collapsing some categories and creating new codes until I was confident in the trustworthiness of the analysis. Then I asked an individual trained and experienced in qualitative data analysis to code the data. I reviewed her codes and made minor revisions

to my final analysis. This analyst triangulation improved the credibility of my data analysis.

Ethical Concerns

The names of the students who participated in the study remain confidential. I analyzed the quantitative data by class, so there was no need to report scores for individuals. As for the qualitative data, I was careful to omit the names of individual students to protect their privacy and keep their information confidential.

Validity and Reliability

Several aspects of the research design maintained a high degree of validity and reliability for this study. The mixed method design provided both qualitative and quantitative data. I reviewed these two data sources to see if the different forms of data corroborated. This is an example of methods triangulation (Patton, 2002). I allowed the music teachers to teach their regular curriculums for this study. This improved the ecological validity of the research. If I had told the music teachers exactly what to teach, the results would offer limited generalizability. The music teachers member-checked the interview transcriptions and a graduate researcher independently coded the qualitative data to provide analyst triangulation and ensure authenticity. As for the quantitative data, another expert music teacher rated the videos in addition to myself, and I calculated the interrater reliability. Prior studies in the development and testing of the Singing Participation Measure examined the content and construct validity of this measure through a focus group discussion and the Delphi technique. These prior studies tested the reliability of the measure and the scores were compared to the students' participation grades on their report cards to determine the concurrent validity.

As I established my research design, I attempted to control for several potentially confounding variables (see Table 4). The treatment groups at each school site studied the same repertoire and received the same instruction as the control groups at the same site. Also, since I expected student participation to vary from day to day, I had the teachers videotape the students at multiple points in time. In addition, the music teachers set up video cameras and left them in place for at least two weeks prior to recording so the students had time to get accustomed to the cameras before they were videotaped. Also, a piece of tape was placed over the recording light on the cameras to keep students from knowing when the video cameras were actually recording. Finally, the students were only videotaped when they were singing songs with which they were familiar. This was

Table 4

Controlling for Potentially Confounding Variables

Variable	Control
Repertoire	The music teacher taught the same repertoire to both the single-sex and coeducational classes at the same school.
Variance in individual student participation	Videos were taken at multiple points in time prior to the treatment period and at multiple points in time during the treatment period.
Reactivity	The music teachers left the video cameras in the classrooms for at least two weeks before collecting video footage. The music teachers covered the recording lights on the video cameras so students did not know when the cameras were recording.
Student reading/language skills	Video recordings were limited to singing lessons in which the students were highly familiar with the lyrics of the songs.

important because students with limited reading abilities often have a difficult time participating when presented with a new song if they cannot read the lyrics efficiently. All of these choices related to the research design increased the validity of this research.

Summary

This study was a true experiment. The sample included 186 boys in fourth and fifth grades at three different school sites. Baseline data were collected prior to beginning the study, then the students were randomly assigned to attend music class in either a single-sex class (the treatment group) or a coeducational class (the control group). I employed a mixed method design for this research by collecting both quantitative data in the form of videotapes that were scored and qualitative data in the form of music teacher journal entries and interviews. The videos were scored using the Singing Participation Measure, a measure that I designed and tested previously in preparation for this research. I attempted to control for several potentially confounding variables and strived to maintain a high level of validity and reliability in the study.

Chapter 4: Results

I used a mixed method design to triangulate the data on boys' participation during group singing activities in single-sex and coeducational classes. This chapter includes both the quantitative and qualitative results of the study. The quantitative data are presented first, followed by the qualitative data and the conclusion. As stated previously, the research hypotheses were:

1. Boys in single-sex classes will participate during group singing activities more than boys in coeducational classes.
2. Boys in single-sex classes will participate during group singing activities more at the end of the study than they did when they were in coeducational classes at the beginning of the study, and they will participate more than the boys who remained in coeducational classes.

I report data directly related to the two hypotheses, as well as other data related to the topic of singing participation. I used PASW Statistics 17.0 to conduct all of the statistical analyses reported in this chapter.

Quantitative Data

Overview. The total sample size for this study was $N = 186$. I intended to videotape each boy at four points in time – two times prior to being assigned to new groups as baseline data and two times at the end of the study in the new groups. This would have provided 744 scores (186 boys scored at four points in time each). Due to

absences, attrition, and technical difficulties, I was unable to videotape every boy four times. Some boys were videotaped at only one point in time, while others were videotaped at all four points in time. The total number of scores was 538.

It is important to note that School 3 encountered technical difficulties when videotaping the students at the second point in time. In the data that follow, there is a decrease in the sample size for School 3 at Time 2.

For all of the statistical analyses, I kept the scores of the fourth and fifth grade students combined. I neither expected nor intended to explore differences by grade level. I used two grades in my sample to increase the sample size. I kept the data for the two grades aggregated during the statistical analyses.

Reliability. I reviewed and scored all of the videos ($N = 538$), and a second rater independently reviewed and scored 20% of the videos ($n = 108$). This second rater was highly qualified to score the videos. She had 13 years of teaching experience, held an M.A. degree in Music Education, and was National Board Certified in Early and Middle Childhood Music. She was 1 of 10 teachers who used the Singing Participation Measure to score videos in an earlier phase of this research. In addition, she was trained on using the measure prior to scoring the videos.

I used a random digits table to randomly select the 108 videos that the second rater scored. I viewed and scored these videos in the same order that she did, however I scored them on a different day, independently from her. Then I compared our scores to determine the interrater reliability.

Table 5 shows the mean participation totals and standard deviations for the scores issued by myself and the second rater at each of the four points in time. In addition, this

Table 5

Mean Participation Totals and Interrater Reliability by Time

	Time 1		Time 2		Time 3		Time 4	
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>
Rater 1	13.52	4.03	11.48	5.83	11.70	5.43	14.46	4.11
Rater 2	14.61	3.98	11.14	5.47	9.20	5.09	12.75	3.85
Pearson Corr.	.83		.88		.88		.83	
<i>n</i>	33		21		30		24	

Note. The participation totals had a possible range of 4-20 points with higher numbers indicating a greater degree of singing participation.

table shows the correlations between my scores and the second rater's scores. The Pearson correlation coefficients ranged from .83 to .88, indicating a strong reliability between the scores given by each rater.

Next I compared the scores for each dimension of the Singing Participation Measure (Eyes, Mouth, Body, and Overall) for the 538 videos that I scored. Table 6 shows the Cronbach's alpha for the videos taken at each point in time. The α ranged from .87 to .94. This shows that the internal consistency of the measure was high.

Table 6

Internal Consistency of the Singing Participation Measure by Time

	Time 1	Time 2	Time 3	Time 4
Cronbach's alpha	.87	.94	.92	.92
<i>n</i>	143	90	152	153

The strength of the correlations between the two raters and the high level of internal consistency of the Singing Participation Measure suggest that the scores from this measure are highly reliable.

Descriptive statistics. During the course of this study, the music teachers at the three school sites followed their own curriculums. This means that the three teachers were not teaching the same songs or lessons. One might expect to see dramatic differences in the boys' singing participation based upon the repertoire. For example, boys may participate more when singing an African American spiritual than they would when singing a lullaby. For this reason, it is important to look at the differences between the mean scores based on song.

That being said, one cannot look at the differences between the mean scores of different songs without considering the impact of school, time, and group. Different schools have different students and teachers, and both of these variables may affect singing participation. Time may also have an effect on the scores. If students sing the same song for a long period of time, their participation may change as they become more comfortable with a song or grow bored with a song. Finally, singing participation may be affected by whether the boys are in the single-sex group or the coeducational group. At both Time 1 and Time 2, all of the boys were in their regular coeducational classes. However, the videos taken at Time 3 and Time 4 captured student participation in their new groups, either single-sex or coeducational. As one reviews the descriptive statistics, it is important to keep in mind the total scores may be affected by the song, school, time, and group, as well as interaction effects among these four variables.

Students at the three school sites were videotaped on four occasions. This means it was possible to have as many as 12 songs in this study. In actuality, the three music teachers collectively used only nine songs. Table 7 identifies the songs by title and composer/lyricist. In addition, this table shows the identification number assigned to each song.

Table 8 shows which songs the students sang by both school and time. School 1 used Song 1 (“The Star-Spangled Banner”) at both Time 1 and Time 3. School 3 also used Song 1, but only at Time 2. School 3 used Song 8 (“I’m Gonna Sing”) at both Time 1 and Time 3. All of the other songs were used by one school, at one point in time only.

Table 7

Song Details by Song Number

Song #	Title	Composer/Lyricist
1	The Star-Spangled Banner	Smith and Key
2	La Buena Vida	Emerson
3	Free at Last	African American Spiritual
4	The Grand Old Duke of York	Traditonal
5	Will You Be My V-A-L-E-N-T-I-N-E?	Unknown
6	Parallel or Perpendicular?	Jacobs and Bedley
7	The Lion Sleeps Tonight	Weiss, Peretti, and Creatore
8	I'm Gonna Sing	African American Spiritual
9	Sing, Sing, Sing	Prima

Table 8

Songs by School and Time

School	Time 1	Time 2	Time 3	Time 4
1	Song 1	Song 2	Song 1	Song 3
2	Song 4	Song 5	Song 6	Song 7
3	Song 8	Song 1	Song 8	Song 9

Table 9 shows the mean totals scores for participation by song, school, and time.

Differences between the single-sex and coeducational groups do not appear in the table,

however group differences are shown in Tables 10-13. As shown in Table 9, the song with the lowest mean participation was “La Buena Vida” (Song 2), and the song with the highest mean participation was “Sing, Sing, Sing” (Song 9).

Table 9

Mean Participation Totals for Each Song by School and Time

Song	School	Time	<i>n</i>	Mean	<i>SD</i>
1	1	1	39	10.49	3.80
1	1	3	39	10.56	4.36
1	3	2	15	10.40	2.97
2	1	2	38	9.29	4.49
3	1	4	38	10.87	4.17
4	2	1	36	12.97	4.63
5	2	2	37	14.43	4.51
6	2	3	35	11.74	5.34
7	2	4	43	12.51	4.58
8	3	1	68	12.32	3.08
8	3	3	78	14.12	2.95
9	3	4	72	14.61	3.11

Note. The participation totals had a possible range of 4-20 points with higher numbers indicating a greater degree of singing participation.

Song 1 and Song 8 were used at multiple times. Although “The Star-Spangled Banner” (Song 1) was performed at three different points in time and at two different school sites, the means for this song were very similar at 10.40, 10.49, and 10.56. The

mean scores for “I’m Gonna Sing” (Song 8) increased from 12.32 to 14.12 from Time 1 to Time 3. This may be due to a treatment effect since Time 3 features data from the end of the treatment period when students were in single-sex and coeducational classes. In addition, this increase in scores may be due to an increased familiarity of the song over time.

The standard deviations were the lowest for School 3 at 2.95, 2.97, 3.08, and 3.11 indicating that there was less variance in the students’ singing participation at this school. The standard deviations were the highest for School 2 at 4.51, 4.58, 4.62, and 5.34 indicating that there was more variance in the students’ singing participation at this school. Overall, Table 9 indicates that the mean totals for singing participation varied by song, school, and point in time. The only song that had similar means regardless of school and time was “The Star-Spangled Banner” (Song 1).

Tables 10-13 present the descriptive statistics for the total scores by school and group at each point in time. The first two tables show the baseline data that were collected at Time 1 and 2, before the students were randomly assigned to new groups. Ideally, the group means would be similar and the effect sizes would be close to 0 in Tables 10 and 11 because this would show similarity between the baseline singing participation of the boys who would later be assigned to the single-sex and coeducational classes.

According to Tables 10 and 11, the means were the most similar for School 3 at Time 1 where the boys who would later be in the single-sex group had a mean of 12.39 and the boys who would later be in the coeducational group had a mean of 12.29. The means were the most different for this same school, School 3, at Time 2 where the boys

Table 10

Descriptive Statistics for Total Scores by School and Group for Time 1

Group	n	Mean	Range		SD	Skewness	Kurtosis	SE of Mean	Cohen's d
			Min	Max					
School 1									
Single-sex	25	10.32	4	16	3.25	-0.53	0.16	0.65	-0.13 ^a
Coeducational	14	10.79	4	19	4.74	0.16	-0.70	1.27	
School 2									
Single-sex	18	13.22	4	20	4.35	-0.25	-0.42	1.02	0.11 ^a
Coeducational	18	12.72	4	19	5.00	-0.70	-0.54	1.18	
School 3									
Single-sex	26	12.39	4	20	3.69	0.33	0.42	0.72	0.03 ^a
Coeducational	42	12.29	8	19	2.69	0.64	0.19	0.42	

Note. These scores were determined under coeducational conditions. The students were not scored in their new single-sex and coeducational groups until Time 3.

^aEffect size was computed using this formula: $d = \frac{\text{Mean}_{\text{Single-sex}} - \text{Mean}_{\text{Coeducational}}}{\text{Pooled } SD}$

Table 11

Descriptive Statistics for Total Scores by School and Group for Time 2

Group	<i>n</i>	Mean	Range		<i>SD</i>	Skewness	Kurtosis	<i>SE</i> of Mean	Cohen's <i>d</i>
			Min	Max					
School 1									
Single-sex	26	8.50	4	18	4.38	0.80	-0.36	0.86	-0.58 ^a
Coeducational	12	11.00	5	19	4.43	0.76	-0.31	1.28	
School 2									
Single-sex	16	15.25	8	20	3.77	-0.48	-0.54	0.94	0.33 ^a
Coeducational	21	13.81	4	20	5.01	-0.58	-0.64	1.09	
School 3									
Single-sex	6 ^b	8.66	8	9	0.52	-0.97	-1.88	0.21	-1.16 ^a
Coeducational	9 ^b	11.56	9	18	3.40	1.18	0.06	1.13	

Note. These scores were determined under coeducational conditions. The students were not scored in their new single-sex and coeducational groups until Time 3.

^aEffect size was computed using this formula: $d = \frac{\text{Mean}_{\text{Single-sex}} - \text{Mean}_{\text{Coeducational}}}{\text{Pooled } SD}$

^bThe sample size for School 3 at Time 2 was reduced due to technical difficulties with the video equipment.

Table 12

Descriptive Statistics for Total Scores by School and Group for Time 3

Group	n	Mean	Range		SD	Skewness	Kurtosis	SE of Mean	Cohen's d
			Min	Max					
School 1									
Single-sex	24	10.13	4	16	4.40	0.34	-1.67	0.90	-0.27 ^a
Coeducational	15	11.27	4	18	4.37	-0.49	-0.62	1.13	
School 2									
Single-sex	18	13.44	4	20	4.91	-0.49	-0.80	1.16	0.71 ^a
Coeducational	17	9.94	4	19	5.31	0.27	-1.50	1.29	
School 3									
Single-sex	32	14.44	5	19	2.82	-1.31	3.45	0.50	0.19 ^a
Coeducational	46	13.89	7	20	3.05	-0.20	-0.31	0.45	

^aEffect size was computed using this formula: $d = \frac{\text{Mean}_{\text{Single-sex}} - \text{Mean}_{\text{Coeducational}}}{\text{Pooled } SD}$

Table 13

Descriptive Statistics for Total Scores by School and Group for Time 4

Group	n	Mean	Range		SD	Skewness	Kurtosis	SE of Mean	Cohen's d
			Min	Max					
School 1									
Single-sex	22	10.96	4	19	4.38	-0.15	-0.86	0.93	0.05 ^a
Coeducational	16	10.75	4	18	3.99	-0.18	-0.44	1.00	
School 2									
Single-sex	23	13.17	4	20	4.92	-0.18	-1.21	1.03	0.32 ^a
Coeducational	20	11.75	5	19	4.14	0.11	-0.69	0.93	
School 3									
Single-sex	25	15.16	10	20	2.75	0.09	-0.97	0.55	0.27 ^a
Coeducational	47	14.32	4	20	3.27	-0.39	0.71	0.48	

^aEffect size was computed using this formula: $d = \frac{\text{Mean}_{\text{Single-sex}} - \text{Mean}_{\text{Coeducational}}}{\text{Pooled SD}}$

who would later be in the single-sex group had a mean of 8.67 and the boys who would later be in the coeducational group had a mean of 11.56. This variance between the two groups may be due to the small sample size ($n = 15$) for School 3 at Time 2. Many of the boys were not videotaped at this school during Time 2 because of technical difficulties during filming.

Cohen (1988) established benchmarks for effect sizes from 0.20 indicating a small effect, 0.50 indicating a medium effect, and 0.80 indicating a large effect. The effect sizes at Time 1 were quite small for all three schools at $d = -0.13$, $d = 0.11$, and $d = 0.03$, respectively (see Table 10). At Time 2, the effect sizes were larger for each school at $d = -0.58$, $d = 0.33$, and $d = -1.16$, respectively (see Table 11). The very large effect size for School 3 at Time 2 is most likely due to an increase in sampling error because of the reduced sample size for this school at Time 2. It is unclear why the effect sizes for School 1 and School 2 are larger at Time 2. This may be due to differences in the boys' level of participation for different songs. Ideally, the effect sizes for Time 1 and Time 2 would be very small, as this would indicate similarities between the boys who would later be divided into the treatment groups (single-sex classes) and control groups (coeducational classes).

The effect sizes for School 1 were negative for both Time 1 and Time 2. This means that the boys who would later be assigned to single-sex classes participated less during the baseline data collection than the boys who would later be assigned to coeducational classes. The opposite was true for School 2; the data for this school showed positive effect sizes for both Time 1 and Time 2. In this case, the boys who would later be assigned to single-sex classes participated more during the baseline data

collection than the boys who would later be assigned to coeducational classes. Since the effect sizes show small to moderate differences between the groups prior to the treatment phase of the study, it is important to keep in mind that there were some group differences in participation prior to the reorganization of the students into their new single-sex or coeducational classes.

The highest possible score on the Singing Participation Measure is 20 and the lowest possible score is 4. The range, standard deviation, skewness, kurtosis, and standard error of the mean for the data reported in Tables 10 and 11 were all within acceptable limits.

Tables 12 and 13 show the data collected at Time 3 and Time 4, the seventh and eighth times students attended music class after they were assigned to their new groups. If my hypotheses were supported, one would expect to see a difference between the group means at each school and moderate to large effect sizes for Time 3 and Time 4. The means for the boys in the single-sex groups were typically higher than the means for the boys in the coeducational groups, although not substantially. At School 1, Time 3, the mean for the single-sex group was actually lower than the mean for the coeducational group.

The effect sizes in Tables 12 and 13 encompass a wide range of effects from $d = -0.27$ to $d = 0.71$. The effect sizes were the highest for School 2, including a moderately large effect size at Time 3 ($d = 0.71$). The effect sizes were smaller for School 3 at $d = 0.19$ and $d = 0.27$. School 1 showed a small negative effect at Time 3 ($d = -0.27$) and a very small positive effect at Time 4 ($d = 0.05$). This means the boys in the coeducational classes participated more than the boys in the single-sex classes for School

1 at Time 3, but the boys in the single-sex classes participated more than the boys in the coeducational classes for School 1 at Time 4. All of the other effect sizes in Tables 12 and 13 show a positive effect. This means that most of the time the boys in the single-sex classes participated more than the boys in the coeducational classes. The size of the effect varied across schools.

The range, standard deviation, skewness, and standard error of the mean reported in Tables 12 and 13 were all within acceptable limits. The kurtosis for School 3 at Time 3 was quite high at 3.45. The kurtosis may be leptokurtic due to a slightly high skewness for this group. According to Glass and Hopkins (1996), “Highly skewed distributions tend to be leptokurtic because they have more scores that are far from the mean than does the normal distribution” (p. 92).

Collectively, Tables 10-13 show that School 1 had the lowest means for singing participation in every group at every point in time except at Time 3 when the means of the coeducational classes at School 1 were higher than the means of the coeducational classes at School 2 (see Table 12). This means that with only one exception, the singing participation of the boys at School 1 was noticeably lower than the singing participation of the boys at Schools 2 and 3.

Analysis of variance. Before conducting the analysis of variance (ANOVA), I had to determine which of the 538 scores to use. My original intent was to take an average of the scores at Time 1 and Time 2 and an average of the scores at Time 3 and Time 4, and then conduct the ANOVA by comparing the two averages. For students who were missing data at one point in time, I intended to simply use the score at that one point in time.

After reviewing the descriptive statistics, I had to reassess my plan. There was a lot of variance in the data by song and I was afraid that averaging some scores (where available) but not others (due to missing data) would skew the results. For example, each school used two different songs at Time 1 and Time 2, and there was a fair amount of variance between the means of the different songs. If I did the ANOVA using the average between Time 1 and Time 2 for the students who were filmed both days but I did not use the average for some students because they were only there for one of those two points in time, I might have skewed the data. To check whether this theory was correct, I calculated a correlation matrix so I could compare the scores at the different points in time. If Time 1 and Time 2 were highly correlated, and if Time 3 and Time 4 were highly correlated, then I could have used the averages of the two baseline scores and post-treatment scores for the students who were filmed on those occasions and used one baseline score and one post-treatment score for the students who were not present for each filming.

Table 14 shows the correlation matrix. The Pearson correlation coefficient for Time 1 and Time 2 was $r = .48$. The Pearson correlation coefficient for Time 3 and Time 4 was $r = .62$. I did not feel these correlations were strong enough to assume that students would have performed similarly on the days they were absent. Therefore, I decided to conduct the ANOVA using only one point in time before the students were reassigned to new groups and only one point in time after students had been in their new groups for 7 music classes.

Table 14

Correlations Between Total Scores at Each Point in Time

		Time 1	Time 2	Time 3	Time 4
Time 1	Pearson Corr.	—	.48	.40	.42
	<i>n</i>		70	120	123
Time 2	Pearson Corr.		—	.19	.37
	<i>n</i>			71	76
Time 3	Pearson Corr.			—	.62
	<i>n</i>				127
Time 4	Pearson Corr.				—
	<i>n</i>				

Next I had to decide which points in time to use. For the baseline data, it was clear that I should use Time 1 rather than Time 2 because many of the boys were not filmed at School 3 at Time 2 due to technical difficulties. The sample size for Time 1 was $n = 143$, while the sample size for Time 2 was only $n = 90$. As for Time 3 and Time 4, the sample sizes differed by only one child; the sample size for Time 3 was $n = 152$ and the sample size for Time 4 was $n = 153$. Ultimately I decided to use Time 4 because this was the last point in time so it captured the entire treatment period. Students who were filmed at Time 4 were in the new groups for 8 music classes.

The final statistical analysis I conducted was the ANOVA. For these calculations, the variable “Time” compared the scores at Time 1 and Time 4. There were 123 students who were present at both Time 1 and Time 4, so the sample size for the ANOVA was

$N = 123$. I used a mixed ANOVA so I could look at differences between subjects (differences between boys in the single-sex and coeducational classes at each school) and within subjects (differences between the baseline scores and the post-treatment scores of the boys in the single-sex and coeducational classes at each school). Table 15 shows the results by Time, School, and Group.

The between-subjects ANOVA showed statistical significance for the variable School ($p < .001$). The analysis did not show statistical significance for the variable

Table 15

Mixed ANOVA Results by School, Time, and Group ($N = 123$)

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Subjects				
School	2	187.96	8.98	<.001
Group	1	7.19	0.34	.56
School * Group	2	7.65	0.37	.69
Error	117	20.92		
Within Subjects				
Time	1	39.13	4.49	.04
Time * School	2	74.00	8.49	<.001
Time * Group	1	0.86	0.10	.75
Time * School * Group	2	1.34	0.15	.86
Error	117	8.71		

Group ($p = .56$) or the interaction of the variables School and Group ($p = .69$). These data suggest there were significant differences in the singing participation of the boys at different schools, but there were no statistically significant differences in the singing participation of the boys in the single-sex and coeducational classes.

The within-subjects ANOVA showed statistical significance for the variable Time ($p = .04$) and for the interaction of the variables Time and School ($p < .001$). The analysis did not show statistical significance for the interaction of Time and Group ($p = .75$) or the interaction of Time, School, and Group ($p = .86$). These data suggest that there were significant differences in the singing participation of the boys at different schools and at different points in time, but there were no statistically significant differences in the baseline and post-treatment scores of the boys in the single-sex and coeducational classes.

Assumptions of the ANOVA. The data met the assumptions of the ANOVA regarding independence of observations and normality of the population distributions, however the data did not meet the assumption of the homogeneity of variance. Box's M test of the equality of covariance matrices showed statistically significant differences at $p = .01$. In addition, Levene's test of the equality of error variances showed statistically significant differences between the error variances at Time 4 at $p = .04$. Fortunately, ANOVA is fairly robust to violations of the homogeneity of variance (Stevens, 2007). In light of this robustness, I chose to conclude my statistical analyses with the ANOVA.

Summary: Quantitative data. The descriptive statistics indicated differences in the mean totals for singing participation according to the song, school, and point in time. The only song that had similar means regardless of school and time was "The Star-

Spangled Banner” (Song 1). In addition, the descriptive statistics showed that the boys at School 1 consistently participated less than the boys at Schools 2 and 3. There was only one point in time when one of the groups at School 1 did not have a lower score than the groups at the other two schools.

The between-subjects ANOVA showed statistically significant differences in the boys’ singing participation based upon the school they attended, and the within-subjects ANOVA showed statistically significant differences in the boys’ singing participation based upon the school they attended and the point in time. Both the between-subjects ANOVA and the within-subjects ANOVA showed no statistically significant differences between the single-sex and coeducational classes. These data fail to support either of the hypotheses.

It is important to note that there was a great deal of variance in the data set. The data did not meet the assumption of homogeneity of variance. While the ANOVA is fairly robust against a violation of this nature, it is possible that a Type II error occurred. This may be due to the relatively small sample size. Harrison, Thompson, and Vannest (2009) warn that statistical significance testing “is **not** efficient for estimating the probability that the claim is correct in the population” (p. 744, emphasis in original). Sampling error increases with smaller sample sizes, and this increases the possibility that the sample does not accurately reflect the population from which the sample was drawn. A larger sample would increase power and reduce the possibility of a Type II error. It is also possible that there were truly no group differences in the boys’ singing participation as measured by the Singing Participation Measure.

According to Wilkinson and the Task Force on Statistical Inference (1991), researchers should “always provide some effect-size estimate when reporting a *p* value” (p. 599). Even though the ANOVA showed no statistically significant differences between the single-sex and coeducational groups, I calculated the effect sizes using Cohen’s *d*. The effect sizes at the end of the treatment period ranged from -0.27 to 0.71 with five of the six effect sizes showing a positive effect on boys’ singing participation in single-sex classes.

Qualitative Data

Overview. To ensure data triangulation, I collected two types of qualitative data – journal entries written by the music teachers and interviews I conducted with each teacher. I transcribed the interviews and conducted member checks of the transcriptions to check for authenticity.

For the qualitative data analysis, I began by coding the data from the interview transcriptions and the music teacher journal entries. I established preliminary codes based upon the interview guide and my research hypotheses. For example, I expected to code the data according to observations of the single-sex classes, coeducation classes, group differences, individual differences, advantages and disadvantages of single-sex education, and possible reactivity caused by the research. As I reviewed the data, I established more codes inductively. For example, under the broader category of “Coeducation Classes,” I developed two different codes: Limited Singing Participation and Participation in Non-Singing Activities. This step was necessary to accurately classify the data. Once all of the data were coded, I looked for themes in the data. I reorganized the previously coded data under broader thematic headings. I judged the themes by assessing the internal

homogeneity and external heterogeneity of the data within each theme. I systematically analyzed the classification system by collapsing some categories and creating new themes until I was confident in the trustworthiness of the analysis. Then I asked an individual trained and experienced in qualitative data analysis to independently code the data and look for themes. I reviewed her codes and themes, and we had a conference regarding our individual analyses. Then I made revisions to my final analysis. This analyst triangulation improved the credibility of my data analysis.

Tables 16-23 present the results of the qualitative data analysis. I organized the data into the following eight themes: Participation in Coeducational Classes, Participation in Single-sex Classes, Advantages of Single-sex Classes, Time, Behavior Problems, Particular Groupings of Students, The Impact of the Research Design on Teachers, and Other. All but one of these categories includes multiple subcategories.

I identified the teachers as Teacher 1, Teacher 2, and Teacher 3. These identification numbers correspond with the numbers for School 1, School 2, and School 3. A full comparison of the schools is provided in Chapter 3. As a brief reminder, School 1 and School 2 were Title 1 schools, whereas School 3 was not.

Qualitative data by theme.

Participation in coeducational classes. The teachers reported limited singing participation of the boys in the coeducational classes, both in the coeducational classes that were in place prior to this study and in the new coeducational classes that were formed when the students were randomly assigned to new groups (see Table 16). The teachers said that some boys just sat there, some boys moved their mouths but did not produce a sound, some boys sang very little, and some boys sang badly on purpose. One

Table 16

Qualitative Data Theme 1: Participation in Coeducational Classes

Description	Teacher Comments
Limited singing participation was standard for the boys in coeducational classes.	<p>Teacher 1: “They just sit. If it’s a song they like, they might sing. But...they just sit. I don’t think [singing] would be their first choice.”</p> <p>Teacher 1: “I had to drag more out of them in that mixed group. It was almost like, ‘Alright, I’m going to take the blame because I’m going to say that you have to sing, so whether you wanted to or not, you’re going to do it. So you get to save face.’”</p> <p>Teacher 1: “What I get a lot is singing badly on purpose.”</p> <p>Teacher 2: “Normally the fifth grade boys act like they do not want to participate. If they do, they’ll just barely open their lips a little bit and if I stand really close to them I can’t hear any sound coming out.”</p> <p>Teacher 2: “The boys did not really sing that much and I really had to almost beg them to sing the song and we would have to do it again and again in little parts.”</p> <p>Teacher 3: “There were some boys who just didn’t sing as much as I thought they should.”</p>
In the coeducational classes, some boys would participate in non-singing activities only.	<p>Teacher 2: “Normally, even with the coed, the boys would participate just as much when we would be playing instruments or doing speech pieces and stuff like that, but the singing is what was the most noticeable.”</p> <p>Teacher 3: “Some [boys] weren’t even moving their mouths. Although, if there was any kind of movement or body percussion involved, they would do that. But they were silent...Maybe 30% were participating but not fully, not doing the singing part.”</p>

teacher said she had to “drag more out of them” and another said she had to “almost beg them to sing.” Two of the teachers mentioned that some boys would participate in non-singing activities only. For example, the boys were willing to play instruments or perform the movements or body percussion for a song without actually singing. Overall, the singing participation for the boys in the coeducational classes was limited.

Participation in single-sex classes. The teachers observed more singing participation from the boys in the single-sex classes (see Table 17). The teachers commented on singing participation for the single-sex classes in general, as well as for individual boys. One teacher reported that it was easier to get her boys to sing in the single-sex classes. Another teacher said more of her boys would offer to sing solos in the single-sex classes. This same teacher explained that some of her boys who would normally sabotage singing activities by intentionally singing badly started to lip sync in the single-sex classes. While lip syncing is not considered full singing participation, this teacher felt this was “a step in the right direction.”

All three of the teachers told stories about certain boys who participated in singing activities more in the single-sex classes. Teacher 2 stated that a small change in participation for one student was actually “a really big deal for him.” The teachers provided many examples, both substantial and subtle, of increased singing participation of individuals and the groups overall in the single-sex classes.

Advantages of single-sex classes. The data indicated that there were many advantages to the single-sex groupings (see Table 18). Teacher 1 liked the fact that she could “focus on stuff just for them,” such as how to read the “non-top” line of music and how to transpose the melody down an octave when it gets too high. She also felt that the “antsy” boys blended in more in the single-sex classes because these classes tended to be more animated in general than the coeducational classes.

Teacher 2 was surprised by the boys’ attitudes in the single-sex classes. She noticed that they were more excited about coming to music and they admitted they liked

Table 17

Qualitative Data Theme 2: Participation in Single-sex Classes

Description	Teacher Comments
The teachers observed more singing participation in the single-sex classes.	<p>Teacher 1: “The boys in the all-boys class volunteered to sing solos, whereas in the mixed group, [the boys] weren’t volunteering. Not as much, I don’t think.”</p> <p>Teacher 1: “The middle of the road people tended to participate more on average in the single-sex classes.”</p> <p>Teacher 1: “There are certain boys who sing bad just to be silly, to get attention. Some of that was reduced in the course of the study. I got more lip syncing. I see that as a step in the right direction. It’s a compromise. There’s some effort in trying to match your mouth to the words.”</p> <p>Teacher 2: [<i>referring to the boys in the single-sex classes</i>] “They would sing out without me having to convince them of it like I would have to with the coed classes.”</p> <p>Teacher 2: “In the mixed classes I felt as if I had to persuade the students to participate and work really hard to drag it out of them. In the all-boy classes I did not have to do that. I worked less to get them to participate.”</p> <p>Teacher 3: “I was like, ‘You guys can do this! You’ve been hiding behind the girls all this time and shying away, and here you are – you are singing and you sound good!’”</p> <p>Teacher 3: “I thought, ‘Wow! [Being in a single-sex class] really does make a difference.’”</p> <p>Teacher 3: “Their participation was impressive.”</p> <p>Teacher 3: “My boys are singing really well.”</p> <p>Teacher 3: “I had my fifth grade boys today. They continue to impress me with their enthusiasm for singing.”</p>
Teachers noticed differences in individual boys’ singing participation in the single-sex classes.	<p>Teacher 1: “I think [<i>names a boy</i>] really benefitted from that all-boys class. He got into it. He got into singing.”</p> <p>Teacher 1: [<i>referring to two boys in the single-sex class</i>] “They perked up a little bit, and I don’t know if they would’ve done that if there were girls.”</p> <p>Teacher 1: [<i>referring to one boy</i>] “He’s not into [music]. He’s shy. It’s not his thing...He would still sing.”</p> <p>Teacher 2: “There was this boy. I don’t really remember him ever even trying to sing in class. And now with the all-boys...he was actually moving his lips and participating some, which was a really big deal for him because he went from not participating at all to doing that.”</p>

Table 17 (continued)

Qualitative Data Theme 2: Participation in Single-sex Classes

Description	Teacher Comments
Teachers noticed differences in individual boys' singing participation in the single-sex classes. (continued)	Teacher 3: [<i>describing one boy</i>] "He's...kind of quiet, just doesn't say a whole lot, not a behavior problem, but just really quiet and shy. And he got into the all-boys group and all of the sudden, hello! He's singing and he's in his head voice and he's participating and doing really well."

the musical activities more readily. She explained that the single-sex classes completed their lessons faster than the coeducational classes because the boys were willing to do what she asked them to do the first time she asked them to do it.

As for Teacher 3, she described the students in the single-sex classes as "proud," "eager to please," "excited," "comfortable," and "confident." Also, she explained that she noticed the boys' singing participation more in the single-sex classes because the boys could not "hide behind the girls." In fact, she said that she picked two boys to participate in the All-County Chorus because of this research study. She explained that she never really heard them singing in their coeducational classes. However, once these two boys switched to a single-sex class, she noticed they were outstanding singers and she chose them to represent her school in the All-County Chorus. She said she probably would not have noticed these boys' singing participation if they remained in a coeducational class. She also claimed that a single-sex environment is "risk-free" for boys who wanted to sing. These data show that all three teachers noticed numerous advantages to conducting singing activities with boys in single-sex classes.

Table 18

Qualitative Data Theme 3: Advantages of Single-sex Classes

Description	Teacher Comments
There were advantages to the single-sex groupings.	<p>Teacher 1: “I got to focus on stuff that was just for them. Like, I got to say, ‘Can’t hit that note? Sing it an octave lower.’”</p> <p>Teacher 1: “I had an opportunity to teach them about reading the non-top line of music.”</p> <p>Teacher 1: “The [boys] who are normally spirited and can’t sit still and all over the place, blended in more in the boy group than they would have boy-girl.”</p> <p>Teacher 1: “In the single-gender, the antsy boys did not stick out as much because everybody was a little more antsy. So because I wasn’t worried about the outliers – the ones who were, like, laying under a chair – I got to just pay attention to some of the ones I wouldn’t normally get to hear.”</p> <p>Teacher 1: “The boy-girl starting to be boyfriend-girlfriend, you don’t have it so much in the all-boy classes.”</p> <p>Teacher 1: [<i>referring to one student in the single-sex class</i>] “I think that group is good for him.”</p> <p>Teacher 2: “[The boys] would act like they liked the song they were singing, by their facial expressions, smiling while doing it.”</p> <p>Teacher 2: “Advantages, definitely is that it’s easier to get them to participate and also to admit that they like what we’re doing.”</p> <p>Teacher 2: “I think just getting them to admit that they like what we’re doing in music class is a big step for some of them because they wouldn’t have done that before.”</p> <p>Teacher 2: “I ended up being able to move at a faster pace [with the single-sex classes] because...they were more willing to do what I asked them to do the first time so I didn’t have to keep spending as much time working on the same thing.”</p> <p>Teacher 2: “I really liked how receptive that they were to everything. They were so willing to do what I asked them to do.”</p> <p>Teacher 2: “The boys seemed a little bit more excited about coming to music.”</p> <p>Teacher 3: “[The boys] were proud of themselves.”</p> <p>Teacher 3: “[The boys] seemed eager to please.”</p> <p>Teacher 3: “[The boys] were excited.”</p> <p>Teacher 3: “The advantage is that I noticed the participation.”</p>

Table 18 (continued)

Qualitative Data Theme 3: Advantages of Single-sex Classes

Description	Teacher Comments
There were advantages to the single-sex groupings. (continued)	<p>Teacher 3: “The students [in the all-boys class] were less inhibited. Students were comfortable with one another.”</p> <p>Teacher 3: “[The boys] actually said, ‘We’re not afraid to sing when it’s us.’”</p> <p>Teacher 3: “It was good for them to be in an environment where they were risk-free and they felt comfortable and confident and not hindered by what somebody else was going to think.”</p> <p>Teacher 3: “In my opinion, the single-gender setting will always be a risk-free environment for a boy.”</p>

Time. I designed this study so the students would be in their new groups for eight music classes before the final data collection because I thought it might take some time for the treatment to take effect. Contrary to what I expected, Teacher 2 and Teacher 3 noticed an increase in singing participation the very first day they had the single-sex classes (see Table 19). Teacher 2 also explained that she saw the opposite effect in the coeducational classes. She claimed the boys in the coeducational classes participated less when they first switched to their new coeducational groupings. She hypothesized that, even though the boys were switching from one coeducational class to another, they needed time to adjust to the new group of students. Until these boys felt comfortable with their new classes, several of the boys participated less in the coeducational classes immediately following the shift to the new groupings.

Time also had an effect on the boys’ behavior. Teacher 1 and Teacher 3 reported that the students were better behaved immediately after they were switched to the single-sex classes. These teachers explained that the boys’ behavior deteriorated over time. They

Table 19

Qualitative Data Theme 4: Time

Description	Teacher Comments
Two of the teachers noticed a sudden change when some of the boys switched to single-sex classes.	<p>Teacher 2: “I noticed right away that it changed...I could actually hear sounds coming out of their mouths from the first day that we switched.”</p> <p>Teacher 2: “Right from when we switched them to all boys, they would sing out.”</p> <p>Teacher 2: “It surprised me at how quick there was a noticeable change. With the all-boys class I instantly noticed that they participated more. The boys would sing to where I could hear them.”</p> <p>Teacher 3: “The first day of the switch I had the all-boy fourth grade class, and they floored me!”</p> <p>Teacher 3: “Right away I noticed that the boys, as a whole, were less inhibited and more willing to participate.”</p>
Time had an effect on the students’ behavior and participation.	<p>Teacher 1: “When we first started, the [single-sex] boys were less antsy and they were getting through a lot of stuff, more than the mixed classes. The first couple, maybe three times, we did limbo at the end because they finished their lesson. But then they got used to each other. The more they got used to each other, the more they would get off-task.”</p> <p>Teacher 2: “In the coed classes I think that when we switched them around they started participating less than they had. They were used to coming to music with their class. They had already gotten to know it. And then as soon as they were mixed up with different kids, still being coed but they had new kids in there to face, they kind of shut down a lot more and were much harder to get to do anything.”</p> <p>Teacher 3: [<i>describing the boys’ behavior</i>] “The boys started off in the beginning, when they didn’t know each other that well, not too much of a problem.”</p> <p>Teacher 3: “Maybe it was just the ‘first day...we’re not comfortable acting up in front of each other yet’ syndrome.”</p>

noticed the boys “acted up” and were more “off-task” once they got used to the other boys in the single-sex class.

In conclusion, the data indicate that reconfiguring the student groups had an immediate effect on the boys’ singing participation. Many of the boys in the single-sex

classes immediately started to sing more, and some of the boys in the coeducational classes immediately started to sing less. Time had an effect on the boys' behavior as well. The boys in the single-sex classes were relatively well-behaved at first, but their behavior deteriorated the more time they spent in the single-sex groupings.

Behavior problems. When I began coding the data I used a code called "Disadvantages of Single-sex Classes," however as I coded the data I was only able to identify one disadvantage: behavior problems. All of the teachers reported issues with the boys' behavior in the single-sex classes (see Table 20). They described the boys as "spirited," "more rambunctious," "energetic," and "rough." They explained that the boys fed off each other in such a way that undesirable behaviors were more prominent. In addition, Teacher 1 pointed out that in her coeducational classes she separates misbehaving boys by placing girls in between them, and she could not use this strategy in the single-sex classes. In total, the teachers described behavior problems in 5 of the 6 single-sex classes.

These findings differ from those reported in my review of the literature. Carp (2004) surveyed 101 choral directors who taught single-sex choirs at the secondary level, and the majority of the directors identified student behavior as **better** in single-sex environments. It is possible the differences in the findings are because Carp's study described the behavior of secondary students while this study describes the behavior of students in the upper elementary grades.

Two of the teachers in this study reported having difficulties with students at times of transition. While these teachers may feel transitions are a time of chaos and combustion throughout the school year, the experimental design of this study added to the

Table 20

Qualitative Data Theme 5: Behavior Problems

Description	Teacher Comments
There were behavior problems in most of the single-sex classes.	<p>Teacher 1: “The boys were spirited in general in the all-boys classes. In the mixed group the boys and girls seemed to balance each other out.”</p> <p>Teacher 1: “All the boys were a little more rambunctious.”</p> <p>Teacher 1: “Those boys are rough. The fifth grade boys are rough.”</p> <p>Teacher 1: “The spirited ones start to drag the other ones with them a little bit.”</p> <p>Teacher 1: “We took three classes worth of boys and concentrated it into two so your behavior problems are more concentrated.”</p> <p>Teacher 1: “There’s so many boys. It’s not like you can separate them with girls. The problem boys, you can put empty chairs in between them, but it’s easier to walk past an empty chair to get to somebody than it is to walk past two girls with their legs [<i>she sticks her legs out in front of her chair to demonstrate</i>]. In the coed, I just had more options before I had to find a way to put them in a corner. There would be somebody to separate them with.”</p> <p>Teacher 2: “They kind of fed off each other. If one would start talking, the other ones – they were almost in competition with each other to see who could push the limits of the expectations that we have in here.”</p> <p>Teacher 3: “It was hard to contain them and keep them focused and on task. They’re just all over the place.”</p> <p>Teacher 3: “It was tough. It was tough to man those all-boy classes.”</p> <p>Teacher 3: “The boys were just hard to contain because of the dynamic in the room.”</p> <p>Teacher 3: “The only downside is that they are so energetic. I really have to keep my thumb on them because if there is any downtime (changing CDs, getting new materials, etc.) I lose them.”</p>
Transitioning into the new groups right before class may have affected the boys’ behavior.	<p>Teacher 1: “The fifth grade boys will break out into a fight before you know it. We’ve had a bunch suspended because of that. And it’s during transitions.”</p> <p>Teacher 3: “Transitions were a disaster. I mean, just a nightmare.”</p>

potential challenge with transitions. Students were reassigned to their groups immediately before going to music class each day. This regrouping may have exacerbated the difficulties normally faced when students transition from their homerooms to the music classroom.

Particular groupings of students. The particular groupings of students in each class had an effect on both the students' behavior and participation (see Table 21). Teacher 2 and Teacher 3 felt an unusually high number of students with behavior problems ended up in the single-sex classes at their schools. To avoid this in future studies, researchers could match boys according to the amount of behavior problems they cause and then randomly assign the boys to the new groups so a similar number of boys with behavior problems would end up in both the single-sex and coeducational classes. In response to the effect caused by particular students being grouped together, Teacher 1 and Teacher 3 expressed a desire to be able to choose which students were in which groups so they could have some control over the personality of the class and choose what was best for individual students.

Both Teacher 1 and Teacher 3 noticed a few boys who participated more in their new coeducational groups. One might not expect this change since these boys moved from one coeducational group to another, but apparently the personality of the new coeducational class had a positive effect on some students' behavior and participation. Teacher 3 clarified by explaining that she noticed many boys who participated more in their new single-sex group, but that for one boy he did better in his new coeducational group. She believed that single-sex classes would always be a risk-free environment

Table 21

Qualitative Data Theme 6: Particular Groupings of Students

Description	Teacher Comments
Some of the teachers felt like a disproportionate amount of boys with behavior problems ended up in the single-sex classes.	<p>Teacher 2: “In my fourth grade group some of my boys have problems with behavior, this one particular group of boys. So I think in that class with that mixture of boys [behavior problems were] heightened a little bit.”</p> <p>Teacher 3: “It may have just been the random grouping of kids... We ended up with a lot of our behavior problems in the all-boys classes.”</p> <p>Teacher 3: “There really were, in the all-boys fifth grade class, like, eight behavior problems who are major behaviors problems in school.”</p>
The combination of particular students had an effect on individual boys’ participation in the coeducational classes.	<p>Teacher 1: “In the mixed group I had a couple of boys who were normally pretty quiet and they seemed to perk up... I got a little more spirit out of them.”</p> <p>Teacher 3: [<i>describing one boy who was in a coeducational class in his new group</i>] “When he got into a different group all of the sudden he started singing. Away from his friends and his buddies, and all of the sudden he’s singing and it’s beautiful.”</p> <p>Teacher 3: “The personality of the class impacted the coed groups. It could be that the cultures in the coed classes were more comfortable than that of the original coed class for some students, but that would be hit or miss.”</p>
Some of the teachers wished they could have placed students in the groups.	<p>Teacher 1: “Wouldn’t it be nice if we could just hand pick them? ‘Look! You’re doing so great being in a single-gender all-boys. Let’s put you here and let’s take out [<i>names some students</i>] and let’s just put them somewhere else.’”</p> <p>Teacher 3: “If we were placing them we could spread those behavior problems out over the whole grade level.”</p>

conducive to increasing boys’ singing participation, but she admitted that occasionally a change in coeducational classes may create a safer environment and increase some boys’ participation in a new coeducational setting.

The impact of the research design on teachers. In order to participate in this study, the music teachers at the three school sites had to have the students sing on a

regular basis. In my final interviews with the teachers, two of them mentioned that they had their students sing more during this study than they usually would (see Table 22). I did not intend for the teachers to change their regularly scheduled lessons for this study, as I had assumed that the students sang on a regular basis anyway. It was unclear from the data if this increased amount of singing had an effect on the students' attitudes, behavior, or participation.

Teacher 3 admitted that throughout the study she was highly aware of the research. She paid close attention to the boys' singing participation, more than she normally would. I questioned her about possible biases or reactivity that may have occurred because of the study. She assured me that although she was more aware of the boys' singing participation, she strived to present herself the way she normally would at all times. For example, she did not go out of her way to either encourage or discourage the boys from participating during group singing activities in the single-sex classes.

Table 22

Qualitative Data Theme 7: The Impact of the Research Design on Teachers

Description	Teacher Comments
One teacher was more aware of singing participation because of the study.	Teacher 3: “[The research] drew my attention to the boys’ singing participation.”
Two of the three teachers had their students sing more than normal.	Teacher 1: “Without a performance it would tend to be odd for us to sing this much. Just sitting and singing is not what I would normally do unless it was prepping for a performance.” Teacher 3: “In the older grades, I kind of don’t focus on the singing as much.”

Although researchers work to minimize reactivity, it is common for participants to be affected by research even in a naturalistic setting. The qualitative data indicate that two of the teachers did more singing with their students than normal, and one teacher's awareness of the boys' singing participation was heightened. There is no evidence to indicate that either of these factors had a significant impact on the data.

Other. There were several codes that appeared less frequently and/or less substantially in the qualitative data. Some of these factors were mentioned by only one teacher, only one time. However, after reviewing the data, I decided it was important to report each of these findings. They appear in Table 23 under the theme "Other."

First, the data indicated that the teachers' words and actions may have influenced student participation during singing activities. Two teachers mentioned that if they "encouraged" or "coerced" their students, they could get them to participate more. One of the teachers worked at a school that used a token economy as an incentive program. In the videos, I observed this teacher offering "Paw Bucks" to students who would participate fully during singing activities. At the other two schools, I noticed the teachers used proximity control to increase participation. In the videos, these teachers can be seen walking over to students who were not participating and standing near them to encourage their participation. Many of the 538 videos featured examples where the students' singing participation appeared to be a result of the teachers' words and actions.

Second, when I asked the teachers to compare the participation of the boys in the single-sex classes to the boys in the coeducational classes, some of the teachers reported that they did not notice a substantial difference. This surprised me because at other points in the qualitative data these same teachers indicated that they observed noticeable

Table 23

Qualitative Data Theme 8: Other

Description	Teacher Comments
Students sang more when the teacher encouraged them.	Teacher 2: [<i>referring to the students in coeducational classes</i>] “Coercing them could maybe get them to sing a little bit. But that’s about it.” Teacher 3: “I found that no matter which group I had – whether it was the boys or the coed – if I encouraged them to sing, they did, but if I didn’t say anything, there were some in both groups that would not participate... If I didn’t encourage, they didn’t participate fully.”
When asked to compare the boys in the single-sex and coeducational classes, some teachers noticed a difference and some did not.	Teacher 1: “I still got a lot of just sitting [by the boys in the single-sex classes]. Fifth grade. In the fourth grade all-boys class there were some boys who sang more.” Teacher 2: “There was definitely a noticeable difference between having the coed class [and the single-sex class].” Teacher 2: “I really believe that I saw a difference in participation in the all-boys class, and I wasn’t even thinking ahead of time that I would.” Teacher 2: “Motivation and energy level... Those are two things that definitely were different in my eyes for the all-boys classes.” Teacher 3: “I didn’t notice a huge difference [between the single-sex classes and the coeducational classes].”
The teachers believed the boys were influenced by the presence of the girls.	Teacher 1: “I think [the boys] are normally trying to be macho. Some of those boys wouldn’t sing normally in a mixed class.” Teacher 1: “I definitely think that if I were going to be able to get boys to sing because they loved it, it would have to be without the girls. I’m very, very positive of that now.” Teacher 2: “That stood out to me, that [the boys] actually do like coming to music, they just don’t always want to admit it around other people... girls.” Teacher 3: “I asked [the boys], ‘Why don’t you do this when there are girls in the room?’ And they actually said, ‘Well, because they might make fun of us,’ or ‘What if our voice cracks?’ or ‘They might say we sound like girls.’”
The boys in the single-sex classes needed to move around more.	Teacher 1: “Movement, movement, movement, movement. ‘All right. You’re driving me crazy. Stand up. Too crazy. Sit down. Stand up. Sit down.’ A lot of that.” Teacher 1: “It’s the roughhousing aspect. It goes like that [<i>snaps</i>] from playing to fighting. And to be fair, until it crosses the line, they’re just being boys. I try to ignore it as

Table 23 (continued)

Qualitative Data Theme 8: Other

Description	Teacher Comments
The boys in the single-sex classes needed to move around more. (continued)	much as possible, but I think that's how they play. That's why the movement's important."
Some of the boys fake singing.	Teacher 1: "There may be some boys in the videos who appear to be singing but actually aren't...They'll fake it but they won't actually make the sound come out."
One teacher thought some boys would never sing and some would always sing.	Teacher 1: "There are some boys who will never sing regardless [of being in a single-sex or coeducational class]. They're not. They're just not! And they don't need to. I hate to say it that way. If it's not their passion, if it's not something they enjoy, it's probably not something they are going to do." Teacher 1: "Of course, you have the kids who are fearless and will participate no matter what."
Student participation may be influenced by the teacher's attitude towards singing.	Teacher 1: "Singing is not necessarily my thing. I was definitely an instrumentalist way before I was a singer and that probably comes through. I prefer instruments. I've found that unless we are preparing for a performance, my kids are like, 'What's the point? Why are we singing?' And it's hard for me to give them that answer...Unless there's a performance, I don't feel there's that motivation for them to get it really, really, really, really good."

differences. For example, when I asked Teacher 3 to "Talk a little bit about how the boys participated in singing activities when there weren't girls in the room," the teacher responded by explaining the substantial change she noticed in the single-sex classes. She ended her response by saying, "I thought, 'Wow! It [*referring to the single-sex grouping*] really does make a difference.'" My very next question was "Compare the boys' participation in the single-sex class to the coed group," and this time Teacher 3 stated, "I didn't notice a huge difference."

It is possible the apparent inconsistencies in the teachers' comments were caused by subtle differences in the teachers' impressions of the results. For example, perhaps a teacher noticed substantial differences in the students in the single-sex classes compared to their participation in their regular coeducational classes (a within groups factor, that is, the same students in coeducational versus single-sex classes), but the teacher did not notice a difference between the single-sex classes and the coeducational classes during the treatment phase (a between groups factor, that is, comparing different students in the two different classes). Each teacher reported differences in the boys' singing participation during the course of the study, but not all of the teachers noticed a substantial difference between the single-sex classes and the coeducational classes.

The third code in this theme addresses the teachers' impressions of why boys do not sing very much in coeducational classes. All three teachers attributed the boys' limited singing participation to the presence of the girls. Teacher 1 believed the boys tried to act "macho" in front of the girls by refusing to sing. Teacher 3 asked the boys why they did not sing as much in front of the girls, and the boys expressed a fear that the girls would make fun of them. Although this research does not directly address why boys may or may not participate more in single-sex classes, the teachers in the study were curious about the influence of the girls and speculated on what effect the girls might have on the boys' singing participation.

The final four codes in Table 23 all contain data from Teacher 1 only. This teacher spent a great deal of time reporting information that was not specifically addressed in the interview guide. The next four paragraphs report the four codes that emerged from the data from Teacher 1 alone.

Teacher 1 noticed the boys needed to move around much more than the girls. The boys would rock in their chairs, leave their seats, lie down on the floor, and “roughhouse” with one another. She felt it was important to give the boys additional opportunities to move, and the single-sex classes made it possible for her to increase movement activities specifically for the boys.

At the end of the data collection, Teacher 1 warned me that some of the students in the videos might have appeared to be singing even though they actually were not. Apparently, a number of her boys lip sync in class and she does not reprimand them for this. She considers lip syncing a compromise to participating fully in singing activities. She was concerned about the validity of the measure since I could not score the boys on what I heard; I could only score the boys on what I saw. She warned me that looks could be deceiving.

During the course of scoring the videos, I noticed that some of the boys always scored very high in singing participation while others never even opened their mouths. For some students, their participation was consistent regardless of the song, the group, or the point in time. During my interview with Teacher 1, she reported similar findings. At one point she said, “There are some boys who will never sing regardless.” Shortly thereafter, she added, “Of course, you have the kids who are fearless and will participate no matter what.” When she reported her overall impression of the study, she suggested it was “the middle of the road people” who demonstrated changes in participation due to the single-sex setting.

Finally, Teacher 1 admitted that she did not enjoy doing singing activities with her students and she thought the students may have picked up on her aversion to singing

activities. She did not maintain a high level of expectation for the students' participation in the videos. It was common to observe students talking to their neighbor for most of the song, or lying down on the floor under their chair, or balancing their book on their head while they were singing. Teacher 1 rarely reprimanded these students. In one of our discussions, she told me that she "picked her battles" with her students, and it appeared that singing participation was a battle in which she did not engage. The quantitative data corroborate this observation; the mean scores for the students at School 1 were consistently lower than the scores for the students at the other two schools.

Qualitative data by school. While one can look collectively at the qualitative data as it is organized by theme, it is also possible to look at the similarities and differences in the qualitative findings when comparing the results by school. Earlier in this chapter I provided descriptive statistics by school. In this section I provide the qualitative findings by school as this makes it easier to identify areas of convergence and divergence between the qualitative data and the descriptive statistics.

School 1. School 1 was a Title 1 school. The music teacher reported many behavior problems with the students at her school, not just in music class but also throughout activities on campus. Teacher 1 did not use assigned seats in her classroom, and her class was less structured than the classes at the other two schools. She reported that most of her male students did not enjoy singing activities, and she admitted that she did not do a lot of singing activities with her students unless they were preparing for a performance.

Singing participation was limited at this school both during the baseline data collection and at the end of the treatment period. In the videos, boys could be seen lying

under their chairs, balancing their music books on their heads, and talking to their neighbors during singing activities. The music teacher used proximity control and occasional verbal and nonverbal praise to encourage her boys to sing, but overall she did not maintain a high expectation for singing participation.

Teacher 1 believed that the boys in her fourth grade single-sex class participated more during singing activities than the boys in her fourth grade coeducational class. She did not notice a difference in singing participation with the boys in her fifth grade single-sex and coeducational classes. When asked about the singing participation of the boys in her fifth grade single-sex class she reported, “I still got a lot of just sitting.” She also reported that the boys in the single-sex classes were more “spirited” than the boys in the coeducational classes.

Teacher 1 warned that several of her boys lip sync during singing activities. She explained that she encourages them to “fake it” by moving their mouths even if they are unwilling to sing. She reported that some of her boys who would normally lip sync actually sang in the single-sex classes. She also stated that some of the boys who typically would not open their mouths started to lip sync in the single-sex classes. Although these boys were not actually singing, Teacher 1 believed that lip syncing was a step in the right direction for them.

In general, Teacher 1 reported an increase in participation in the single-sex classes. She offered many examples of individual students who participated more in their new single-sex groupings. She also noticed a couple of boys who “perked up” when they were assigned to a new coeducational group, probably due to the “chemistry” of the new coeducational class. In addition, Teacher 1 reported that more boys would volunteer

during solo singing activities in the single-sex classes than the coeducational classes. Overall, she expressed support for single-sex music classes. She liked that she could tailor her instruction to meet the specific needs of the boys. She also believed the boys were more likely to sing in a single-sex class. She emphasized, “I definitely think that if I were going to be able to get the boys to sing because they loved it, it would have to be without the girls. I’m very, very positive of that now.”

The descriptive statistics corroborated the qualitative data from Teacher 1. She reported that her boys did not like to sing, and this was evident in the low mean scores for both the boys in the single-sex and coeducational groups at all four points in time. There was only one time when one of the two groups from School 1 had a higher mean score than one of the groups at the other two schools. Other than that one exception, the boys at School 1 consistently participated less than the boys at the other two schools. As for the effect sizes, School 1 showed negative effect sizes during the baseline data collection. This suggests that, prior to the treatment period, the boys who would later be assigned to single-sex classes participated less than the boys who would later be assigned to coeducational classes. By the end of the treatment period, School 1 showed a positive effect size ($d = 0.05$). While this effect size is very small, it signifies a change from the small to moderate negative effect sizes at Time 1 and Time 2.

School 2. Like School 1, School 2 was also a Title I school. Teacher 2 mentioned that there were several students with behavior problems at her school, although I did not notice any major issues with behavior when I observed the videos of her classes. Her students sat in assigned seats, followed directions, and almost always met the teacher’s expectations. School 2 used a positive behavior support system, and the videos showed

evidence of Teacher 2 implementing this system by offering “Paw Bucks” from the school’s token economy system to students who were well-behaved and participating. The class activities were structured, and the students spent a great deal of time on task.

Of the three teachers, Teacher 2 was the most adamant about reporting a noticeable increase in the boys’ singing participation in the single-sex classes. She admitted that she was skeptical about the research before it began, and she was surprised not only by the amount of the increase in the participation of the boys in the single-sex classes but also by how quickly the boys’ participation changed. She noticed an immediate substantial increase in the boys’ participation in single-sex classes. She also reported that the boys in the single-sex classes were more willing to sing the first time she asked them, so they were able to move through their lessons at a faster pace than the boys in the coeducational classes. She mentioned that sometimes she could coerce the boys in the coeducational classes to sing, but it took a longer time and a great deal of effort and “begging” on her part. She also said that the boys in her single-sex classes were more willing to admit that they liked the singing activities.

The teachers at School 1 and School 3 reported behavior problems with both their fourth grade and fifth grade single-sex classes. In contrast, Teacher 2 only reported behavior problems with her fourth grade class. She attributed the behavior problems to “one particular group of boys” in the fourth grade class. She did not have behavior problems with her fifth grade single-sex class, and unlike the teacher at School 3, Teacher 2 did not think that behavior problems would always be an issue with a class of all boys.

The effect sizes for School 2 at Time 1 and Time 2 were small and positive ($d = 0.11$ and $d = 0.33$). This means the boys who would later be assigned to single-sex

classes participated more than the boys who would later be assigned to coeducational classes. While there were small differences in the groups prior to being assigned to new classes, there was a large difference between the groups at Time 3 ($d = 0.71$). The boys in the single-sex classes participated in singing activities much more than the boys in the coeducational classes at Time 3. The effect size was smaller at Time 4 ($d = 0.32$). This may be due to differences in participation based on song. Overall, School 2 showed the largest positive effect sizes and Teacher 2 was the most adamant about concluding that she saw a substantial increase in singing participation for the boys in her single-sex classes.

School 3. Unlike Schools 1 and 2, School 3 was not a Title 1 school. Many of the students came from affluent families, and School 3 reported a lower suspension rate than Schools 1 and 2. The music teacher maintained a very structured classroom, and her expectations for the students were high. She used proximity control and both verbal and nonverbal feedback to manage the students in her class.

Teacher 3 reported a substantial increase in the boys' singing participation in the single-sex classes. Like Teacher 2, Teacher 3 reported that the increase in singing participation was immediate. She asked the boys why they did not sing as much in the coeducational classes in which they were previously, and the boys told her that they were afraid the girls would make fun of them. Teacher 3 attributed the boys' increase in singing participation to the "risk-free environment" that was created in the single-sex setting.

The vast majority of the comments from Teacher 3 indicated that she noticed an increase in singing participation for the boys in the single-sex classes, however at one

point Teacher 3 reported that she did not notice a substantial difference between the single-sex and coeducational groups. She explained that while many boys in the single-sex classes participated more than they had when they were in their coeducational classes earlier in the year, there were also some boys who participated more in their new coeducational groupings. She believed this occurred because some of the boys found the personality of their new coeducational class to be less threatening than their previous coeducational class. Teacher 3 stated:

It could be that the cultures in the coed classes were more comfortable than that of the original coed class for some students, but that would be hit or miss...In my opinion, the single-gender setting will always be a risk-free environment for a boy.

Overall, she believed the single-sex setting would increase boys' singing participation, although she acknowledged that some of her students participated more in their new coeducational groupings.

Teacher 3 reported behavior problems with both her fourth and fifth grade single-sex classes. She believed that part of the behavior problems were due to an unusually high number of challenging students that were assigned to the single-sex classes. She also thought the behavior issues were confounded by the single-sex setting.

The effect sizes for School 3 were all positive with the exception of a very large negative effect size at Time 2 ($d = -1.16$). The sample size was greatly reduced at Time 2 for this school due to technical difficulties during filming, and it is likely the reduction in sample size increased the sampling error in the data. Therefore, the data for School 3 at

Time 2 has limited reliability. As for the effect sizes at Time 3 and Time 4, they were small and positive at $d = 0.19$ and $d = 0.27$.

Overall. Each of the teachers reported increases in singing participation for the boys in the single-sex classes, however the qualitative data varied by school. Teacher 2 spoke consistently about the substantial changes she saw in the singing participation of the boys in the single-sex classes. Teacher 3 also reported changes, but she admitted that she “didn’t notice a huge difference” between the boys in the single-sex and coeducational classes. Teacher 1 noticed an increase in singing participation for individual students, but overall she reported that many of her students were still unwilling to sing even in a single-sex class.

The qualitative data for the three schools corroborated the descriptive statistics reported earlier in this chapter. The largest positive effect sizes were for School 2 ($d = 0.71$ and $d = 0.32$). There were smaller positive effect sizes for School 3 ($d = 0.19$ and $d = 0.27$). School 1 showed a negative effect size at Time 3 and a very small positive effect size at Time 4 ($d = -0.27$ and $d = 0.05$, respectively). In addition, Teacher 1 reported the least amount of singing participation for the students at her school, and with only one exception, the group means for the students at School 1 were always lower than the group means for the students at the other two schools.

Summary: Qualitative data. Overall the qualitative data show that there were noticeable differences in the boys’ singing participation in the single-sex classes. The teachers noticed that many boys sang more, appeared more comfortable singing, and participated willingly without having to be coerced. Teacher 1 did not notice a major change in the boys’ participation in her fifth grade single-sex group, but she noticed

increased participation for individual students. In the coeducational classes, the teachers felt like they had to “beg” the boys to sing, and some of the boys would sabotage singing activities by singing badly or simply not sing at all. The teachers described many varied advantages for teaching boys in single-sex classes. The teachers reported only one disadvantage, and that was the boys’ behavior. In the single-sex classes, the boys were more “spirited,” “rambunctious,” and “hard to contain.”

Time played a factor in this study. The music teachers noticed an immediate increase in the boys’ singing participation in the single-sex classes. Teacher 2 also reported an immediate decrease in singing participation for the boys who switched to a new coeducational class. As for issues with behavior in the single-sex classes, the boys were relatively well behaved at the beginning of the treatment period. The boys in the single-sex classes got more off-task as the weeks progressed.

In addition to differences in the single-sex and coeducational classes, the data highlight other factors that affected singing participation. For example, there were a few cases of boys who participated more in their new coeducational classes. This suggests that the chemistry of the students in the class may affect singing participation regardless of whether the class is single-sex or coeducational. The teachers expressed a desire to “hand pick” which students were in each class. They thought that if the students were intentionally assigned to their new groups, there would be fewer behavior problems and a greater increase in singing participation. In addition to changes based on the personality of the class, there were significant differences in participation based on the teacher who taught the lesson. The teachers who held higher expectations for their students observed more singing participation from their students.

Conclusion

According to Patton (2002), “Triangulation of qualitative and quantitative data constitutes a form of comparative analysis” (p. 558). This mixed method design provided method triangulation and a wealth of rich data. When comparing the results of the quantitative and qualitative data in this study, one area of divergence is clear. The ANOVA showed no statistically significant differences between the single-sex classes and the coeducational classes, however in most cases the qualitative data showed a substantial increase in the boys’ singing participation in the single-sex classes. There are a couple of probable explanations for the differences in the results.

First, although the Singing Participation Measure scores appear to be both valid and reliable, there is one major limitation for using this measure in a study of this design. The original Singing Participation Measure included a dimension called “Voice.” For this dimension, each boy was scored based on the sound that he produced during singing activities. Since this study focused on boys’ singing participation when they were singing with the entire class, rather than singing solo, it was impossible to score each boy based on the dimension “Voice.” While I could hear the overall sound of the classes in the videos, there was no way to identify individual voices within the group. Therefore, for this research I removed the dimension “Voice” from the Singing Participation Measure. If I had chosen to observe the classes in person, rather than by means of a video, I may have been able to keep the dimension “Voice” as part of the measure.

Second, the videos that I scored captured only one moment in time. I scored the final performance of the songs at each point in time. The quantitative data did not capture the effort or length of time it took to prepare the song to be sung. One of the teachers in

the study stated, “I worked less to get the all-boy classes to participate.” She said that while the end results of the performances of the single-sex classes and coeducational classes may have appeared similar in the videos, these brief moments in time did not show how the boys in the single-sex classes were ready and willing to sing while the boys in the coeducational classes had to be coerced into singing. This might have been a reflection of the difference between data based on brief moments in time and data based on extended periods of observation by the teachers.

In summary, while the ANOVA was an important part of this research, it is vital not to dismiss the hypotheses based on the results of the ANOVA alone. The qualitative data showed different results. It is possible that scoring videos of groups of students might not be the best way to explore the variable of individual boys’ singing participation. One of the advantages of collecting qualitative data is that these data bring context to the issue at hand. Qualitative data can capture feelings, perceptions, and other information that may be difficult to quantify. One of the strengths of this study is that the mixed method provided both quantitative and qualitative data.

Furthermore, although the ANOVA showed no statistically significant differences by group, the descriptive statistics corroborated the qualitative data. Five of the six effect sizes at the end of the treatment period showed a positive effect on boys’ singing participation in single-sex classes, including small, medium, and large positive effects for the groups at School 2 and School 3 for Time 3 and Time 4 (ranging from $d = 0.19$ to $d = 0.71$). Continued research on the effect of single-sex education on boys’ singing participation is warranted.

Chapter 5: Discussion

The purpose of this research was to determine if upper elementary boys' level of participation during group singing activities would be affected by attending music classes in a single-sex setting. The hypotheses were:

1. Boys in single-sex classes will participate during group singing activities more than boys in coeducational classes.
2. Boys in single-sex classes will participate during group singing activities more at the end of the study than they did when they were in coeducational classes at the beginning of the study, and they will participate more than the boys who remained in coeducational classes.

The sample ($N = 186$) included students at three different school sites where students normally attended music classes in coeducational settings. Students were videotaped in their regular coeducational classes on two occasions. Then students were randomly assigned to new groups. Some students were assigned to single-sex classes for music, and others were assigned to new coeducational classes. The students remained in their new groups for 8 music classes. Then students were videotaped two more times at the end of the study period.

I collected quantitative data in the form of scoring individual boys on their participation using the Singing Participation Measure. This instrument measures singing participation only. It does not measure quality of singing, on-task/off-task behavior, or

any other factors. I collected qualitative data in the form of music teacher interviews and music teacher journal entries.

The Research Hypotheses Revisited

The task of measuring the degree of singing participation is somewhat complex. It is difficult to understand the issues at hand by looking solely at one form of data. One of the strengths of this study was the mixed method design. By collecting both quantitative and qualitative data, I was able to triangulate the findings. This triangulation was especially important in my data set as the quantitative and qualitative data did not corroborate. If I had only looked at one type of data, I would have limited the breadth and depth of the results.

The ANOVA revealed statistically significant differences between the boys at the three school sites, as well as statistically significant differences between the boys' participation at different points in time. The differences in time may be the result of the teachers using a variety of songs on different days, as the descriptive statistics show differences in the mean participation scores for the various songs. The ANOVA showed no statistically significant differences between the participation of the boys in the single-sex and coeducational classes. In addition, the data indicated no statistically significant interaction effect for group (either single-sex or coeducational) and time. Although the ANOVA showed no statistically significant differences by group, five of the six effect sizes at the end of the treatment period illustrated a positive effect on boys' singing participation in single-sex classes, including small, medium, and large positive effects for the groups at School 2 and School 3 for Time 3 and Time 4 (ranging from $d = 0.19$ to $d = 0.71$).

The qualitative data showed substantial differences between the participation of most of the boys in the single-sex and coeducational classes. The teachers noticed an increase in many of the boys' willingness to sing in the single-sex settings. The teachers reported differences between the single-sex and coeducational classes overall, as well as differences in the participation of individual boys. These differences were evident immediately after the boys were reassigned to their new groups for music class.

As for the students who switched to new coeducational classes, some of these boys participated less after the new groups began. Although the boys moved from one coeducational class to another, they were affected by the specific combination of students in the room. It took time for some of the boys to get comfortable with their new classmates before they would participate in singing activities. In a couple of cases, boys participated in their new coeducational classes more than they did previously. This was most likely due to the boys being influenced by the presence of certain individuals in their class. It is possible that some boys felt their new coeducational class was a safer environment than the group of students with whom they normally attended class. However, the majority of the boys participated less in the coeducational classes than in the single-sex classes.

In reference to the research hypotheses, the ANOVA did not support the hypotheses but overall the qualitative data did. This may be a testament of the complexity of the issue at hand. Although the Singing Participation Measure appears to be both valid and reliable, this measure may not capture all of the factors related to singing participation. For example, while the original Singing Participation Measure included a dimension for "Voice," I had to remove this dimension from the measure for the current

study. Since I was assessing individual boys within a group setting using videos of the entire class singing, I could not score boys on the sounds they produced individually. As I watched the videos, I simply could not accurately assess which sounds were coming from which students. If I had scored the boys in person, I may have been able to hear individual voices within the group and maintained the dimension “Voice” on the measure. In addition, if I had scored the boys in person, I may have been able to identify which boys were feigning participation by lip syncing.

Another factor that was not captured by the quantitative data was the amount of effort the teachers had to exert to get the students to participate. The teachers reported that the boys were more willing to sing in the single-sex classes and sometimes these boys even finished their lessons early. The teachers often had to “beg” the boys in the coeducational classes to sing. While it was possible for the teachers to get many boys to sing in the coeducational classes, the boys begrudged participating in singing activities. While the degree of participation in the videos may appear similar between the single-sex and coeducational classes, the quantitative data did not reflect the increased effort exerted by the music teachers to coerce the boys in the coeducational classes to sing.

Furthermore, this study included a relatively small sample size. Smaller samples include a greater degree of sampling error, less power, and a higher chance of a Type II error. This may explain why the descriptive statistics included some moderate to high effect sizes even though the ANOVA showed no statistically significant differences between the single-sex and coeducational classes.

Since the quantitative data do not corroborate the qualitative findings, it is difficult to come to a definitive conclusion regarding the research hypotheses. The

ANOVA did not support the hypotheses, but overall the qualitative findings did. I believe the qualitative findings offer a more complete picture of the phenomenon of boys' participation during group singing activities in single-sex and coeducational classes. The qualitative data encompassed changes the teachers saw throughout the research period, not just at the two brief moments in time included in the ANOVA. The teachers were able to identify individual voices when the classes sang, and this was a dimension I could not assess using the Singing Participation Measure. In addition, the teachers reported a decrease in the amount of effort they had to exert to get the boys in the single-sex classes to sing. This was another factor that could not be reflected in the quantitative data. In summary, the qualitative data supported the research hypotheses and explored the issue of boys' singing participation in ways the quantitative data could not. Further study on the effect of single-sex music education is warranted.

Beyond the Research Hypotheses

The music teacher interviews and journal entries included a wealth of information. While many of the themes were not directly related to the research hypotheses, I believe it is important to discuss these additional considerations since they relate to single-sex music education. In the following section, I discuss the advantages and disadvantages of single-sex education, the impact of song choice on boys' singing participation, and the influence the teacher has on singing participation.

Advantages and disadvantages of single-sex education. The teachers reported several advantages of single-sex music education. One teacher gave her boys an opportunity to read the "non-top" line of music. She also allowed her boys to sing one octave lower when the melody was too high. Another teacher said the boys in the single-

sex classes were more likely to admit they enjoyed activities in music class. She found the boys in the single-sex classes progressed through the lessons faster because they were willing to participate the first time they were asked to sing, and the teacher spent less time having to “convince” the boys to participate. The third teacher reported that the boys in the single-sex classes were more confident and comfortable. She believed that the single-sex classes were risk-free environments for boys who wanted to sing. All of the teachers touted the many advantages of single-sex music education. The single-sex model enables music educators to tailor their instruction to meet the differing needs of boys and girls. This specialization can improve music teacher effectiveness.

The qualitative data revealed only one disadvantage for single-sex education: behavior. All of the teachers reported some difficulties with the boys’ behavior in the single-sex classes. The boys were more spirited, rambunctious, energetic, off-task, and hard to contain. The students had to transition into their new groups right before coming to music, and this may have added to the boys’ high energy level. Two of the teachers reported that an unusually high number of students with behavior problems ended up in several of the single-sex classes. The teachers thought the behavior problems would have been reduced if they had been able to assign students to their new groups.

Although the teachers witnessed some problems with the boys’ behavior in the single-sex classes, it appears the many advantages outweigh the one disadvantage. Teachers with strong classroom management strategies may not have a problem with a class comprised of energetic and spirited boys. For example, one of the teachers noticed that her boys had fewer problems if she gave them multiple opportunities to move. Sax (2005) stresses, “There are no differences in what girls and boys can learn. But there are

big differences in the best ways to teach them” (p. 106). Teachers of all-boy classes can choose to incorporate more kinesthetic activities to accommodate boys’ need to move and alleviate some of the behavior challenges that may occur in a classroom full of boys.

Harrison (2008) posits a number of strategies for developing a “sensory approach” when teaching music to boys (p. 138). He suggests music educators provide opportunities for “physical involvement in learning” to help boys stay actively engaged in the lesson at hand. In addition to helping boys remain attentive to the learning tasks, movement activities may help boys express some of their need for kinesthetic action and reduce unwanted behaviors that may occur when boys are asked to sit still. Music educators who are concerned with potential behavior problems in an all-boys class may benefit from adopting a sensory approach to music education and allowing boys opportunities to move. The advantages of single-sex music education appear substantial, and skilled music educators may find any possible challenges in the behavior of the students in an all-boys class may be a small price to pay for the potential benefits. Furthermore, teachers with well-developed classroom management strategies and a variety of approaches to teaching music to boys may experience very few issues with behavior in a class comprised of all boys.

Song choice. The quantitative data showed significant differences in boys’ singing participation at different points in time. Since the music teachers used different songs on different days, it is possible that the boys’ participation may have differed, in part, based upon the song that was used. Although this is beyond the scope of this research, it is possible that girls would also participate to varying degrees based upon the repertoire. In addition, research shows differences between the song preferences of boys

and girls (Lehmann, Sloboda, & Woody, 2007). Whether teaching boys in a single-sex or coeducational setting, it is important for teachers to be aware that boys may be more willing to sing certain songs. Of course, teachers do not have to choose repertoire based solely on the preferences of the students. For example, a teacher may feel it is important for all students to sing “The Star-Spangled Banner” regardless of whether or not they enjoy singing it. That being said, teachers can strive to include a variety of songs that appeal to boys when choosing repertoire for their classes.

The teacher’s influence. The singing participation of the boys at School 1 was significantly less than the singing participation of the boys at the other two schools. In the videos, one can see the boys talking to their neighbors, lying down under chairs, and balancing their books on their heads. Although the teacher at this school said that she expected all students to sing, her words and actions did not appear to reinforce this expectation. Her primary form of classroom management was proximity control. When she would stand next to students, most of them would sing, however it was impossible for her to stand next to every child at every moment. As she would move away from boys, many would stop singing. She did not ask the boys lying on the floor to sit in the chairs properly, and she did not reprimand the students who balanced the books on their heads. The students were allowed to choose their own seats, and the classroom was less structured than many other classroom environments. My general impression was that the boys knew the teacher wanted them to sing, but they also believed there would be no incentives or consequences as a result of their participation or lack thereof. The teacher admitted that she did not enjoy doing singing activities with the students, and she suspected that the students were aware of her reservations. She also said that she chose

her battles with her students, and it was clear that she chose not to “battle” with the boys regarding their limited singing participation.

These observations reinforce the important role of the teacher in education. The teacher’s expectations and attitudes have a direct impact on the students he or she teaches. Essentially, the teacher can create an environment in which students think of themselves as singers. The teacher can establish a routine that involves singing on a daily basis, and the teacher can find creative ways to motivate students both extrinsically and intrinsically. Teachers can award incentives to both individuals and entire classes who perform well. Since the teacher is a paramount factor in cultivating singing participation in students, one cannot have a comprehensive discussion of the topic without acknowledging the great impact teachers have on student performance.

Implications for Music Educators

Based upon the findings of this research, I posit five implications for music educators :

1. Create single-sex singing opportunities
2. Remember that “one size” does not “fit all”
3. Choose repertoire mindfully
4. Establish a “singing culture” at the school
5. Know your students

I explain each of these implications in the sections that follow.

Create single-sex singing opportunities. According to the qualitative data, many of the boys participated more during singing activities in the single-sex classes. One of the teachers stated, “In my opinion, the single-gender setting will always be a risk-free

environment for a boy.” Music teachers at schools with coeducational classes can create single-sex singing opportunities to establish a “risk-free environment” where boys might be more willing to sing. In addition, teachers can modify their instruction to meet the specific needs of boys in a single-sex setting. The teacher can choose specific repertoire, include more gross motor movement, and employ instructional strategies that are appropriate for teaching boys.

There are several different ways to create a single-sex environment. For this study, the teachers rearranged students into new groups immediately prior to music class to form the single-sex classes. At these schools, the entire grade level of students attended music, art, physical education, and other special area classes simultaneously. This meant that rearranging the students affected all of the special area teachers. This plan would work at other schools where the entire special area team is willing to rearrange the students to have the opportunity to teach single-sex classes.

At many schools, the special area teams may not be willing to rearrange their classes. If this is the case, the music teacher might be able to establish a single-sex choir before, after, or during school instead of rearranging the students in the regularly scheduled music classes. Boys could either self-select to participate in the choir, or the teacher could invite certain individuals to join the choir based upon the teacher’s belief that these students would benefit from a single-sex setting.

If teachers cannot establish a single-sex environment, either in the context of the regular music class or in the form of a single-sex choir, then the teacher could provide single-sex singing opportunities within the coeducational class. For example, if a teacher taught partner songs, he or she could have the boys sing one song while the girls sing the

other. This arrangement is not ideal since the boys still may be inhibited by the presence of girls in the room. However, dividing the coeducational class would make it so the boys could not “hide” behind the girls by letting the girls do the majority of the singing. In the example using two partner songs, it would be blatantly obvious if the boys were not singing their song. Sometimes boys can “fake” singing participation when boys and girls sing together because often the girls will take on the majority of the singing responsibility. Creating single-sex singing opportunities within the coeducational class will spotlight the boys’ singing participation. Of course, the ideal situation would be to establish a single-sex class or choir since the boys may feel more confident and willing to sing in an environment solely comprised of boys.

Teachers who are able to work with boys in a single-sex setting should be prepared to accommodate the needs of boys. All of the teachers in this study reported some difficulties with the boys’ behavior in the single-sex setting. The boys may seem more “spirited” or “energetic” when surrounded by other boys. It may be helpful to allow ample opportunities for the boys to participate in gross motor movements. In addition, the pacing of the instruction can have a substantial impact on the boys’ attentiveness. One teacher warned that she could not have any “down time” or she would lose the boys’ focus. Teachers should be prepared for potential challenges with the behavior of students in a single-sex boys class and may need to alter their teaching methods and classroom management strategies accordingly.

Remember that “one size” does not “fit all.” While some boys may flourish in a single-sex environment, other boys may excel in a coeducational setting. There were several boys who received the highest possible scores on the Singing Participation

Measure during the baseline data collection when they attended music class with their regular coeducational class. These boys were not only willing to sing, but sang enthusiastically in a mixed setting. There was no need to use single-sex education as an intervention for these students since they were already successful singers in a coeducational class.

Every teacher is responsible for knowing his or her students and differentiating instruction to best meet the needs and interests of individual students whenever possible. There is no “one magic intervention” that will always prove effective with every child. While single-sex music education may increase some boys’ willingness to sing, it would be an overstatement to suggest that every boy must attend music class in a single-sex setting to be successful. Two of the teachers in this study expressed a desire to “hand pick” which students were in each group. Teacher 3 mentioned this in reference to splitting up boys with behavior problems, however Teacher 1 made this suggestion in reference to meeting the needs of individual students. She recognized that some of her students did better both academically and socially in a single-sex environment while others excelled in a coeducational environment. I believe the best-case scenario is to offer both single-sex and coeducational classes so teachers, students, and parents can select the type of class that would best serve the needs of individual students.

Unfortunately, many elementary music teachers teach the same lessons to the students in each grade level in the same manner. While teachers are responsible for teaching certain music standards to all students, music educators can teach the same benchmarks in a variety of ways. For example, singing activities can include singing as a large ensemble, singing in small groups, singing solo into a microphone, and singing

different types of music such as folk songs, partner songs, and popular music, just to name a few. Just as the “one size fits all” approach may not be the best choice when it comes to single-sex education, teachers may find that “one size” does not “fit all” when it comes to other approaches to music education as well. The students in one third grade class may benefit from spending a lot of time engaged in singing activities, while the students in another third grade class may benefit from fewer singing activities and more composition activities. Effective music educators differentiate their instruction to meet the needs of specific classes as well as students within classes.

Choose repertoire mindfully. According to the data, the boys’ level of participation varied by song. It is important for teachers to be aware of the impact repertoire has on students’ singing participation. Research shows that boys and girls have different song preferences (Lehmann, Sloboda, & Woody, 2007). Therefore, if a teacher has the opportunity to teach single-sex groups, he or she may choose entirely different repertoire for the all-boys groups and the all-girls groups.

Choosing appropriate repertoire can increase singing participation. For example, fifth grade boys might refuse to sing a song about kittens but might be willing to sing a song about a journey to the moon. Careful selection of the repertoire may positively impact the boys’ singing participation. That being said, teachers should beware of choosing gender-typical repertoire as this reinforces gender stereotypes. While I believe it is appropriate to choose gender-typical repertoire to cultivate a love for singing in students who refuse to sing, I believe the ultimate goal is to create an environment where it is safe for boys and girls to explore gender-atypical songs. Essentially, it may be acceptable to use stereotypically masculine songs to get boys interested in singing,

however, once the boys are interested in singing, the music teacher should work to broaden the repertoire of the boys to gender-atypical songs.

Establish a “singing culture” at the school. The teacher sets the tone for the culture of his or her classroom. A music teacher can create an environment where it is safe to take risks, where students know they will not be laughed at if they sing at the wrong time or if their voice cracks as they sing. A music teacher can encourage students to sing, offer incentives for good singing, and inspire the students to think of themselves as singers. Even in an all-boys class, boys might not be willing to sing if the teacher has an unfavorable attitude towards singing. Children are very impressionable. Music teachers can foster singing participation by establishing what I refer to as a “singing culture.” Students who identify with the role of “singer,” are praised for their singing efforts, and know their teacher has high expectations for their participation are more likely to engage fully in singing activities.

Know your students. One of the teachers in this study made a brave confession in her interview; she admitted that prior to the study she “never noticed” that some of her boys were not participating during singing activities. She explained that during the course of the study she paid closer attention to the boys’ singing participation and she began to recognize which students “faked” singing. As she became more aware of the lack of participation from some of the boys, she wanted to encourage the boys to sing more.

It is possible that many educators in the field lack an accurate assessment of each boy’s singing ability and willingness to sing. As educators, we can strive to know our students, and know them well. Each student has strengths and weaknesses as a developing musician. Some students may even have their own musical goals and

interests, and these goals and interests may lie within the music classroom, outside the music classroom, or both. Music teachers who know their students well may be able to identify musical aptitude and foster the development of students who might be successful in a career in music.

In some cases, boys may enjoy singing but may not feel like they have the support of their family and peers to pursue singing activities. Adler (2002) conducted a qualitative study on boys' experiences of singing in school. He grouped students into five categories: Jocks of Singing, Sensitive Boys, Neutral Boys, Non-Singers, or Bad Asses. He concluded that boys in the different groups were influenced by gender stereotypes to different degrees. Music educators who are aware of students' social influences may have a better understanding of why students behave as they do and what teachers can do to motivate students to participate in singing activities. Music educators can serve as mentors who support the singing interests of young boys and girls alike. When music teachers know their students well, they can modify their instruction within the classroom setting and offer encouragement and assistance outside of the classroom to positively impact the development of young musicians.

Future Research

Currently, there is very little research available on single-sex music education at the elementary level. According to the National Association for Single Sex Public Education (NASSPE), there are 540 schools in the United States that offer single-sex environments, but the majority of these are coeducational schools that offer single-sex classes (n.d.). In some of these cases, boys and girls may attend music class in a coeducational setting even though they attend their regular classes in a single-sex group.

So, while the NASSPE reported an increase in single-sex education over the past 8 years, there has been less of an increase in single-sex music classrooms. Many high schools offer single-sex choirs, but single-sex music classes are rare at the elementary level. Since there is very little research on the phenomenon of single-sex elementary music education, further research is needed.

Replication studies would be highly valuable. The current study has a relatively small sample size ($N = 186$ total, with $N = 123$ for the ANOVA), so power was limited and the possibility of a Type II error was increased. Ideally this study would be reproduced with a much larger sample size. In addition, a future researcher could score individual boys on their degree of participation by visiting them in person rather than by watching videos. If the researcher were present during the singing activities, he or she could include the “Voice” dimension of the Singing Participation Measure to improve the validity of the scores. Furthermore, it would be useful to conduct replication studies with students at schools with male music teachers. All of the music teachers in this study were female; it is possible the results would be different if some or all of the music teachers were male.

If replication studies are conducted, future researchers may consider collecting data on boys in single-sex classes at one school and boys in coeducational classes at another school. In the current study, there were single-sex and coeducational classes at each school. I chose this design because I wanted to collect data from boys from the same school population with the same music teacher studying the same curriculum in single-sex and coeducational settings. However, some researchers may be concerned that having single-sex and coeducational classes at the same school could result in treatment

diffusion. Boys in the various classes had opportunities to interact throughout the rest of the school day, at lunch, at recess, and in their homeroom classes. As the boys interacted, they may have discussed the new configurations of classes, and their discussions may have impacted their behaviors. For example, one boy might tell another, “You are so lucky! You get to be in the all-boys class!” Then, the boy in the single-sex class could feel a sense of pride and might perform better in music class. A researcher can reduce this contamination by creating single-sex classes at one school and coeducational classes at another school since students at different school sites will have limited contact, if any. Unfortunately, there is usually a sizeable tradeoff when changing the design of a study; if students in the treatment and control groups attend different schools, they will probably come from different school populations, have different music teachers, and experience different curricula. These extraneous variables limit the internal validity of the study. Future researchers may choose to alter the design of the current study rather than replicate it, however researchers must weigh the strengths and weakness of various designs when planning research on this topic.

Another important study would be a qualitative study on why many boys in the upper elementary grades are hesitant to sing in a coeducational setting. This study might include interviews with the students, as well as the teachers and parents. In addition, students could complete a self-report survey or an open-ended questionnaire to highlight some of the issues they might not be willing to report in a face-to-face interview. This research would go beyond the question of “Do boys in single-sex classes sing more than boys in coeducational classes?” and delve into the realm of **why** boys might participate less when there are girls in the room.

Further study of music preferences of boys and girls may also be helpful. If it were possible to identify which songs boys and girls prefer, one could compare the songs to the repertoire in various elementary music curricula. It is possible there is a gender bias in favor of females when it comes to the choice of songs taught in the elementary music classroom. This may reinforce gender stereotype that “singing is for girls.” Ideally, songs used in a coeducational class would appeal to both boys and girls, and the songs used in single-sex classes could accommodate differences in the song preferences of boys and girls. Continued research is necessary to explore the many facets of boys’ willingness to sing in educational settings.

Conclusion

Research shows that girls participate in singing activities much more than boys (Eccles, Wigfield, Harold, & Blumenfeld, 1993; Haladyna & Thomas, 1979; Mizener, 1993; Moore, 1987; Sherban, 1995). In fact, boys’ participation in singing activities has declined over the past century (Gates, 1989). This decline may be due to gender stereotypes that “singing is for girls” and “boys who sing must be gay.” Studies show that there is less gender stereotyping in single-sex environments (Colley, Comber, & Hargreaves, 1994). Single-sex classes may create safe environments where boys who like to sing feel it is acceptable to participate in singing activities.

This research employed a true experimental design. Baseline data were collected on boys’ singing participation in coeducational classes, and then boys were randomly assigned to attend music in either a single-sex or coeducational class. I collected more data on the boys’ singing participation at the end of the treatment period. The research hypotheses were:

1. Boys in single-sex classes will participate during group singing activities more than boys in coeducational classes.
2. Boys in single-sex classes will participate during group singing activities more at the end of the study than they did when they were in coeducational classes at the beginning of the study, and they will participate more than the boys who remained in coeducational classes.

I used a mixed method design to triangulate the data. I collected quantitative data in the form of videos that were scored using the Singing Participation Measure; I collected qualitative data in the form of music teacher journals entries and interviews.

The teachers reported that the boys in the single-sex classes typically participated in singing activities more than the boys in the coeducational classes. Each teacher also reported changes in individual boys' participation in the all-boys classes. The quantitative data did not corroborate these findings. It is possible that the Singing Participation Measure was unable to capture the full spectrum of changes that the teachers observed. Further research is necessary to explore whether or not boys will participate during singing activities more in single-sex classes than in coeducational classes.

As one of the first studies on single-sex education in the elementary general music classroom, this research just begins to scratch the surface of the issues surrounding boys' willingness to sing in a school setting. The findings show that many boys in the upper elementary grades are hesitant to participate in singing activities in coeducational classes. Some of the boys appeared more comfortable and willing to sing in a single-sex environment. Boys who feel it is safe and socially acceptable to sing are more likely to participate in singing activities and may develop of love of singing. This love of singing

may influence whether or not boys continue with music once it becomes an elective course. Furthermore, if elementary music teachers consciously strive to cultivate a love of singing in boys while they are young, these boys may grow up to be lifelong singers and challenge the stereotypes surrounding boys and singing.

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Appendices

Appendix B: Semi-structured Interview Guide

1. The boys at your school typically attend music in coeducational classes. Tell me about the boys' participation during group singing activities when they attend music in coeducational classes.
2. During the course of this study, some of the boys at your school attended music in single-sex classes. Describe the boys' participation during group singing activities when there were no girls in the class.
3. How did the boys' participation in the single-sex classes compare to the boys' participation in the coeducational classes?
4. How did the individual boys' participation compare when you consider how each boy participated in singing activities prior to the reorganization into new classes and after the boys were in their new classes?
5. Can you give a specific example of a boy whose participation in singing activities in the single-sex class was different than it was when he was in the coeducational class?
6. Can you share other examples as well?
7. What aspects of this study, if any, surprised you?
8. Describe any advantages and/or disadvantages you have seen when boys attend music classes as a single-sex group?
9. In what ways, if any, did you alter your delivery of instruction when teaching the all-boys groups?
10. How did you feel about teaching single-sex classes?
11. Is there anything else you would like to share with me?

The researcher may also include questions about specific students or incidents reported by the music teacher in her journal entries.

About the Author

Zadda M. Bazzy was born in Warren, Michigan. She earned a Bachelor of Fine Arts degree in Musical Theatre from the University of Michigan and a Master of Arts degree in Music Education from the University of South Florida. She was certified in Early/Middle Childhood Music by the National Board for Professional Teaching Standards and holds a Level III Orff certification. She received the Provost's Award for Outstanding Teaching by a Graduate Teaching Assistant in 2010 for teaching at the University of South Florida during her doctoral studies. She has taught elementary general music for 12 years, including 6 years of teaching both single-sex and coeducational classes. She frequently presents workshops for inservice and preservice music teachers.