

TEACHERS' PERCEPTIONS OF SINGLE SEX SCIENCE CLASSES IN AN URBAN
PUBLIC HIGH SCHOOL

by

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(Under the direction of Julie M. Kittleson)

ABSTRACT

Single sex education has been a popular topic in the media and has been met with significant interest, questions, and criticism. In 2002, the No Child Left Behind Act introduced lenience for public schools to experiment with single sex classes without being in violation of Title IX and the Fourteenth Amendment. Although research exists to support single sex education, some opponents cite a lack of credible and generalizable evidence to convince or substantiate trials in public schools. Many public schools are utilizing the ambiguity to experiment with single sex education as a way to improve academic achievement and instructional engagement of students in the classroom. This study presents research on science teachers' perceptions and lived experiences having been players as a part of their school's inaugural implementation of single sex classes. All participants displayed acceptance of self-fulfilling prophecies with respect to the student population in their school. These self-fulfilling prophecies intersected with social construction of gender as participants revealed their own

beliefs and accepted gender stereotypes as a way to frame their descriptions as well as a way to make sense of and respond to classroom situations. Determining areas of potential effectiveness with respect to single sex classrooms is important to contribute to the knowledge base used by school personnel to make sound decisions that will positively impact students. These findings taken together present a snapshot of a single urban public high school and contribute to the body of knowledge with respect to single sex classes such to encourage further scrutiny and exploration into this potentially positive educational intervention.

INDEX WORDS: Single sex education, Self-fulfilling prophecy, Gender, Teacher perceptions, Stereotypes

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Chapter One: Introduction

Faced with the intense pressure and high stakes of the No Child Left Behind Act, public schools are beginning to search for creative interventions as a way to raise the achievement levels of their students and schools, especially for those underperforming systems, schools, or sub groups. Emergence of single sex classes in public schools is a growing phenomenon (Bigler & Signorella, 2011). Prior to the reinterpretation of Title IX as a result of No Child Left Behind, segregating students by sex into separate classes was considered to be unconstitutional.

Influenced by the research in the private sector (Cherney & Campbell, 2011), public schools became interested in the potential benefits of single sex education. Public schools are beginning to experiment with separating students into single sex classrooms in the hopes of improving learning environments and raising the overall achievement levels of students. Single sex education is not without criticism, and questions still linger about the constitutionality of the intervention.

Historically, segregation—whether by race, class, or gender— has been a controversial issue in education and in society. In 1896, *Plessy v. Ferguson* established that it was legal for public schools to separate students on the basis of race. In 1954, *Brown v. Board of Education* overturned the *Plessy* doctrine pertaining to public schools by announcing that within the bounds of public education the doctrine of ‘separate but equal’ had no place. This landmark case held *de jure* public school separation of students to be unconstitutional (LaMort, 2002). Title IX followed these cases, and its purpose was to ensure that a now desegregated public education system treated men and women equally in academic endeavors.

Statement of the Problem

In this study, I examined single sex public education, which involves separating students into male and female classes. Amidst hesitation to accept gender separation in public school as a potentially positive intervention, it is important to investigate single sex education to uncover details and characteristics of the potential benefit to students. Some researchers believe that non-cognitive and academic characteristics can be improved by implementing single sex educational environments (Branson & Miller, 1979; Carpenter & Hayden, 1987; Finn, 1980; Fox, Brody & Tobin, 1985; Gillibrand, Robinson, Brawn & Osborn, 1999; Lee & Bryk, 1989; Lee & Lockheed, 1990; Harding, 1981; Subotnik & Strauss, 1995; Younger & Warrington, 2006). Single sex education may be an attractive option in cases where the co-educational classroom may inhibit the academic experience of any particular student because of social distractions, expectations, and relationships that may form amongst a mixed sex group of students.

Benefits could be social and/or academic in nature. Social benefits may manifest themselves in terms of more relaxed or less stressful classroom atmospheres or reduction in social pressures of the classroom, both of which could lead to increased academic achievement or positive changes in students' attitudes about school or their own abilities. While implementing single sex educational experiences may not be the cure for "social ills that beset young adolescence and impact their academic performance, recent research suggests that such arrangements work for some students, boys and girls, in some academic areas" (Spielhagen, 2008, p.59). By "work" Spielhagen is referring to maximizing the social and academic gains that a student can potentially take away from an academic experience in a classroom.

One of the strongest indicators of success and motivators for educational change and reform is the perception and acceptance of teachers who are tasked with implementing the

reform (Tyack & Cuban, 2001). In this context, education reform is defined by change represented by the restructuring of the traditional public school classroom from a coeducational setting to a single sex setting. Therefore, it is imperative to understand teachers' perceptions of single sex classes. By examining teachers' perceptions of characteristics of single sex environments, researchers may get insight into components of these environments that potentially make them so powerful. Uncovering teachers' perceptions of single sex classes and gaining a more accurate sense of the environment will strengthen the argument for continued exploration of single sex education. Understanding teachers' perceptions will provide insight into the inner workings of the single sex classroom and provide a springboard for further investigations as well as considerations for improvement with respect to implementation so that fidelity may be achieved. It will also strengthen arguments to expand these learning environments as well as allocate more resources to the teaching and professional development surrounding single sex education in public school.

In this study, I investigated high school teachers' perceptions of student engagement and actions in single sex classes compared to the traditional mixed sex classes. Single sex classes were implemented at this school because the administration perceived that separating students by gender was potentially beneficial for behavioral, social and academic reasons. For this study, I worked with ninth grade science teachers at a public high school. Teachers were asked to discuss student engagement in terms of academically-focused behavior such as participation in discussions, lessons and activities. Additionally, I talked with teachers about student actions, specifically in terms of discipline (favorable versus non-favorable classroom behavior as defined by the teacher) and characteristics of students that teachers may have observed (for example

teachers' perceptions that a student has gained efficacy or confidence in their performance and abilities in class through observable behaviors).

Sociological frameworks about social construction of gender as well as symbolic interactionism provide a foundation for this study; these foundations help one begin to understand what is happening within the single sex classroom environment, as well as the potential sources influencing those environments. Symbolic interactionism assists to analyze the observational data gathered from participants in order to make meaning of their social interactions with students in their single sex classes. An emergent theme in the data was the presentation of self-fulfilling prophecies. The facets of self-fulfilling prophecies describe how influence from external factors can alter or drive decisions, actions and responses (Rosenthal & Jacobson, 1968). From the information gathered in this study, recommendations were made to better inform school administrators and school districts as to the potential benefits and or cautions of implementing single sex education in their schools.

Research Questions

The research questions framing this study are:

- What are teachers' perceptions of single sex science classes during the initial implementation and what influences these perceptions?
- What are teachers' perceptions of their own teaching practices as a result of the implementation of single sex science classes?

Key terms used in this study are:

- Teacher perceptions: defined as the teacher's perceived characteristics of situations occurring in his or her classroom (Vanderlinde, R., & Brask, J.,2011);

- Student actions: defined in this study as the observable outward display of student thoughts and feelings.
- Engagement: defined in this study as how teachers perceive students investing themselves during class time into the material taught, as well as their willingness to participate in the activities determined by the teacher;

Addressing these question contributes to understanding single sex education because investigating student actions in such environments will help researchers understand the potential benefits and reasonable explanations of the outcomes. These questions will also begin to shed light on the speculated relationship between the social/emotional aspect of how teachers describe students to ‘feel’ in a class and about how motivated they are to be involved in learning and whether or not those ‘feelings’ can be connected to increased engagement during the learning and teaching process through data collection.

These research questions build on existing research and serve to strengthen the research base in the area of single sex education, and provide a qualitative aspect of data from the perspective of teachers, which is often absent in current research. Based on the theory of social construction of gender and past research in the areas of single sex education, I have described characteristics of single sex science classrooms. Social construction of gender theory proposes that social interactions and environments shape what one believes about gender and categorization. Assuming that the students involved in the single sex classes have a sense of what it means to be associated with one particular gender, and therefore have constructed their own meaning and interpretation of what it means to be a ‘boy’ or a ‘girl’, one can also assume that being placed in an unfamiliar and nontraditional environment such as single sex classes will produce a reaction from the students.

Based on that reaction, recommendations can be made as to why a single sex arrangement should be implemented more widely within a school or district. Moreover, science can be a fruitful setting for examining single sex education given the underrepresentation of women in mathematics intense science fields of study, as well as other research data that show it is still common for middle and high school girls to feel innately less equipped to be successful in science and mathematics, and that those areas of study are male dominated class, career and interest (Bronshtein & Zohar, 2005; Gillibrand, Robinson, Brawn & Osborn, 1999; Kohlstedt & Longino, 1997). It is important to also investigate the practices of those teachers in that science classroom with respect to equitable practices and procedures when dealing with single sex classes.

Chapter Two: Literature Review and Theoretical Framework

Advocates of single sex education cite a number of reasons why students in any course are best served in separate classrooms. Most of the support for single sex education comes from standardized test scores, grades, or other numerical measurements of student achievement for students in grades 6-12; these data typically become labeled student achievement. Some studies show that achievement increases when students are placed in a single sex classroom (Branson & Miller, 1979; Carpenter & Hayden, 1987; Finn, 1980; Fox, Brody & Tobin, 1985; Gillibrand, Robinson, Brawn & Osborn, 1999; Lee & Bryk, 1989; Lee & Lockheed, 1990; Harding, 1981; Riesman, 1991; Subotnik & Strauss, 1995; Younger & Warrington, 2006). In this study, I investigated the nature of single sex science classes at an urban high school, specifically considering students' actions and teachers' perceptions. Single sex classes are thought to be a potential solution to gender stereotypes in classrooms (Younger & Warrington, 2006). They are also thought to be a way to diminish social distractions in the classroom, thus creating a classroom environment that is more conducive to learning (Parker & Rennie, 2002). Through interviews with teachers and observations of science classes, I investigated whether or not these claims have validity in the single sex science classrooms of this study's particular context. This information can be used to inform decisions made by public school administrators regarding whether or not this intervention should be implemented in their school with their student population in order to meet with specific needs. Before public schools will begin to experiment with single sex classes on a large scale, schools want a compilation of results that show the intervention can have positive effects in various areas of academics.

In the following sections, I discuss the legal history surrounding the constitutionality of separating students according to sex, both historically and in the present. I also present the controversial nature of single sex education, stated purposes of sex segregation in school and positions of proponents and opponents of single sex classes. I also outline potential complications with the available research base informing single sex studies. Finally I present an overview of the literature on single sex education in table form, summarizing the limited available research on single sex education in the context of the science classroom to provide a basis for this study and to demonstrate the need for continued research in the area of single sex education in order to broaden the research base in public schools.

Legal Context Surrounding Single Sex Education

First, it is important to understand the legal history of single sex education. An understanding of the legal history and recent changes to legislation helps to understand reasons that contribute to the recent rise in experimentation with single sex classes without fear of litigation. Title IX of the 1972 Education Amendments indicated that persons in a federally funded educational institution could not be discriminated against on the basis of sex. This brought about significant changes in the area of women's sports and funding for those types of programs, and it served to eliminate public single sex institutions and open the doors for both males and females to attend public schools that had previously been restricted to single sex. "Early feminists supported this reform because, in theory, these schools would provide access to the entire curriculum to all students, particularly girls, who had previously been afforded limited opportunities, particularly in math and science" (Spielhagen, 2008, p. 1).

As noted in the introduction, separation has been an issue in public school at different times during history, first mentioned here as an example of racial discrimination highlighted by

Plessy v Ferguson then by *Brown v BOE*. When examining the similarities between types of discrimination in schools, from a legal context, it is important to note the differences between strict scrutiny and intermediate scrutiny as they apply to discrimination based on race and discrimination based on gender.

There are significant difference between gender discrimination and race discrimination as a matter of law. Race discrimination received what the courts call “strict” scrutiny, that is, it’s never justifiable under any circumstances because, legally, Blacks and whites are the same. Gender discrimination receives what is called “intermediate” scrutiny- it is usually wrong but you can discriminate only under some very well defined circumstances. Such discrimination has to (1) be based on real differences between the sexes, not on stereotypes; (2) serve a legitimate state interest; and (3) be functionally and directly related to the qualifications for the job, the so-called bona fide occupational qualification, or BFOQ (Kimmel, 2000, p. 497).

An examination of single sex education in public schools is an issue looked at under intermediate scrutiny. Unlike race, strict scrutiny does not apply. The constitutionality of single sex education is still under debate, in part because parties cannot agree that single sex education is in accordance to intermediate scrutiny within the first two guidelines presented. There is disagreement as to whether the premise of single sex education is based on research grounded differences in the sexes or merely based on gender stereotypes. It is also under debate as to whether or not separating boys and girls into separate classroom serves a legitimate state interest. As questions of intermediate scrutiny linger about single sex education, usually the first examination with respect to constitutionality deals with Title IX.

Title IX was an important law associated with gender equity. “Enactment of Title IX of the Education Amendments of 1972 addressed the issues of prohibiting gender discrimination in any educational programs receiving federal funds” (LaMorte, 2002, p. 89). In 1996, Title IX was exercised to its full potential with the discrimination case against Virginia Military Institute, more commonly referred to historically as the ‘VMI case’, one of the more high profile cases dealing with Title IX and the Fourteenth Amendment. Intermediate scrutiny was implemented to examine whether or not the actions of the school were in fact unconstitutional. Prior to the case against *VMI*, Title IX in its existence began to slowly dissolve any remnants of single sex classes. “Confused over both the spirit and the letter of Title IX, schools began to steer clear of single-sex classes in all subjects, although they were not globally forbidden by law” (Spielhagen, 2008, p. 2). Even though the *VMI* case did not necessarily seal the fate of *any* future single sex educational institution, it certainly made pleading a case for establishing one much more challenging.

Critics further maintain that the Supreme Court’s 1996 decision striking down the all-male admissions policy at the Virginia Military Institute presents serious legal impediments. There the court affirmed that state actors must present an “exceedingly persuasive” justification when drawing distinctions on the basis of sex. If not, they run the risk of violating the Fourteenth Amendment guarantee to equal protection of the laws (Salomone, 2006, p.778).

It is this exceedingly persuasive body of data and research that public school decision makers look for and need when deciding upon implementation of single sex classes in their schools. Administrators are constantly seeking new and innovative interventions to raise the achievement level of their students, and single sex education has become a growing trend.

Controversial Nature of Single Sex Education

While single sex education is growing in popularity (Bloom, 2009), it remains controversial due to the lack of consistent evidence and findings with respect to research. Many scholars and stakeholders have opinions on single sex education, but the body of research is inconclusive on the potential benefits or detriment of single sex education. One reason for the ideological divide is due to the conflicting nature of the findings. Another reason that single sex education has a lack of consensus is due to the highly specific nature of many research studies. Single sex education research represents a variety of subject areas, groups of students, and structure of schools (private, public, charter, etc.). With conflicting research findings and a lack of transferability from one study to another, the merit of single sex education remains in flux (Bigler & Signorella, 2011). Table 1 organizes single sex education research that was used to inform this study. The table indicates author, title, context, and overview of the research pertaining to single sex education. The table is organized by first author last name in alphabetical order. Table 1 demonstrates the scattered nature of the research pool contributing to the field of single sex education.

Table 1*Summary of Single Sex Education Research Literature Utilized in this Study*

Author(s)	Title	Location and Context of Research	Subject of Research
Carpenter, P. & Hayden, M. (1987).	Girls' Achievements: Single Sex versus Coeducational Schools in Australia	Victoria and Queensland (Australia)	Effects of parents' occupational status, teacher encouragement and high school curriculum on girls' academic achievement in coeducation schools and all-girl schools
Cherney, I. & Campbell, K. (2011).	A League of Their Own: Do Single-Sex Schools Increase Girls' Participation in the Physical Sciences?	Male and female high school students in the Midwest United States	The study surveyed U.S. high-school boys and girls from single-sex and coeducational high-schools from the Midwest. Half of the participants completed a mathematics test under stereotype threat (ST) condition and half under no threat condition.
Ewing, T. (2006).	The Repudiation of Single-Sex Education: Boys' Schools in the Soviet Union, 1943-1954	Original study performed in Russia	This article examines the 11-year Soviet experiment with boys' schools as a way to cast new light on scholarly research and public debates about single sex education.
Gibb, S., Fergusson, D., & Horwood, L. (2008).	Effects of single-sex and coeducational schooling on the gender gap in educational achievement	Christchurch, New Zealand	This study examined the effects of single-sex and coeducational schooling on the gender gap in educational achievement to age 25. Data were drawn from the Christchurch Health and Development Study, a longitudinal study of a birth cohort of 1265 individuals born in 1977 in Christchurch, New Zealand

Hayes, A., Pahlke, E., & Bigler, R. (2011).	The Efficacy of Single-Sex Education: Testing for Selection and Peer Quality Effects	Girls attending public single sex middle school in the Southwest United States and girls who applied but were not admitted to the same school	Achievement scores were collected to determine any differences between single sex and coeducational school experiences.
Hoffman, B., Badgett, B., & Parker, R. (2008).	The Effect of Single Sex Instruction in a Large, Urban, At-Risk High School	High School in Southwest United States	Evaluation designed to investigate the effectiveness of SSI on student achievement, classroom culture, and teacher efficacy in a large, urban high school in the Southwest with an at-risk student population.
Datnow, A. & Hubbard, L. (2005).	Do Single-Sex School Improve the Education of Low-Income and Minority Students? An Investigation of California's Public Single-Gender Academies	Experimental California Single Sex Public Schools	Investigating student and teacher experiences as part of a single sex school
Kessels, U. & Hannover, B. (2008).	When being a girl matters less: Accessibility of gender-related self-knowledge in single sex and coeducational classes and its impact on students' physics-related self-concept of ability	State schools in Berlin, Germany	Testing the assumptions that the beneficial effects of single-sex education on girls' self-concept of ability in masculine subjects are due to lower accessibility of gender related self-knowledge
Parker, L. & Rennie, L. (2002).	Teachers' implementation of gender-inclusive instructional strategies in single sex and mixed-sex science classrooms	Rural and urban Western Australia	Examination of single sex science classes in coeducation and single sex schools during the Single Sex Education Pilot Program (SSEPP) in Western Australia

Hannon, J. & Ratliffe, T. (2007)	Opportunities to Participate and Teacher Interactions in Coed versus Single-Gender Physical Education Settings	Public school, United States	The purpose of this study was to compare high school aged females and males opportunities to participate and interact with teachers during flag football, soccer, and ultimate Frisbee game play in a coeducational and single-gender setting. Participants included 67 high school students enrolled in two intact physical education classes
Rizza, M. (1999)	Learning to Play the Game: Female Students Discuss Their Successes in High School	Co-educational high school in the northeastern United States and a Catholic Academy in the northeastern United States	Student learning preferences in a co-educational public school and an all-girl Catholic high school
Robinson, W.P., Gillibrand, E. (2004).	Single-sex teaching and achievement in science	United Kingdom	Investigation into the efficacy of a full year of single-sex teaching of science at a Church of England urban secondary school
Stables, A. (1990)	Differences Between Pupils from Mixed and Single Sex Schools	Co-educational and single sex schools in England	Examining differences between students from co-educational and single sex English comprehensive high school examining attitudes and enjoyment of school and science
Titze, C., Jansen, P., & Heil, M. (2011)	Single-Sex School Girls Outperform Girls Attending a Co-Educative School in Mental Rotation Accuracy	High school females at a single sex school and co-educational school in West Germany	German pupils attending single-sex and co-educative high-schools completed the 'Mental Rotations Test' (MRT) to determine differences in spatial ability.

Watson, C., Quatman, T., & Edler, E. (2002).	Career Aspirations of Adolescent Girls: Effects of Achievement Level, Grade, and Single-Sex School Environment	Students from public middle and high schools in the United States	The career aspirations of high- achieving adolescent girls were explored by comparing them to the aspirations of adolescent boys as well as by looking at the influence of grade in school, achievement level, and an all-girls school environment.
Younger, M. & Warrington, M. (2006).	Would Harry and Hermione Have Done Better in Single Sex Classes? A Review of Single Sex Teaching in Coeducational, Secondary Schools in the United Kingdom	United Kingdom	Examination of experiences in all-boys schools in the United Kingdom during the implementation of the “Raising Boys Achievement” project

Arguments Surrounding Single Sex Educational Environments

Single sex education has both supporters and opponents. Those who are proponents of single sex class arrangements cite their support and ground their beliefs in research, as do opponents of the intervention. Both sides of the debate have valid data to support their points of view and beliefs about the effects (or non-effects) of single sex education. The following sections explore the rationales, evidence and beliefs of those on both sides of the issue, those that support single sex education and those who oppose it. The purpose of the following section is to lay a foundation and backdrop to the issues and struggles that schools have faced and will continue to face as single sex education gains popularity and more schools attempt to implement the intervention. The following sections will demonstrate a sampling of research that provides favorable outcomes to single sex arrangements as well as inconclusive results.

Benefits associated with single sex environments.

The following section provides a sampling of single sex research that concludes with favorable results for the participants and or schools involved. Again, due to the diverse nature of single sex research, the foci of the research are varied. First, literature will be presented that shows academic improvements or positive academic related outcomes as a result of the study. Next, literature will be presented that is focused on social aspects related to single sex education. Academic improvement is often the impetus for experimentation with innovative interventions in schools. Some single sex education research suggests that separating students into boys and girls academic classes has positive effects on student achievement defined by test scores and numerical grades. In a study performed by Younger and Warrington (2006), several aspects of “improvement” were examined, including standardized test scores. These researchers examined three schools in the United Kingdom experimenting with single sex education. The researchers

described the three contexts as being socioeconomically diverse. Overall, the outcomes from all three sites were positive. The authors indicated that students were “broadly enthusiastic” about single sex education; teachers exhibited enthusiasm as well. This study showed an overall trend in improvement of students’ test scores after the implementation of single-sex classes.

The effects of these strategies on achievement, taken together, were transformative.

Within the context of a relatively stable student intake, 82% of girls and 81% of boys achieved the benchmark GCSE grades in 2004, and the gender gap in academic achievement between girls and boys and girls narrowed markedly” (Younger & Warrington, 2006, p. 587).

In another study performed by Mael (1998) students were reported to have higher academic achievement in single sex classes compared to similar students in a co-educational setting:

[S]tudents at single-sex schools demonstrated higher academic achievement and educational aspirations, with effects generally higher for females. Girls at single sex schools did more homework and enrolled in more math classes and single sex boys enrolled in more math and science courses, than did their counterparts in coeducational schools. (Mael, 1998, p. 107) .

Some single sex studies are indirectly related to academic achievement. Studies have been conducted to determine participation in academic classes and relate participation to achievement (Cherney & Campbell, 2011). Other studies attempt to determine differences in academic related processes (such as spatial ability) between boys and girls in single sex classes (Titze, Petra & Martin, 2011). Most focus on differences between boys and girls achievement in the same academic subject, or differences in academic achievement between similar populations of

students in single sex and co-educational environments (Hayes, Phalke & Bigler, 2011; Hoffman, Parker & Badgett, 2011)

In terms of qualitative research, there are several words used to describe the perceived benefits for students in single sex classes. Common descriptions found in the literature include self-confidence, motivation, self-efficacy, comfort level, and safety level (Branson & Miller, 1979; Carpenter & Hayden, 1987; Finn, 1980). These terms indicate that the studies presented in the next section are focused on social aspects and interactions of students in single sex classes. As opposed to examining quantitative data in the form of test scores, some single sex research focuses on social implications of separating boys and girls into segregated classrooms. In addition to these descriptions presented, students reported in various research findings they did not feel the pressures of being embarrassed in front of students of the other sex and that they experienced fewer distractions in the learning process (Fox, Brody & Tobin, 1985; Gillibrand, Robinson, Brawn & Osborn, 1999; Lee & Bryk, 1989; Subotnik & Strauss, 1995).

In a study by Robinson and Gillebrand (2004), findings from interviews with student participants showed evidence of preference by boys for single sex classes. “They [boys] reported feeling more confident in class without girls, although they missed the ‘service’ role provided by girls in class” (Robinson & Gillebrand, 2004, p. 667). Other telling information comes from ways in which girls at single sex schools see themselves and how they define self-esteem. Some results indicate that girls in coeducational schools define their self-esteem in terms of social standing such as popularity with their peers, whereas girls in single sex schools report that they measure self-esteem in other ways such as their academic achievement (Stabiner, 2002). This freedom from typical social judgment can also be seen in research conducted by Datnow and Hubbard (2005) who reported that “one advantage of gender separation offered the girls was the

freedom to make decisions about their appearance without harassment from the boys” (p. 116). Kessels and Hanover (2008) found similar occurrences in their study of girls’ gender-related self-knowledge in physics. Self-knowledge refers to how the female participants view their own competencies and depth of knowledge in a subject, which is similar to self-confidence and self-efficacy. They found that their participants had a more positive self-concept in subjects usually stereotyped as masculine, and they also found that their female participants reported having a better self-concept of ability in physics compared to their coeducational counterparts.

Teachers have also described positive experiences with single sex education. Some teachers report fewer management problems in their single-sex classes, which contributes to a more open environment and more opportunity to tailor lessons and discussions that were meaningful to the audience (Parker & Rennie, 2002). Further research by Parker and Rennie indicated that teachers of girls in single sex classes identified gaps in girls’ science experiences in terms of risk taking. They found that the single sex environment allowed the girls a safe place to take risks and the opportunity to design and carry out experiences in a way that they never have before (Parker & Rennie, 2002). Other research also suggests that single sex environments do not reinforce the stereotypes of what it means to be a girl or what it means to be a boy, but rather taps into the student as an individual and allows development of knowledge and identity in a more value free model of school.

For many, the reduced level of student-student harassment in single sex girls’ classes was intertwined with increased levels of student achievement and increased opportunity to learn, especially in ways which were integral to gender inclusive strategies, such as cooperative group work and collaborative problem solving. (Parker & Rennie, 2002)

These examples describe settings that provide less social stressors for the participants in the studies. Such environments can be attributed to changes in behavior and academic engagement for students.

There are also people who believe that the stereotyped school subjects such as mathematics and science for boys and language and fine arts for girls can be opened up to all students in a single sex classroom. Settings such as these may allow for personal exploration and determinations of talents and interests that are not predetermined by societal or cultural roles for males and females based on sex, bringing more equity into the classroom. Cornelius Riordan commented on Lockheed and Hall's research (1976), saying:

[A]s predicted by status characteristic theory, men dominated mixed sex groups when the subjects had no previous experience with the task. However, mixed sex groups composed of individuals who had first experienced the task in a single sex condition display a pattern of equal status behavior between males and females. (Riordan, 1990, p. 56)

Although the evidence to support positive academic outcomes is strong, it is difficult, if not impossible, to attribute the rise in students' grades or test scores to classroom placement alone given the large number of variables at work (Younger & Warrington, 2006). "Some educators point out that many existing single sex schools are not particularly effective and attribute the academic successes of others less to single gender and more to smaller classes, engaged parents, well trained teachers, and strong academic emphasis" (Sadker & Zittleman, 2005, p. 19). Cornelius Riordan, who cautions against quick acceptance and reliance on single-sex classes alone to foster changes in student achievement, also echoes this sentiment. "The quality of some studies is excellent, but some are below par, lacking controls for home

background and other likely biasing factors” (Riordan, 1990, p.61). Multiple changes other than the implementation of single sex classes (i.e. teacher changes, administration changes, philosophical and pedagogical changes) can also contribute to the results seen in single sex school studies. Riordan (1990) also points out that parental and student decisions to attend a single sex school (private, charter or public) can be an indication of commitment and dedication to academic success, making them a unique population which may not be an accurate representation of students as a whole.

Opposition to single sex education.

Those who oppose single sex education typically cite the lack of evidence that it is better than coeducational schools (Salomone, 2003). Some findings suggest that there are no differences between how students in coeducational classes and those in single sex classes perform. Furthermore, findings do not necessarily suggest that students feel any differently toward school or the class as a result of their placement (Carpenter & Hayden, 1987; Dale, 1971; Younger & Warrington, 2006). Sadker and Zittleman take this idea even further to claim that “we have yet to come across a single study showing that gender segregation and competition serve any positive educational, social, or psychological purpose” (Sadker & Zittleman, 2005, p.18). In one study, students who were interviewed stated that they preferred to be in coeducational classes because they felt that they benefited from the presence of the opposite sex in the form of academic knowledge and the diversity it brought to the class (Dale, 1971).

Some academic research in the area of single sex education suggests that there are no academic benefits for either sex by implementation single sex classes.

Placing students in single sex classes does not always resolve discipline problems. In fact, it can create more problems than it solves as one research study indicates (Mael, 1998).

A common view among these teachers was that single-sex classes were sites of untold stress, dominated by behavior problems on the part of boys, and that this had a negative impact on achievement. In all-male groups, it was seen to be very difficult to establish a learning ethos regardless of the ability level of the boys. (Younger & Warrington, 2006, p. 593)

Moving beyond overt behaviors such as students acting out or preferring to socialize with friends of the opposite sex, some rather undesirable behaviors can transpire in a single sex classroom. Some research suggests that instead of breaking down gender stereotypes, single sex classes may reinforce existing social stereotypes such as male dominance, female inequality, the notion of the intellectual or aggressive male and the nurturing female, as well as career stereotypes preparing women to be caretakers and teachers and men to be engineers and businessmen (Bracey, 2007; Cooper, et al. 1994; Lee, 1997; 2006; Vail, 2002).

A perspective often invoked in favor of coeducation is that boys and girls see and interact with one another in most real world settings. Interactions that will be a part of daily activity when students enter the real world are cited as a priority. Reinforcing the masculine stereotype of domination rooted in patriarchy and the feminine stereotype of being less than capable is a fear that many opponents share.

Without daily interactions between the sexes to contradict the messages being sent by the media, boys have little chance to learn non-sexist behavior. Boys will be at a disadvantage in the modern world if they have trouble learning and working with girls as

peers. It is clear that teachers and administrators need to make a special effort to ensure that boys get a chance to see women as authority figures and to give boys a chance to work with girls in educational projects. (Barnett & Rivers, 2007, p. 94)

Researchers suggest that keeping males and females away from one another will not prepare them for the interactions that they will encounter when they enter college and or the workplace. Riordan makes one such point when he describes the issue of interaction and understanding and equity between genders in terms of the “contact hypothesis” which he describes in the following way:

Some people contend that in separate schools boys and girls may acquire mistaken notions about the opposite sex. Stereotypes of males and females may be established and maintained, and the relative lack of inter-group contact would allow little opportunity to disconfirm such stereotypes. (Riordan, 1990, p. 42)

According to the premise of contact theory as it applies to gender inequity in schools, students of different genders may have misconceptions or expectations of the other, which may only be remedied through the interaction of the two groups and creating realistic attitudes and expectations through contact (Riordan, 1990). With mixed and inconclusive results, single sex education continues to be a controversial solution to a diverse set of problems.

Single Sex Science Education

This study focused on interactions in single sex science classrooms. Early work in single sex education focused heavily on the perceived effects of single sex environments for females in mathematics and science courses. The interest in single sex education for science (and math) classes has persisted into current research as well (Cherney & Campbell, 2011; Parker & Rennie, 2006). Rationales for research into single sex science classes have historically been grounded by

a lack of female representation in math-intense science fields (Carpenter & Hayden, 1987; Gillibrand, Robinson, Brawn & Osborn, 1999; Lee & Lockheed, 1990; Younger & Warrington, 2006). This under-representation of females does not appear to be as prevalent in the life sciences, such as biology and related fields like medicine and nursing, compared to fields that are perceived to be ‘math-intense’ such as physics. The Division of Science Resource Statistics reported that in 2005 men who earned degrees in computer science outnumbered women 78% to 22%. Engineering showed the starkest difference with men earning 80% of the bachelor’s degrees, while in physics men earned 79% of the bachelor’s degrees (NSF, 2007). The pattern revealed by these statistics prompted some researchers to investigate single sex education as a way to increase science participation for girls.

Fostering interest, a connection, confidence, and a feeling of belonging within a learning environment is key to igniting students’ desire to continue their investigations and continue to learn (Brody, et. al. 2000; Gillibrand, Robinson, Brawn & Osborn, 1999; Younger & Warrington, 2006). Barriers to acquiring fundamental knowledge at an early age can persist throughout a student’s academic life, preventing them from further investigating a topic or field of study due to lack of interest, lack of connection, or lack of feeling that one fits with a group or community associated with that material. Students need to feel welcomed, encouraged and safe in their investigations and inquiries when learning new material. If they do not feel these things, there is a significant chance that students will not take risks, will not fully engage in the material, and will not see the content and material in the class as something that is interesting, appealing, necessary, or important for their lives. Single sex educational settings in science could potentially provide the necessary environment to allow students to experience a more value-free

and equitable academic experience in the typical classroom by removing some potential social stereotypes and stressors that may accompany the mixed sex or co-educational classroom.

While some of the research presented hypothesizes a potential reduction in gender stereotypes via single sex science classes, researchers must be cautious of recognizing situations in single sex settings that exacerbate stereotypes and differential treatment of students. This study investigated the daily activities and interactions in science classrooms. Special attention was paid to the classroom climate and interactions between students and teachers in order to try and determine if the single sex science classes reinforce, or help to eliminate gender stereotypes.

Theoretical Framework

Two ideas that inform this study are symbolic interactionism and social construction of gender. The first idea that informs this study is social construction of gender, which means that notions of gender are socially constructed. What it means to be a boy or a girl, a man or a woman is constructed by society for the purposes of being able to recognize, categorize and understand other as being similar or different. Judith Butler (1990) suggests that being placed into a gendered category is not necessarily natural. There can be physiological differences that place us into sex categories but us as people, as a social group of individuals, have produced a set of rules and expectations that define what it means to me a male or a female and by reproduction of these expectations and ideas we perpetuate the traditional categories and roles of each gender. Social construction of gender is important to consider as a process that contributes to the lens that teachers looked through in order to categorize their students as males or females. The emphasis on differences between male students and female students is highly emphasized when the students are separated into different classrooms. Coupled with the importance that the administration placed on addressing each group of students instructionally, I believe this

heightens the teachers' awareness of the categories and thus how they as the teacher should interact with each particular group of students.

Building on the idea of social construction of gender, and assuming that the teachers involved in this study possessed their own ideas of gender and that the ideas contributed to their expectations of actions, preferences and needs of students, I used symbolic interactionism as a framework to examine the relationships between students and teachers and thus how teachers made meaning of their experiences in the classroom and with students in single gender classes. These pieces are interconnected; the teachers in this study entered a classroom situation where they were faced with a new and unique single sex environment. Further, they are entering that situation with socially constructed ideas of what it means to be a girl or be a boy and with preconceived ideas about how those students will behave, what they will like or respond to and generally how they will "be" in class. In terms of understanding teachers' perceptions of single sex classes, the combination of these ideas is useful because it provides a way to understand how the teachers' socially constructed ideas of gender and gender stereotypes play a role in how the interactions between teacher and student occurs, and also how the teachers interviewed made sense of those interactions in the single sex classroom.

Social construction of gender.

Social construction of gender suggests that the value or validity of objects, experiences, relationships, and people are conditional to that specific person's lived experiences and point in life, referring to context, background, age, etc. (Howard & Alamilla, 2000). When specifically taking into account how a person's gender has shaped his or her identity, Risman discusses that becoming aware of gender as a difference (between male and female) is a natural difference that satisfies a child's need for order as they try to make sense of his or her surroundings and the

players involved. Often parents will reinforce the assignment of sex (male/female) and therefore stereotypical behavioral expectations (Risman, 1998). Parents, teachers, and even peers will reward individuals who conform or exhibit the “correct” behaviors that coincide with that particular gender (Bandura, 1962, 1971). Having constant positive feedback for stereotyped gendered behavior begins to mold and shape an individual’s identity (social construction) and therefore their behavior and behaviors with others. Based on these ideas, we expect different behavior and different identities from males and females; an assumption can be made that teachers and school are no exception. Students who have identities that have been socially constructed to adhere to male or female ideals can also receive messages or innuendos of how they should act or behave around the opposite sex.

Children who live in gendered societies no doubt develop gender schemas and will code themselves, as well as the world around them, in gendered terms. But this seems much more likely to be the result of their lived experiences in patriarchal societies than the consequence of innate drive for cognitive development. While children are developing cognitive gender schemas, adults are older children are treating boys and girls quite differently...The cognitive effects of living in a gendered (and sexist) society, the reality of gender socialization, and the active efforts of boys and girls to negotiate their own worlds interact to shape their daily lives, and perhaps to affect their future options.

(Risman, 1998, p.133)

Recognizing that students and teachers come into school (and society) with predisposed idea of what it means to have a gendered identity, or be a “boy” or “girl”, then one must take into account of how school and the culture of school continues to perpetuate those ideas. I build on the social construction theory by examining if and how these gender roles are expressed in the

single sex classroom. Bem (1993) discusses how children attempt to make sense of the world by creating categories (schemas) for those around them in order to classify them in tandem with existing social categories. Eckert (1989) points out that schools assist in placing students further into social niches.

But the relation between the individual student and the school does not simply develop through one-on-one interactions between children and adults in and out of school; instead it is mediated by an emerging peer culture that develops both in and out of school, from common experience with adults and adult institutions” (p.11, 1989).

Our society tends to separate the sexes, on the basis of gender, into categories whose members are assumed to share similar abilities and personality traits. Gender is a structural feature of society similar to social class.

Gender traits influence interactions between males and females in a wide variety of environments. Women are often still socialized toward taking on nurturing roles, while men are socialized to think of themselves as more independent and less nurturing. Examining patterns of gender socialization are important because they influence the ways in which males and females perceive themselves and construct their external actions. It is important to connect these overarching guiding facets of gender and society when considering the microcosm of the typical America high school, which is not exempt from the same stereotypical social norms and expectations that males and females encounter and experience in the rest of the world. It is this peer culture that is inherently tied to gender and influenced by the social constructions of gender at work, that lie at the focal point of theoretical framework in this proposed study. In summary, changing the social interactions and social environment that students experience in academic settings at school can potential have effects by helping individuals and in effect classes, construct

new peer groups, and new identities of what it means to be a player in the social context of the public school classroom.

Symbolic interactionism.

Symbolic interactionism is a perspective that places emphasis on small-scale interactions that are social in nature. Symbolic interactionism is derived from pragmatism and the work of George Herbert Mead, Charles Cooley and Herbert Blumer. According to symbolic interactionism, people's actions in situations and contexts are based upon established meanings those situations and contexts have for them. The particular meaning of situations or contexts is driven by social interaction and through the course of the interaction; meanings are modified through interpretation of the person having the experience. This framework relates to the nature of this study and to social construction of gender. Ideas of gender are socially constructed for the participants prior to having the experience in the single sex classrooms. Teachers entered the classroom situation with a lens influenced by social construction of gender; having his/her own concept of gender and categorizing themselves and their students as such in order to make meaning of as assist with interactions to come in the classroom.

Once those interactions started to take place in the classroom, symbolic interactionism became relevant to analyze and make sense of the information provided by the teachers. This study examined social interactions taking place in the small environment of a singular single sex classroom with teachers and students who came into the classroom with preconceived notions of gender. As the teachers and students cultivated their interactions and formed relationships over the semester, teachers reported their experiences and made meaning of their experiences via their interactions with students in the social context of the science classroom. Charmaz (2006) defines symbolic interactionism as:

[A] theoretical perspective derived from pragmatism which assumes that people construct selves, society, and reality through interaction. Because this perspective focuses on dynamic relationships between meaning and actions, it addressed the active processes through which people create and mediate meanings. Meanings arise out of actions, and in turn influence actions. This perspective assumes that individual's are active, creative, and reflective and that social life consist of processes. (p. 189)

This study focused on teachers' perceptions of their experiences in the single sex science classroom. In order for teachers to explain their experiences, they shared their relationships and interactions with their students in the single sex classroom as a way to articulate meaning from the various interactions that occur between students in single sex classrooms as well as students and teachers.

Originally introduced by George Herbert Mead and first articulated by Herbert Blumer, symbolic interactionism focuses on methods by which to examine the actions of human beings based on the meaning that those particular things have for the actors involved (Blumer, 1969). In addition to this first premise of symbolic interactionism, the rest as stated by Blumer says

the second premise is that the meaning of such things is derived from or arises out of, the social interaction that one has with one's fellows. The third premise is that these meanings are handled in and modified through an interpretive process used by the person in dealing with things he encounters" (1969, p.2).

Relative to this study, the teachers who experienced single sex classrooms participate in the first phase of symbolic interactionism by being persons who are involved in the unique situation of being a teacher in a single sex classroom and entering that single sex environment with socially

constructed ideas of gender which guides their actions as individuals with respect to how to interact with student sets of varied gender.

The second phase of symbolic interactionism is displayed as teachers are retelling their experiences through their own personal lens and recounting their experiences told via the social interactions that each teacher had with students in the single sex classroom. Teachers were not simply telling their opinions or perceptions of the idea of single sex education but basing their perceptions and ideas on their experiences which were driven by their personal interactions between themselves and their students. Blumer (1969) explained that “symbolic interactionism sees meanings as social products, as creations that are formed in and through the defining activities of people as they interact” (p. 5). The third aspect of symbolic interactionism is also addressed through the reflective process of retelling the teachers’ experiences in the classroom because the meaning of events and interactions were interpreted on the part of the teacher during the sense-making process that each of them experienced as part of being asked to recall their personal perceptions.

Chapter Three: Methodology and Methods

In this chapter, I describe the methods used to investigate teachers' perceptions of single sex classes in an urban public high school. This research study has been designed to answer the following questions:

- What are teachers' perceptions of single sex science classes during the initial implementation and what influences these perceptions?
- What are teachers' perceptions of their own teaching practices as a result of the implementation of single sex science classes?

Context

This research study was conducted Southeast High School, a high school located in the southeastern United States. The school serves approximately 1550 students in grades nine through twelve, is one of two high schools in the county, and is classified as an urban school based on its location and student population. Approximately 62% of students are African-American, 23% are White, 9% of students are Asian, 3% of students are Hispanic, and 3% of students identify themselves as multiracial. The percentage of students eligible for free/reduced lunch is 55%. This percentage indicates that of the students who self-reported by completing free/reduced lunch applications, 55% of the school population is considered to be part of a family that is below the federal poverty line. At the time of the study, all schools in the school district were either school-wide Title I or Title I Targeted Assistance schools (14 elementary, 4 middle, 2 high schools).

At Southeast High School, students follow a traditional program of study. In ninth grade, all students take mathematics, science, language arts, social studies and elective classes. The prescribed science class for ninth grade students is physical science. All ninth grade students take physical science during their first year of high school. Depending upon the individual student's performance and decisions made by the student and student's family, a student will either be placed in a college preparatory (CP) track of classes or an advanced track of classes. College preparatory classes are the basic or lowest level of courses offered that meet the requirements for graduation from high school with a diploma that meets standards for entry to college. Advanced, honors or Advanced Placement (AP) classes are offered at Southeast High School, but students must be on an advanced track to be enrolled in those courses. Students who are on an advanced track have shown the ability to exceed basic standards and are driven by accelerated content and challenges for students. The courses at Southeast High School that were scheduled for single sex classes were all ninth grade core classes (science, math, social studies, language arts) at the college preparatory level.

Southeast High School chose explicitly to incorporate only ninth grade college preparatory level courses for the implementation of single sex classes. This may imply the presence of a selection effect.

Non-random selection is both a source of bias in empirical research and a fundamental aspect of many social processes. When observations in social research are selected so that they are not independent of the outcome variables in a study, sample selection bias (sometimes labeled 'selection effects') leads to biased inferences about social processes" (Scott & Marshall, 2006).

The administration at Southeast High School provided information that logistically, it was in the best interest of the master schedule, and the school, for the implementation to begin in ninth grade for the initial trial. No information was provided by the administration as to why honors or advanced placement classes in ninth grade were not considered for implementation. Without having information about individual students, it may be inferred that while the students in the college preparatory courses may not be considered underachieving students, they are not academically at the same level of achievement as students in honors or advanced classes. This is an important consideration in this study due to potential differences that may have been present in the classroom environments of honors or advanced students compared to college preparatory level. The data collected in this study applies to college preparatory level students at Southeast High School in ninth grade physical science classes, and may not be transferrable to students in the same population who are grouped into a different academic track.

In the summer of 2010, the school administration of Southeast High School made the decision to implement single sex classes in the fall semester of 2010. The decision to schedule students into core classes by gender was made exclusively by the building principal and supporting administration of assistant and associate principal. The decisions made with respect to implementation, organization, and scheduling were made solely by the school administration in a top-down approach. The faculty was not privy to the information regarding single sex classes prior to returning to school for pre-planning fall 2010. Teachers were not polled about single sex education with respect to their willingness to participate or their preference of all-girl versus all-boy classes.

The administration of Southeast High School cited research based evidence generically as supporting the notion of single sex education but did not share the research resources with me,

nor did they disclose if any of their observations and assumptions about single sex education were based on any valid and reliable data collection within the school system, as other schools were experimenting with single sex classes on a smaller and less organized basis. The idea had been discussed as a potential solution to problems that the school was experiencing. The perceived problems at the school were determined by an administrative needs assessment.

Students at Southeast High School were not academically meeting standards for Adequate Yearly Progress (AYP) and were overall not displaying actions that showed engagement in academic activities or actively taking an intrinsic interest in their own education. According to administrators and teachers, students at Southeast High School were more interested in social interactions with one another as well as other distractions outside of the school day academics. School personnel reported that the inception of this intervention was for the purpose of minimizing distractions in the classroom in an effort to improve the daily school climate and in turn the academic performance of the study body by creating a more academically focused and engaged environment.

Shortly before Southeast High School administrators made the decision to implement single sex classes, a neighboring school system to Southeast County publically announced its intentions to transition their entire school system (K-12), all classes at all school to single sex classes. The neighboring county (West County) cited what they referred to as academic research in the area of single sex education as well as a desire to change the overall climate and culture of the school buildings to influence academics and positive productivity as the impetus for the change. West County provided a singular publication as their “research base” for single sex education. That publication was titled *Gender Education in 7 Steps: Reigniting the academic pilot light of boys and girls* (Holliday, 2007). If any academic research was used to inform the

decisions made by West County, they were not disclosed to the public. West County held public meetings and invited the community and other stakeholders to learn more about the research behind single sex education as well as ask questions and voice concerns.

The author of the aforementioned book used as research by West County attended a public school board meeting to speak to his work and why he felt that this initiative would be fruitful to the community and schools of West County. The author's presentation was met with skepticism and outrage by parents when they were told that their sons' primary focus in school was sports, the female population at the school, and lunch. West County announced its decision to the community and the public at large prior to following through with implementation. Their announcement was met with much concern from parents. First and foremost was the announcement that the physical space (school buildings) to be occupied by students would be shifted to accommodate male students in the high school facility and female students in an elementary school. The facilities and amenities of each of those buildings (including technology, restrooms, athletic/physical education facilities, etc.) were not equitable, which was a concern to parents. Community members were very vocal in West County as to the many faults in the school system's plan. These oppositions became so great, along with the threat of litigation, that the system abandoned the idea of single sex education and the acting superintendent resigned.

Administrators at Southeast High School did acknowledge the influence of the neighboring West County with respect to single sex education, as well as learning about it and becoming interested in it for their school from other sources. Having the details of the struggles of West County with respect to single sex education, Southeast High School administrators decided to make the decision to implement in-house, meaning the decision was made among a small group of administrators with the support of the district leaders, and implemented without

announcing to parents and the community the intentions or plans of the intervention. Southeast High School has now implemented single sex classes for one full academic year (2010-2011). It is unclear whether or not the single sex class arrangement will continue into the 2010-2011 school year as the entire administrative team at the school has changed from the 2010-2011 school year to the 2011-2012.

Demographic information about Southeast High School is important when building an understanding of the administration's motivation for implementation. Research has indicated that populations with demographics similar to that of Southeast High School have shown the greatest impact of such an intervention (Riordan, 1990). (The demographics of the county in which the school is located is very different from the population of families and full time residents that feed into the schools. The county is home to a large university, which contributes to varied demographics for the county as a whole versus the population of families with children attending local schools. Below are the most current statistics from the city/county municipal website.

- Population: 114,737 (including college students)
- Median age: 26.6 years old
- 48.8% male, 51.2% female
- White: 69.7%
- African-American: 25.3%
- Hispanic: 9.2%
- Asian: 3.4%
- Other: 1.5%
- Poverty level: 28.6%
- Median household income: \$36,158

Participants

Participants in this study included ninth physical science teachers. Physical science is the introductory ninth grade science class taken by all students at Southeast High School. Honors and advanced versions of this class are available to accelerated students, but the single sex physical science classes are the basic college preparatory level course. The entire ninth grade academy has been assigned single sex classes in the four core content areas (science, math, language arts, and social studies). Six science teachers were assigned to teach either all-male or all-female classes. Some teachers taught only single sex classes, while others taught both single sex classes and co-educational classes. All teachers involved in single sex science classes were briefed on the study and invited to participate. Five of the six teachers expressed interest in participating and completed the interview process. Table 2 shows information about each of the five participants.

Table 2*Participant Demographic Information*

Participant Pseudonym*	Demographics	Experience in Education
Daisy	Daisy is a Caucasian female between the ages of 22 and 25. She is from a self-described small town in the southeastern United States and comes from what she describes as a rural community with little diversity.	Daisy is a first year high school science teacher. Her one year of experience prior to this school year was as a middle school science teacher in a rural school district in the southeast. Daisy teaches all-male physical science classes.
Janet	Janet is an African-American female between the ages of 25 and 30. She describes herself as being from an urban community in the southeastern United States.	Janet is in her second year teaching science. She has been at the same school (research site) her entire teaching career. Janet teaches all-male and all-female physical science classes.
Olive	Olive is a Caucasian female between the ages of 29 and 35. She describes herself as being from a suburban area in the southeastern United States.	Olive is in her first year teaching science at the research site. She has one half years of experience teaching in another school system. She describes her previous system as suburban area with moderate diversity. She teaches an all-male physical science class along with advanced chemistry and AP physics (co-ed).
Dolly	Dolly is a Caucasian female between the ages of 32 and 36. She describes herself as being from a suburban area in the southeastern United States.	Dolly is in her fourth year teaching science at the research site, sixth year teaching total. She describes her previous system as a rural area with limited diversity. She teaches an all-female physical science class, an all-male physical science class as well as advanced co-ed physical science.
Quentin	Quentin is a Caucasian male between the ages of 28 and 32. He describes himself as from a suburban area in the southeastern United States.	Quentin is in his first year teaching science. He has no previous experiences in education with the exception of student teaching. He teaches all-male physical science classes.

Data Collection

Data sources for this study included interviews with teachers of single sex classes, along with classroom observations and field notes. Teachers participated in three interviews. All interviews were scheduled at the participant's convenience and took place at the school. These interviews took place approximately 2-3 weeks apart to allow for time to elapse between interviews with the intent of participants having additional and potentially new experiences as the semester progressed. Allowing time between interviews also allowed for initial interviews to be transcribed and individual or specific questions to be documented as follow up for the second interview. Initial protocols for all interviews are included in Appendices A-C. Samples of edited protocols based upon prior interviews can be found in Appendix D. All interviews were audio recorded and transcribed. Table 3 displays the frequency and dates of participant interviews as well as classroom visits in order to collect field notes.

Table 3*Summary of Data Collection Schedule*

Participant	Interview Dates	Classroom Observation Dates
Daisy	Interview #1: 4/7/11	Observation #1: 3/28/11
	Interview #2: 4/21/11	Observation #2: 4/27/11
	Interview #3: 5/2/11	Observation #3: 5/13/11
Dolly	Interview #1: 4/8/11	Observation #1: 3/28/11
	Interview #2: 4/21/11	Observation #2: 4/28/11
	Interview #3: 5/10/11	Observation #3: 5/12/11
Janet	Interview #1: 4/10/11	Observation #1: 3/28/11
	Interview #2: 4/30/11	Observation #2: 4/27/11
	Interview #3: 5/10/11	Observation #3: 5/10/11
Olive	Interview #1: 4/8/11	Observation #1: 3/29/11
	Interview #2: 4/27/11	Observation #2: 4/28/11
	Interview #3: 5/2/11	Observation #3: 5/11/11
Quentin	Interview #1: 4/11/11	Observation #1: 3/30/11
	Interview #2: 4/30/11	Observation #2: 4/26/11
	Interview #3: 5/5/11	Observation #3: 5/11/11

Classroom observations of participating teachers' classes were used as a data source in an attempt to confirm and support interview data gathered from teachers. Non-intrusive observations accompanied by the researcher's field notes were collected in each participant's class. Students were not interviewed, and no student names were used in discussions or questioning with teacher participants. The protocol followed was drawn from Frank (2000), which outlines methods for taking ethnographic field notes. I created observations in a notebook, which I referred to as note-taking, where I compiled objective observations of the actions in the classroom. I followed each note-taking session with a note-making session the same day. This is where I added my own thoughts, interpretations, perceptions, and opinions to the notes that were made in the classroom that day.

Data Analysis

The methods that were used in the initial analysis of the transcripts are derived from basic thematic analysis. After initial themes were coded from the transcripts the constant comparative method of grounded theory analysis was applied to the data for a more in depth and focused analysis. Following the guidelines outlined by Rossman and Ralls (2003), there are seven phases of generic analysis: organization of the data, becoming familiar with the data, creating categories and themes, coding, interpreting, looking for alternative understandings that emerge, and writing a final report. According to Rossman and Rallis (2003) an essential part of the first step in organization of the data is to condense the amount of data that exists. Making the task more manageable by reduction is essential in making sense of the data. "All analysis entails making judgments about how to reduce the massive amounts of data collected" (p. 279). The authors also advocate reading and re-reading interviews in order to become more familiar with the data, and

to write down any analytic ideas that materialize as a result of reading and (reason) making. This aligns with the constant comparative methods of data analysis in grounded theory.

Marshall and Rossman (2006) describe generating initial codes as creating “general statements about relationships and underlying themes” (p.154). They go on to emphasize the importance of generating these themes for the purpose of focusing the study itself. Crabtree and Miller (1992) display a continuum of analysis strategies, which can be useful when situating the data prior to the formation of codes and themes. According to Crabtree and Miller (1992) one end of the continuum of codes and themes situates an objective stance by the researcher where categories are formed in advance, and the other end of the continuum holds that categories are not predetermined, they rely on the researchers interpretations of the data to emerge.

This coincides with Rossman and Rallis’ (2003) idea that categories appear to be in the researcher’s mind and themes seem to emerge after analysis. Pre-analysis knowledge exists in this case to contribute to the formation of categories as an extension of the research questions. Themes emerged as analysis of the transcripts and classroom observations were initially completed. Using generic analysis for the initial review of data focused on locating patterns, themes, and data (Patton, 2002) that emerged from transcripts and field notes from observations. Research questions guided the emergence of themes, such as looking for commonalities in respondents’ reactions to the idea of their school offering single sex classes as well as their own perceptions and reactions. Interview transcripts were analyzed further through Strauss and Glaser’s (1967) constant comparative method of grounded theory after initial analysis of generic thematic coding was complete. Significant data points (responses to interview questions) were coded (in-vivo coding) and extracted from the transcript for further analysis and comparison.

Comparisons were made within the same interview strand, as well as across interview strands (example: first interview and second interview).

Grounded theory was a useful approach to data analysis because interactions between persons in specific environments were the foci of research questions (Grbich, 2007).

The grounded theory perspective locates the phenomena of human experiences within the world of social interaction. The assumptions underpinning grounded theory come originally from symbolic interaction and presume that reality is a constructed and shifting entity and that social processes can be changed by interactions among people. (Grbich, 2007, p. 71)

This method of analysis was appropriate to this particular study because the interactions between students in single sex classes, as well as interactions between teachers and students are at the center of the proposed research questions. Through data analysis of the interactions that happen in this social setting of the single sex classroom, construction of meaning was attained through the inductive grounded theory approach of combining observations (field notes and participant interviews). Using observations of reality to construct both relevant theories and meaning is the crux of the grounded theory approach (Grbich, 2007).

After initial thematic coding of interview data as well as field notes, open coding was applied to the narrowed data from the initial thematic coding. Open coding was line-by-line analysis “questioning the data in order to identify concepts and categories which can then be dimensionalised” (Grbich, 2007, p.74). After open coding the data, following the guidelines of grounded theory, axial coding was applied which is the practice of identifying emerging categories and linking it to sub categories that contribute to them. Axial coding was important when identifying categories of responses between teacher participants. This assisted to situate

broad categories early to guide subsequent interviews (i.e. the potential need to amend and add pertinent questions) and explore deeper meanings of participant responses.

Axial coding is the process of relating categories to each other. To simplify the process, rather than look for any and all kind of relations, grounded theory emphasizes more generic relationships. Axial coding was important in relating emergent themes to the idea of self-fulfilling prophecies that emerged in different parts of interviews and concentrated around different content. Examples of axial coding as well as the resulting concept map used for data analysis can be found in Appendix G-J. After axial coding of each transcript was complete, selective coding was applied to all teacher interviews in order to validate initial emerging codes, and clean up data before integration began. Integration of data was the next step in analysis. Integration of field notes from classroom observations as well as transcription data was completed through the creation of concept maps to organize and further condense data. Once trends and patterns were identified further analysis took place to interpret the analyzed responses in an attempt to match or answer the research questions posed. A sample transcript from the initial interview with Olive, as well as coding schemes can be found in Appendices A-J. This sample transcript displays the levels of coding described in the previous paragraphs.

Findings from this study are organized by addressing each research question, and culling data responses and analysis to describe characteristics of participants' classrooms. I attempted to make connections between participants' responses in order to make generalizations across the research site, while still highlighting significant outliers among the data. The data will represent a collective description of teachers' perceptions, responses, actions and observations of their students, which will be compared to the anticipated outcomes based on the theoretical influences that ground this study. This study will attempt to make connections with the theoretical

frameworks utilized in order to further strengthen the claims of previous research in the area of single sex education.

Subjectivities Statement

I served in the capacity of data collector and data analyzer in the process of this research project. Prior to beginning data collection for this research I was employed by Southeast County School District. I was employed with the district from August 2009 to December 2010. During my time with Southeast School District I served in the capacity of a consultant to schools with respect to intervention programs. I had prior knowledge that Southeast High School was planning to implement single sex classes, but I was not privy to any details of the implementation until the school year began in fall 2010. I had the opportunity to gain a sense of the schools in the district, the community perspective and insight into perceptions of teachers, students and administrators while participating as an insider in the district.

I was approached in the summer of 2010 by the principal of Southeast High School to conduct professional learning for the teachers of single sex classes during professional learning prior to the fall semester beginning. I agreed to deliver the professional learning based on the specific requests of the administration; which were to provide teachers with instructional strategies that are aimed at different sexes. Although these strategies are not widely tested, and highly controversial, the administration was only interested in providing their teachers with tools that would potentially address the need for differentiated instruction to male and female students. I provided the information that was requested by the administration in August 2010. I ended my employment with Southeast School District in December 2010 and was awaiting the approval of my research study at that time.

After the initial delivery of professional learning at Southeast High School I did not have any contact with those teachers or their classrooms until after research approval had been granted. It is unclear whether the participants who volunteered for this study remember that I was the individual who provided their professional learning. None of the participants indicated that they recalled my presentation specifically or indicated that they remembered me from a prior experience. Even though none of the participants indicated that they made a connection between the professional learning experience and myself, there is a chance that the participants interactions with me, and thus the ways in which they answered my interview questions could have been influenced by my previous position as the leader of their professional development.

Chapter Four: Findings

In chapter four, I describe the perceptions of the teacher participants with respect to their students and single sex classes. I use the emergent theme of subscription to a self-fulfilling prophecy to illustrate the influences that contributed to the participants' perceptions of single sex classes. The following research questions will be addressed in this chapter:

- What are teachers' perceptions of single sex science classes during the initial implementation and what influences these perceptions?
- What are teachers' perceptions of their own teaching practices as a result of the implementation of single sex science classes?

In order to understand the narratives teachers share about their perceptions and lived experiences in the single sex classroom setting, I must attempt to understand the prior experiences and influences these educators bring to the table. From the perspective of constructivist epistemology (Crotty, 2003), people generate knowledge and meaning from their interactions and lived experiences. It is critically important to consider the participants' lived experiences and interactions within the context of the school setting in order understand their perceptions and how they were generated. Investigating factors influencing teachers' views of their school, students, and classes revealed that these individuals were acting out a self-fulfilling prophecy with relation to the expected outcomes and actions of their students.

In examining self-fulfilling prophecies, there are three areas that should be addressed. First to be considered is the acknowledgement that teachers in the context of this research study have expectations for their students. Those expectations are influenced by their administration,

their peers, and even outside influences. Merton (1949) states, “public definitions of a situation (prophecies or predication) become an integral part of the situation and thus affect subsequent developments” (p.175). The expectations for success as well as expectations for instruction became an integral part of these teachers’ experiences in the single sex classroom. The second area for examination in this study is to look at how their expectations that teachers have are affecting their own actions in the classroom. “The self-fulfilling prophecy is, in the beginning, a false definition of the situation evoking new behavior, which makes the originally false conception come true” (Merton, 1949, p. 175). The teachers’ expectations have effects on their actions with and toward students in the single sex classroom. Teachers have a concept of what is expected of them and what the intended outcomes are with respect to single sex classrooms. These expectations affect the actions of the teachers as well as their concepts of daily classroom activities and interactions. Third, it is important to consider the teachers’ expectations and actions and the consequences that the teachers’ actions have on students. Due to the nature of the data collection for this study, students were not part of the data collection. In order to address the third area of self-fulfilling prophecies, I will present potential impacts on students as well as questions for continued research into this area in Chapter Five.

Marzano (2003) explains that teachers form expectations about the success and general actions of their students and interact with their students based on expectations or predetermined ideas. Students, in turn, reciprocate by acting and producing actions that coincide with teachers’ expectations. This is the self-fulfilling prophecy. In my investigation, I found that teachers’ perceptions of single sex classes were influenced by messages they encountered from colleagues and supervisors, as well as by their personal experiences and knowledge. Said differently, participants’ experiences with their school, their students, and their classrooms were informed by

local rhetoric or societal stereotypes. An example of this is how newcomers to the area are informed about the school system. The local rhetoric consists of descriptions of the local school population as being a tough, difficult to teach, low socio-economic student population that consists of learners with significant challenges both in the classroom and in the home. This local rhetoric is repeated throughout the community and even outside of the community. Teachers who are new to the school system are informed about this information via parents, community members, and even school personnel. Being a permanent resident of the Southeast County community, as well as having several varied experiences with the school system and teachers, I have experienced the rhetoric personally, as well as been told by other teachers of the same experiences.

When teachers were asked to describe their own students' actions and their instructional responsiveness to their students' needs, their responses reflected the same rhetoric to which the teachers previously had exposure, surrounding the deficits of students and the culture of the school. I believe these teachers were able to make authentic observations of their students and classes but relied on prior knowledge and, in cases, prior accepted stereotypes to form their descriptions of their students, classrooms and school. This is evident in the teachers' descriptions of their students and their school (relying on the local rhetoric); it is also evident with respect to how teachers discuss and describe gender. Participants relied on and used their own gender stereotypes to describe their perceptions on the single sex classroom. In this chapter I present the idea of framing the findings in terms of a self-fulfilling prophecy, which shapes the teachers' perceptions of the actions taking place in their classrooms, and thus shapes their instructional responses (teaching) to their perceived needs of students. All were influenced by messages they encounter about the school, community, students, gender, teaching, and learning.

School Climate

Description of school and implementation of single sex classes.

Gaining a perspective on the school climate of Southeast High School is an important feature of understanding the decision to implement single sex classes. In trying to gain insight into teachers' perceptions of the single sex classes, it is important to know how and why single sex classes originated as well as any opinions teachers had about the implementation. Teachers' opinions are important because they can influence a teacher's acceptance and thus perceptions of a particular intervention in their school. In this section, I describe teachers' perceptions of their administrators and co-workers at Southeast High School, as well as the way in which single sex classes were implemented at Southeast High School.

All participants who commented on their co-workers and/or administration had positive comments about the leadership, support, collaborative environment in their department and the relationships between fellow teachers. Dolly described the support she felt she received as a teacher to be one of the best parts about teaching at Southeast High School.

The best things are administration by far, if you would rather have, you know, it's good to have a good faculty but it's better to have a really great administration but it's easier on you when you have a good administration. The faculty has been really great and the administration has been really supportive (Dolly, Interview, 4/8/11).

Olive had positive comments about the science department and instructional coach at her school, although she did not mention the administration.

I really like my department head and I like my instructional coach, I like the students a lot they are really easy to get to know, they are really open and those are the things that matter the most to me (Olive, Interview, 4/8/11).

Upon observing Olive's single sex science class, she appeared to have positive relationships with her students. She was observed talking casually with her students as they entered the room, and asking them about things outside of school such as whether or not they were having a good day and generally how things were going. Students were open and friendly with Olive as they entered her classroom and appeared to be comfortable with her and their surroundings (Olive, Field Notes, 4/28/11).

Janet also commented on the support of the department and how important it was that the teachers had common planning in order to meet and discuss instructional strategies. She also mentioned the supportive administration at Southeast High School:

The support we have from the administration [is important along with]...the different cultures at the school, I feel like you are introduced to several different situations and diversity of just all around, the other thing is collaborative planning is really key and my school is awesome, we all have the same planning so we meet together and I love to see how see all teachers are working toward the same goal which is to raise student achievement (Janet, Interview, 4/10/11).

Overall the teachers had a favorable view of their colleagues and felt supported by their fellow teachers as well as by their administrators. This information is salient in terms of understanding participants' responsiveness to new initiatives their administrators asked them to implement. I observed minimal teacher interaction during observations of the participants' classrooms, but the interactions that I did observe were always positive and conversations were focused on academics and instruction. I observed a brief conversation during class changes between Olive and another science teacher (non-participant) focused on alignment of lessons in the curriculum

and inquiring about where Olive was in the unit, and where she would be at the end of that week (Olive, Field Notes, 5/11/11)

Since teachers trusted the administration they felt that decisions made by the administration were sound and in the best interest of teachers and students. The teachers who participated in this study supported the idea that they would be teaching single sex classes. Furthermore, they accepted the information they were given about single sex classes, likely because of where the information came from (their school administrators) and because they had no other information available to them to contradict the information coming in from the administration. They believed that arranging students into classes of boys and classes of girls would provide a sound instructional context to promote learning and help reduce social distractions so that the 90 minutes of instructional time spent in the classroom could be focused on teaching and learning. This is evident in teachers' explanations of how and why single sex classes originated.

All participants recalled being made aware of the arrangement during the first week of pre-planning before the fall semester of 2010 began. Although participants could not definitely recall how or from what source they received information about the decision to implement single sex classes, all participants were able to answer the question of why they thought the administration implemented single sex classes. Most alluded to talk they overheard around the school or vaguely remembered what administrators had told them about the implementation. Dolly believed single sex classes would raise the comfort level of students in the class, and she believed that was why the administration initiated the implementation.

I think it allows for students to be more comfortable and maybe take more risks especially in science and math classes especially with girls since they usually think that

it's the boys who do better in science and math. I love it. I wish we could do this always it's been wonderful I feel like the discipline has been much better than it's ever been I feel like the relationship with students are stronger, and their success is greater than I have seen in past classes and especially with the girls I have seen them doing more. I had one young lady that I felt should move up to advanced class but she didn't want to because she felt so comfortable in the all-girls class. That's why the decision was made to transition to single sex classes (Dolly, Interview, 4/8/11).

While observing Dolly's classes, it was apparent that she did in fact have positive relationships with her students. I described her relationships as being positive with respect to the observations that students appeared comfortable in the classroom, engaged in discourse with her in a positive tone, participated in academic tasks as asked, and displayed minimal actions in the classroom that distracted from instructional time (Dolly, Field Notes, 4/28/11).

Quentin, like other teachers, indicated that he believed that having a single sex in a classroom would reduce distractions between girls and boys and allow for more time to be focused on instruction.

I haven't read as much research as I should and I have nothing to base it off of but I would assume that it would be based on less distraction between the two sexes, more boys may want to impress a girl instead of work on school work and if you remove the girls then maybe they will be more focused (Quentin, Interview, 4/11/11).

Daisy expressed a similar opinion. She felt that limiting distractions in class was the impetus for single sex classes, adding that she thought the students might be less embarrassed to engage in class activities in a single sex class.

To keep focused on the instruction, a lot of it, they [administrators] feel that boys can stay focused if girls aren't in the room, and they aren't trying to impress girls. I can't speak for the ladies because I haven't been in a single gender classroom with the ladies, but I would guess it would be so they are more comfortable and they won't feel like they have to impress anyone, and students this age can get embarrassed if they are wrong in class and the boys can pick on you or the girls might say that's stupid. I think they would be less self-conscious and in my opinion that is the premise behind the whole thing (Daisy, Interview, 4/7/11).

I observed Janet as having a strong personality and commanding the attention and respect of her classroom. She does this with her tone of voice, volume of voice and discourse strategies. Janet used questioning techniques with her students to redirect their behavior such as asking students what they should be doing at that time, and asking students if they should be doing what they are doing at that time. She gave her students the opportunity to self-correct their behavior without being called out in front of their peers in an embarrassing way. With Janet displaying what I would classify as a strong personality and a strict classroom I am unsure that distractions from a mixed sex class would manifest in her classroom. Although Janet hypothesizes about the effects of single sex classes, her control of the classroom might eliminate any potential distractions in either a coeducation or a single sex class (Janet, Field Notes, 3/28/11).

Olive agreed that fewer distractions could be a desired outcome while also pointing out that she thought another reason could be for at the purpose of differentiating instructional strategies for the different sexes. "Two things, one to keep the students from distractions and two to appeal to the learning styles of the different sexes" (Olive, Interview, 4/8/11).

Janet seemed the least confident with her answer, but said she thought it would increase student achievement. She was not very sure about why the administration chose single sex classes, but she felt sure that the outcome in the end would be the improvement in student achievement.

I seriously think it is to increase student achievement as well as student focus, I have noticed that guys are more willing to come to the board and things like that. They are more willing to work or come to the board or to try and make an A; I think it's for more students to be successful (Janet, Interview, 4/10/11).

Janet did implement activities in her classroom that required student participation. Some of that participation did consist of students coming up to the interactive media board to complete activities or problems, while other activities required students to engage in discourse with Janet (Janet, Field Notes, 5/10/11).

While none of the teachers were able to repeat what they had been told about the implementation of single sex classes at Southeast High School, all were able to recall “knowing” something about it and falling back on what they believed to be the root motivation for the single sex arrangement. Overall, teachers indicated they believed single sex classes were implemented to increase student achievement and to reduce social distractions in order to make a more comfortable environment for the students. They believed single sex classes were implemented to address issues of student engagement and, indirectly, student achievement. Furthermore, they believed that single sex classes would improve the engagement of their students by reducing social pressures and distractions in the classroom. These ideas mentioned here are ones administrators used to rationalize the implementation of single sex classes. Teachers restated

these ideas when describing single sex classes, it appears that they subscribed to the reasons used to frame the decisions made in their school.

While the message to teachers (and repeated by teachers) was that the motivation framing single sex classes was social in nature, an alternate message was given which stated that students have inherent differentiated instructional needs based on sex. To prepare for the implementation of single sex classes, teachers participated in professional learning. The professional learning session occurred once during the early fall pre-planning time for teachers. This training focused on perceived innate differences between the sexes, along with teaching strategies that were specific to male and female students. Based on the information provided, the impetus for single sex classes was not based on the notion that boys and girls are hard wired differently and thus require different learning modalities. However, this is exactly what the administration prescribed for teachers in terms of a professional learning experience in order to prepare for teaching single sex classes. Examining the interplay between these messages helps to understand teachers' actions and approaches to teaching the different sexes in their classes, and it helps to reveal teachers' own perceptions of gender in the classroom in terms of preference and perceived instructional needs. This information is crucial when creating the links between teachers' reported perceptions of events in their classroom and the expected outcomes based on outside information.

Teacher perceptions are not limited to the confines of their own classroom, so it was important to also find out what teachers knew and thought about the climate of their school in general. Gathering information about how teachers perceive Southeast High School helped to situate the participants' positions and gain insight into their experiences in the classroom. Having that information from the participants was necessary in order to make sense of the information

they were providing about their current experiences in the single sex classroom. Overall, teachers described the school and students in similar ways. They shared information about the demographics of the student population as well as the community, including the racial and ethnic make-up and socio-economic status of the students. One feature that all participants highlighted was the overarching low socio-economic status of the majority of the students at Southeast High School.

Southeast High School is a majority minority school, meaning that the majority of the student population falls into a minority category of classification by race/ethnicity. Most students attending Southeast High School are African-American and are classified as economically disadvantaged. Teachers used similar characteristics to describe their students. The teacher participants described their students as “poor” and “African-American”, which, to these teachers, also implied that the students struggled academically, displayed challenging actions in the classroom that presented difficulties for learning, and were, as a group, disengaged in the teaching/learning process in the classroom.

When discussing the student population comprising Southeast High School (and the school district as a whole), teachers used the same rhetoric of describing students in terms of their socio-economic status and deficits. As I talked with teachers, administrators, district administrative staff, parents, and other community members, the same information was emphasized about the student population. Field notes corroborate that the following information is consistently used to describe students and schools:

- Majority economically disadvantaged
- Majority minority students
- Struggling academically

- Lack of academic engagement
- Behavioral challenges for teachers

If community members and school personnel use these phrases to describe schools and students, it makes sense that teachers coming into the system would hear the same information. Teachers may adopt this information and retell it when describing Southeast County and Southeast High School. Using this rhetoric reinforces the framework of the self-fulfilling prophecy. Entering the setting of the school system and especially the high school, outsiders (new teachers) are given this information as a way to describe and define the school and the system. They adopt this way of describing and way of making meaning of the school culture of which they are a part, and then they redistribute that information as their way of depicting their school and their students.

Not only do these teachers retell and redistribute this information as a means of describing and characterizing their school, but they adopt this information as a way to frame their students' actions and intentions. They acknowledge and then expect their students to be what they have been told they are. This is important when laying a foundation of the culture of the school to understand why single sex classes were implemented, but it is also important to frame the actions and perceptions of the teachers throughout this research process. Janet, an African-American female teacher with two years of experience, described the school and the students of Southeast High School as needing motivation as well as attention.

Southeast High School is a great school to work at but you have to have a passion for it, you have to be there for the kids, they need you, you have to have a passion, you have to motivate them to learn, you have to be there for the kids when they need you after school time and things like that. You can't just be there for a paycheck. You have to be there for the kids (Janet, Interview, 4/10/11).

While Janet said she loved the school where she worked, she also alluded to the needs of students and how these needs stretched beyond the confines of the regular school day. She indicated there may be difficult situations at Southeast High School that require educators to be available for students. The situations to which Janet referred relate to student needs that are typically met in the home by parents or caregivers, such as transportation home from an afterschool activity, money for lunch, additional time for homework assistance after school hours, and an adult that a student can talk to about personal matters if one is not available at home. Janet pointed out teachers have to motivate their students, indicating that students are not intrinsically motivated while at school. She used phrases such as “you have to be there for the kids” and “you can’t just be there for a paycheck” to indicate that the role of a teacher at Southeast High School is difficult.

Quentin’s perspective was similar to Janet’s, but he specifically cited poverty as a challenge for him in his teaching of students at Southeast High School. When asked to describe his school Quentin responded,

It’s a challenging demographic, very high free and reduced lunch population, Southeast County is one of the poorest counties in the nation, the students, it’s not that they can’t learn but they don’t put in as much effort as they should and it’s frustrating, but when they do, they do well. The teachers and the relationships are the best, and even though it’s a challenging school building relationships are good with students (Quentin, Interview, 4/11/11).

Quentin described the school as a challenging environment in which to teach, and he attributed the lack of motivation of his students to the low socio-economic status of the majority of students and families. Again it is apparent that participants describe the school and students in terms of

socioeconomic status. Quentin repeated that Southeast High School is a difficult place to teach and attributed that difficulty to poverty or the economically disadvantaged status of his students. He repeated the rhetoric of many in the district as well as the community.

Olive also commented on the socio-economic status of students and families when asked to describe her school. She pointed out that her school was a Title I school, meaning her school receives federal Title I funds under the Elementary and Secondary Education Act. Title I funds are distributed to schools in order to improve the academic achievement of students who come from low-income families. A formula is used to determine eligibility of schools for Title I funds. This formula is based upon the number of families with students attending the school who are currently below the federal poverty line. Schools qualify for Title I funds if fifteen percent or more of the school's population falls into the low socio-economic category based upon household income (U.S. Department of Education, 2011). At Southeast High School, the percentage of students meeting this criterion is approximately seventy eight percent. When asked to describe her school, Olive said, "Big, and very diverse and Title I school and I guess that's about it other than that it's a pretty normal school, other than being diverse and a Title I school" (Olive, Interview, 4/8/11). Based on Olive's answer to this question, her personal definition of "normal" (in terms of the makeup of a school) does not include a diverse student population or one which has a high rate of poverty. Olive is again, retelling the statistics of her school and her system, but she is indicating that something about Southeast High School is outside of her definition of "normal." She believes that "normal" schools are more homogenous and a lower percentage of economically disadvantaged students, and she believes that this makes her school different from the mainstream high schools in the area and state. Again, economically

disadvantaged (Title I), and a high percentage of minority students has become the way that teachers define their school.

Dolly, the participant who had the most years of experience and the most years at Southeast High School, indicated that issues related to students' low socio-economic status sometimes distracted them from school. When asked to describe her school Dolly answered,

Roughly 1600 students, we have a large African American population and a large population of white students and the rest would fall into Asian or Hispanic. I usually teach mainly college prep classes and class size varies from about 22 to 28 students, no larger than that. Our students come from lower socioeconomic backgrounds and usually have things outside of school that present challenges, so we have to be mindful of that, but overall they are really great kids (Dolly, Interview, 4/8/11).

Dolly, too, used the rhetoric of economically disadvantaged students and challenges. Those themes are common and recurring through all participants to the point where it has become the identity of the school. Daisy, a first year teacher, also described the students with words like "challenge" and described the behavioral issues she sees in her classroom as a way to describe her students in general.

It's a challenge. They [students] are challenging, and that is a positive. It causes me to reevaluate and concentrate on the things I know and don't know. They challenge me every day to make an impact. I don't say challenge in a negative way I say that in a positive way. I have to say this [lesson] may have worked last year one time in one class, but will it be useful for the dynamic and the students that I have now. They have caused me to be a really reflective practitioner. I also think they are pretty content with the

environment they are in, I feel like they feel safe where they are, they are content with the educational environment, but it's definitely a challenge (Daisy, Interview, 4/7/11).

Daisy described her students as challenging. Through my observations of her class I came to the conclusion that challenging (in one sense) for Daisy probably meant the relaxed attitude that students have as they enter the classroom. While none of Daisy's students were particularly disruptive to the point where they were breaking classroom or school rules, her students did not readily take their seats and prepare for the day's lesson. There was a significant amount of talking going on in the room. As best I could deduce every student in the room was talking to at least one other student at the beginning of the class period. It took Daisy multiple requests for the student's attention before the noise began to quiet. Daisy had to call a few students by name and address them directly to lower their voices and get ready to begin class. There were no observable negative reactions to Daisy's requests, but it appeared frustrating to Daisy that she had to request quiet and order multiple times from her class (Daisy, Field Notes, 5/13/11).

When asked to elaborate on what she meant by challenging, Daisy indicated that discipline contributed to her impression of Southeast High School being a challenging school.

Discipline. That and having students take responsibility for their own education. The biggest challenge I have faced is discipline. Coming from middle school, that is where we try to teach students to take responsibility for their education, and a lot of students here have not been taught to take ownership of their own learning and since they are already to high school and haven't learned that yet, I feel like they are handicapped in that way because we think they should be able to do that but they can't do that (Daisy, Interview, 4/7/11).

Daisy viewed taking responsibility for one's education as a skill high school student should possess but one she did not see existing in her students. Realizing that students did not take ownership of their learning frustrated Daisy and shaped her perception of the school as a challenging place to teach.

Each participant was asked to describe their school, and each participant did so by describing challenges in the classroom, socio-economic challenges for families, and overall disengagement with school. These descriptions are the same descriptions that are used widely throughout the school system to describe the student body and also the same descriptions of students and schools Southeast High School administrators used to qualify the implementation of single sex classes. Administrators based their decision on research that suggests that at-risk students may benefit from the single sex classroom environment by experiencing "school" in a less socially driven environment such that students may focus their attention and efforts on learning and engaging with teachers. With two neighboring school system experimenting with single sex classes, the administration at Southeast High School was influenced to implement single sex classes at Southeast High School. Using many of the same resources that neighboring school systems were citing, the administration examined the benefits of single sex education for middle and high school students as a means to reduce academic distractions and emphasize academic engagement. Both neighboring school systems to Southeast County that were interested in single sex education were similar to Southeast County in terms of student population demographics as well as community demographics.

Teachers are receiving the information that their students have hardships and challenges and that they are bringing those challenges into their classrooms. The teachers are listening to that message and have formed an idea of what Southeast High School is, based on those

descriptions and characteristics that they are given from their leaders, peers and community. Believing and repeating what the teachers hear is important when navigating teachers' perceptions of the single sex class implementation. These teachers have taken ownership of the "big idea" being spread around, and they are likely doing the same thing with the reasons, rationales and expectations of the single sex classes.

Participants' descriptions of their students.

Just as understanding the participants' perceptions about their school, and support systems (administrators and colleagues) was important, so was capturing how these teachers described their students. The next step in building a complete picture of the single sex class arrangement was to profile the teachers' descriptions of their students and the actions their students display in the classroom. Participants were asked to describe the students they see in their classes every day.

Daisy described her students as "laid back" about their education:

Most of my students have a laid back idea of education I would say most of them are not concerned about exceeding expectations most of them are just trying to reach the expectation and they don't want to take the next step to exceed expectations. There is a part where they don't like to be challenged; however as a teacher my expectation will not fall below a certain line and that frustrates them, they don't understand why I won't give a little on that. A lot of these students don't like to take notes, they have been told at some point that taking notes is not an important part of the learning. I gave them an open notebook test about a month ago and still about 30-40% of students failed. I tried to prove a point that I am giving you the bare minimum as it is and it should be important to you, so I have kind of tailored the way I do it differently to meet them half way, I give them

closed notes that they have to fill in and they have to fill in a lot of blanks, so at least they have to read it twice. It has yet to be determined if it's going to be a success, I haven't given the second assessment yet, but after that I should know if it's been effective. They also live study guides, and I am not a fan. I give them notes and even give out some test questions throughout the unit, so I tell them I feel that I am rewarding bad behavior, I give them notes and test questions and they still ask for study guides, and I don't like it. Our biggest struggle is just getting them to do what is necessary to be successful on the assessment (Daisy, Interview, 4/7/11)

I observed a class period with Daisy when she provided students with guided notes. Information was provided through presentation software, and students were provided with paper copies of fill-in-the blank notes. Although this particular day the students were not disruptive during Daisy's explanation of the notes, several students were observed with the heads down or not taking notes. Some students were attempting to hide their cell phones in their laps as they used them in class. Daisy did not address the disengaged behaviors during class (Daisy, Field Notes, 4/27/11).

Daisy's issues with students, which she previously described as challenges or challenging, stem from students' attitudes and actions with respect to their own education being different from what Daisy feels they should be. She described them as being content with getting by, not wanting to push themselves further than just enough to get by, and wanting more support from her than she feels is necessary or fair given that she has provided them [students] with the opportunity to learn the science material, thus she feels study guides are an additional resource they should not need. While her frustration was evident, she seemed willing to try different

strategies to scaffold the learning process for the students without getting into uncomfortable territory, such as giving students guided notes but not study guides before an assessment.

Quentin's description of his students focused on what his student know in terms of content. He said,

My students, a lot of them are below performance on the [state assessment], I don't know percentages but the ones that don't do as well in my class didn't do well on the [state assessment] and I check out their history and I don't think they aren't smart I think they don't put in the effort, they don't have the will to do so. It's a grade wide definitely and maybe even a school wide issue. It's hard for freshman anyway, lots of distractions are there. They see high school as a playground and they just want to play and mess around (Quentin, Interview, 4/11/11).

Observations made in Daisy's classroom mirror Quentin's classroom. Students were talkative and social as they entered the classroom and were reluctant to cease their conversations and begin with the activities and lessons of the classroom. Students were reluctant to take out paper and pencils in order to begin note taking and other activities for the day. Quentin had to ask multiple times, and like Daisy had to ask some specific students to comply with his requests (Quentin, Field Notes, 4/26/11).

Quentin and Daisy had similar descriptions of students; both described their students as capable but unwilling or unmotivated to achieve at their potential. These descriptions of their students are not only similar, but they echo the descriptions of the school system that were presented earlier.

Olive compared the students in her single sex class to those in her other classes as a way to describe her ninth grade students.

I guess they are all different, my all boys CP classes compared to my AP class, there is a world of difference, it's like they have had a totally different educational background. My CP class, an 8th to a 10th of them have failed before and most of them had at least gone to summer school so they had failed before. There is another I'd say 25% that still aren't into school but they care more about their grade. Most of them are not motivated by the material but they are motivated or by me, and it's good that I have a good relationship with them. They are easily offended, they are very sensitive boys, they do a lot of "gay chicken." I don't know if anyone has told you about that but they see how touchy they can get with each other before they offend someone or make someone feel uncomfortable. So they are very touchy and sensitive but easy to talk to and if you tell them to do something they won't do it but if you ask them to do something they will. They are loud, they tend to be loud. They do well with group work and they do really well with hands on activities but with lectures you have to keep them down to like 7 minutes at a time or they will freak out. My advanced kids are totally different. They feel a little isolated at Southeast High School because not much attention is given to them at the school (Olive, Interview, 4/27/11).

Olive went on to describe a weakness of her students in terms of discipline and their ability to conform to the discipline and behavioral expectations of school.

Discipline, the kids need a lot of structure so it's difficult in that a lot of them were never really taught how to behave and they are already adults, they live on their own and having someone tell them what to do is out of their element and a lot of teachers are from different socioeconomic and racial backgrounds cause some conflicts since they are very different (Olive, Interview, 4/27/11).

Several noteworthy points come out of this exchange with Olive. She broadly spoke about the students in her CP classes (the ninth grade students) as being unmotivated, which coincides with what Quentin and Daisy described, and the overarching descriptions of the schools and students. Olive laughed as she described her freshman male students as being sensitive or touchy emotionally, and she did not seem to be bothered by the “game” she described as “gay chicken.” Olive appeared to either believe that none of her students are homosexual or that it is a rite of passage or macho display of manhood to allow another male to invade your personal space to the point where the offended must express to the offender that the proximity is too close. If this situation were occurring between a male and female student, Olive might have a different perception of what the interaction meant, as opposed to passing it off as a silly game that students play.

C.J. Pascoe discusses a similar phenomenon occurring in American high schools with her book titled *Dude, You're a Fag*. Pascoe (2007) investigated how boys assert their hierarchy by consistently and compulsively asserting their heterosexuality through actions that show their aggression and dominance over other males who may be viewed as weaker, noncompetitive etc. It is the purpose of the aggressor to locate or find the weaker male in the group and push the stereotype of “gay” or “fag” on that particular person, drawing any negative attention away from themselves and through their lens asserting their masculinity and dominance. I find similarities between the occurrences of gay chicken that Olive discusses, and the findings in C.J. Pascoe’s study. I have to wonder if the addition of all male classes exacerbated these conditions. Pascoe also points out that per her findings, males can be “fags” and not necessarily be homosexual. These males may be physically weaker than the aggressor, more expressive or warm tendencies

or unable to dominate females. I did not directly observe the occurrence of “gay chicken” as describe by Olive, but she insists that it happens quite often and throughout the school.

Olive also raised two important points not mentioned by all participants. One is that many students at Southeast High School do not have adult roles at home and outside of the school day due to parents/family/caregivers working or away from the home. This is an extension of the working class families that inhabit Southeast County and a function of the low socioeconomic status of the majority of families in the area. Although all participants alluded to or spoke generally about how poverty affects their students or that their students have facets of their home lives that interfere with their school lives, Olive described the role that she believes the students to play at home versus the role the student is expected to play at school as a source of tension or misalignment causing difficulty for the student to conform with school expectations.

Olive also indicated that she believed that the socioeconomic and racial backgrounds of many teachers are different from that of students, and she cited that mismatch as a source of tension between teachers and students. When probed about why this might cause friction, she was not willing to discuss any deeper perceptions that she had but instead would only say that she believes that the differences in background can be difficult because “teachers don’t know where students are coming from and they don’t know what’s going on at home all the time and when its different than what they are used to it just make it hard sometimes.” Olive may have been reluctant to dig deeper into the topic of teachers and students differing culturally and socio-economically because she was not comfortable discussing the subject. I believe Olive was reluctant to discuss further because she was simply repeating the system “talk” that she has heard

numerous times in the past. She was passing on what she has been told, and heard, as a way to make meaning and frame her students, her school, and their situations.

Janet described students as having deficits. She described them as not being ready for her class, needing a better content foundation in order to be successful and also having a deficit of attention and affection outside of school. Janet believed that she has students in a college preparatory level that have the capability to be in an advanced class or who need to be academically more challenged than they are.

I have majority African American students, more Hispanic students this semester. It's a mixture of high achieving kids who should probably be in advanced class mixed with our 12 special ed kids, so it's difficult to get to all the kids and meet all of their needs because they are all at different places. Some of my kids, their background knowledge is so low that they just struggle and they aren't ready for my class. I see kids that want to be loved, they struggle at home, they get to school and they are hungry or they just need a hug and they want that attention every day (Janet, Interview, 4/30/11).

Janet's descriptions of her class's demographics were representative of what I observed in her classroom during my first visit. It was not observable during classroom interactions if students, and which students, may have been academically struggling (Janet, Field Notes, 3/28/11).

Janet provided descriptions that are consistent with those provided by her colleagues as well as the overarching description of the system. All participants have been told that the students in Southeast County are economically struggling, and because they are economically struggling they are also disengaged with education, have distractions and hardships at home, and will present challenges in the classroom. These teachers believe what they are hearing. They believe that because their students are economically disadvantaged that they will struggle in their classes

and come through the door with a host of distractions and issues that manifest outside of the classroom. Not only do they believe it, but they repeat it when asked to describe their students. Descriptions of students are not vastly different than the descriptions of the school.

Quentin highlighted the same idea when discussing challenges that his students face, or challenges that he faces as the instructor in his classroom. Quentin pointed out that his students are generally unmotivated and come from a high poverty background with little parental support. He reiterated that this was not an occurrence only in his classroom, but something that he believes to be widespread throughout the entire school.

The lack of motivation is the biggest [issue]. You can tell if the student has a good home life or not. One of my students has 6 or 7 brothers and sisters and he always looks tired and it's probably because he is taking care of them at night, so that makes sense. It's hard to get parents to come to conferences, they don't buy into it. Work could be an issue but there are a lot of time slots and we work around that, I think it's just that parents don't value education like they should and it's a challenge to get the impoverished community to buy in. It's not just my classes; it's like that throughout the whole school (Quentin, Interview, 4/11/11)

This evidence goes to further support the notion that these teachers are subscribing to a self-fulfilling prophecy with respect to their students. Evidence suggests that teachers are not only displaying these patterns with respect to how they perceive their school and students, but also related to how they perceive the events in their single sex classes. The notion of the teachers in this study accepting and acting on a self-fulfilling prophecy is a unifying theme that ties together the influences as well as the perceptions of the teachers in this study.

Student Actions and Teacher Beliefs about Single Sex Classes

Rist (2000) points out that studies have shown that there is a correlation between social class of students and their academic achievement or success. He argues that it is important to investigate how the school assists in reinforcing the stereotypes of society and thus eliciting specific behaviors and levels of achievement from the students. In Rist's study, he focuses on "the relation of the teacher's expectations of potential academic performance to the social status of the student" (Rist, 2000, p 267). He examines expectations of teachers that are based upon "subjectively interpreted attributes and characteristics" of the students. I propose that the same framework can be applied when examining teachers' perceptions of gender when asked to discuss the events and actions taking place in the single sex classroom.

Rist argues that schools can and do reinforce the social stereotypes of poor children by expecting less from them in terms of academic achievement compared to other students. The ideas about poor children and their preparation for success in class as well as their capabilities come from stereotypes and messages that individuals encounter in society. I argue that this framework applies when analyzing responses from teachers from Southeast High School with respect to gender. Trends in teachers' responses indicate that teachers rely on stereotypes of gender to interpret the actions in their classroom. Furthermore, the analysis reveals that teachers' expectations of actions displayed in their classrooms as well as instructional needs may stem from social stereotypes of gender. Similar to Rist's argument that social stereotypes about poverty influence teachers' perceptions of student achievement, I argue that teachers' stereotypes of gender and what it means to be a girl and or be a boy colors their perceptions of the interactions and needs in their single sex classes.

Emergence of accepted gender stereotypes by teachers.

During the course of the interviews, several participants relied on gender stereotypes as a way to describe what they observed in their classrooms. This is important to recognize because it is yet another instance of teachers displaying their acceptance of a self-fulfilling prophecy. Just as the teachers were heavily influenced by the widely accepted descriptions of the student population at Southeast High School, the same teachers were also influenced by their own personal experiences with gender. Each held his/her own conceptions of gender stereotypes prior to the experience with single sex classes, and relied on those experiences when making sense of the events in their class, and for forming descriptions of what was happening. When asked to describe their single sex classes, Olive and Dolly both used the same phrase when describing girls in their classes. Olive used the term “hen mother” to describe one of her AP students. This student was in Olive’s co-educational AP class, not her single sex class. This comment, however, indicates Olive’s recognition of roles students assumed in her classes.

I thought it was great and it’s been fine but it’s been difficult because I have never had single sex classes at this school, so it’s hard to compare, the CP classes are tough and they would be tough with girls, these are just the kids that struggle with education. I think it’s a great idea, even with my AP kids if there is ever a disruption it’s something between a girl and a boy. My learning style is good for teaching boys. [What is that?] Outdoor labs and you know it’s statistically proven to be effective and so that’s good. I’d like to be able to see how girls can do in a science class without the boys. The one girl I have in AP class has become like the hen mother and she tells people when they are doing something wrong or she fixes things or takes care of things or people. She’s not

looked at as the top kid in the class but in fact she scores just as well on tests as the boys (Olive, Interview, 4/27/11).

Olive viewed the role of the single female student in her AP course as a “hen mother.” According to Olive, this term describes a female caregiver who provides directions, instructions, and overall guidance for situations. She also indicated that because of this role that the student plays, she is not thought of by her peers as an academic leader in the class. Olive described a typical gender stereotype that is playing out in her AP class. The female student is viewed as the caretaker and compared to the males in the class, she accepts this role and extends the care-taking to others and in turn is not viewed as academically high achieving as the other peers. The interesting piece is not only that Olive recognized this stereotype playing out before her eyes in class, but that she chose gendered language and references when she attempted to explain the situation and relationship she observed. She chose to describe this student as the “hen mother” which has imagery and implications associated with it. Risman (1998) discusses the long held ideas in society regarding females and their disposition toward nurturing and mothering behaviors.

Reinforcement theory suggests, for example, that girls develop nurturing personalities because they are given praise and attention for their interests in dolls and babies, and that boys develop competitive selves because they are positively reinforced for winning, whether at checkers or football. (p. 15)

Risman goes on to discuss the various ways that contribute to the perpetuation of the idea in society that women and girls are predisposed or taught that it is socially appropriate to act in such a way that displays nurturing or mothering.

Dolly used an almost identical phrase when discussing her students. Dolly was using the phrase to describe her observations of the sense of community that had formed in her all female science class when asked how the course was progressing, and to describe any benefits that she might have observed.

A bonus has been building relationships, they are a tight knit group and if someone is absent they are like where is she and is she okay and they want to get their work together for her when she comes back, and there is a sense of community, they are like little mother hens. They take care of each other. They encourage each other and they have created a really safe environment for each other (Dolly, Interview, x/x/11).

Dolly believed that the single sex classroom environment has been positive for building relationships. She reported that she has observed a strong sense of community among the girls in her physical science class and that the classroom environment is a safe place to learn. Like Olive, Dolly used the reference of a mother hen to describe the girls in her class. She equated the care she observes her student demonstrate for one another to be a typical female care-giver behavior. She described her community of students in terms of a gender stereotype.

Other teachers reported more general stereotypes about gender and their students. Some teachers accepted the idea that boys are rowdy and wildly behaved students. Boys tend to unfairly get that reputation in school, when in fact it is likely for any student (male or female) to misbehave or get out of hand at times. These teachers made statements that indicated to me that they expect boys to be wild and rowdy, and when they observed those behaviors, they are anticipated and almost expected as part of being a boy. Alongside the notion of boys being “wild” with respect to their outward actions, many of these teachers believed that competition is innately a male characteristic and should be expected in a class of all-males. None of the teachers

mentioned sensing or observing competition among female students. Janet taught both male and female classes. In describing her single sex classes and what they are accomplishing, she described how her male students get very excited and have a tendency to misbehave and get “wild” when they are around girls.

I feel like its building self-esteem and confidence. Usually the guys would act out or storm out of the room or be the class clown and now they are like “I’m sorry” if they do wrong. Guys like to sometimes show off, and when they are exposed to the women at lunch they are off the chain. I wish they weren’t exposed to the women at all, I wish they didn’t see them at lunch because they are so good before that and once they see the women it takes forever to calm them back down (Janet, Interview, 4/30/11).

During one observation in Janet’s classroom a female student entered the classroom during the course of the lesson to deliver a piece of paper to Janet. Some of the male students in Janet’s class called out to her and tried to talk to her while she was in the room. Janet quickly corrected their behavior and asked them to be quiet. While no one else spoke to the female student in the room, the interaction did ignite small quieter conversation that Janet had to address before she could proceed with her lesson (Janet, Field Notes, 5/10/11).

Janet also brought up another stereotype about males constantly desiring to “show off” or impress females. She mentioned it again in another section of the interview with respect to males needing to be and appear dominant in a mixed sex group.

I have enjoyed it because more personalities show with the single sex classes. I think I can incorporate more movement into my classes, more friendly competition, because sometimes with co-ed sometimes the girls may outshine the guys but it hurts more for a little boy to lose to a girl as opposed to another guy so they are willing to participate. The

girls like me to do more verbal communication and the guys like it when I write things down instead of just verbal (Janet, Interview, 4/30/11).

Janet incorporated competition into her lessons and referenced her reward system in the class often to motivate students to perform well with their behavior as well as academics. I observed Janet implementing competition-like strategies in her instruction in the form of question and answer systems that placed students into teams with a point system. The winning team received reward points that contribute to the reward system she has established (Janet, Field Notes, 5/10/11).

Daisy also made observations about the “wild” behavior that she believes defines the typical actions of boys. She described them as being difficult to discipline as well as having a desire to display their superiority, which she explicitly attributed to being “male.”

It becomes an issue of having to prove themselves to each other, they say well you aren't going to let him talk to you like that are you and stuff like that, they boost each other up and they feel like they have something to prove as a male in the classroom. I think that the boys do better with men, just from what I have observed this semester outside of my own classroom the boys do better with a lot of structure and if you can't provide that rigid structure every day it's almost like a fail they have got to have that and if you can't do that then you are going to lose them. I feel like the men provide more structure that they need as young students and boys. I think the boys tend to make their own way if you are not giving them a way. They do whatever they want to do and whatever they think of, if you give them 5 minutes of time that they can think about for what they might want to do and they do it, if you give them time to think they will do whatever they want. Every

minute has to be filled and they have to be challenged. You will lose control very quickly (Daisy, Interview, 5/2/11).

Based on classroom observations of Daisy, she provided an adequate level of structure in her classroom. While the boys in her class did not always respond with appropriate behavior the first time she asks, such as quieting down at the beginning of class, I did not observe any practices that Daisy exhibited that would lead me to the conclusion that she lacked structure in the classroom (Daisy, Field Notes, 3/28/11).

Daisy believed that when all together, boys have “something to prove” to one another, which in this case refers to establishing one’s place in the hierarchy of the social group that makes up the class. She also indicated that boys can and do get “out of control” easily. This also supports the idea that Daisy believes boys are inherently “wild” and more unpredictable with their actions, as well as less likely to respond to instructions or re-direction in the classroom. Daisy shared that she felt a male teacher would be better suited to teach her male students. She conveyed that she felt very different and potentially disconnected from understanding “boys” and assumed that a male teacher would better connect with and understands those “tendencies” of being a boy and, thus, be a more appropriate instructor.

Quentin, like Daisy, accepted the stereotype that female students are not as inclined to enjoy and or understand sports like male students. This came up when describing the daily happenings of his single sex male classroom. Like Daisy, Quentin also insisted that he would be better suited to stay teaching male students and he does not believe that he would enjoy or be successful at teaching a classroom full of girls.

Boys kind of feed off each other and they keep it going and you have to round them up and keep it going. I would much rather have all boys, I don’t think I could handle all

girls. Initially during the first semester in the fall students were kind of confused as to why there were no girls in their classrooms and so they were upset about having no girls and I think what is kind of bad is they have all their core classes together so they are together all day so if they can mix up those groups it would be better, sometimes they feed off each other all day. The jaw with each other, you know with the NBA playoffs and the draft, that's all they want to talk about. [Do you think that would be different if there were girls in the class?] Definitely, they would have no idea. [Would they still talk about it with girls there?] Yes they would but not nearly as much and I don't see the girls talking about that. I handle the boys better, another colleague seems to like the girls better, but he and I are really different and that's what he is better at and I know I'm better suited to boys. [Why] I just think I am better suited to boys I just don't think I could handle the girls, I just, I don't know but I feel like I would be better with boys rather than girls. I think boys would benefit more, having a bunch of girls in a small area just doesn't seem right. It just seems like it would be bad. I have heard from other teachers that girls who are together all day, some of the jawing just carries over all day and it just gets worse. All females in the same area for an extended time just can't be good (Quentin, Interview, 5/5/11).

Based on field observations in Quentin's classroom, there were no observed conversations between boys that would be excluded from a girl's conversation. While the occasional conversation between male students was centered on sports, most of the conversations that were observed were about the class, assignments, grades, and social situations between other students not in that particular class. I did not observe any interactions or conversations that I would deem explicitly male (Quentin, Field Notes, 5/11/11).

It is apparent from Quentin's emphatic insistence that he did not wish to be the instructor of an all-female class. Field notes from casual conversation with Quentin revealed details that support the reasons for his feeling about teaching an all-girl class. It is evident through the interviews that Quentin has gendered perceptions about males and females; this is reiterated in the field notes. Part of Quentin's gendered perception is that females are very social compared to males and those social tendencies lead to added drama when a group of females are together. Quentin's perception of how single sex classes of girls would be was the reason he was not interested in teaching an all-girls class. He expected the all-girls classes to be dramatic and wrought with social disagreements, which is something that he did not believe would happen in an all-male class. He provided more evidence that he in fact subscribes to societal stereotypes of gender by pointing out that he believes conversations about sports would not occur in the same way in an all-girl or mixed sec classroom. Quentin believed that males are more interested and knowledgeable about sports competitions than females.

Daisy shared a unique experience from her single sex all-male physical science class. She was describing positive and negative perceptions that she had about the implementation of single sex classes and she chose to share a story about an interaction between herself and a student in the class. Through this story, another stereotype emerged that Daisy was actively drawing on to frame the interactions between her and the students as well as frame her reflection for the purpose of the interview.

I had a student that wanted to argue with me about speed and acceleration, he thought they were the same, and he argued with me and this happened two months ago and the kids will not let him forget it. The boys are protective of me and it's nice, I like it. But they didn't like the way he was talking to me and the rest of the boys didn't like it and

they have decided already how the rest of his time is going to go. That can be damaging to that individual student because they will not let him forget. They have kind of put him in his own corner. I don't think that would have happened in a mixed gender class. In some of my other classes something like that or similar to that has happened and they don't even notice, and usually the girls speak up and say shut up and we just move on and there are not girls in there to say just stop and let's move on we don't have time for this and you know girls will be the first to say that we don't have time for this but the boys will not let him forget and they just brought it up last week and it's been two months since it happened. Guys stick with it, they do and girls don't do that but guys do and it changes the dynamic of the class. The older kids let it roll off a lot better, a lot quicker (Daisy, Interview, 4/21/11).

Daisy provided an interesting picture of the interactions that happened in her classroom. This information is also very revealing about how she views gender, interactions, and the preconceived notions that she possesses. Risman (1998) describes societal stereotypes of gender, and provides an example of a small woman appearing helpless next to a large heavy object, or seemingly stranded with a flat tire on her car waiting for a man to come to her aid. The imagery that Risman discusses runs through our gendered society, and Daisy is an example of someone who may hold to these ideas, or who has bought into some of the gender stereotypes that society has impressed upon her. After sharing her interaction with the student in her class, it appears that Daisy described herself as the "damsel in distress."

Through her story telling of this event, she described herself as the victim and the student who challenged her knowledge and authority in the classroom as the assailant. That part of the descriptions was not as telling as the later pieces where she described the male students in her

class as taking care of her, or coming to her rescue to defend her against the students who was challenging her in class. She spoke with appreciation and relief that her male students played this role in that situation, which revealed that Daisy in fact does hold gendered perceptions of males and females. She used those gendered perceptions, and revealed them, as she described interactions between herself and her students in the single sex classroom.

Teachers' gendered perceptions emerged in various areas of interviews throughout the study. They emerged when discussing the students in their classes as well as when the teachers described relationships between themselves and the students as well as between student groups. An important area of gendered ideas and language that appeared via interviews was when teachers discussed their instructional approaches. The teachers' perceptions considered together help to create the picture of the gendered environment that teachers are creating in their single sex science classrooms.

Teachers' perceptions of need for sex differentiated instruction.

Some researchers working in the area of single sex education believe that boys and girls inherently learn differently. For example, Leonard Sax (2005), founder of the National Association for Single Sex Public Education, provides professional development for public schools that wish to implement single sex classes. His approach is based on the premise that boys and girls are "hard-wired" differently. Sax posits that boys' brains and girls' brains develop differently and thus they require different instructional strategies in the classroom to maximize academic achievement and engagement during instructional time. The majority of Sax's work does not take into account the social factors at work that contribute to how boys and girls interact in the social context of the classroom, or how those social interactions may shape the actions of students in the classroom.

The notion that boys and girls simply “learn” differently was the foundation for the administration’s approach to framing how teaching should occur in single sex classes. This is evident from the requests for information as well as the requested structure of professional learning sessions for Southeast High School teachers. Administrators requested that all ninth grade Southeast High School teachers participate in professional development about single sex classes that specifically addressed classroom and teaching strategies (i.e., methods for delivery of instruction) to male students and female students. Administrators wanted their teachers to know what to do with boys in the classroom and what to do with girls in the classroom, and they assumed that these tactics would be different based upon the sex of the students. Information was presented based on the work of Sax and other researchers in the area of single sex education whose work may be linked to biological essentialism. As one of the few individuals in the area with knowledge of single sex education, the Southeast High School administration asked me to administer their professional learning. They specifically requested that I present instructional strategies tailored to male and female students. An example of the information that was shared with teachers of Southeast High School is included in Table 4.

Table 4

Sample of Instructional Strategies Presented at Professional Learning Session

Student Group	Instructional Strategies
Male Students	<ul style="list-style-type: none">• Active movement in the room• Tactile activities including hands on manipulative materials• Activities centered around healthy competition• Specific time limits set for all activities
Female Students	<ul style="list-style-type: none">• Small group work• Classroom discussions• Activities and instruction that makes connections to students lived experiences• No specific time limits on activities required• Language based activities (writing, sharing, discussions)

When I asked teachers about their instruction in their single sex classrooms, I inquired about whether they had altered their instructional strategies based upon their student audiences and if so, how they altered their instruction. I also asked them to describe any specific strategies that they felt had been successful with a particular sex and to provide evidence to substantiate their perceptions. I found that many of the teachers provided information that was in line with the ideas presented to them in the professional development session. Also, several teachers provided information that related to widely known gender stereotypes related to perceived strengths, weaknesses or preferences of a particular sex. Again, the influence that the administration had on teachers' perceptions as well as these teachers falling into the self-fulfilling prophecy was evident. The teachers were told that boys and girls learn differently, and were provided with overarching general strategies for instruction. The teachers accepted these ideas and along with the individual teacher's conception(s) of gender, were the primary

influences on what the teachers implemented in their classrooms, as well as what they reported as their perceptions.

When Janet was asked to describe what she had observed in her single sex classes she mentioned that the boys were curious at first about the lack of girls in the classroom and that girls tended to respond well to group work.

The thing I noticed is at first you get more complaints from the guys, why are girls not here, but after a week you are able to get every guy to participate, they aren't sleeping or cursing at a teacher to impress a girl, there isn't that back and forth. I have noticed with the girls, more groups work better. They seem to be willing to get into pairs or groups and get some good work done. If I have guys classes again I will do even more hands on activities, and things can get out of hand if you don't set time limits and keep things moving. I think I would try to have more handouts either worksheets or fill in the blank.

The guys write so much slower than the girls, it takes so long for them to write before they try problems, so I think I would create more handouts (Janet, Interview, 5/10/11).

During classroom observations it was not noticeable that boys and girls classes worked at different rates, or that the male students were slower at writing than the female students. This may not be something that can be observed in three classroom observations, but rather something that a teacher in the classroom would notice over time and through interactions with students (Janet, Field Notes, 5/10/11).

Janet pointed out that hands-on-activities are something that she felt worked well with her male students. She also observed that her male students were slower at writing activities compared to her female students. This prompted Janet to explain that she would provide more guided notes in the future to her male classes so the progress of the class would not be slowed.

Janet's perceptions of her male students' writing abilities follow a well-known stereotype that males lag behind females in terms of reading and writing. Field notes from Janet's male and female classes did not support a noticeable difference in the writing speeds or strengths between male and female students that was observable by the researcher.

Janet went on to describe other tactics that she used with her students as well as explain why she felt the instructional strategies that she had chosen were best suited to each specific group of students. Janet reiterated that she could not teach the same lesson and use the same strategies with her male and female classes.

You can't teach the same exact lesson plans. Guys like more hands on activities, and females like more creative or worksheets or working individually or with a partner, so I had experience last summer at summer school. The thing I enjoy the most are my guys, a lot of people don't really like the guys but if you motivate them they will not sleep, I did this new award winning student wall and so the guys love the competition, hands on activities and working with things and they like the quick pace, now they write a little slower so sometimes we need to slow it down, and I have noticed they really like to get attention, so the award winning student program has been great for the to be recognized. And my girls like the structure. They like the learning focused model and the think-pair-share and making presentations and they like that (Janet, Interview, 4/30/11).

It was observed that Janet did not teach the same lessons to the all-male and all-female classes. While the content addressed was the same, she had student engage in different activities. One particular observation was split between Janet's all female class and her all male class. She had female students engage in collaborative group work to answer content related questions. She

presented the same content to the all-male class but asked that the all-male class complete the questions individually at their desks (Janet, Field Notes, 5/10/11).

Janet shared that her male students fared better with hands on activities and they liked competition, the same strategies that were shared at her professional learning session. She also echoed that her female students perform well with small group work activities. No observations were made with classes of all-male students being asked to do small group activities that mirrored the activities the female students were doing. Janet went on to make more observations about teaching strategies with her students. She provided more examples of male students reacting positively to active learning activities where they are up and out of their seats. She also made reference to girls enjoying activities that are centered on art projects and male students reacting positively to sports related activities, two additional examples of gender stereotyped tendencies for male and female students. There was no evidence that any of the chosen activities were more or less academically rigorous than others.

If you have the same lesson and I have told other teachers about this, but if you have the same lesson, you can't use the same lesson with the guys and the girls. The guys do better with building things and holding things in their hands, but the girls do better drawing it or putting it on a poster, and the guys really love doing white board activities and coming up in front of the class and the girls are more comfortable calling out the answers and discussing in class. Just all this little stuff that I am noticing that lets me know that I can't have the same lesson, I'm still learning but I do know that I just can't have the same lesson for the boys and the girls. There are things that I do, I make my guys color still, but you aren't going to get the colors and the glitter, you are going to get the one color

with guys or the sports but you aren't going to get the same as you do with the girls
(Janet, Interview, 4/30/11).

Janet's perceptions of female students putting in additional effort compared to male students with respect to art projects and emphasizing the interested in sports from male students reinforces stereotypical gender perceptions and preferences.

Daisy, being a first year high school teacher, did not have prior teaching experience to use in comparison to this experience at Southeast High School. Daisy assumed that some experiences in her one other year of experience in middle school were transferrable, but acknowledged that teaching at the high school level is an entirely new experience. Her only comment on her all-male classes with respect to instruction is centered on her boys' abilities in physical science. Daisy's perception of her all-male class was that they globally understand and comprehend abstract ideas quickly. This is a perception, not a comparison to an all-girl class or a comparison to her one year of co-ed middle school experience.

They [boys] tend to get the abstract ideas a little easier, they tend to visualize things better so when it comes to machines and electricity and current they flew right through that and it didn't take much of my help to get through that. If one of the boys get it they are really good about all getting it (Daisy, Interview, 4/21/11).

Although this excerpt does not speak to instructional strategies that Daisy utilized in class, it does speak to her perception of male students and their abilities and learning styles. She believed that the boys she taught that semester were competent in learning abstract concepts. When she says "they get the abstract ideas a little easier" she was referring to boys, indicating that boys comprehend abstract ideas easier than girls. This is a belief Daisy has that she perceives is substantiated by her observations at Southeast High School, although, she has no all-female class

with which to make a comparison. This speaks to Daisy's perceptions about gender and learning. She perceives that boys are more adept at understanding abstract ideas in the science classroom compared to female students.

Similar to Daisy, Quentin was unable to articulate any specific instructional strategies in conversation, but commented on his perceptions generally of boys' actions in his classroom and strategies that were not directly related to instruction that he used to increase the boys engagement and involvement with class.

Boys think that they are smarter than they really are, so I post my grades weekly to show them, not to bring them down, but to let them know where they are so that it will motivate them to do better. Boys need timers on their work, I use them every day (Quentin, Interview, 4/30/11).

Quentin displayed grades on a bulletin board in his classroom. During each observation Quentin used an electronic timer on his interactive white board. Each segment of his daily lessons were timed and Quentin stuck to the allotted time limit stated at the beginning of class (Quentin, Field Notes, 5/11/11). Quentin also mentioned timers for work, something that Janet also mentioned and a tactic that was presented to teachers during their initial professional development. When asked why Quentin thought that the use of timers was important or necessary in class he explained that students would "get off task" or begin to engage in activities that were "off topic" if the timers were not in place. Field notes corroborate Quentin's claim that he used timers each day in his class. Each observation in Quentin's class involved activities that were assigned a finite amount of time, followed by a timer posted in class to complete the task. Even though the timer was implemented, off task actions still occasionally occurred during class that took the

attention away from instruction and caused Quentin to stop instruction and redirect actions during class.

Dolly was able to describe instructional strategies that she perceived to be positive in her classroom. When asked if she differentiated instruction to the single sex classes compared to her co-ed classes she expressed that she did apply some differentiation but she felt that more was needed.

I did but not enough. I would have liked to investigate that more. My boy group, we were able to break the groups up and the boys seemed to be better on task in smaller groups but working in groups was better with girls and sometimes they would do better than if we had asked them not to work together. The males, they like to be up, and the girls do too some, but it was more hurried and sit down and the boys liked to be up more (Dolly, Interview, 5/10/11).

Dolly was observed using multiple strategies with both male and female classes. She was not observed differentiating instructional strategies based on sex of the class (Daisy, Field Notes, 5/13/11). Dolly explains that she attempted group with both classes (male and female) and she perceived the strategy to work better with her all girl class. She also observed that the all-boys classes like to be up out of their seats and engaged in active learning. She alluded to girls participating in activities that required them to be out of their seat but hurried the process so they could sit back down, which Dolly perceived to mean that the girls did not enjoy the activity as much as the boys.

In summary, participants were asked to describe how they perceived their own instructional strategies with single sex classes. Specifically they were probed on whether or not they differentiated strategies between girls' and boys' classes, and whether or not they

approached the teaching of single sex classes differently than co-ed classes. Teachers reported that they did indeed alter their instructional strategies to fit their perceived needs of boys and girls classes. I argue that their alterations of instruction were based on pre-existing expectations of boys and girls having inherently different learning needs, reinforced by the ideas presented in professional learning. Teachers were told by administrators that single sex classes would be implemented to meet the academic needs of the school population. That was followed with professional learning emphasizing strategies for teaching sexes, not students, implying that girls and boys needed different teaching models to maximize effectiveness in the classroom.

It is evident that strategies for engaging male and female students that were presented to the teachers were repeated in the teachers' narratives about what they implemented and what they perceived to be working in their classes. Teachers have been primed to expect differences in the classroom in terms of instructional needs of boys and girls, and teachers took ownership of that information and used it as a basis for expectation of what is best for the boys and girls that they teach. The issue of sound instructional strategies in general was not addressed by administrators or teachers, rather assumptions of best practices based on the stereotypes or assumed preferences of boys and girls drove the choices made by teachers.

Overview of participants and their experiences

To summarize the scope of the findings I have presented, there are five participants that agreed to speak to me about their experienced teaching single sex physical science classes in an urban public high school setting. There are more than five science teachers who teach single sex classes but not all wished to participate in this study. Of the five participants, three are new to the profession of teaching and therefore new to Southeast High School and to the notion of single sex classes. All three have had experience in a college setting of student teaching or practicum

teaching, but this school year was their first experience being in charge of their own classroom. These participants are Olive, Daisy and Quentin. Olive, Daisy and Quentin all teach all-boy classes. None of these teachers teach an all-girl class and Daisy and Olive teach other courses besides physical science which means they have co-educational classes as well. These co-educational classes are either honors or advanced level courses and are not a good comparison to the single sex classes, which are basic college preparatory level courses.

The other two participants are Janet and Dolly. Dolly has been teaching a total of six year with the last four years being at the research site. Janet has been teaching for two years and both of those years have been spent at the research site. Janet has both all-boy and all-girl classes. Dolly has only all-girl classes as well as a coeducational advanced science class. It is important to point out that three of the five participants in this study do not have experience at the research site or a legitimate experience in a classroom as a teacher of record until this year of teaching. These teachers did not have prior experiences to compare or use to help make sense of experiences in their single sex classes, therefore I expected that these participants relied on preconceived notions of teaching, students, instructional strategies and gender that they brought with them to the context of the classroom in order to construct meaning of their interactions and observations with students in the single sex environment.

Science Instruction in Single Sex Classrooms

This section will present findings that demonstrate the potential impact of single sex classes on science instruction. Evidence from interviews and field notes indicate emergent themes related to science instruction. The presentation of preconceived gender stereotypes related to instructional strategies along with the influence of instructional expectations related to single sex teaching will be discussed in this section.

Among participants in this study, two teachers indicated through interview data that they held gender stereotypes related to their boys and girls classes that directly impacted their science instruction. First, Olive shared that she felt her personal teaching style was well suited to an all-male class. When probed as to what that style consisted of, she responded that she preferred to conduct outdoor labs and she felt that particular approach was best suited to boys. “My learning style is good for teaching boys. [What is that?] Outdoor labs and you know it’s statistically proven to be effective and so that’s good” (Olive, Interview, 4/27/11). Olive believes that outdoor labs are best suited to boys. Conducting labs for students outside of the regular classroom setting could be a meaningful learning experience for any student, not just boys. Olive believes that taking science teaching and learning outside of the classroom environment aligns with what she believes to be the learning preference for boys. This indicates Olive’s gendered concepts of learning styles of male and female students, and how her preconceived notions emerge and impact the science classroom. Although Olive claims to prefer outdoor labs as a method of science instruction, she was not observed engaging in any outdoor labs during observations of her class.

Olive was not the only participant who revealed gendered concepts of male and female students related to learning style. Quentin also revealed that his concept of the all-boy classroom impacts how he chooses instructional strategies for his all-male classes. Quentin disclosed that he had been told by other teachers as well as remembered from professional learning that an instructional suggested for engaging boys in the classroom was to incorporate hands on activities and movement in the classroom. Quentin shared at the conclusion of an observational session that even though he understood those suggestions, he chose not to use them in his classroom. He explained that he thought his all-male classes were a threat to get out of control and off task, so

he makes a conscious effort to limit the hands on activities and movement in his classroom in order to keep classroom management issues to a minimum (Quentin, Field Notes, 3/30/11). Quentin went on to share an example that another teacher shared with a group of colleagues. The activity being shared involved bringing in items for the students to hold in their hands to observe and create connections with the topic being taught. Quentin shared that he would not consider using that particular activity because he feared that his students would begin to throw the objects around the room instead of focusing on the purpose and instructions related to the activity (Quentin, Field Notes, 3/30/11). Quentin was observed using primarily lecture and discourse in his classroom. He was observed using paper and pencil tasks for reinforcement or assessment of concepts learned, but use of manipulative were not observed during visits to Quentin's classroom (Quentin, Field Notes, 4/26/11).

Both Olive and Quentin appear to have preconceived notions of what their all-male classes prefer and need in terms of science instruction. Since Olive and Quentin do not teach all-female classes, it is unclear whether or not they would have displayed different instructional approaches to different single sex physical science classes. According to their own responses and field notes collected, they appear to have strong beliefs about what is best for their all-male classes. This is an important consideration when looking at the field of science education. It is important to inquire as to whether Olive would engage an all-female physical science class in outdoor labs. Likewise, it is important to inquire as to whether or not Quentin would implement hands-on activities with an all-female class. The issue of higher importance seems to be the potential impact that these teachers' gendered notions and choices may have on the educational experience of their students. Examining the experience of students was not a part of this study.

As a point for further exploration, it should be considered that a lack of outdoor labs or a lack of hands-on activities is a potential issue that reached beyond gender. In science education, and teaching in general, there are standard best practices of teaching that can apply across disciplines. Engaging students in hands-on or inquiry based activities as well as creating authentic experiences outside of the classroom can be beneficial for all students learning. Omitting one or both of these opportunities for students in the classroom may affect the acquisition of knowledge for the student or diminish the experience students have in the classroom. If teachers' preconceived ideas of gender are manifesting themselves as a filter for good instructional strategies in science, then single sex classes may be harmful to science instruction without proper investigation, planning, and preparation for teachers.

Summary

In summary, teacher had numerous sources of information influencing and informing their perceptions and actions in the single sex classroom. Through the lens of a self-fulfilling prophecy, I addressed the research questions framing this study. First I addressed the research question:

What are teachers' perceptions of single sex science classes during the initial implementation and what influences these perceptions?

Overall perceptions of the implementation itself were uniformly positive as reported by the teachers who chose to participate in this study. There was quite a bit of consistency among the information shared from the teacher participants. Most of this information dealt with the purpose of the intervention and how it was related to raising student achievement in their classrooms by way of reducing social distractions. In alignment with the idea of a self-fulfilling prophecy as a major influence, teachers reported their perceptions of the intervention to be in alignment with

their administration's vision for the implementation. The participants accepted the rationale presented to them and held it as the standard and expectation of performance and outcome. This is evident in their responses.

This influence was also seen with respect to the teachers' views of their students, school, and classroom. Teachers' descriptions of their school held in line with the overarching descriptions that were widely held by the school and community. Teachers' perceptions of their single sex classrooms as environments were also influenced by their own personal constructs and experiences with respect to gender socialization. Teachers' descriptions of their interactions with students and student interactions with one another were described using gendered language and representations that displayed stereotypes that the teachers as individuals hold. These personal and social influences on the teachers serve to provide another lens that they use to view their students. The preconceived notions that the teachers hold about gender emerged in their descriptions and became another piece of the self-fulfilling prophecy. Their expectations of what it means to be a girl or a boy were played out in their classroom interactions and were perpetuated by their responses.

Data collected with respect to how teachers addressed the perceived instructional needs of their male and female students went to support addressing the second research question:

What are teachers' perceptions of their own teaching practices as a result of the implementation of single sex science classes?

The administration of Southeast High School instructed teachers to be mindful and address any sex specific instructional needs, the administration helped to lay the foundation for teachers to expect girls and boys to have differentiated instructional needs. As evident from the teacher interviews, teachers are operating under the assumptions that boys and girls have different

academic and instructional needs. This is further supported by evidence of the professional learning that was presented to the teachers. Again, we see the self-fulfilling prophecy being played out in the single sex classroom.

Teachers anticipated students having differentiated instruction needs by way of their sex, and tailored their instruction to the perceived needs of each gender, needs that were based in stereotypes and broad generalizations. Influences from the administration as well as each teacher's own views and accepted stereotypes of gender contributed to the instructional decisions that each teacher made with respect with presenting science material to their class of male or female students. I have presented that teachers' perceptions of their teaching practices stem from the ways in which they structure their classroom tasks. Task selection is based on and differentiated by the sex of the class. Task selection is also based upon influences and pre-existing notions about what boys and girls enjoy, what they are "good" at, and what is "appropriate" for each different sex. Again, all of these decisions are based in outside influences, and not from data collected from the specific set of students in the classroom.

Chapter Five: Summary, Discussions, and Implications

Summary

The purpose of this dissertation research was to investigate the perceptions of high school science teachers who were involved in a school wide initiative to implement single sex classes as a means for academic improvement. Specifically the teacher participants were asked to share their perceptions of the implementation of single sex classes and events or information that influenced their perceptions. Teachers were also asked to discuss any adjustments they may have made in their instructional delivery as a result of the single sex class intervention arrangement.

Due to the growing interest, but somewhat weak research base of the effects of single sex classes, it is important to investigate multiple aspects of single sex education. This particular research study focused on the perceptions that teachers had about their own experiences teaching single sex science classes. This study addressed the following research questions:

- What are teachers' perceptions of single sex science classes during the initial implementation and what influences these perceptions?
- What are teachers' perceptions of their own teaching practices as a result of the implementation of single sex science classes?

There were three major findings that emerged from this analysis, and all three supported the overarching theme of a self-fulfilling prophecy and how the teachers subscribed to a self-fulfilling prophecy by way of their actions and perceptions as they described their encounters and experiences with students in the single sex classroom. I propose that the teachers involved in this study display characteristics of subscribing to a self-fulfilling prophecy regarding their school,

their students, and gender. Arends (2009) describes this in terms of educators by saying it is a “situation in which teachers’ expectations and predictions about student behavior or learning causes it to happen” (p. 552). I conjecture that teachers may allow their expectations or predictions about the events in their single sex classroom to drive them to fruition or influence their perceptions. With respect to teaching in a more general setting, Rist (2000) discusses the impact on teachers’ expectations of low-income students and the subsequent outcomes in the classroom. Rist suggests that teachers’ initial expectations of outcomes and levels of performance for students dramatically impacts how those students are serviced in the classroom. While Rist specifically examined low-income minority students in the primary grades, I believe that this idea of the self-fulfilling prophecy is transferrable to multiple aspects of education. It is certainly applicable to performance, but I also believe that it is applicable to the general expectations teachers may have for students in terms of motivation to learn, value of school, value that family places on school, and behavior.

With respect to gender the self-fulfilling prophecy still applies. Expectations and predictions about what a gender is like, prefers, should or should be or do, drives our perceptions and can perpetuate the behaviors based on our own notions. Risman (1998) discusses the idea of the self-fulfilling prophecy and gender in her reflection on West and Zimmerman’s (1987) article titled *Doing Gender*. West and Zimmerman (1987) expanded the idea of “doing gender” and what it means for the players involved when we do, and do not, play our gender roles as expected by society. Risman attributes the need or compliance with doing gender to a self-fulfilling prophecy. She proposes that based on the work of West and Zimmerman, that when individuals interact with one another, despite their own individual characteristics or preferences, they are expected to play their gender role, and that “playing of a role” is expected in order to make sense

of the interaction. “They suggest that interactional contexts take priority over individual traits and personality differences; others’ expectations create the self-fulfilling prophecies that lead us all to do gender” (p. 23). Risman attributes the expectations of other and perhaps society in general to drive the gendered ways in which people act, behave, and conduct themselves around others. I argue that this same philosophy holds in the classroom. It is especially important to examine this situation when placing students of the same sex into a single classroom. I argue that the individual traits of the students may give way to the gender of the class. The strength of the gender expectations that exist for how girls should act and what girls should like (likewise for boys) will overshadow the potential individual needs or characteristics of a single student, and that the gendered expectations that the teachers have about boys or girls will drive their reactions, perceptions, and teaching.

The first evidence of self-fulfilling prophecies in Chapter Four that emerged from the analysis was the common way in which the teacher participants described their students and their school. All teachers described their students and school in terms of the student demographics related to the high poverty rate in the area, as well as hardships faced by students at Southeast High School. This was the first indication that the teachers were falling into a situation where they were allowing the common rhetoric of the community to influence their own perceptions, at least to the point of how they described their school and students to others, or outsiders. Although it is the case that the student population of Southeast High School consists predominantly of low-socioeconomic students and families, it was curious that this was the predominant information that was shared when asked to provide descriptions and perceptions of students.

As stated in Chapter Four, I have personal experience with the school district, as well as numerous contacts who serve the in capacity of teachers outside of those who volunteered to be a part of this study. My personal experience, contacts, as well as the teacher participants all reinforced the messages that are circulated throughout the community which are that the student population is disadvantaged and tough. This perception of the student population makes this situation ideal for the implementation of single sex classes. Existing research suggests that student populations that are, or have a tendency to be, unfocused on school work and minimally engaged in instructional time during class can benefit from the separation into boys and girls classrooms by way of minimizing social distractions (Datnow & Hubbard, 2005). The aforementioned pressure on schools to meet the standards set forth by No Child Left Behind, coupled with the reported disengaged student population, was the driving influence behind the decision to implement the intervention. This is where we see the second area and emergence of self-fulfilling prophecies.

First, we saw that the teachers were influenced by the messages they received from the community, other teachers, and stakeholders around the school. Those influences provided information that was repeated during data collection as a way to describe the school population and culture. The stigma of being poor and disengaged in school had become the way in which teachers identified their student population. Like the influences that the community had on teachers' perceptions of their school and students, administrators had the same influence on teachers when it came to discussing their perceptions about single sex classes. This was the second common thread in the data that supported the self-fulfilling prophecy.

When the topic of single sex classes was discussed with the teachers, they reported having minimal information about why it was being implemented, but all responded with very

similar information, matching the information that was provided by the school administration. That information dealt with the implementation of single sex classes as a catalyst to improved student engagement in classroom instruction by minimizing social distractions that can occur between students of the opposite sex. It is important to note the motivating factors behind the school's decision to implement single sex classes, and the tools that were provided to the teachers to aid them in maximizing the learning environment for students. As mentioned in Chapter Four, there are two distinct and different strands of research dealing with single sex education. One strand focuses on innate, biological differences in the brains of males and females, and attributes different learning needs and environments to those physiological and developmental differences. The other strand focuses on the social nature of interaction between males and female in a social setting such as a classroom, and suggests that separation may create a more palatable and fruitful learning environment for both male and female students given a space with fewer social pressures and distractions.

Given that the administration based their initiative on the social distractions in the classroom, the professional learning that was supplied to the teachers was focused more on learning styles and preferences of male and female students grounded in physiological or biological differences. This is important because it highlights the point that teachers are subscribing to a self-fulfilling prophecy in numerous aspects of their existence and activities as a teacher in Southeast High School. This information goes to support this notion as evidence because when teachers were probed about their instructional strategies and how or if those strategies had changed from a co-educational to single sex class, almost all teachers reported yes. The important point to make is although they reported yes to changing their instructional strategies for their male and female audiences, none of the teachers reported using trial and error,

surveying their students or a method of assessment to figure out what each particular group of male and female students may prefer as a learning modality. Instead the teachers relied on the small amount of information they received in professional learning and their own gender stereotypes to select teaching and instructional strategies to fit with their single sex classes.

The information presented to teachers in professional learning included strategies that could reasonably be applied to all male or all female classes, and the generalizability of the strategies extending to all girls or all boys is questionable. I saw these suggested strategies from professional learning being applied by the teachers and reported back to me as strategies that were working well for each particular group of student. For example, a suggested strategy for boys in a classroom according to Sax (2004) is that boys like to engage in competition or classroom activities that are structures around a feeling of competition. This was a suggested given in professional learning, and almost every teacher participant of boys noted that they used competition as a strategy for their male students, and the male students responded well.

Pointing out that teacher are acting out self-fulfilling prophecies with respect to the information they are given by their colleagues, administrators and community stakeholders may seem like a stretch with the two pieces of evidence given. I believe that the third emergent theme in the data collection assists in strengthening the claim of self-fulfilling prophecies. The third emerging theme discussed in Chapter Four was that of gender. It was coupled with the instructional strategies that teachers reported they implemented in their classrooms. Not only did I hear teachers repeat the information that had been presented to them with no real indication of a personal or reflective perception, but I also began to gather information about the language, references, analogies, and comparisons that the teachers used to describe student actions and relationships in their classrooms.

One aspect of the teachers' comments and explanations demonstrated that teachers believed the information given to them about the learning needs of boys and girls. The second is that many of these ideas meshed with the individual teacher's pre-existing personal beliefs and stereotypes of gender. This was evident in the speech and references made by the teachers. Teachers were consistently retelling information that had been presented to them by school personnel using the same terms and rationales that has been shared with them about single sex classes. While the professional learning presented to the teachers did possess undertones of gender stereotypes by indicating that boys and girls indeed had different learning needs, I believe that the teachers were also drawing on their own personal beliefs and accepted stereotypes of gender when explaining observations and interactions in their classes. I believe this because their responses were not consistent with anything presented to them by the administration; however, their responses were in line with widely accepted stereotypes of gender.

Another important gendered aspect of the teachers' responses also had to do with gender, but was mixed between teachers discussing their relationships with students, the students' relationships with each other and also the instructional time in the classroom. When discussions shifted away from what the teachers were doing in their classrooms specifically with instruction, gendered ideas and stereotypes continued to emerge. Just as the majority of teachers described their school and their students in terms of the community rhetoric of low socio-economic status and disengaged, the teachers were describing their interactions with students and their observations of students in gendered terms. Teachers presented descriptions of their classrooms and students using gender stereotypes to make sense of what they were seeing and thus to frame their perceptions. Teachers used phrases like "mother hens" to describe girls and "protectors" to

describe the boys, describing that girls were attuned to art projects and “glitter” while boys would prefer to engage in a competition and discuss sports.

In closing, teachers involved in this interview process gave information that was heavily influenced by outside factors. Information about Southeast High School and students was heavily influenced by the community and internal stakeholders. Information about the inception of single sex classes and the impetus for the implementation was heavily influenced by the school administration, and likewise the appropriate instructional strategies for these single sex classes was heavily and predominantly influenced by minimal information provided to teachers in professional learning. Lastly, teachers’ abilities to perceive interpret and disclose information about the interactions in their single sex classes were heavily influenced by their own preconceived notions and stereotypes of gender. Self-fulfilling prophecies tell us that when given information of influence, that we will sway toward the influence and “see what we are told we will see.” I believe that this is happening at Southeast High School. Evidence indicates that teachers are already adhering to the self-fulfilling prophecies in other areas of their thinking about the school and their students. I believe that the same idea applies when examining the teachers’ gendered responses to single sex classes and the actions carries out in their classrooms.

Teachers may expect boys to be interested in sports and girls to be interested in glitter; therefore, they build instructional tasks and discourse with their girls around glitter, and around sports with their boys. They then report that these instructional strategies are the best suited for those specific populations. Likewise, they view a collegial group of girls working collaboratively to be similar to hens in a hen house and aggressive behavior from one male toward another on behalf of a female teacher as being a protector. It is unclear what if anything these teachers are doing to perpetuate these gender stereotypes, or how much it emerges in their instruction and

into their classroom. What is clear is that the influences and expectations, whether initiated from the school or society, had a significant influence on the actions and perceptions of the teachers in this study. These teachers entered the situation of teaching single sex classes with their own ideas, and with a specific set of information, and they entered the classroom environment with an expectation of what they would see, perceived and understand. Teachers were carrying out a self-fulfilling prophecy with respect to their school, students, teaching, and single sex classes.

Discussion

Depending on the research one chooses to read, claims exist that single sex classes can potentially reduce or begin to break down gender stereotypes for males and females. The notion behind this thought stems from the removal of the opposite sex from the classroom, which allows for the single sex group of students to explore the classroom setting in a risk-free environment. An environment in which people are open to trying things in new ways, and one that is not fraught with expectations of behaviors, actions, or preferences based on sex. This was the initial premise behind the decision to implement single sex classes at Southeast High School. In Chapter Four evidence is presented from participants showing that some of the teacher participants in this study, did in fact report the observance of improved self-esteem, emergence of student personalities, increased confidence, and the emergence of stronger relationships among students in the class. Not all of the participants reported these observations, and it is unclear how the teachers that did report these observations made those determinations. The only evidence provided was that the observations reported were different perceptions than those specific teachers had observed in previous years teaching at Southeast High School.

In Chapter Two I presented literature that suggested single sex classes may reduce the persistence or prevalence of gender stereotypes in classrooms. The research presented in Chapter

Two that supported these ideas focused on the students in the classroom of the opposite sex as being the primary catalysts for gender stereotype perpetuation in the classroom. What I found as a result of the interviews with teacher participants was that the teachers themselves are bringing in their own personal gender stereotypes into their classrooms. Removing students of the opposite sex who may believe or hold conceptions of gender that are based on folklore or rumor does not necessarily eliminate the presence of gender stereotypes in the classroom.

Through the examination of teachers' perceptions of the single sex classes at Southeast High School, I believe that teachers unknowingly continued the perpetuation of gender stereotypes. Through analyzing teachers' responses to their classroom practices, and their gendered descriptions of their students I believe that the teachers as individuals hold their own gender stereotypes and use those to make meaning of the actions they observe in the classroom.

While I do not believe that teachers are knowingly reinforcing the stereotypes about boys and girls with respect to their tendencies and preferences, the information gathered through their responses suggests that they are relying on their perceptions of gender to make sense of the environment they are operating within while in the single sex classroom. In Chapter Two I discuss the literature foundation that suggests the arrangement of single sex classes may reinforce or perpetuate gender stereotypes. Some examples of this were outlined in Chapter Four with respect to how teachers described their students. Two participants described girls in their classes as "mother hens" and one participant shared that girls would not engage in conversations about sports like the boys in the class. Another example is presented about boys playing the role of the "protector" while the young female teacher described her role in the situation as one being "rescued" by the boys.

I believe this is evidence to suggest that in the context of Southeast High School, teachers are bringing their gender stereotypes into the classroom and continuing to perpetuate them through their actions and interactions with students. We see additional examples with respect to instruction. Teachers reporting that girls prefer the glitter and take more time and care with art based projects, when the boys are reported to not have as much interest in those assignments. It was also widely reported that boys prefer and engage in activities that are centered on competition. All of these examples discussed in Chapter Four align with some of the generally accepted stereotypes of boys and girls. Those stereotypes include girls possessing more motherly or nurturing characteristics and boys being the aggressors. These characteristics were discussed in Chapter Two as some of the more predominant stereotypes that can be perpetuated in single sex classrooms.

I presented evidence of this in Chapter Four through interview data with participants. Teachers were using gendered language to describe the nurturing characteristics they were observing with all girl classes and providing descriptions of how their actions toward one another were nurturing and motherly. None of these types of descriptions were used when describing any of the all-male classrooms. Likewise, evidence is present in Chapter Four that demonstrates the stereotype of male students being aggressive. This was reported by teachers in general terms by saying that they preferred competition and relating their outward behaviors in class as being of aggressive nature and at times out of control. Specifically described by one participant, her male students displayed aggression toward her which in turn was met by more aggressive behavior by other students rushing to her aid, placing her into a social position of being weak or weaker and being rescued by her male students.

These reports from teachers also align with some of the gender stereotypes that are specific to instruction and school. Those include girls having an affinity for the arts and languages and being more interested in detail oriented art-based projects, while boys prefer competition situations and are less interested in taking time on detail based assignments such as creating a poster or other art based project. These instructional beliefs that some teachers hold, represent more gender stereotypes. It was evident from the interview data that teachers chose their instructional strategies based on the professional learning they received as well as what they believed were activities and methods best suited to an audience of boys and an audience of girls.

I believe that the teachers' previous experiences have exposed them to gender stereotypes that they have accepted and expect to be true. I believe that they use those accepted ideas about gender and about boys and girls to assist them in making meaning of situations in their single sex classroom, and to drive decisions that they make with respect to instruction. I believe that these ideas that teachers are bringing into the classroom are cultivated through the social construction of gender, discussed in Chapter Two. Teachers expect the boys and girls in their classes to be and act in certain ways because they are "boys" or because they are "girls". They look at these students as genders or sexes instead of looking at them as general learners. This gendered lens that the teachers are using to view their classes affect how they act, react, and plan for the instructional time they spend with their students. This can lead to the perpetuation of gender stereotypes in the classroom and have implications for student learning and engagement.

In Chapter Four, the emergent theme of the self-fulfilling prophecy was explored in three parts. First, evidence was presented that teachers enter the classroom with expectations. Second, evidence was provided to support that teachers' expectations affect their own actions in their classrooms. The third part of examining the self-fulfilling prophecy was to explore the

consequences that the teachers' expectations and actions had on the students in their classrooms. Due to the nature of this study, attaining information about how the teachers' actions affected students could not be collected. This is an important piece of information when gathering information about the experience of single sex classrooms. It is a necessary piece of information if evaluating the implementation of single sex classes is desired. Having evidence that suggests that the teachers in this study did in fact have expectations about their students, and were observed as well as disclosed how they were acting out those expectations, probing further into effects on students is a necessary consideration moving forward with research in single sex education. Specifically in the context of science education, the consideration must be made to how the alterations of instructional strategies or choices of instructional strategies may affect boys and or girls in the science classroom.

Implications

Key implications from this study include recommendations and considerations that can be made to administrators, schools and school systems that are considering implementing single sex classes. It is important for schools to be aware of potential benefits and potential challenges associated with single sex education. I will discuss the benefits that were reported as a result of this study, as well as potential challenges, and thoughts on teacher training and preparation. All of these things should be taken into consideration and used for planning and implementation of a single sex classroom initiative.

Limitations.

Teachers widely reported benefits as a result of the single sex classes. None of the participating teachers had negative comments about the arrangement. Since no formal data were collected about the impact that this intervention had on student achievement measured by grades

or test scores, teachers were basing “success” on how the single sex class arrangement impacted or did not impact their instructional time. It did not appear to negatively impact their instructional time by creating unfavorable classroom situations or creating more distractions that were barriers to student engagement in academics. Teachers reported favorable experiences in the classes with respect to students taking academic risks, building relationships, and generally being engaged with the content. They also reported enjoying the atmosphere. Some reported strongly preferring single sex classrooms to co-educational classrooms, while others reported that it was fine, but no overwhelming strong feelings toward the positive. None of the participants reported negatively on their experiences of their perceived experiences of their students in the classes. Most reported hoping that the administration would choose to keep the arrangement for the next school year.

Challenges that schools may face when implementing single sex classes range from teachers being uncomfortable or unwilling to participate in the initiative, students reacting negatively to being placed in the single sex classes, and providing adequate support for teachers. All of the teachers who chose to participate in the study had favorable things to say about the initiative. All were willing participants in the single sex classes and had no aversion to being assigned an all-boy or all girl class. Favorable results in this study could be affected by the pool of participants. Participants who chose to participate may not be representative of all of the single sex science classes at the school, and most likely are not representative of the entire population of ninth grade teachers with single sex classes. According to the teacher participants in this study, student backlash was not a problem in their classrooms. Teachers reported students being inquisitive as to why there were no boys in the class or why there were no girls in the class but according to reports, those questions and concerns faded quickly after the first day of school

and students fell into a routine. Although student concern was not an issue as reported by the participants in this study, it is something to keep in mind when planning a similar intervention at another school.

Teacher training and preparation for single sex classes is crucially important when considering an implementation. One very important thing to consider is the philosophy that will be adopted at the school with respect to the foundation for single sex classes. In the case of Southeast High School I believe that there was a disconnect between the adopted philosophy of why the single sex classes were being implemented and the desired outcome against the professional learning tools that were supplied for teacher preparation. In talking with the administration about the implementation, it was clear that the adopted philosophy was that separating students based on sex would provide fewer social distractions in the classroom and provide a potentially more productive learning environment. While this is an accepted and even research based approach to single sex education, the training that teachers received was based on characteristic sex differences. Teacher training consisted of a presentation of tools that teachers could use in the form of instructional models and strategies specific to boys and girls. In my opinion these two philosophies work against one another when looking at the ultimate goal.

The school administration did not appear to initially intend to convey to teachers that boys and girls needed to be taught differently, they simply felt that the social distractions in the classroom could be a potential barrier to maximizing teaching and learning, but when faced with needing to provide teachers with support and training for the upcoming implementation the school fell back on one of the only resources available in the realm of single sex education, which was the sharing of ideas about how boys and girls are inherently different and thus have different learning needs. I do not believe that the evidence is clear to suggest that boys and girls

have different learning needs based on sex. I believe that with the emphasis on differentiation in schools we must recognize that individual students may have differing instructional needs independent of their gender. It is also critical to recognize that there must be alignment in the philosophy behind the implementation and the tools that are provided to support it. My recommendation to any school or system that intends to experiment with single sex classes is to be clear on your philosophy when communicating with your teachers, and ensure that the support provided to the staff aligns with that philosophy.

The top-down approach that was utilized in the decision making process with respect to single sex classes at Southeast High School, should also be considered. Teachers and parents were not informed about single sex classes before assignment and implementation was complete. I suspect that given the difficulties in West County with single sex initiatives, the administration felt that the decisions made should be kept within a small number of administrators at the school. The administration did not comment on the reasons behind the top down approach, so this may only be inferred. It should be a consideration for schools and administrators who intend to experiment with single sex education that the teacher or other stakeholders are made aware of plans prior to implementation.

From an administrative standpoint, I believe that logistical aspects of planning were made easier and cleaner by keeping the pool of participants small. If ease of planning were the only consideration, then I believe that this was an effective method of planning. Given that teachers were unaware of the arrangement until their pre-planning session one week prior to the school year starting, I would argue that their input would have been valuable in planning and potentially assessing teachers' concerns and needs in order to implement single sex classes with fidelity and confidence. Furthermore, I believe that a collaborative approach would have given an

opportunity for administrators as well as teachers to establish common ground with respect to the purpose and goals of single sex classes for Southeast High School, as well as expectations and means of attaining those goals.

Implications in the area of science education.

The selected context for this study was the science classroom. Options were available to observe and conduct research in science, language arts, social studies and or mathematics classrooms at Southeast High School. All of these disciplines were included in the implementation of single sex classes at the ninth grade level at Southeast High School. The specific reason that science classrooms were chosen for this investigation was due in part to the interest and prior research in the area of single sex science education. While the literature suggesting the benefits of single sex education is scattered across disciplines, grade levels and school types, the literature concentrating on single sex science education does so with a consistent purpose. Seen in in the literature is an undertone of generating student interest in science, along with the other motivations that schools and administrators claim as the reasons for implementing single sex classes. Generating increased student interest in science studies and science careers seems to be a consistent theme in single sex science education research.

As mentioned in Chapter Four, there is a persistent underrepresentation of females in math intense science related fields of study and professions such as engineering and physics (NSF, 2007). The reasons for this underrepresentation are varied and beyond the scope of this particular study. Given this premise, single sex education has been proposed as a potential solution to the problem of disengagement by females in math intense science classes and careers. The research that supports these notions exists, but it limited and controversial. Single sex science education has implications in the studies of single sex education in general because if

single sex education is used to try and promote the engagement of girls (or boys) in science, the findings of this study may impact those goals. Summarizing the findings in this study, teachers involved in the initial implementation of single sex classes at Southeast High School are operating under preconceived notions of gender and allowing those conceptions and expectations to influence their actions with students as well as their instruction. Instruction is the foundation for the delivery of content in the classroom. If teachers are making instructional decisions based on gender and potentially excluding experiences from girls and or boys due to their own conceptions, it could potentially have serious effects on the students' acquisition of science knowledge.

Specifically, a concern that arose from these findings was the selection of activities within instruction based on gender. I observed that Quentin was eliminating hands on activities and more inquiry based strategies for his all-male class because he thought the class would get out of control. His perception of the all-male class being unable to handle the freedom of hands on activities meant that the majority of the activities that Quentin used with students were paper and pencil activities. Likewise, Janet assumed that the all-female classes preferred arts and crafts based projects as well as collaborative group work and discourse. She also excluded hands on activities in favor of more verbal and paper and pencil tasks. Both teachers were demonstrating tendencies to exclude hands on activities that could have been used to create authentic learning experiences.

The primary consideration with respect to science that emerged from these particular examples was the implication that the implementation of single sex classes in science may bring teachers' gender stereotypes and preconceived ideas to the forefront of their instruction. The effect on student experience in the science classroom as a result of this emergence of teacher

concepts may affect the student experience in science by elimination of research based best practices in science such as hands on learning, experiential learning, inquiry and authentic learning situations. It is unclear what effect these varied experiences may have on student learning, and student perception of science. I argue that if single sex classes are considered as a means to improve interest and engagement in science, the consideration should be made to the type of instruction that is occurring in those classes. Separation of students by sex into different classrooms may have little effect; or an undesired effect, on student perception of science and how science relates to them, if no consideration is made to the types of instruction occurring in those classrooms.

Considerations.

An area that should be considered and proposed for further research is the effect that teachers' perceptions and pre-conceived notions about their students and gender has on the teacher's actions in the classroom. I proposed that the ideas that teachers held about their students at Southeast High School as well as their personal beliefs about gender influenced their instructional design as well as their descriptions of their students and events in their classroom. What is unclear is to what degree this affected the classroom environment. Furthermore, it is an important consideration to propose that providing teachers with a framework for general best practices in the classroom as opposed to gender specific methods may have an impact on the classroom outcomes, and thus the teachers' perceptions of their single sex classrooms. Providing guidance for best practices that are not gender specific could be a potential benefit for teachers and students, as well as a step toward reducing the perpetuation of gender stereotypes in the classroom while reinforcing the purpose of single sex classrooms as one that serves to reduce social pressures and distractions and focus students' attention on meaningful engagement and

learning. If the ultimate goal is to provide our students with the best possible educational experience while in the public school classroom, single sex education deserves more time and attention in the area of academic research. Potential benefits are great, but potential pitfalls are also a possibility. With continued research and attention to all aspects of what single sex education may have to offer, we may discover the true potential benefits of this innovative experimental educational intervention.

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Appendix A (Initial Interview)

- 1) Briefly tell me a little about yourself.
 - a. How long have you been teaching?
 - b. What grade levels have you taught?
- 2) Tell me about your school....
 - a. What are the best things about your school?
 - b. What are the biggest challenges for your school?
 - c. What is the relationship between your school and the community?
- 3) Tell me about the students
 - a. Describe the students in your classes.
 - b. What are the words that best describe the positive attributes of the students at your school?
 - c. What are some ways to describe what the students at your school lack?
 - d. What are the challenges your school faces in serving the needs of these students?
- 4) Tell me about any experience you may have had involving single sex education...(personal experience, anecdotal experience, research) either as a teacher or a student...
 - a. What do you think the purpose of single sex classes is?
 - b. How did/do you feel about your involvement?
 - c. Describe your feelings about single sex classes and the merit of implementing such an arrangement.
- 5) How are the students in your classes reacting to single sex classes?
 - a. What feedback have you heard from other teachers/students?
- 6) Talk about how the teachers in your department feel about the single sex classes...
 - a. Can you speak as to how the decision was reached at your school regarding the implementation of the single sex classes?
 - b. Describe the teachers in your department who were selected to teach the single sex classes.
 - c. Talk about the collaboration between teachers in preparing for the single sex classes.
 - d. Will the preparation for these single sex classes be different for the boy's class than the girls class? Will they differ from preparing for coeducational classes? Should they?
- 7) Tell me about your feelings about your single sex classes...
 - a. How do you feel about teaching the classes you will be teaching?
 - b. Do you think this will require more, less, or about the same amount of work in your classroom to maintain discipline, engage learners, etc.?
 - c. What ways do you think single sex classes will benefit the students?

- d. What ways do you think single sex classes will be problematic for the students?
- e. Do you think the benefits/problems will be different between the girls and boys?
Why?
- f. What are your thoughts on how/how much being in single sex classes will help some of the challenges you mentioned your school faces in serving the needs of the students?

Appendix B (Second Teacher Interview)

- 1) Talk about your experience so far.....
 - a. Compare and contrast your experience teaching coed classes versus single sex classes
 - b. Have you enjoyed the experience thus far? What about it have you enjoyed/not enjoyed and why?

- 2) Talk about your perceptions of the students' experience so far...
 - a. Compare and contrast the interaction you have observed so far between students in single sex classes versus those you've experienced before in coeducational classes
 - b. Describe the academic growth of your students so far.
 - c. How have they been similar/different from your previous coeducational classes?
 - d. Describe any non-cognitive gains you've perceived thus far? Specifically, discuss students' engagement in the lessons/material...their focused behavior in participation, class discussions and activities
 - e. Talk about student behavior in these single sex classes... How is it different/similar to those you've experienced in coed classes?
 - f. Is it better in your view? Worse? Why?
 - g. Have you gathered any data regarding discipline referrals, phone calls home, interventions and the like?
 - i. Can you share those (without divulging any personal confidential information)?
 - h. Can you speak to what you have noticed regarding students' self confidence in your class...specifically, are they more or less willing to lead conversations?
 - i. Do they probe the lesson?
 - i. Are they more or less apt to risk asking a "stupid" question in front of their classmates? Do they share among others their results, both positive and negative?
 - j. Do you perceive the students are raising/lowering their expectations of their classroom performance?
 - k. Specifically, talk about how you perceive they are visualizing their abilities as students in your subject area...
 - l. Can you speak as to the social experiences of your students as they come to/ leave class and their social interaction in your classroom with same sex students, i.e., is it different from that which you notice outside the classroom? Better, how? Worse, how?

Appendix C (Final Teacher Interview)

- 1) Tell me how your experience concluded....
 - a. Discuss how this experience has affected your ideas about single sex classrooms from initial to the end of this study.
 - b. Describe what went well for you (not the students) and what was troublesome for you in your single sex classroom.
 - c. What would you do different?
 - d. What, if anything, has this experience affected your views on teaching a coed class?
 - e. Would you volunteer to teach single sex classes again? Under what conditions (only same sex as your gender, or opposite...in conjunction with teaching coed classes etc.)?
 - f. Do you believe your teaching peers would support continuing/expanding the single sex offerings at your school? Why or why not?
 - g. Do you believe single sex classes are better in some disciplines than others?
 - h. Which ones? Do you believe single sex classrooms would be beneficial in other grade levels?
 - i. Talk about the best aspects of single sex classrooms in your view. Talk about aspects of the single sex classroom that you perceive as not as good in the coed classroom

- 2) Tell me your perceptions of the students' experience
 - a. Expand and summarize the academic progress you began in the previous interview session...what evidence would you use to best describe the academic performance of your students? Without divulging individual confidential information, can you share some stories about individual students who may have benefitted from the single sex classroom?

 - b. Describe the evolution of academic interaction between students from the beginning of this study to the end... Describe how things like cooperation, mutual understanding, empathy for the opinions and feelings of other students developed or went missing during the extent of this semester.

- 3) Describe the social interaction between your students in your perception...describe how or if it changed during the course of this study...improved or not?
 - a. Describe the evolution of the behavior of your students during the study. Expand and summarize your experiences involving behavior from the previous interview...

 - b. Expand and summarize your views regarding the self confidence in the classroom of your students that was developing during the previous interview... Do you think that this experience and the effects on these students' self confidence are such that they will endure once these students move into coed classes? How?

- 4) Can you speak as to how the students view this experience overall? Would they choose it voluntarily if it were offered again? Why or why not?

Appendix D (Sample of edited protocol questions from second interview based on information gathered in first interview for participant called “Janet”)

1) ~~Talk about your experience so far.....~~

- ~~e. Compare and contrast your experience teaching coed classes versus single sex classes~~
- ~~d. Have you enjoyed the experience thus far? What about it have you enjoyed/not enjoyed and why?~~

Note: Janet already discussed these points in detail during first interview – no need to revisit these questions

2) Talk about your perceptions of the students’ experience so far....

- m. Compare and contrast the interaction you have observed so far between students in single sex classes versus those you’ve experienced before in coeducational classes
- n. Describe the academic growth of your students so far.
- o. How have they been similar/different from your previous coeducational classes?
- p. Describe any non-cognitive gains you’ve perceived thus far? Specifically, discuss students’ engagement in the lessons/material...their focused behavior in participation, class discussions and activities
- q. Talk about student behavior in these single sex classes... How is it different/similar to those you’ve experienced in coed classes?
- r. Is it better in your view? Worse? Why?
- s. Have you gathered any data regarding discipline referrals, phone calls home, interventions and the like?
 - i. Can you share those (without divulging any personal confidential information)?
- t. Can you speak to what you have noticed regarding students’ self confidence in your class...specifically, are they more or less willing to lead conversations?
 - i. Do they probe the lesson?
- u. Are they more or less apt to risk asking a “stupid” question in front of their classmates? Do they share among others their results, both positive and negative?**
 - i. First interview- Janet mentioned “risk taking” – follow up and elaborate**
- v. Do you perceive the students are raising/lowering their expectations of their classroom performance?
- w. Specifically, talk about how you perceive they are visualizing their abilities as students in your subject area...
- x. Can you speak as to the social experiences of your students as they come to/ leave class and their social interaction in your classroom with same sex students, i.e., is it different from that which you notice outside the classroom? Better, how? Worse, how?

Note: Add question: during the last interview you spoke a lot about changing your instructional approaches between your boys class and girls class and how you can’t use the

“same lesson” with two classes. Can you elaborate on that, and speak more about what you mean by “different lessons” and what you are experiencing from an instructional standpoint?

Appendix E (Sample transcript with coding schemes- initial transcript generic coding)

A: I'm going to ask you some questions about things that are going on right now in your school and your teaching, so first if you will just tell me a little bit about yourself like how long you have been teaching, classes you have taught, grade levels, etc.

O: Well, this is **my first school** year and I had a half year as my teaching practicum but it was at a private school and I taught um by myself for my practicum so basically it will be a year and a half at the end of this year

A: Hmm, that was interesting that you were by yourself for your practicum

O: (laughs) it was okay because **it was at a private school**, umm, the practicum was 9th, 10th, 11th and 12th grade English and **here I'm teaching 9th grade physical science and AP physics**. The physical science classes are CP level and I only have boys and the advanced classes that I have had have been mixed sex classes

A: Okay, all right, so tell me a little bit about your school, just in general how would you describe your school

O: Well Southeast High is **big, and very diverse being a Title I school** and I guess that's about...I mean other than that its a **pretty normal school besides having a diverse population and being a Title I school** other than that its a typical public high school

A: Okay, so what are the best things about your school

O: Umm, I really **like my department head** I really **like the instructional coach** I really like the, I **like the students a lot** I feel like they are really **easy to get to know they are very open** umm, and I mean **those are the things that matter the most** to me, really, so, umm it's guess that's about it

A: Okay, tell me what are the biggest challenges for your school

O: Definitely **discipline**, the **kids need a lot of structure and it difficult in that a lot of them never really were taught how to behave** and then also a lot of them are **already adults** basically like **they live on their own** even though they are in ninth grade and umm, so **having someone tell them what to do is a little out of their element**

A: Okay, that makes sense

O: And plus having a lot of the **teachers be from a different socioeconomic and racial perspective that can cause a clash sometimes, teachers are not like students**

A: Okay, describe for me the relationship between your school and the community, if you think there is a relationship between the school and community

O: Okay, umm for the kids it's a huge like..they stay after school as much as they can and there are all kinds of afterschool programs they can do and in that sense I think I plays a big role in keeping them involved in positive activities as they go through high school and umm some of the teachers are involved with different community oriented activities like I went to a march on Friday against the new immigration act and I don't even know what I think about it but i went to support some students and umm, my friend (in the department) she is working with a youth program with her husband and they take students from the school and put them through a program that basically makes them care about their future and help motivate the, basically kids at risk, it tries to help them get on track. I mean, there's all kinds of stuff but I mean, if I knew more i could probably talk all day about it but there is a lot of stuff

A: Sounds like there are some strong ties between the school and community. So, tell me about the students in your classes, describe them to me a little bit. I know you mentioned you have all-boy physical science classes and your AP class has boys and girls but if you can, please describe their personalities or actions, just how would you describe them?

O: Well, I have an advanced physical science class too and that is mixed sex.

A: Oh, okay

O: So I have three different classes, only one single sex class, and they are all very different. I guess they are all different, my all boys CP classes compared to my AP class, there is a world of difference, it's like they have had a totally different educational background. My CP class, an 8th to a 10th of them have failed before and most of them had at least gone to summer school so they had failed before. There is another I'd say 25% that still aren't into school but they care more about their grade. Most of them are not motivated by the material but they are motivated or by me, and it's good that I have a good relationship with them. They are easily offended, they are very sensitive boys, they do a lot of "gay chicken." I don't know if anyone has told you about that but they see how touchy they can get with each other before they offend someone or make someone feel uncomfortable. So they are very touchy and sensitive but easy to talk to and if you tell them to do something they won't do it but if you ask them to do something they will. They are loud, they tend to be loud..

A: Are they disruptive with the noise or is that just something that you get use to or you have to manage?

O: It depends on how you are teaching, they do very well working on their own, they do very well with hands on things and if you are going to lecture you have to keep it to about 10 minutes or they are going to freak out. My AP kids are totally different. They are very morally upstanding people. If I gave them a test and walked out of the room I know they would not cheat. I've had these kids all year and they eat lunch in my room and hand out they feel a little bit isolated in Southeast High and they feel like not much energy is given to them and umm and they are just on the ball and they teach themselves and would teach themselves if I wasn't there, they are really good kids.

A: What are the challenges that your school faces in meeting the needs of your students? You have mentioned some positive things about the kids in your classes and also some potential challenges, but what are some challenges that your school faces in serving the needs that your students have? Are there any challenges?

O: Umm in the sense that their needs, their educational needs are tied to their personal needs are challenging because we don't have access to their personal lives so umm, its difficult.

A: Tell me about if you have had any experience at all involving single sex education, personal experience or anecdotal experience, any prior to this year?

O: No, none at all. I have no experience with it. Not until this year.

A: What do you think the purpose of single sex classes is?

O: Umm I guess it would be two things, one to keep the students from distractions, unnecessary distraction and two appeal to the learning styles of the different sexes

A: And how do you feel about your involvement? How did you feel in the beginning and how do you feel now about having the classes of all boys?

O: I thought it was great and it's been fine but it's been difficult because I have never had single sex classes at this school, so it's hard to compare, the CP classes are tough and they would be tough with girls, these are just the kids that struggle with education. I think it's a great idea, even with my AP kids if there is ever a disruption it's something between a girl and a boy. My learning style is good for teaching boys. [What is that?] Outdoor labs and you know it's statistically proven to be effective and so that's good. I'd like to be able to see how girls can do in a science class without the boys. The one girl I have in AP class has become like the hen mother and she tells people when they are doing something wrong or she fixes things or takes care of things or people. She's not looked at as the top kid in the class but in fact she scores just as well on tests as the boys. She's not a weird nerdy kid but no one thinks of her as the top kid in the class. It would be interesting to see where she falls in a class of all girls

A: Have you had any feedback from student in your class about the arrangement?

O: No they never said anything at all.

A: What about teachers?

O: I've heard a lot of good things about all girls classes I've heard that all boy classes tend to play a lot

A: Do you think it has anything to do with the fact that it's all boys or more to do with the leadership in the class?

O: Umm, I mean I can't really say. People who said those things were two very different people so I mean one of them is pretty uptight and the other is laid back but they are both saying the same thing, so I don't know I really can't say but I think that energy should be harnessed I don't think its necessarily a bad thing and I don't think that its bad that they want to play.

A: Has there been any collaboration between teachers in planning or preparing for single sex classes? I know you collaboratively plan in terms of content but how about planning for single sex strategies?

O: We tried that at the beginning for the year but it didn't really happen because our data team decided we have to basically focus on the lesson plans and assessment for each class so that didn't really happen.

A: So it sounds like the data team process goes against the grain with differentiation for single sex classes

O: Well I don't know I think it's just this one instance and they wanted to stick to the original plan, so there just wasn't much discussion about what to do for the single sex classes.

A: Do you think the preparation for boys classes would be different from girls?

O: Oh, I'm sure

A: In what ways do you think single sex classes are going to benefit students?

O: Well umm it keeps them focused on learning and not on other things that they might want to focus on like building a social hierarchy I guess and them umm it also allows the teacher to teach according to their learning style but I think the problem might come, I had a student who learned more like a girl but was a boy so that was probably bad for him

A: Are there any things that you could see as being problematic?

O: Umm no, nothing I can think of. I mean I can see different challenges but I don't see any problems.

Appendix F (Thematic coding, extraction from initial transcript with generic identification of codes, reduction of data.)

Experience before coming to Southeast High School

- my first school
- it was at a private school

Description of school

- here I'm teaching 9th grade physical science and AP physics.
- big, and very diverse being a Title I school
- pretty normal school besides having a diverse population and being a Title I school

Things she likes about her school

- like my department
- like the instructional coach
- like the students a lot I feel like they are really easy to get to know they are very open
- those are the things that matter the most

Challenges at the school

- discipline
- kids need a lot of structure and it difficult in that a lot of them never really were taught how to behave
- already adults
- they live on their own
- having someone tell them what to do is a little out of their element
- teachers be from a different socioeconomic and racial perspective that can cause a clash sometimes, teachers are not like students
- for the kids it's a huge like..they stay after school as much as they can and there are all kids of afterschool programs they can do and in that sense I think I plays a big role in keeping them involved in positive activities

Who are the kids in your class

- three different classes, only one single sex class,
- it's like they have had a totally different educational background
- CP class, an 8th to a 10th of them have failed before
- not motivated by the material but they are motivated or by me, and it's good that I have a good relationship with them
- easily offended, they are very sensitive boys
- gay chicken
- they see how touchy they can get with each other before they offend someone or make someone feel uncomfortable
- touchy and sensitive but easy
- tell them to do something they won't do it but if you ask them to do something they will.
- Loud

Instructional characteristics

- they do very well working on their own
- lecture you have to keep it to about 10 minutes or they are going to freak out
- educational needs are tied to their personal needs are challenging

Purpose of SSE

- keep the students from distractions, unnecessary distraction and two appeal to the learning styles of the different sexes
- it was great
- it's been fine
- difficult because I have never had single sex classes at this school, so it's hard to compare, the CP classes are tough and they would be tough with girls, these are just the kids that struggle with education.
- great idea
- learning style is good for teaching boys
- Outdoor labs
- statistically proven to be effective and so that's good
- hen mother and she tells people when they are doing something wrong or she fixes things or takes care of things or people
- boy classes tend to play a lot

Teacher feedback about SSE

- People who sad those things were two very different people
- focus on the lesson plans and assessment
- wasn't much discussion about what to do for the single sex classes.

What will SSE do for students

- focused on learning
- not on other things that they might want to focus on like building a social hierarchy

Appendix G (Development of core themes, axial coding)

Experience before coming to Southeast High School

- my first school
- it was at a private school

Description of school

- here I'm teaching 9th grade physical science and AP physics.
- big, and very diverse being a Title I school
- pretty normal school besides having a diverse population and being a Title I school

THEME: Description of students and school in terms of socioeconomic status

Things she likes about her school

- like my department
- like the instructional coach
- like the students a lot I feel like they are really easy to get to know they are very open
- those are the things that matter the most

THEME: Good relationships with administrators, trust in colleagues

Challenges at the school

- discipline
- kids need a lot of structure and it difficult in that a lot of them never really were taught how to behave
- already adults
- they live on their own
- having someone tell them what to do is a little out of their element
- teachers be from a different socioeconomic and racial perspective that can cause a clash sometimes, teachers are not like students
- for the kids it's a huge like..they stay after school as much as they can and there are all kids of afterschool programs they can do and in that sense I think I plays a big role in keeping them involved in positive activities

THEME: Challenges stemming from socioeconomics

Who are the kids in your class

- three different classes, only one single sex class,
- it's like they have had a totally different educational background
- CP class, an 8th to a 10th of them have failed before
- not motivated by the material but they are motivated or by me, and it's good that I have a good relationship with them
- easily offended, they are very sensitive boys
- gay chicken
- they see how touchy they can get with each other before they offend someone or make someone feel uncomfortable
- touchy and sensitive but easy
- tell them to do something they won't do it but if you ask them to do something they will.
- Loud

THEME: Students are historically underachieving

THEME: Gendered language to describe students in the single sex class

Instructional characteristics

- they do very well working on their own
- lecture you have to keep it to about 10 minutes or they are going to freak out
- educational needs are tied to their personal needs are challenging

THEME: Descriptions of instructional needs or preferences for the single sex class

Purpose of SSE

- keep the students from distractions, unnecessary distraction and two appeal to the learning styles of the different sexes
- it was great
- it's been fine
- difficult because I have never had single sex classes at this school, so it's hard to compare, the CP classes are tough and they would be tough with girls, these are just the kids that struggle with education.
- great idea

THEME: Acceptance of single sex classes

THEME: Minimize distractions and appeal meet gendered instructional needs

- learning style is good for teaching boys
- Outdoor labs
- statistically proven to be effective and so that's good
- hen mother and she tells people when they are doing something wrong or she fixes things or takes care of things or people
- boy classes tend to play a lot

THEME: Evidence of "science thinking" by teachers

Teacher feedback about SSE

- People who sad those things were two very different people
- focus on the lesson plans and assessment
- wasn't much discussion about what to do for the single sex classes.

THEME: No collaboration for single sex classes

What will SSE do for students

- focused on learning
- not on other things that they might want to focus on like building a social hierarchy

THEME: Teachers believe coeducational classrooms can be unfocused on learning and focused on social dynamics

Appendix H (Extension of axial coding, checking for themes across interviews and participants)

THEME: Description of students and school in terms of socioeconomic status

- Consistent with other participants

THEME: Good relationships with administrators

- Consistent with other participants

THEME: Challenges stemming from socioeconomics

- Consistent with other participants

THEME: Students are historically underachieving

- ***Not consistent*** with other participants

THEME: Gendered language to describe students in the single sex class

- Consistent with other participants

THEME: Descriptions of instructional needs or preferences for the single sex class

- Consistent with other participants

THEME: Acceptance of single sex classes

- Consistent with ***some*** other participants

THEME: Minimize distractions and appeal meet gendered instructional needs

- Consistent with other participants

THEME: Evidence of “science thinking” by teachers

- Consistent with ***some*** other participants

THEME: No collaboration for single sex classes

- Consistent with ***some*** other participants

THEME: Teachers believe coeducational classrooms can be unfocused on learning and focused on social dynamics

- Consistent with ***some*** other participants

Appendix I (Emergent themes and supporting information from field notes and transcripts, further generation of themes and categories)

THEME: Description of students and school in terms of socioeconomic status

- Consistent with other participants
- How does this relate to the “rhetoric” of the school?
- Self-fulfilling prophecy? (Appearing (surprisingly) across all interviews)
- Can this be tied to gender?
- Teachers’ assumptions about students based on their socioeconomic status (or gender?)

THEME: Good relationships with administrators

- Consistent with other participants
- Appears that teachers have a support system with one another
- Teachers appear very supportive of their administration
- Teachers appear to buy in when it comes to initiatives at the school
- Teachers appear to agree with administrators

THEME: Challenges stemming from socioeconomics

- Consistent with other participants
- Also part of a self-fulfilling prophecy?
- Related to the perception that teachers have of their students and school related to socioeconomics

THEME: Students are historically underachieving

- *Not consistent* with other participants
- Information appears in some interviews but not all
- Some interviews suggest that the underachievement is a function of socioeconomics

THEME: Gendered language to describe students in the single sex class

- Consisted with other participants
- Gendered language consistent throughout all interviews
- Used with both boys and girls
- Stereotypes are being repeated
- Are stereotypes being perpetuated?
- Where do these ideas of gender come from? (with respect to the teachers?)
- Mother hen, girls not interested in sports, boys not interested in art, boys liking competition, girls liking collaborative work

THEME: Descriptions of instructional needs or preferences for the single sex class

- Consistent with other participants
- Teachers acknowledge using different instructional strategies with different classes
- They appear to “know” what the group needs
- How do they know this? Where did it come from
- No one has experience with single sex classes
- Assumption: ideas for differentiated instruction may have solely come from professional learning activity prepared for teachers
- Instructional needs for males and females are consistent from teacher to teacher
- Are these ideas from PD or do these ideas come from held stereotypes?

THEME: Acceptance of single sex classes

- Consistent with *some* other participants
- All teachers reported favorable feelings toward SSE
- Could be a function of self-selection for participation in the study
- These teachers do not represent the entire school or all SS science teachers
- Teachers could not provide any negatives that make this arrangement any worse than coed teaching
- Almost all teachers in the SSE situation are new teachers.
- Was that strategic?

THEME: Minimize distractions and appeal meet gendered instructional needs

- Consistence with other participants
- All teachers responded with the same answers
- This appears to be what they were told
- They are not thinking for themselves
- They are repeating the information that was given to them
- Another SFP?
- All teachers reported a reduction in distractions
- This is what administrators shared with teachers as a reason to try SSE
- Some teachers brought up instructional strategies, not all – although all implemented or described different strategies, even when they don’t teach both male and female classes.

THEME: Evidence of “science thinking” by teachers

- Consistence with *some* other participants
- Not all participants acknowledged any science pedagogy as part of the interview
- Not all participants are presenting a variety of instructional strategies as seen in field observations
- Emphasis seems to go to sex based strategies which were provided to teachers instead of best practices

THEME: No collaboration for single sex classes

- Consistent with *some* other participants

- All acknowledged that there was no administrative directive for meeting times and places with the expressed purpose of sharing SS strategies
- All teachers had scheduled data team meetings to examine information related to standards and planning (general planning)
- Some teachers indicated talking to peers about strategies for SS classes on their own
- Some teachers indicated the desire to talk to other teachers and plan or discuss best strategies

THEME: Teachers believe coeducational classrooms can be unfocused on learning and focused on social dynamics

- Consistent with *some* other participants
- Relates back to what teachers were told about single sex classes
- Relates back to earlier point- teachers are buying into the administration's vision for the intervention
- SFP?
- Teachers has no basis fort thinking of believing this outside of their situation
- Teachers are buying into the administrations push and repeating the information they were told as opposed to expressing a reflective or opposing opinion.

Appendix J (Extension of axial coding, concept map representing the emergent theme of self-fulfilling prophecies)

