AN EXAMINATION INTO THE ATTITUDES OF GIRLS TOWARDS PHYSICAL ACTIVITY AND PERFORMANCE IN AEROBIC CAPACITY

by

Cynthia Dawn Fairey

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University

2019

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2019

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ABSTRACT

Over the last 30 years, physical activity among adolescents between the ages of 10 and 18 has continued to decline, and the risk of morbidity associated with sedentary living has increased (CDC, 2017). Furthermore, research has identified females as being at greater risk of morbidity because they are opting out of physical activity at twice the rate of boys and not getting the recommended 60 minutes a day of physical activity (NPAP, 2016). Many girls are avoiding physical education classes, where the concepts of health-related fitness, the development of skills necessary to participate in a variety of physical activities, and a love for physical fitness are formed. This research examined attitudes toward physical activity of females in a single-gender versus a mixed-gender physical education (PE) class. The purpose of this static group comparison examination was to determine if a statistically significant difference existed in the attitudes toward physical activity between girls taking a ninth-grade, single-gender PE course and girls taking a ninth-grade coed PE course. The participants for this investigation comprised females between the ages of 13 and 18 taking physical education during the 2018-2019 school year. Three items from a physical activity attitude scale related to gender, competence, and usefulness were used to determine attitudes toward physical activity. Performance in aerobic capacity was also evaluated between the groups using the school district's adopted standardized physical education assessment, FITNESSGRAM® to ascertain the level of cardiovascular fitness of girls taking a single-gender physical education class and girls taking a mixed-gender physical education class.

Keywords: aerobic capacity, FITNESSGRAM, healthy fitness zone, health-related fitness, mile run assessment, obesity, physical activity, self-efficacy, vigorous activity

Dedication

I had a high school guidance counselor who once told me that I would never make it in college and that I should learn a trade. I always dreamed of going to college, but didn't have the support at home or developed the skills to be academically successful. This dissertation is dedicated to those who have been told they can't accomplish something or shouldn't chase their dreams. Have faith, work hard and continue to dream big, because if I can do it, anyone can!

Acknowledgments

Philippians 4:13 asserts “I can do all things through Christ who strengthens me.” There have been many people along the way who have supported and encouraged me but First and foremost, I would like to acknowledge Jesus Christ who made all of this possible. I would like to thank Liberty University for introducing Him to me during my first intensive and providing an avenue to get to know Him through a Biblical approach to education.

I would also like to acknowledge my professors and colleagues who supported me during this process, especially my mentor Dr. Silvernail for your advice and patience during this process. Your words of wisdom and faith that I would finish meant more than you will ever know. When I was feeling overwhelmed you once told me to eat an elephant one bite at a time and you don’t know how many times, I revisited the analogy to get through a section of this dissertation or countless revisions. In addition, I would like to thank my Dissertation Chair, Dr. Judy Sandlin, and Research Consultant, Dr. Lunde, for their professionalism, suggestions and motivation to get this project completed.

Finally, I would like to acknowledge my family and friends for your unconditional love and support. Without you, I would not have stayed on course. Thank you for always asking how the dissertation was going, the jokes and encouragement to finish. To my “biggest fan,” thank you for always being there, having my back, putting up with weekends and nights in front of the computer, and taking care of things so that I could complete this project. You have always been there despite the circumstances, consistently reminding me that I would finish. I would not have wanted to participate in this journey without you.

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List of Abbreviations

Attitudes Toward Physical Activity Scale (ATPAS)

Body Mass Index (BMI)

Centers for Disease Control and Prevention (CDC)

Comprehensive School Physical Activity Program (CSPAP)

English as a Second Language (ESL)

Healthy Fitness Zone (HFZ)

Individual Education Plan (IEP)

Institutional Review Board (IRB)

Metabolic Equivalent (MET)

National Association of Sport and Physical Education (NASPE)

National Physical Activity Plan (NPAP)

No Child Left Behind Act (NCLB)

Physical Activity (PA)

Physical Education (PE)

Social Cognitive Theory (SCT)

Society of Health and Physical Educators America (SHAPE)

South Carolina Department of Education (SCDE)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this research was to determine if a statistically significant difference exists in attitudes towards physical activity (PA) between girls taking a ninth-grade, female-only physical education (PE) course and girls taking a ninth-grade PE course with both boys and girls and to determine the aerobic capacity of both groups. The chapter begins with a discussion of the background about the health and PA trends in adolescents, with an emphasis on the female population. The researcher then presents the problem statement, purpose of the study, significance of the study, research questions, and important definitions.

Background

Despite the U.S. Department of Health and Human Services (2012) recommendation that children participate in PA at least 60 minutes a day to reduce cardiovascular disease, diabetes, and other health issues related to living a sedentary lifestyle, research continues to reflect rising obesity rates (Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018). In the United States, adults are not the only population to suffer the consequences of leading non-active lifestyles; children and adolescents are also at risk. Since the 1970s, obesity in children and adolescents has more than tripled, and the trend does not seem to be slowing down (Centers for Disease Control and Prevention [CDC], 2018). Adolescents appear to be frequently opting out of vigorous exercise needed to maintain health-related fitness. Research conducted through the U.S. Department of Health and Human Services (2012) noted that only 29% of high school students participated in the recommended daily 60 minutes of vigorous activity. Furthermore, the number of obese children between the ages of 6 and 11 has increased from 7% in 1980 to 20% in 2008, and obesity in children between the ages of 12 and 19 also increased from 5% to

18% during the same time period (Alfonso et al., 2013). Overall, the prevalence of obesity in children 12-19 years old in the United States is 17%, with substantial disparities between males and females. Specifically, data have suggested the pervasiveness of obesity is much higher in females (Ogden, Carroll, Fryar, & Flegal, 2015).

An abundance of research has reflected the lack of PA between boys and girls, but the most disturbing statistic is the number of girls as compared to boys who are choosing not to participate in exercise, and the disparity has been shown to occur as early as elementary school, leaving females more predisposed to physical and psychological health issues associated with overweight and obesity (Standiford, 2013). This finding suggests that as girls avoid PE and activity, the likelihood of them becoming healthy, active lifetime movers also declines. The Surgeon General's Report on Physical Activity and Health revealed that girls are twice as inactive as boys, with 14% inactivity for females compared to 7% inactivity for males (U.S. Department of Health and Human Services, 2012). Furthermore, females participate less frequently in moderate to vigorous activity than males during their adolescent years (CDC, 2016). This problem was not only shown to be consistent in the United States but also globally. Australia has also seen a decrease in PA among the adult population, as well as in children and adolescents. Researchers found global trends and data very similar to those found in the United States that support a steeper decline in the participation in PA among females than among boys (Slater & Tiggarmann, 2010).

Moderate to vigorous activity 5 to 6 days a week is not only needed to promote bone growth and lower the risk of heart disease but also to combat the obesity epidemic in the United States. Research has shown sedentary habits of pre-adolescent and adolescent females surpass those of boys, and girls have been found to have lower baseline PA levels than boys in as early

as fourth and fifth grades (Hannon & Ratliffe, 2007). In a U.S. investigation into the obesity epidemic, the National Center for Disease Prevention and Health Promotion discovered that girls were twice as likely not to get the recommended amount of PA as boys (CDC, 2017). Although interscholastic recreation sports as well as PE are valuable avenues to mobility, adolescents appear to be avoiding participating in these opportunities.

In examining the relationship between gender differences and the participation in sports and PA, Slater and Tiggarmann (2010) noted that girls were less likely to participate and were more likely during participation to experience teasing—by the same sex as well as the opposite sex—than males. In addition, Ogden et al. (2015) suggested that girls were less likely to attend PE class, where opportunities to participate in vigorous PAs are available. During a qualitative synthesis of 19 multidisciplinary research studies, Standiford (2013) found multiple themes that suggested both perceptual and interpersonal barriers to girls' participation in PA, such as competing for time, space, and recognition with the opposite sex; appearance and body image concerns related to teasing and bullying from boys in the PE setting; and gender roles associated with what social media portrays as feminine.

Before Title IX of the Education Amendment Act of 1972, PE classes were separated by gender (Gabbei, 2004). However, to create a more equitable learning environment for females, PE classes became coeducational settings. Many have argued that although Title IX created more opportunities for girls and women in sport, it did not require that all PE courses become mixed gender, nor did it prescribe the coeducational setting as the most appropriate learning environment for some students (G. M. Hill, Hannon, & Knowles, 2012). Title IX legislation stipulated that "no person in the United States, on the basis of sex shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education

program or activity receiving federal financial assistance" (Cooky, 2017, p. 12). One of the intentions of the law was to level the playing field by providing equal access and opportunities for interscholastic, intercollegiate, and professional women's athletics so that all have access to the same opportunities. However, it has been suggested that girls and women in sports are skilled and trained in competition, very unlike the typical, female adolescent taking a coed PE class to earn a high school credit for graduation. Therefore, non-athletic females may feel inferior playing with or against males who may be aggressive and take over the playing environment, which in turn impacts the amount of daily practice and playing time. Examinations into barriers between boys and girls in the activity environment have suggested females do not get ample practice time to improve skill development to meet state and national standards in the coed setting (Gabbei, 2004). In addition, researchers have found fear of being ridiculed, bullied, and teased by the opposite sex to be barriers that can have detrimental effects on self-efficacy and intrinsic motivation when learning new skills. Zaravigka and Pantazis (2012) postulated that male and female stereotypes taught from birth are reinforced and exhibited in behaviors that create barriers between male and female students and in teacher/student interactions that prevent free expression and participation in the coed PE setting.

Using Albert Bandura's (1986) social cognitive theory (SCT) as a framework to explore factors impacting the likelihood of adolescent girls participating in sport and PA provided support for considering the reimplementation of single-gender PE as an intervention for change to combat the current trend of inactivity impacting the number of overweight and obese pre-adolescent and adolescent females and to decrease the rate of morbidity related to sedentary living. According to Bandura (1986), SCT was derived from the idea that stimuli through the environment in which one interacts, personal factors, and behavior are all interwoven and impact

one another, and as a result, a person's knowledge from experience and the observation of one's immediate environment impact the choices a person makes. For instance, knowledge from previous experiences and having a familiarization with the outcome of the experiences increases self-efficacy, which determines perceptions of competence in engaging in a similar situation within one's environment (Miller, 2011). In addition, Bandura (1977) suggested that an individual is more likely to emulate behavior if the model is similar to the individual observing the behavior. This point is relevant in evaluating why the coed setting may not be a suitable environment conducive to motivating girls to be active. Negative stimuli from boys, such as teasing, bullying, and other verbal and non-verbal cues that are experienced during practice and gameplay impact the cognitive process to participate or not. Feelings of intimidation or inferiority that may have been experienced by girls in the coed PE setting initiate anticipated negative outcomes such as being ostracized or picked on; thus, the decision not to participate is much more attractive.

Self-efficacy and outcome expectations have been identified as strong and consistent factors that impact PA (Young, Plotnikoff, Collins, Callister, & Morgan, 2014). Anticipated negative verbal cues, such as teasing and bullying, are examples of outcome expectations that impact choices girls make about choosing to participate in PA. According to SCT, people demonstrate behavior based on the probability of a positive or negative outcome that can be related to physical gains or losses, social approval, or disapproval of others, as well as self-evaluative feelings about how one will feel after demonstrating the behavior (Young et al., 2014). This idea suggests that females who have been unsuccessful in PA or who have had negative experiences in PE may have developed negative perceptions toward PE and activity. Thus, such negativity could impact the likelihood of future participation. It also suggests that

learned gender roles can influence the presence of gender bias that may have a positive or negative impact on performance.

Problem Statement

Declining levels of PA have been documented for a growing number of children and adolescents (Ogden et al., 2015). Research has indicated barriers much different from those that hinder boys from participating in PA are hindering females from finding enjoyment in PA, participating in PE, and getting involved in sport. Not getting the recommended amount of vigorous PA and failing to find enjoyment in movement during adolescence has been found to increase the risk of obesity, cardiovascular disease, and the probability of not pursuing a physically active lifestyle as an adult. Data reflect that obese adolescents are 70% more likely to become obese adults (Alfonso et al., 2013). Previous research has identified some of the underlying causes of this trend, and they appear to be present in activity settings where girls and boys are required to participate together. Barriers such as verbal teasing, taunting, and bullying by boys, non-verbal actions such as the exclusion of girls during gameplay, and the aggressive nature of boys appear to have an impact on the attitude of girls toward PA. Self-efficacy has been identified as an essential factor needed to motivate and encourage females to make PA a priority and pursue a physically active lifestyle. It has also been described as an important part of keeping students engaged and on task in the PE environment and on the field (Pajares & Urdan, 2006). Furthermore, it is essential that professionals in the field of education and sport implement interventions that encourage self-efficacy in order to impact the number of physically active females who choose to be lifetime movers and to combat the risk of morbidity associated with a sedentary lifestyle.

Much research has been conducted on attitudes and participation in the coed PE setting and on factors related to why girls are opting out of PE and PA, but none of the studies to date have offered any solutions. Currently, few studies have concentrated on the unique nature of the single-gender PE class and how it impacts self-efficacy, attitudes toward participating in PA, performance in aerobic capacity, and the likelihood adolescent girls will continue to pursue a physically active lifestyle. Physical education classes with males and females will continue to have negative implications on the likelihood of girls choosing to pursue a physically active lifestyle because of the barriers identified in the research. Single-gender PA programs that promote positive interaction between adolescent girls and foster fun, vigorous activity and an opportunity to socialize are needed to change the current national and global trend (Standiford, 2013). The problem is there is an abundance of current literature regarding the declining levels of PA in adolescent females and attitudes related to the coed PE setting, but very little research has offered interventions to address the issue or insight into the nature of the single-gender PE class and how it impacts attitudes toward participation in PA and aerobic capacity.

Purpose Statement

The purpose of this static group comparison design study was to test the relationship between girls' attitudes toward PA in a single-gender versus mixed-gender PE setting while controlling for learning environment and gender. This research design was chosen because of the nature of the public-school setting. Students were not able to be randomly assigned without disrupting or reorganizing the education setting. The static group comparison design is most commonly used due to the absence of random sampling and a pre-test(Gall, Gall, & Borg, 2007). Therefore, convenience sampling was used to assign a control group consisting of a girl-only class and an experimental group of a mixed-gender class. In addition to determining the

attitudes of girls towards PA, this research also identified the aerobic capacity of females taking both single gender and mixed gender physical education to compare aerobic capacity between groups.

The independent variable for this study was learning environment. *Learning environment* is defined as a multi-dimensional domain where varied instruction, learning tasks, and activities include all students from diverse circumstances, where personal growth and cooperation are emphasized, and where all students feel safe and supported (Weidong, 2015). The PE learning environment encourages students to demonstrate the outcomes of high-quality PE, encourages student engagement, and supports a task-oriented, physically and emotionally safe environment (Grout & Long, 2009). The dependent variables were aerobic capacity and attitudes. Aerobic capacity is synonymous with cardiovascular activity, cardiovascular fitness, and aerobic fitness. It is measured using estimates of maximum oxygen uptake, or VO_2 max. It is the ability of the cardiovascular, respiratory, and muscular systems to take in and supply oxygen to the body tissues and working muscles and the efficiency of the tissue and muscles to use the oxygen (Cooper Institute, 2017). Aerobic capacity scores were measured by FITNESSGRAM®, a standardized fitness test that measures the five components of health-related fitness: cardiovascular fitness, muscular strength, muscular endurance, body composition, and aerobic capacity.

The formation of *attitudes* begins early in life and have been identified as key factors that influence PA in adolescents (Jurisin, Malcic, & Kostovic, 2017). Attitudes are defined as beliefs that lead to choices people make (Jurisin et al., 2017). The Attitudes Toward Physical Activity Scale (ATPAS), with a Likert design, determined attitudes toward participating in PA, participation with boys, and the likelihood of further participation beyond the completion of the

course. The ATPAS used in this research to help identify attitudes toward participating in PA was adopted from a scale developed by Fennema and Sherman (1976) to investigate sex-related differences in learning mathematics. It was modified to adapt to the PE environment and attitudes toward PA.

Prior to 1972, PE was a single-gender course in most schools around the country. However, due to the influence of Title IX and an effort to create a more equitable learning environment where girls have the same access and opportunities as boys, many schools transitioned to coed PE courses. However, the participation of girls in the coed classroom presented a unique set of challenges that affected whether girls were actually getting equitable access to PE and the positive influences that impact future decisions to participate in the vigorous activity needed to lead a healthy lifestyle. Zarazigka and Pantazis (2012) suggested that for many students, the coed setting was not the best alternative due to barriers that were caused by differences between boys and girls. Barriers were found to influence opportunities to participate in PA and social and emotional factors were found to be contributing factors for the continued decline of physically active females and the increase in morbidity related to sedentary living.

The population in this investigation were girls between the ages of 13 and 18 who were either taking a ninth-grade PE course with girls only and girls taking a ninth-grade PE course with both boys and girls. The purpose of this research was to determine the impact a single-gender PE course has on the attitudes of girls toward participating and learning skills related to PA and on recognizing the necessity of leading a physically active lifestyle versus those attitudes of girls in the coed setting. By exploring the potential effects of the single-gender versus the coed environment, potential changes in current practices can be discussed that may increase the

number of girls taking PE, improve their activity throughout life, and lower the risk of childhood obesity and disease related to inactivity.

Significance of the Study

It is recommended that adolescents between the ages of 5 and 17 should participate in at least 60 minutes of moderate to vigorous PA 5 to 6 days a week (Martins, Marques, Sarmento, & Carreiro da Costa, 2015). In addition, the U.S. Department of Health and Human Services (2012) has recommended at least 150 minutes a week of moderate to vigorous PA for adults. Despite these guidelines, research has continued to reflect both adults and children are not getting the recommended amount of physical exercise for cardiovascular health (Bornstein & Pate, 2014). To address this problem and advocate for physically active lifestyles, the U.S. National Physical Activity Plan (NPAP) was implemented in 2010. Strategy 1 targeted public schools and emphasized accessibility and opportunities for high-quality, comprehensive PA programs influenced and grounded by quality PE programs that are inclusive, safe, and promote PA from pre-kindergarten through 12th grade (Bornstein & Pate, 2014). Despite this initiative and research indicating a higher risk of chronic disease and premature death associated with inactivity, the problem has continued, not only in the United States but globally, with adolescents in 39 countries between the ages of 11 and 15 engaging in less than the recommended amount of moderate to vigorous PA (Martins et al., 2015).

Due to precipitous declines in PA over the last several years, pre-adolescent and adolescent females have been found to be more at risk of morbidity associated with lack of cardiovascular health (Gao, Liu, Lodewyk, Zhang, & Kosma, 2011). In fact, although the benefits of lifelong fitness are clearly defined, adolescent and pre-adolescent girls have continued to opt out of vigorous PA at a much steeper rate than boys. In a report published by

the CDC, it was identified that 31.8% of girls and 18.0% of boys were failing to meet the minimum 60 minutes of vigorous activity 5 or more days a week (Alfonso et al., 2013). Furthermore, it has been suggested that during puberty girls get about 30 minutes less PA per day than boys of any age and begin to decline in the recommended amount of PA as early as 1.5 years before boys (Spruijtmetz et al., 2013). In addition, evidence of declining PA has indicated an increased proportion of adolescent girls who are overweight and obese (Alfonso et al., 2013). Higher PA levels have equated to a lower incidence of chronic disease and premature death (Bornstein & Pate, 2014).

Aerobic capacity has been directly related to overall health and wellness and reduced risk of heart disease. A lack of PA that encourages heart and lung function has not only been shown to decrease aerobic capacity, it has also indicated an increase in risks associated with morbidity related to inactivity. Furthermore, research has indicated that aerobic capacity is one of the most important components of health-related fitness because acceptable levels are associated with the reduced risk of coronary heart disease, obesity, diabetes, cancer, and high blood pressure (Meredith & Welk, 2010).

Although an abundance of research exists on identifying barriers present in the coed setting that impact the attitudes of girls toward participation and learning skills necessary to enjoy and lead active lifestyles, scant research has focused on identifying if those attitudes are present in the single-gender environment. This study thus contributes to previous research pertaining to barriers for females in the high school PE setting and the impact of the single-gender environment on females' attitudes toward participating in and learning the skills necessary to pursue an active lifestyle and lower the risk of disease associated with inactivity.

Research Questions

The following research questions guided this study:

RQ 1: Is there a difference in the attitudes toward participating in physical activity, as measured by an attitude scale, between girls who have completed a ninth-grade single-gender physical education course and girls who have completed a ninth-grade mixed-gender physical education course?

RQ 2: What is the aerobic capacity of girls taking a ninth grade single gender physical education class and girls taking a ninth grade mixed gender physical education class as measured by FITNESSGRAM?

Definitions

The following definitions of key terms are provided to encourage understanding and consistency throughout this research:

1. *Aerobic capacity*: Aerobic capacity is synonymous with cardiovascular activity, cardiovascular fitness, and aerobic fitness. It is measured using estimates of maximum oxygen uptake, or VO_2 max. It is the ability of the cardiovascular, respiratory, and muscular systems to take in and supply oxygen to the body tissues and working muscles and the efficiency of the tissue and muscles to use the oxygen (Cooper Institute, 2017).
2. *Attitudes*: Attitudes are defined as beliefs that lead to choices people make. They are formed early in life and are key factors that influence PA in young people (Jurisin et al., 2017).
3. *FITNESSGRAM*: FITNESSGRAM is a criterion-referenced fitness test that was created more than 20 years ago by the Cooper Institute to provide PE teachers with a tool that not only assesses health-related fitness but also encourages communication of the testing

results to students and parents. The assessment measures five components of health-related fitness: cardiovascular fitness, muscular strength, muscular endurance, body composition, and flexibility (Meredith & Welk, 2010).

4. *Healthy fitness zone (HFZ)*: The HFZ consists of the criterion-referenced standards that have been established based on what is needed for good health (Meredith & Welk, 2010).
5. *Health-related fitness*: Health-related fitness refers to the components of physical fitness that are needed for good health. These include but are not limited to cardiovascular fitness, body composition, flexibility, muscular strength, and endurance (Corbin & Lindsey, 2005).
6. *Learning environment*: Learning environment is defined as a multi-dimensional domain where varied instruction, learning tasks, and activities include all students from diverse circumstances, where personal growth and cooperation are emphasized, and where students feel safe and supported (Weidong, 2015).
7. *Metobolic equivalent (MET)*: An exercise intensity measurement that equates to the amount of oxygen consumption or energy expenditure that is exerted during exercise (Lacy & Williams, 2018)
8. *Mile run assessment*: The mile run assessment is used to provide an estimate of aerobic capacity (VO_2 max). The students run and/or walk 1 mile in the fastest time possible (Meredith & Welk, 2010).
9. *Obesity*: Obesity in children and adolescents as defined by the CDC is having a body mass index (BMI) at or above the 95th percentile of adolescents and children of the same gender and age. Due to varying body composition occurring during the maturation

process, it is necessary to measure BMI scores relative to others of the same sex and age (CDC, 2016).

10. *Pacer test*: The Pacer test is a progressive aerobic capacity assessment that measures cardiovascular endurance. It is multi-stage and adapted from the 20-meter shuttle run (Meredith & Welk, 2010).
11. *Physical activity*: Physical activity is the contraction of skeletal muscle during any body movement that increases energy expenditure. This can include but is not limited to team and individual sports and recreation activities, dance, and aquatics (Pajares & Urdan, 2006).
12. *Self-efficacy*: Self-efficacy is the belief in one's ability to learn or perform motor skills and/or tasks related to sports to achieve an outcome (Pajares & Urdan, 2006).
13. *Vigorous activity*: According to the CDC, vigorous activity can be defined as brisk walking at 5 mph or faster and/or greater than 7.0 METS, or more than 7 kcal/min (as cited in Ainsworth et al., 1993).

CHAPTER TWO: REVIEW OF LITERATURE

Overview

This review of literature examines gender issues related to females in PE. The investigation began as an exploration of the steadily growing rate of sedentary habits of pre-adolescent and adolescent females. As students participate in PE, the necessity for them to recognize the importance of lifelong fitness and acquire an enjoyment of PA is needed in order to become lifelong movers (National Association of Sport and Physical Education [NASPE], 2013). However, the research identified barriers associated with gender, environment, and social interaction in the mixed-gender PE settings that not only affected competence in acquiring the skills necessary to become lifetime movers but also affected attitudes toward PA that may impact the likelihood that females choose to pursue a physically active lifestyle.

Although much research has been conducted on the impact of the coed PE environment and the attitudes and performance of females, few studies have explored the nature of single-gender PE and the effect on the health-related fitness of adolescent females or have explored females' attitudes toward PA and working with other girls of similar age without the distractions of boys. Therefore, this literature review begins with a description of the current health status of females and is followed by a discussion of Bandura's SCT, which served as the theoretical framework for the study. The research is then summarized, and a discussion of further research is included.

Historical Background

Based on a rise in childhood obesity and morbidity related to sedentary living, it is evident that a lack of PA is present that encourages a healthy level of fitness in adolescents. It has been recommended that adolescents between 12 and 17 participate in moderate to vigorous

activity for at least 60 minutes 6 to 7 days a week to maintain a healthy lifestyle that is free of disease related to inactivity (Adams, Johnson, & Tudor-Locke, 2013). Despite these recommendations, childhood obesity has continued to rise, and declining levels of PA have been documented for a growing number of children and adolescents (CDC, 2018). Activity levels of females have continued to fall at a rate twice that of males, making disease related to sedentary choices a greater risk for girls than boys, and research has reflected vigorous activity declines in participation for girls, from 45.4% in eighth grade to 34.1% in 12th grade (Yungblut, Schinke, & McGannon, 2012). It has been suggested females are adamant about not attending PE and avoid it at all costs by skipping class, asking to go to the nurse's office, and hiding in the locker room during class (G. M. Hill et al., 2012). Research has also demonstrated that attitudes toward PA and sport influence participation, skill development, and the likelihood of pursuing an active lifestyle (Todaro, 2014).

In addition to the influences of positive and negative attitudes toward PE, explorations into females and their perceptions of PA during adolescence has confirmed that healthy habits formed early in life can impact the likelihood of carrying those habits into adulthood. Yungblut et al. (2012) postulated that girls who actively participate in PA during their eighth-grade year are more likely to continue to engage in PA in 12th grade. Establishing physically active behavior early in life has not only been deemed important for health and well-being, it also establishes patterns that are more likely to be continued later in life (Dwyer et al., 2006). Although early habits are influential in establishing lifelong patterns of exercise, research has indicated the necessity of intrinsic motivation through finding fun and enjoyment in PA (Ennis, 2014). As children develop favorable attitudes for vigorous PA, the likelihood of future participation is more likely, and risks associated with sedentary living are reduced. While

looking into determining factors impacting the participation and likelihood of PE students finding enjoyment in PA, Ennis (2014) postulated competence, motivation, and self-efficacy as intrinsic beliefs that must be present to develop positive perceptions about exercise. Self-efficacy, competence, and motivation were found to be three components embedded in Bandura's SCT that described a person's intrinsic belief system, wherein success is directly impacted by perceptions and interactions the learner has acquired and experienced through the environment and other individuals (Bandura, 1977). Ennis (2014) suggested that students who look favorably upon learning new skills and concepts believe effort and persistence will impact improvement, and those who observe positive behaviors from others will more likely find enjoyment in the process of learning skills related to PA than those who have unfavorable perceptions of themselves and the environment around them.

Theoretical Framework

This study was based on the idea that environment, opportunities to participate, social support, and gender barriers impact competence, attitudes toward PA, and the likelihood of females to participate in vigorous activity beyond the PE class. Bandura's (1986) SCT was used in this quantitative investigation to explore how environmental factors impact attitudes toward PA and performance in aerobic capacity. Bandura is one of the most notable psychologists in the field of developmental psychology (Miller, 2011). He is known for his contributions to the study of social learning theory, which explains human behavior as being influenced by interactions between thoughts, behavior, and environmental influences and continuous, reciprocal interaction based on reactions or outcomes. In other words, a person and the environment are both reciprocal determinants of each other (Bandura, 1977). As this theory evolved, Bandura developed it into a more empirical theory known as SCT to discern how young people learn

information and behaviors that are necessary for interacting in a variety of situations (Weiss, 2004).

Social cognitive theory suggests that human behavior is formed through interactions within the environment, and a person's behavior, cognitive, and other personal influences are all interwoven as interacting determinants of one another. This idea was grounded in Bandura's (1986) triadic reciprocal causation model (see Figure 1), in which influences between causal variables produce effects that in turn impact behavior. Human thought and action have been found to be driven by these cognitive processes and impact motivation, effect, and action, which lead to efficacy beliefs that can influence a person's perception of competence to demonstrate influence over one's actions and overcome circumstances that may otherwise have adverse effects (Bandura, 2007). Self-efficacy beliefs are grounded in what a person believes they can do with the abilities and skills they have acquired under various conditions (Leary & Tangney, 2003). This was not found to be a prediction about behavior but an emphasis on what the individual believes can be done during challenging, changing environments and situations (Leary & Tangney, 2003). Furthermore, goals, outcome expectations, and perceived environmental constraints and facilitators, which are all interwoven and operate through self-efficacy beliefs, regulate an individual's motivation, behavior, and well-being (Bandura, 2004). Social cognitive theory describes self-efficacy as beliefs that are connected with these factors and work together with goals, outcome expectations, and perceived environmental impediments and facilitators as determinants of one's ability to exercise control over psychosocial influences that affect health behavior and the process to change (Bandura, 2004).

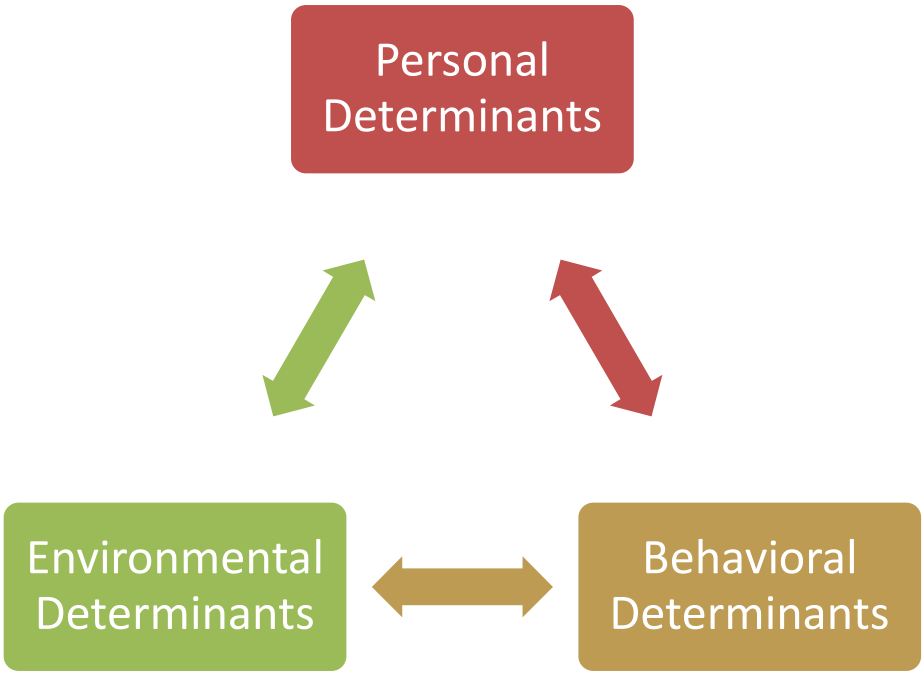


Figure 1. Bandura's (1986) triadic reciprocal causation model.

Knowledge has been identified as the catalyst for behavior change because the information that is acquired by a person through experience can negate any preconceived ideas. Knowledge of health risks associated with sedentary living or experiencing social interactions that are fun while participating in physical activity can impact the intention to participate in PA (Dewar, Plotnikoff, Morgan, Okely, & Costigan, 2013). Self-efficacy has been identified as the median determinant for behavior change because it influences a person's goals, outcome expectations, and perceptions formed from the environment (Bandura, 1986). It was also the central focus for this research because the experiences in the single-gender and coed PE environment impact the development of competence and motivation through positive or negative outcomes. Motivation can impact the formation of goals or the intention to do something, such as participating in the recommended amount of vigorous daily PA. Self-efficacy beliefs drive motivation, which was found as a necessary component for adolescents to engage in PA and sport (Ortega et al., 2018). If an individual does not believe a desired change will occur by his or

her actions, there is very little incentive to act or continue through adverse situations or failures (Bandura, 2004). Health behaviors are formulated through outcome expectations that may be physical, social, or self-evaluative, and a person's reaction, motivation, and goals are influenced by expectations from previous experiences that have been premised on what an individual expects the outcome to produce (Dewar et al., 2013). An example of this was evident in research into behavior changes and the influences of social and environmental support through the amount of family and peer reinforcement and access to facilities and equipment. An investigation into interventions that foster belongingness and target health behavior change identified interpersonal connections, adequate facilities and equipment as important factors in overcoming challenges related to PA and health behaviors in adolescent girls (Dowd, Chen, Jung, & Beavchamp, 2015).

Self-efficacy beliefs have been described as an integral part of SCT because they are personal factors that can be cultivated from interactions with the environment into motivation, knowledge, and a sense of commitment that can impact a student's behavior to participate in PA and continue a healthy lifestyle or to not choose healthy behaviors. Weinberg and Gould (1999) noted individuals who perceive themselves successfully performing a behavior will increase the likelihood they will continue to engage in the behavior. Griffin, Meaney, and Hart (2013) suggested that when environment and self-efficacy beliefs interact, knowledge is obtained and used to make judgments that will impact whether adolescents will commit to engage in PA. Females who may not have had ample practice opportunities and are grouped in competitive, physically active games may develop positive or negative efficacy beliefs that will influence the decision to participate in vigorous games in the future. Hamilton, Warner, and Schwarzer (2017) postulated that efficacious beliefs impact the likelihood of future participation in PA, and

adolescents with higher self-efficacy beliefs have higher levels of PA and are more likely to develop motivation to continue to participate over time. Conversely, females who have been unsuccessful in PA or who have had negative experiences in PE may develop lower self-efficacy beliefs and are more likely not to participate in PA or PE, which will in turn impact the intention to choose a healthy lifestyle. This negativity may explain the current national trends of inactivity and failing to meet the minimum requirements of 60 daily minutes of vigorous PA. It may also provide insight into the disparities between boys and girls in regard to PA. Teasing and aggressive behavior elicited by boys may create perceptions of an emotionally unsafe environment for females wherein they feel a lack of social support.

According to Bandura (2006), the three factors that encompass efficacy beliefs and impact an individual's decision to act are inhibitory effects or positive outcomes, disinhibitory effects or negative outcomes, and modeling (see Figure 2). Self-efficacy judgments are found to be based on perceived abilities to perform an activity rather than on a person's personality or psychological traits. In addition, performance can be enhanced by an individual's sense of confidence, and strong self-efficacy toward his or her ability to approach tasks will result in more favorable results. Research has indicated individuals who are more self-efficacious are less likely to avoid challenges than those who are less self-efficacious (Zhu, Haegele, & Davis, 2018).

Social cognitive theory describes self-efficacy beliefs as multifaceted, task-specific, and based on perceptions of the rewards and consequences from what is being performed or modeled (Bandura, 2006). For instance, a student could convey lower self-efficacy beliefs playing volleyball in a competitive environment as opposed to a more congenial environment. Another example includes a student who feels more efficacious hitting a tennis ball back and forth with a

partner but feels lower efficacy for the tennis serve. Finally, an individual may feel efficacious with certain sport skills but have lower self-efficacy while participating in environments with both genders as opposed to the same gender, or vice versa. Efficacious behavior is dependent on a student's personal perception of whether the same rewards and consequences will occur if the performance is demonstrated again. The level of mastery the student perceives or the level the student feels he or she is currently at in comparison to peers influences behavior. During activities where competency is required, self-efficacy impacts how outcome expectations influence personal decisions and effort spent, and motivation to perform an activity is greater when the perceived outcome expectancy is higher (Bandura, 1986). These factors are important when learning skills or participating in PA because practice, repetition, and failure are all an integral part of achieving competency.

Elliot and Dweck (2005) described competence and motivation from the social cognitive perspective in three stages. During Stage 1, the learner closely watches a model learn or perform a skill, and discernment of the correct form is established. The observer makes a self-efficacy judgment based on the consequences to the model, such as applause or cheering. The likelihood the beginner will be motivated to engage in the learning experience is enhanced or diminished through the observation of positive or negative consequences to the model. Stage 2 is the emulation level, where the learner demonstrates what was observed based on what was modeled. Stage 3 is the self-regulatory level, where the learner must practice without the model present, and success and failure impact the motivation to continue until mastery. It has been suggested the more self-efficacious the individual is, the more likely mastery will occur (Elliot & Dweck, 2005).

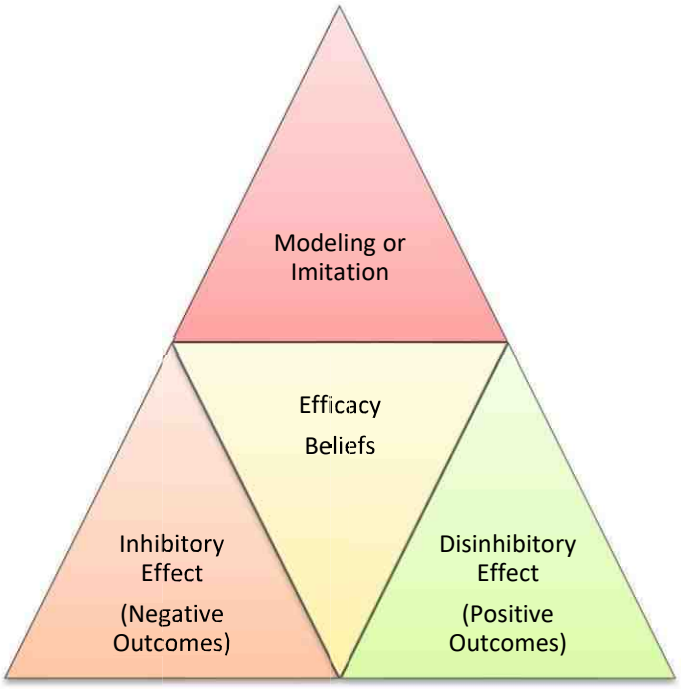


Figure 2. Bandura's (2006) inhibitory and disinhibitory effect.

In an investigation of eighth- and ninth-grade girls' perceived physical environment and PA, Motl et al. (2005) found a direct correlation between feelings, behavior, and outcome expectations related to the environment. The triadic reciprocal determinant in the research was self-efficacy and the belief in one's capability to perform. Girls were more likely to participate if they received positive reinforcement and felt safe during the activity than if they had negative experiences. The research supported the idea that environments that are perceived emotionally unsafe, inaccessible, and lacking social support may be associated with negative beliefs of personal efficacy. This suggests a correlation between lower PA levels and negative self-efficacy beliefs.

In addition to emotionally safe and accessible environments, Tokar, Thompson, Plaufcan, and Williams (2007) postulated that efficacious beliefs and assumptions related to learned experiences impact the development of positive or negative beliefs about PA that influence the development of an interest or disinterest to participate. These interactions with the environment,

observations, modeling, and social interactions demonstrate learning experiences that affect perceptions and assist in the formulation of a person's belief or competence in being able to carry out a task or challenge. This finding suggested that choices made and behavior elicited may be rooted in outcome expectations based on observations. Behavior to participate may be based on what has been coded from observations through learned experiences. Environmental influences such as time on task, types of activities, social support, interaction with peers, and equipment in a PE class affect what is perceived and learned. These observations and interactions impact the cultivation of personal traits that develop self-efficacy, which can influence behavior related to participating in PA. A person's thoughts can be "a source of human failing and distress as well as human accomplishment" (Bandura, 1986, p. 19).

Related Literature

This section discusses the literature on gender issues related to females in PE. Topics covered include PE and trends related to PA; PE and the impact of Title IX; PA, such as opportunities to participate and differences between boys and girls; social and emotional barriers; barriers to student/teacher interaction; and benefits of single-gender education.

Physical Education and Trends Related to Physical Activity

Before the 1900s, PE was limited to calisthenics and gymnastics, and the primary focus was to correct posture problems (Mechikoff & Estes, 2006). However, by the mid-1900s, due to trends in science, social changes in American living, and advancements in education, it progressed to a three-dimensional initiative that included competitive athletics, social reform, and PE in the form of play, games, and sport (Mechikoff & Estes, 2006). These activities were found to be necessary for the physical and mental development of both boys and girls, and the primary objective was to build character, intellect, and social adjustment skills needed to become

contributing members of society (Mechikoff & Estes, 2006). As demands of society changed and to prepare for the 21st century, the national education reform movement was introduced to address what children needed to know and be able to do in order to meet the demands of the future (NASPE, 2004). Content standards with assessments and benchmarks were established across all content areas, including PE (NASPE, 2004). To meet these requirements and align with materials from other content areas, NASPE and the American Alliance for Health, Physical Education, Recreation and Dance introduced the first national PE standards that reflected what a physically educated individual should know and be able to do, with the following five areas of emphasis (NASPE, 2004):

- Has learned skills necessary to perform various physical activities.
- Knows the implications and the benefits of involvement in PA.
- Does participate regularly in PA.
- Is physically fit.
- Values PA and the contribution to a healthful lifestyle.

Over the last 20 years, PE has evolved into a more focused and rigorous content area that has become an essential part of a young person's education and basis for the development of lifelong fitness (Society of Health and Physical Educators [SHAPE] America, 2015). The primary focus of PE programs, not only in the United States but across the globe, is developing the skills necessary for participation in sports and PA, acquiring the knowledge to develop an adequate level of health-related fitness, and encouraging the enjoyment of PA (Woodson-Smith, Dorwart, & Linder, 2015). SHAPE America (2015) defined a *physically literate individual* as someone who possesses the following criteria:

- Has learned the skills required to participate in a variety of PAs.

- Understands the implications and the benefits of participating in various types of PAs and is involved in regular PA.
- Values and participates in regular PA and understands the contributions to a healthful lifestyle.

Despite a more rigorous and purposeful approach to PE, only 8% of children and adolescents between the ages of 6 and 17 met the 60 daily minutes of vigorous PA recommended to reduce the risk of chronic diseases such as high blood pressure, obesity, and type 2 diabetes (Pabayo, Molnar, Cradock, & Kawachi, 2014). In addition, data from the 2015 Youth Risk Behavior Surveillance System revealed that only 57.8% of high school boys and 39.1% of high school girls reported engaging in recommended vigorous activity 5 to 7 days per week (NPAP Alliance, 2016). Furthermore, only 47.8% of high school females and 55.3% of high school males are involved in PE that offers children and adolescent's opportunities to participate in vigorous activities in which valuable, lifelong health habits are established (CDC, 2015).

This issue is not just isolated to the United States, it is an international health concern (Dishman, Mciver, Dowda, & Pate, 2018). Countries around the globe are seeing similar trends in the decrease of recommended PA and avoidance of PE among adolescents (Usher, Edwards, & Cudmore, 2016). In an investigation into the declining levels of motivation and PA from middle school to high school, Dishman et al. (2018) identified consistencies in multiple countries reflecting that adolescents get less than the recommended amount of vigorous PA, and participation decreases much more rapidly between the ages of 9 and 15. These findings were supported by Gruno and Gibbon's (2016) inquiry into Canadian females and their experiences in the coed PE setting. Data revealed that PA levels decreased significantly with age, and females were much less active than boys, with only 27% getting the recommended 60 minutes of PA 5 to

6 days a week. Studies in the exercise habits of adolescent girls in Australia and declining PA rates and their relationship to inadequate PA levels prompted further research into the Australian Health and PE curriculum (Usher et al., 2016). During that inquiry, data recorded declining levels of PA in youth between the ages of 5 and 17, with 80.3% not getting the recommended 60 minutes of PA per day and 60% of adolescent girls failing to participate in organized PE and sport. In addition, the examination revealed barriers such as body image issues, boy-centered curricula, and negative experiences that both directly and indirectly impacted adolescent girls and their decision to avoid PE classes not to participate in PA and (Usher et al., 2016).

To combat this trend, both U.S. and international health experts have recommended health initiatives, but despite these efforts young people continue to choose not to participate in the recommended amount of vigorous activity to promote healthy, lifelong living (Dishman et al., 2018). Continuing efforts to address persistent, declining levels of PA have initiated interventions that have targeted public schools and PE programs around the country in order to implement and teach healthy living strategies and emphasize more vigorous PA in PE programs (Woodson-Smith et al., 2015). Due to this plan of action, the President's Council on Fitness, Sport and Nutrition implemented the NPAP (NPAP Alliance, 2016). The mission of NPAP is to increase PA in the schools during the school day through comprehensive school physical activity programs (CSPAPs). Most schools provide PA, but the required participation of students in schools drastically decreases as students age, from 47% of kindergarten through fifth-grade students to below 9% of high school students, and only a limited number of schools have implemented CSPAPs (NPAP Alliance, 2016). Despite the intervention of CSPAPs and more rigorous and focused PE programs to encourage children and adolescents to be physically active, there continues to be disparities in the participation in PA between boys and girls, and boys

attend PE classes more consistently than girls do. This dissimilarity has been identified in all females, both those with and without disabilities. In an investigation into the secular changes in PE attendance among U.S. high school students, data identified only 46% of girls with disabilities attended at least one PE course compared to 61% of boys with disabilities (NPAP Alliance, 2013). Findings consistently attribute the differences to social, emotional, and environmental barriers that may be present in PE settings where both boys and girls participate. Woodson-Smith et al. (2015) suggested that physical education settings that are positive, physically and emotionally supportive, and provide adequate practice and activity time impact the participation of PA in females. The researchers identified coed physical education classes as less likely to support these elements.

Physical Education and the Impact of Title IX

Prior to Title IX of the Education Amendment Act of 1972, single-gender PE was common, but girls frequently did not have access to the same education, facilities, and equipment as boys (Furrer, 2010). In fact, availability of facilities was scheduled based on when males were not using them, and broken and overused equipment was frequently handed down from males to females and often was inadequate (Pritchard, McCollum, Sundal, & Colquit, 2014). Since Title IX, in order to create a more equitable learning environment for females and to end sex-based discrimination, PE classes have become coeducational settings. However, many argue that although Title IX has created more opportunities for girls and women in sport, it does not require that all PE courses are mixed gender, nor does it stipulate that the coeducational setting is the most appropriate learning environment for some students (G. M. Hill et al., 2012). Instead, Title IX legislation stipulates that "no person in the United States, on the basis of sex shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under

any education program or activity receiving federal financial assistance" (Turner, 2017, p. 230). Clearly, Title IX requires that all students receive the same opportunities on a level playing field, but it does not necessarily mean the playing field must be a coeducational setting. In fact, some research has found that coeducational settings create negative consequences for females, including but not limited to (a) gender stereotyping that impedes the full potential for females; (b) lack of self-confidence due to the dominant behavior of boys; and (c) teacher bias associated with more instructional and management attention placed on males (Schneeweis & Zweimuller, 2012).

Thus, to adhere to the regulations of Title IX, mixed-gender PE classes were implemented without regard to the impact it would have on adolescent girls. Pritchard et al. (2014) discovered that after Title IX reform, teachers felt males were not reaching their potential due to differences in skill and activity levels. In addition, males were observed as being dominating and too aggressive, and females appeared less likely to participate in games when males were involved. Some have argued that coeducation PE settings create negative perceptions in girls not only toward PA but toward the PE class in general. Craft, Pfeiffer, and Pivarnik (2003) examined predictors of competence in adolescent girls and found that mixed-gender PE can do more harm than good due to negative interactions with boys. Girls were more likely to feel self-conscious, less confident, and more apprehensive in mixed-gender PE settings. McKenzie, Prochaska, Sallis, and LaMaster (2004) investigated the impact of coeducational and single-gender PE on PA in middle school students and found a prevalence of sexual harassment in the mixed PE setting due to the dominant behavior of boys. Teacher interaction and feedback were also found to be inconsistent when compared in single-gender and coeducation PE classes.

Furthermore, almost all research investigating the positive and negative aspects of single-gender PE asserts that girls more often than boys are at risk of being intimidated, stereotyped, and harassed by aggressive boys and are more subject to teacher bias (G. M. Hill et al., 2012). McKenzie et al. (2004) determined that girls who participated in single-gender PE felt they received more practice time and attention from their instructor and were less apprehensive about being picked on or made fun of by the opposite sex. Koca (2009) suggested equity must go beyond equal access and extend to the impact of individual and group differences as well as power relations and equity in society.

Despite the intention of Title IX regulation, continuing debate persists as to whether coed PE classes provide an equitable environment in regard to females and PA (Koca, 2009). To address inequities found in all coeducation content areas, the U.S. Department of Education (2012) incorporated changes that would ease restrictions on single-gender classes. However, to ensure the integrity of Title IX, schools implementing single-gender classes must be evaluated every 2 years.

Physical Activity—Opportunities to Participate and Differences Between Boys and Girls

An abundance of data reflected the causal relationship between physical inactivity, sedentary habits, and higher risks of persistent health issues. Chronic disease related to sedentary living such as cardiovascular disease, diabetes, and cancer are the leading causes of death globally and are associated with significant financial ramifications (Champion, Newton, Spring, Wafford, & Parmenter, 2017). In fact, 60% of all deaths worldwide are related to unhealthy lifestyle choices that can be controlled by the individual (Smpokos, Linardakis, Papadaki, Sarri, & Kafatos, 2014). In addition, the implications of failing to establish health-enhancing lifestyle behaviors as a young person have been found to have a detrimental impact

when the person reaches adulthood. Lack of PA and more time spent using electronic devices and watching television during childhood and young adulthood coupled with inadequate levels of PA have been associated with a higher risk of adiposity and morbidity later into adulthood (Champion et al., 2017). The leading global risk factors associated with mortality have been identified as high blood pressure, tobacco use, diabetes, physical inactivity, and obesity, and although diseases related to these behaviors do not occur until adulthood, many unhealthy lifestyle behaviors are acquired during childhood and adolescence and are likely to remain into adulthood (Smpokos et al., 2014). McNamee, Timken, Coste, Tompkins, and Peterson (2017) explored adolescent girls' PA, fitness, psychological well-being, and a non-traditional, health club approach to PE, and findings reported trends of inactivity documented in both male and female adolescents, but data consistently reflected that inactivity among females increases at a much more alarming rate than males. In addition, this tendency has been consistent in PE classes, where female students continue to be significantly less physically active than males and are more at risk for obesity and overweight (McNamee et al., 2017).

Research has indicated differences between boys and girls toward activity begin as early as 2 years of age. Girls seem to gravitate more toward dance and boys toward balls and competitive play. In an examination of sex differences in children, Rhoads (2004) found that boys participated in competitive games 50% of the time, whereas girls only competed 1% of the time. These differences extended into peer interaction, where girls were more social and more prone to walk away from a game if controversy erupted, while boys appeared to argue but resolve disputes using rules related to gameplay. Furthermore, research has also reflected that by the time boys and girls reach adolescence, they have varying levels of physical skill, learn differently, and have different preferences in PA (Vu, Murray, Gonzalez, & Jobe, 2006). In an

investigation into the behaviors of girls and boys toward PA, Vu et al. (2006) found that both boys and girls had different perceptions about the benefits of PA. Boys were more likely to report an emphasis on competitive games, recognize that PA increases strength, and reflect personal incentives for exercise. In contrast, girls reported a dislike for competitive games and PA as a means to get healthier, but they reported stronger personal incentives for weight management. In addition, G. M. Hill et al. (2012) reported that boys felt they received more practice opportunities, performed skills better, played team sports more effectively, were able to play harder, and were more comfortable in single-gender classes than those with girls and boys. In comparison, girls felt they were also able to practice more, demonstrate skills better, felt less likely to get hurt, and worried less about getting scrutinized and ridiculed in the single-gender setting if boys were not present. These findings reflect consistency in the belief about performing skills in both boys and girls, and based on SCT and Bandura's (1977) self-efficacy theory, they suggest that when both genders are placed in single-gender groups, self-efficacy beliefs related to practice and play appear to be high in comparison to mixed-gender groups. Additional research has suggested self-efficacy is the central determinant of adolescents and levels of PA (Alert, Saab, Llabre, & McCalla, 2018). In addition, lack of PA and sedentary behavior has been identified as risk factors associated with adolescents and obesity (Rusby, Westling, Crowley, & Light, 2014). Thus, higher levels of self-efficacy are associated with more PA (Alert et al., 2018).

Inquiries into motor skill acquisition and opportunities to participate revealed disparities between girls and boys. For skill acquisition to occur, a certain amount of practice time should be afforded to facilitate participation and learning. Researchers examined differences between single-gender and coeducation PE and identified in most instances that female students receive

more opportunities to participate in single-gender formats. Hannon and Ratliffe (2007) examined students engaged in three units during the semester—flag football, ultimate frisbee, and soccer—in both single-gender PE and coeducation classes. An *opportunity to participate* was defined as a touch of the soccer ball, frisbee, or football during gameplay. The researchers found that females in a single-gender setting had significantly more touches during all three units of gameplay than in a coeducation setting. However, it was also noted that males appeared to have less touches in a single-gender setting during the soccer and flag football units than in a coeducation setting. During an inquiry into the impact of mixed-gender and single-gender groupings on cardiovascular benefits and skill acquisition during a three-sided soccer game, Pereira, Costa, Joao, Espada, and Duarte (2015) found girls executed fewer correct passes and goals during the coed grouping than those who were in single-gender groups, but they registered higher heart rates during the small-sided games in the mixed-gender groups. The research demonstrated consistent findings with Hannon and Ratliffe (2007), who found that single-gender groups provided more opportunity for skill acquisition, but small-sided mixed groups may encourage more cardiovascular benefits (Pereira et al., 2015).

During an exploration into gender equity issues in secondary PE, Shimone (2005) found consistent data confirming single-gender PE is more conducive to skill development in girls than coed PE courses. She noted that girls tend to give the impression they are participating in the coeducation environment by cheering on their male peers or by inconspicuously hiding during gameplay. She also contended that many girls would most likely benefit from more skill practice time than boys, especially at the secondary level, where teachers spend more time on gameplay scenarios than on skill development. She also observed that students seem to respond better to teachers of the same gender. She suggested that male teachers emphasize more strategy and

game-like approaches to teaching, whereas female teachers tend to focus on skill development and progression. These barriers appear to make it difficult for females to acquire positive perceptions of competence and to develop fundamental skills that will allow them to participate in fitness activities and games that will promote lifelong health. G. M. Hill et al. (2012) reported consistent findings that identified greater difficulty for girls to learn fundamental skills and meet skill-related requirements in a coeducation PE course than in a single-gender PE setting. Furthermore, while some girls preferred coeducation classes, more were engaged and on task during skill development in single-gender classes. Pritchard et al. (2014) investigated the effect of the sport education tactical model on mixed-gender and single-gender game performance in small-sided basketball games, and findings showed females were significantly more involved in the game during the single-gender groupings than during mixed-gender games. Menno, Leen, Greet, and Lars (2014) also noted evidence supporting skill acquisition and improvement in performance during an examination into differences in perceived competence and PA levels during single-gender modified game play. The researchers found girls to be competitive in single-gender groupings, and they may have experienced more practice, as well as more ball contacts, through better interaction and cooperation with other female teammates.

Social, Emotional Barriers

The reduction of cardiovascular disease, diabetes, osteoporosis, obesity, and other chronic health conditions associated with sedentary living from PA were consistent in current research (Dudley, Pearson, Okely, & Cotton, 2015; Slingerland, Haerens, Cardon, & Borghouts, 2014; Standiford, 2013). In addition, positive psychological benefits in adolescents from PA have been documented that are associated with a lower risk of depression and anxiety (Costigan, Eather, Plotnikoff, Hillman, & Lubans, 2016). Slater and Tiggarmann (2011) found that regular

PA is linked to an increase in self-esteem, lower anxiety, positive self-perceptions, and a boost in mood. However, research findings about adolescents, sport, and PA consistently reflect that boys are more active than girls, and declining levels of PA and participation in sport is more drastic for girls than for boys (Mitchell, Gray, & Inchley, 2015; Slater & Tiggarmann, 2011). Furthermore, declining rates of PA occur at a steeper rate during adolescence (Mitchell et al., 2015). These findings suggest females are more at risk for chronic physical and psychological conditions associated with sedentary living.

Examinations into psychological explanations for this trend have identified tendencies toward lower self-esteem that is more frequently seen in girls than boys, and girls generally prefer single-gender PE due to gender barriers associated with boys (Mitchell et al., 2015). Investigations into this phenomenon suggest social, environmental, and behavioral influences—such as sharing showers, facilities, and changing rooms with other girls, a lack of appropriate equipment, and the aggressive and competitive nature of boys—are factors that deter females from participating in PA and cause them to develop negative perceptions toward PE and PA (Mitchell et al., 2015). These barriers often encourage females to become spectators of learning who are unmotivated to physically engage in PE and PA (Goodyear, 2014).

During an investigation into an activity program designed to engage adolescent girls between the ages of 11 and 14, Mitchell et al. (2015) noted that the most frequent barriers that impacted girls' participation in PA were feelings of self-consciousness and lack of motivation to be active. In addition, self-consciousness negatively impacted girls' participation in PE, and females who stated their motivation to participate was to socialize and have fun with their peers were less likely to feel self-conscious. Kling, Hyde, Showers, and Buswell (1999) investigated gender differences in the development of self-esteem, and they postulated two explanations for

the tendency for girls to develop lower self-esteem. One explanation can be attributed to gender roles, in which boys are expected to develop self-confidence but girls are not. The other explanation is socialization within peer groups, wherein established gender roles and expected behavior are formed. Male-oriented groups tend to display dominance and make demands upon one another. Groups of females display more shared social activities and polite suggestion. Kling et al. suggested this behavior causes cross-sex interactions early in life, and because males have been socialized in a dominant and demanding environment, they become unreceptive to the influence of girls. When girls interact with boys, the boys are more dominant and less receptive to their suggestions and verbal interaction. Such responses in turn cause females to feel inferior and less powerful, which impacts their self-efficacy. Mitchell et al. (2015) reported that girls with less perceived competence were less likely to engage and put forth effort in PE. In addition, they were also less likely to continue to take PE and engage in PA in the future.

Another barrier that appeared to impact lower PA levels in females was perceived body image, which is formed from interactions with others and by internalized social evaluation formed from what others perceive (Senin-Calderon, Rodriguez-Testal, & Perona-Garcelan, 2017). Adolescents were more likely to place an emphasis on their appearance and compare themselves with others (Senin-Calderon et al., 2017). According to Carmona, Tornero-Quinones, and Sierra-Robles (2015), PE classes foster a greater probability for bullying attitudes and situations regarding appearance and more condescending remarks about weight while participating in PA and sports. While investigating body image avoidance behaviors during adolescence, the researchers identified the occurrence of more avoidance behaviors in those who had previously been bullied or teased while participating in sports and PA. Avoidance behaviors, such as making excuses not to participate in an activity or opting out of PE all

together, were more prevalent in females, and the behaviors were more evident in coed environments.

In an investigation of gender differences in adolescent sport and participation, teasing, and body image, Slater and Tiggarmann (2011) found gender-role expectations and teasing to be consistent factors in the decision of girls to participate in PE and PA. In this qualitative inquiry, participants were asked questions about how much time they spent participating in sports and PA, as well as about any negative experiences they may have had that influenced their decision to withdraw from PA. Findings revealed body image, appearance, and teasing to be consistent themes in the decision to avoid activity. Girls reported not participating in sports because they felt it portrayed a masculine appearance, and it did not align with what they considered feminine. In addition, teasing from boys was reported and found to impact body image because most of the boys' comments were directed at weight and physical appearance. In an investigation into the relationship between body image and health-related quality of life in adolescent girls, Ra and Cho (2017) found body image to be a common determinant of health-related quality of life, and it impacted not only physical and social health but also had psychological effects related to depression and anxiety.

Examinations into the quality of life in adolescents consistently identified a decline in PA, with girls opting out of exercise at a steeper rate than boys (CDC, 2016; Ogden et al., 2015; Standiford, 2013), even though the aim of PE programs is to encourage the enjoyment of PA and promote lifelong fitness (South Carolina Department of Education [SCDE], 2018). The research consistently suggested negative perceptions developed in females contributed to physical inactivity and the trend toward opting out of PE (Mitchell et al., 2015; Slater & Tiggarmann, 2010; Standiford, 2013). It was suggested many of the perceptions were formed from negative

experiences with males while in the coed PE environment. Unpleasant experiences were shown to influence a lack of enjoyment toward movement, poor self-confidence, lack of competence, and a lack of opportunity, all of which are consistently reflected among adolescent females in coed PE classes. Hannon and Ratliffe (2007) reinforced this idea in a study examining the opportunities to participate and teacher interactions in coeducation versus single-gender PE settings. The researchers revealed that girls preferred individual games over team sports because of the dominant inclinations of boys. In addition, they concluded that activities chosen by the teacher can influence perceptions toward PA. This suggested the inclination to participate in PE and activity may be more favorable if girls are presented with units such as dance, racket sports, and other non-invasion games.

Barriers to Student/Teacher Interaction

The PE class has been described as a maze of interactions between the teacher and his or her students that are affected by verbal behavior, skill differences, teaching styles, class management, and curriculum (Davis, 2003). In many instances, perceptions of stereotypical roles influence student/teacher interaction and impact learning. In an examination of teaching for equity in PE, Davis (2003) suggested that a teacher's interaction with students, teaching style, selected activities taught, behavior, and verbal cues are based on stereotypical roles or gender bias, and teachers create an inequitable learning environment without realizing it. Koca (2009) posited gender bias toward boys is present in student/student and teacher/student interactions. To address this issue, research supports the importance of analyzing pedagogy to address gender bias in order to change girls' perceptions of PA. Teachers have a responsibility to model gender-fair attitudes among their students (Koca, 2009).

This notion is supported by Constantinou, Manson, and Silverman (2009) in a study examining female students' perceptions about gender-role stereotypes and their influence on attitudes toward PE. The researchers suggested that most children develop an understanding of gender roles early in life and behave based on what is considered appropriate. As a result, many PE teachers have certain expectations based on their perceptions of gender differences, and researchers found them to be more prevalent in the coeducation setting, where girls are more likely to be treated as second-class citizens. This marginalization influences girls' perceptions toward activity and results in alienation, lack of effort, and an ineffective learning environment. In addition, Constantinou et al. (2009) revealed that achievement and success appear to lead to a positive attitude, and girls who experience success in the PE environment have more positive perceptions toward PA. Their findings clearly demonstrate that it is essential for physical educators to develop positive attitudes toward activity in both males and females to build lifelong movers.

Hannon and Williams (2008) investigated whether PE should be single or mixed gender by interviewing PE teachers and analyzing their perceptions of girls. They found a consensus in PE teachers' perceptions: Girls are less physically capable than boys, and they should avoid activities that may be dangerous to them. This finding indicates that teachers' gender biases are likely to influence teacher expectations and impact pedagogical strategies toward female students in the coeducation setting. Furthermore, in studies examining student/teacher interaction, researchers found that boys receive more attention and interaction; they are asked more questions and are given more detailed instruction across all content areas. They also receive more praise and criticism (Davis, 2003). However, Nicaise, Cogerino, and Fairclough (2007) reported boys receive more criticism and feedback related to management and behavior, while girls received

more praise and skill instruction. Unfortunately, teacher bias is not confined to only the area of PE; it has also been examined across other content areas, and it has been found that boys are called on more often by their teachers, provided more time to answer questions, and receive more feedback than girls (Sadker & Zittleman, 2005).

In an examination by Hannon and Williams (2008) into student perceptions toward single- and mixed-gender classes, both boys and girls appeared to prefer single-gender PE, and students who reported liking PE had a preference for single-gender classes. Of those interviewed, girls perceived boys to be uncooperative, and boys perceived girls to be lazy and unwilling to put forth a high enough effort. Student/teacher interaction was also found to be more frequent in a single-gender arrangement than in a mixed-gender PE.

All these barriers affect the learning environment in many ways. Girls and boys need a positive learning environment to grow and develop physically, mentally, and socially. Positive verbal and physical expressions are needed to build healthy relationships free of discrimination. Low expectations for girls and student and teacher behavior caused by gender bias leads to low self-esteem for female students in PE (Davis, 2003), though findings also reflect that teachers who use a variety of teaching methods can combat these barriers to make a more equitable learning environment (Davis, 2003).

Benefits of Single-Gender Education

Historically, pre-1800s, before it was deemed financially viable to teach coeducational classes, males and females were taught separately (Glasser, 2012). Single-gender classrooms were limited to private institutions until the passage of the No Child Left Behind Act (NCLB) in 2001 (Hart, 2015). As a result of this education reform, public schools were given the flexibility to include single-sex classrooms (Hart, 2015). According to data provided by the National

Association for Single Sex Public Education (2016), a non-profit organization dedicated to the advancement of single-gender public education for both boys and girls, there were 506 public schools in the United States that offered single-sex opportunities, and of those, 116 were single-sex schools, while 390 public schools had single-sex classrooms within the coeducation setting.

Investigations into the experiences of boys and girls and the area of single-gender education continue to spark debate and research regarding the impact of single-sex classrooms on scholastic performance (Glasser, 2012). Academic achievement data continue to reflect gender disparities, with boys outperforming girls in science and math and girls performing better in reading (Friend, 2007). Disparities in performance are not isolated to the traditional academic setting; they are also observed in PE, where girls are choosing not to participate and are significantly less active than boys (Timken, McNamee, & Coste, 2017). Furthermore, females are more likely than boys not to participate in the recommended 60 minutes of PA at least 5 days a week needed to avoid risk of disease related to sedentary living (CDC, 2016; Ogden et al., 2015; Standiford, 2013). Proponents of single-sex opportunities argue the absence of males promotes an environment that diminishes the impact of gender stereotypes that may be present in the coeducation setting (Feniger, 2011).

Some argue that a single-gender PE setting promotes higher PA levels because the environment offers females more practice opportunities and time on task due to the availability of equipment and space normally dominated by males. Furthermore, it has been noted that females do not want to participate in PA due to negative experiences related to a lack of enjoyment, poor self-image, and a lack of competence (Pritchard et al., 2014). An investigation into activity and intensity related to invasion games between boys and girls revealed that girls recorded longer time intervals in their target heart rate zone while playing ultimate frisbee when

they were separated by gender, and both boys and girls accumulated more pedometer steps during engagement games such as soccer, flag football, and ultimate frisbee in the single-gender setting as opposed to in a coed environment. Although there is very little difference regarding intensity in both mixed-gender and single-gender groups, both boys and girls engaged in PA for longer intervals in a zone that encourages cardiovascular health while in single-gender groups (G. M. Hill et al., 2012).

It has also been argued that competence has positive implications toward participating in PA and choosing to lead a physically active lifestyle. Slingerland et al. (2014) investigated perceived competence and PA levels during single-gender groupings for both boys and girls while engaged in modified basketball game play. They identified both boys and girls with high perceived competence in single-gender groups, and girls felt more competent during single-gender gameplay than when engaged with boys. Boys were consistent in both single-gender and mixed-gender groupings. The researchers found that not only were pupils' moderate to vigorous PA levels high during single-gender gameplay, but perceived competence also increased. Competence in sports and PA increases the probability of further participation throughout life, and lack of competence is linked to lack of enjoyment in PA. Higher competence levels have been directly associated with motivation to participate in PA (Bandura, 1986).

In a case study examining learning differences in coed and single-gender groups, Gabbei (2004) supported previous research by identifying that coed PE settings fail to support the needs of female students. His examination of middle-level, female PE students determined that many of them lacked the skills and resources to assertively interact with male peers while grouped together, which negatively impacted the motivation to participate in activity and influenced the decision to find creative ways to avoid activity. Moon, Jeon, and Kwon (2016) found that the

hierarchy in many coed PE classes emphasizes the dominance of males, and boys tend to have more social power than girls. Girls are alienated more often than boys and are susceptible to taunting, teasing, and disapproval from others while engaging in PA (Moon et al., 2016). Practice time and opportunities for participation have also been much lower for females than males in coed settings, and it has been documented that females feel less confident learning skills and more self-conscious concerning body image (Gabbei, 2004). Findings reflected that females felt more overweight in classes with both sexes and had a stronger preference to be grouped with other females due to negative remarks experienced by male peers (Gabbei, 2004).

Research has also indicated that benefits for boys related to single-gender PE are plentiful. Data from a study by G. M. Hill et al. (2012) showed that boys tend to receive more practice time, appropriate skill-related task assignments, and a higher percentage of appropriate practice in single-gender classes. Boys were also found to have more confidence, were able to play team sports better, and were able to compete harder in single-gender classes. In a study conducted to determine the perception of teachers in regard to the activity levels in middle school boys, teacher observations indicated that boys did not play as hard when in coeducation classes, and classes became less difficult due to the lower skill levels of girls (Hannon & Ratliffe, 2007).

Biologically, boys develop differently than girls, and to address the learning needs of both genders, research implies that there should be changes in pedagogy to address these differences. In fact, Gurian and Stevens (2006) suggested that rather than changing boys to adapt to the education system, educators should change to adapt to the ways boys learn. Research has shown that gender is hardwired into an individual's brain at conception, and differences in gender can be detected as early as 4 days old. Girls spend twice as much time as

boys maintaining eye contact, and by 4 months, boys are less likely to distinguish between a known person and a stranger. Boys are also more spatially aware and mechanically inclined than girls by as early as 4 months old. Male babies spend more time looking at objects and moving in space as opposed to girls. When given dolls, males are more prone to pulling the heads off, hitting them against something, or throwing them in the air. Girls, in contrast, are more social with dolls, using words and bonding with them (Gurian & Stevens, 2006). These varying learning styles make it difficult to plan and execute instruction that is effective for both genders (Jackson, 2012).

PA research has reflected that males are more likely to sustain their target heart rate for longer periods of time due to the competitive climate the single-gender environment fosters (G. M. Hill et al., 2012). Furthermore, a case study also revealed that males were more confident, skilled, and stronger when they were grouped with boys rather than with mixed-gender groupings (Gabbei, 2004). Although the research suggests this may be due to comparisons of skill level, little empirical data reflect this finding.

Summary

Evidence clearly illustrates a rapid rise in the sedentary habits of adolescent girls, and concern for the health-related fitness of this population is clearly warranted. Females appear to be much less active and are frequently avoiding PA and PE programs. Although legislation related to Title IX has afforded many opportunities for females in athletics and other interests, it also encouraged educational institutions to establish coed PE, which may have done more harm than good to young females by fostering negative perceptions toward PA. According to Bandura's social learning theory, perception determines whether participation in a task occurs or not. If females develop negative attitudes toward vigorous activity, they are less likely to

actively participate. However, research findings indicate that if girls are physically active during early years, habits can form that will likely encourage continued activity later in life.

Environment, pedagogy, socialization, gender roles, and expectations are considered barriers to health-related fitness and positive attitudes toward PA and PE for females. Data reflect that adolescent girls are increasing their risk of disease related to inactivity by choosing to avoid opportunities to be physically active. Social, emotional, and physical well-being are the necessary components for lifelong wellness.

Some solutions have been suggested. Perhaps it would be beneficial to reconsider the coeducation PE setting and take advantage of the Title IX changes in order to level the playing field. Both females and males appear to feel more confident, get more practice time, play team sports better, and have more student/teacher interaction in single-gender PE than in coeducation settings. It has been suggested that girls tend to appreciate individual activities over invasion games. If this is accurate, a single-gender PE course could offer more individual activities for males and females. Separation of girls and boys during invasion games may impact girls' attitudes toward vigorous activity because they would not be required to compete with males.

Due to the stereotypical roles that influence student/teacher interaction and impact learning, educators should consider analyzing gender biases that they may hold. Presenting material in a more "girl friendly" manner and addressing stereotypes that may be present can encourage girls to feel valuable and meet higher expectations. Addressing the differences in male and female cognitive and emotional development may also assist in planning a curriculum that addresses the needs of both sexes. More inquiry is needed into the impact of single-gender environments on the health-related fitness and attitudes of females toward PA if educators are to change the activity level of females.

CHAPTER THREE: METHODS

Overview

This chapter identifies the methods that were used in this static group comparison research study. This research examined the relationship of gender grouping in the PE environment and attitudes toward PA in ninth-grade girls, as well as determining the aerobic capacity of girls in both groups. Methods for the study are discussed in the following sections: research design, research questions, hypotheses, participants and setting, instrumentation, procedures, and data analysis.

Attitudes toward participating with boys in the PE environment, confidence in participating in PA, and the likelihood of continuing to pursue a physically active lifestyle beyond the PA setting were examined in girls from both groups. The data reflecting aerobic capacity and attitudes were collected over a 6-week period during the fourth quarter of the 2018-2019 school year. The standardized physical fitness test FITNESSGRAM was used to identify aerobic capacity scores between the groups by conducting a mile run assessment. The data were collected between ninth-grade girls who were placed in single-gender PE comprised of girls only and girls who were grouped into a coeducation PE class.

Design

A static group comparison design was used to test the relationship between ninth-grade girls' attitudes toward PA in single-gender versus mixed-gender PE while controlling for learning environment, age and gender. The independent variable for this study was the learning environment and is defined as a multi-dimensional domain where varied instruction, learning tasks, and activities include all students from diverse circumstances, where personal growth and

cooperation are emphasized, and where students feel safe and supported (Weidong, 2015). The dependent variable was attitudes towards participation in PA.

Aerobic capacity can be identified as cardiovascular activity, cardiovascular fitness, or aerobic fitness. It is measured using estimates of maximum oxygen uptake, or VO_2 max. It is the ability of the cardiovascular, respiratory, and muscular systems to take in and supply oxygen to the body tissues and working muscles and the efficiency of the tissue and muscles to use the oxygen (Cooper Institute, 2017). Attitudes are key factors that influence PA in adolescents and are defined as beliefs that lead to choices people make (Jurisin et al., 2017).

This research design was chosen because of the nature of the public-school setting. Students were unable to be randomly assigned without disrupting or reorganizing the education setting. The static group comparison design is most commonly used when there is an absence of a pre-test and random sampling is not used as in cases such as this research where normal school operation cannot be changed. (Gall et al., 2007). Therefore, convenience sampling was used to assign a control group consisting of a girls-only class and an experimental group of a mixed-gender class An attitude survey designed by Fennema and Sherman (1976), originally developed to measure attitudes in mathematics, was used in this research to determine attitudes toward PA. The instrument has been modified and used in multiple content areas with both students and teachers. Brown and Ronau (2012) utilized the instrument in science to investigate perceptions of single-gender classroom experiences. In addition, Dantzler, Bensoy, and Siders (2014) modified the scale to determine the attitudes of artistically gifted students, and Ren, Green, and Smith (2016) used it to assess confidence, motivation, and anxiety in primary school teachers. It is scored using a Likert scale and was administered after the post-FITNESSGRAM assessment to determine attitudes toward participation in PA, participation in PE with boys, and usefulness of

participating in PA throughout life. To determine aerobic capacity between groups, a pre-test was administered to determine baseline physical fitness, followed by a post-test that was administered 6 weeks later.

Research Questions

The following research questions guided this study:

RQ 1: Is there a difference between the attitudes toward participating in physical activity, as measured by an attitude scale, of girls who have completed a ninth-grade single-gender physical education course and girls who have completed a ninth-grade mixed-gender physical education course?

RQ 2: What is the aerobic capacity of girls taking a ninth grade single gender physical education class and girls taking a ninth grade mixed gender physical education class as measured by FITNESSGRAM?

Null Hypothesis

The null hypothesis for this study was the following:

$H_0$1: No statistically significant difference exists between the attitudes of girls taking a ninth-grade single-gender physical education course and the attitudes of girls taking a ninth-grade mixed-gender physical education course toward participating in physical activity, as measured by an attitudes toward physical activity survey.

Participants and Setting

Population

Due to the lack of flexibility in the normal school day that impacted the accessibility of students and teachers, a convenience sample was utilized to select the participants for this research (Gall, Gall, & Borg, 2010). The participant population was ethnically and culturally

diverse and composed of females between the ages of 13 and 17, who were healthy enough to meet the requirements for the mandated PE course required for graduation by the SCDE. The participants were recruited from a population enrolled in four secondary high schools in the Southeast that offered PE during the spring of 2019. The high schools utilized for this research were part of the same school district located in the central part of the state. At the time of this study, the school district served a student population of approximately 28,062 students spanning pre-kindergarten through Grade 12 in 41 schools and centers, including five high schools. Roughly 48% of students qualified for free and reduced lunch, 9% of the students were from military families, and the student population contained speakers of more than 62 native languages representing 63 foreign countries and territories. This suggested a culturally and socioeconomically diverse population for this research. For the five schools that participated in this research, 46-52% of the student population was African American, and 31-35% qualified for free and reduced lunch. Each school had an enrollment of over 2000 students.

Sample

Two classes each from four high schools were included in the sample, for a total of eight PE classes. Participants for this research were selected from general PE classes offered as the required PE course for graduation that all ninth-grade students must take. The sample represented 128 (n = 128) females with a variety of academic and skill-related ability levels who ranged in age from 13 to 17 years old. The demographic breakdown for the sample was 50% African American, 35% Caucasian, 8% Hispanic, 2% Asian, and 5% Other. The sample size was adequate for a medium effect size.

To determine differences in attitudes toward PA, the sample for the first research question represented 126 (n = 126) females and was reduced from 128 (n = 128) due to outliers.

The sample participants also possessed a variety of academic and skill-related ability levels and ranged in age from 13 to 17 years old. The demographic breakdown for the sample was 50% African American, 35% Caucasian, 8% Hispanic, 2% Asian, and 5% Other. For all levels of attitudes toward PA that served as the dependent variable for research question one, the effect size was small. The effect size for all levels of the dependent variable reflected the following: confidence—0.266, usefulness—0.078, and gender appropriateness—0.124. Using Cohen's *d*, 126 students reflected a small effect size with a statistical power of .8 at the .05 alpha level (Cohen, 1988). A power of .8 or .9 was needed to ensure the probability the sample would detect the expected effect and reflect a statistically significant result (Cohen, 1988; Gall et al., 2010; Warner, 2013). In addition, an alpha level of .05 was used in conjunction with power to ensure the probability the research would support the hypothesis if true, thereby rejecting the null hypothesis and reducing the chance of a type I and type II error (Gall et al., 2010). Although the effect size was small across all levels of the dependent variable, according to Warner (2013), *t* tests have been found to be robust in terms of type I errors in bigger sample sizes ($n > 50$).

All of the PE instructors who were recruited for this research used the published PE curriculum standards based on mandated requirements established by the SCDE (2018). Class instruction was shared between health-related fitness and sport skill development. The classes were taught during the spring semester of 2019.

Instrumentation

Attitudes Toward Physical Activity Scale

The instrument used to determine attitudes towards PA was an attitude toward physical activity survey designed to quantify the attitudes of girls toward engaging in PA and participating with boys in the PE setting. Use of the instrument and the data obtained enabled

the researcher to identify the effects of gender grouping on the attitudes of ninth-grade girls toward PA in the PE setting. In addition, by quantifying attitudes about the usefulness of PA, the researcher was able identify the likelihood of further participation and the pursuit of an active lifestyle, which has been found to reduce the risks of cardiovascular disease (McNamee & Timken, 2016). Furthermore, identifying the attitudes of girls toward the PE environment as it relates to gender grouping provided insight for physical educators and other stakeholders into making the course a more enjoyable and comfortable environment that may encourage females to engage in an active lifestyle and pursue a lifetime of fitness. Attitudes have been defined as not only the key factors that influence PA in young people, but beliefs that are formed early in life that impact most choices people make (Jurisin et al., 2017).

The instrument was originally designed by Fennema and Sherman (1976) to investigate sex-related differences in learning mathematics developed as part of a government grant from the National Science Foundation to gather information related to females learning mathematics as well as collecting information related to the selection of math courses. The scale was created with nine specific domains, with a Likert design containing five possible responses that ranged from 1 = *strongly disagree* to 5 = *strongly agree*, and provided the flexibility to investigate a specific group, individual, or combination. It has been modified and used in multiple content areas, such as technology, mathematics, art, science, and PE (Brown & Ronau, 2012; Dantzler et al., 2014; Kahveci, 2010; Ren et al., 2016; Wilson, 2010). Using Cronbach's alpha, modified versions of this instrument have been found to have strong reliability, with a coefficient of .92 in the domains related to usefulness and confidence and .90 in gender differences (Dantzler et al., 2014). Furthermore, Lim and Chapman (2013) found the instrument to have an overall split-half

reliability coefficient of .92. A measure is considered reliable if the coefficient is .80 or above (Gall et al., 2010).

The instrument used in this research was designed and modified by Wilson (2010) to investigate the attitudes of girls toward physical fitness testing. Modifications from the original Fennema and Sherman Mathematics Attitude Scale were made by substituting physical fitness for mathematics, in addition to other minor word changes that relate to participating in physical fitness instead of mathematics. The instrument demonstrated reliability and validity in the three domains that were investigated: confidence toward PA, usefulness of participating in PA, and the gender appropriateness of PA. Analysis of Cronbach's alpha coefficients showed an overall internal consistency of .90 across all domains (Wilson, 2010). The Cronbach's alpha coefficients for confidence in participating in PA, usefulness in participating in PA, and the gender appropriateness of PA domains were found to be .88, 81, and .60, respectively (Wilson, 2010).

Three areas of interest were investigated with the ATPAS in this research: attitudes toward confidence in one's ability to learn and participate in PA; attitudes toward gender appropriateness for females to see PA as a masculine, neutral, or feminine domain; and attitudes toward the usefulness of PA that measures current beliefs about PA and relationships toward future participation. The survey consisted of 24 items with three levels of student's attitudes. The survey took approximately 20 minutes for the students to complete, and it was formatted with 5-point Likert-type responses. Each domain included eight questions with four favorable statements and four unfavorable statements. The responses ranged from the following: 5 = *strongly agree*, 4 = *agree*, 3 = *not sure*, 2 = *disagree*, and 1 = *strongly disagree*. The statements were organized in a random fashion rather than being grouped by each level of the dependent variable. Confidence in one's ability to learn and participate in PA contained eight questions,

permitting each participant's score to total between 8 points—indicating more negative attitudes toward the confidence in one's ability to learn and participate in PA—and 40 points—indicating more positive attitudes toward the confidence in one's ability to learn and participate in PA. Attitudes toward the gender appropriateness for females to see PA as a masculine, neutral, or feminine domain also included eight questions allowing each student's score to total between 8 points—indicating less favorable attitudes of PA as a more masculine to neutral domain—and 40 points—indicating more favorable attitudes toward PA being viewed as a neutral to feminine domain. In addition, the attitude toward the usefulness of PA domain included eight items that allowed each participant to score 8 points—indicating more negative attitudes toward the usefulness of PA—and 40 points—indicating more positive attitudes toward the usefulness of PA (Wilson, 2010). Permission to use the ATPAS was obtained from Dr. Wilson and can be viewed in Appendix D.

FITNESSGRAM

The instrument used to determine the aerobic capacity of girls in both groups was FITNESSGRAM. The purpose of the instrument was to identify the aerobic capacity of the girls in both the single gender and mixed gender setting and compare them with the healthy fitness standards published through FITNESSGRAM. In addition, by collecting mile run scores and calculating the mean, provided data reflecting performance outcomes that could have been impacted by gender grouping. Aerobic capacity, or cardiovascular endurance, is one of the most important areas of health-related fitness because it has been shown to reduce morbidity related to sedentary living (CDC, 2016). Aerobic capacity can be measured in several ways, but the most reliable method is through maximum oxygen uptake $VO_{2\ max.}$ This test is usually conducted in a laboratory and is based on body size, which can influence results. The test is recorded as ml O_2

consumed per kg of body weight per minute. Lack of equipment and facilities to measure $VO_{2\ max}$ did not make this a practical field test for ninth-grade students in the public-school setting. Therefore, the mile run assessment, which is an aerobic capacity test used in the standardized test FITNESSGRAM, was chosen as an alternative.

The standardized fitness test that measures health-related fitness, FITNESSGRAM, was used to measure aerobic capacity in this research. It is a criterion-referenced fitness test available for purchase and public use. The instrument was the mandated fitness assessment and data reporting software system required by the state in which this research was conducted. The assessment was developed to measure the five components of health-related fitness. The FITNESSGRAM usage agreement can be viewed in Appendix E. The state where the study was conducted requires that all students are fitness tested in Grades 2, 5, 8, and 9 in health-related fitness (NASPE, 2010). In addition to using the FITNESSGRAM assessment, the state requires FITNESSGRAM reports with student results to be sent home to parents and guardians (NASPE, 2010).

The FITNESSGRAM instrument was created more than 20 years ago by the Cooper Institute to provide a scientifically established fitness assessment to help schools and PE programs assess, track, and promote lifetime fitness (Cooper Institute, 2014). The instrument measures the five components of health-related fitness: cardiovascular fitness, muscular strength, muscular endurance, body composition, and flexibility. Evidence-based standards called healthy fitness zones (HFZs) are used to determine students' fitness levels based on age, gender, and what is considered favorable for good health (Cooper Institute, 2014). There are three classifications of HFZs for aerobic capacity: needs improvement health risk (NIHR), needs improvement (NI), and HFZ. The use of HFZ criteria as opposed to focusing solely on

performance encourages students to strive toward personal fitness goals rather than comparing themselves to another student or the entire class (Meredith & Welk, 2010).

Research has identified high reliability and validity scores due to the efforts of Cooper Institute's years of extensive research in health-related fitness standards and an abundance of research examining the instrument's testing measures (Morrow, Martin, & Jackson, 2010). In an investigation into the reliability and validity of the instrument using proportion of agreement (Pa) scores and modified kappa coefficients, researchers found the FITNESSGRAM battery to be the most psychometrically sound assessment of health-related fitness for field-based testing in children (Morrow et al., 2010). During the 2-year, multi-group study of students in Grades 3, 5, 7, and 9, reliability and validity results were recorded between .70 and .95 (Morrow et al., 2010). The FITNESSGRAM assessments for aerobic capacity showed the highest reliability and validity of the five components of health-related fitness. The mile run reflected a reliability of .92 (Morrow et al., 2010).

The mile run was administered as the aerobic capacity test for this research. It was a performance test that began with the words *Ready, Start*, and as the students completed each lap on a standard 400-meter track, each participant was given their elapsed time by the teacher until they finished running and/or walking 1 mile. Students were paired with a partner before the test, and each alternately served as the scorer and the tester. The scorer and the teacher kept track of the tester's laps and final test time. A copy of the score report each student was given is shown in Appendix A. The FITNESSGRAM standards that reflected the HFZs for students based on age and gender are posted in Appendix B. Students were scored on whether they were in the HFZ or the NI zone based on the time it took each participant to complete 1 mile. Females in both the experimental and control groups were tested, and differences in mile run times, as well

as HFZs, were analyzed based on the FITNESSGRAM HFZ criteria to determine any differences between groups.

Procedures

Schools participating in this research were chosen in close geographical proximity to one another, and they were part of the same school district. An IRB application was submitted that included the following information: the rationale of examining gender grouping and the impact on the aerobic capacity of ninth-grade females and of examining the effects of gender grouping on the attitudes of girls toward participating in PA after the completion of a ninth-grade PE course. In regard to procedures related to the execution of FITNESSGRAM and the ATPAS, the researcher obtained an approval letter that can be seen in Appendix F by the Liberty University Institutional Review Board (IRB). Immediately following authorization from the IRB, the researcher obtained consent from the school district where the study was conducted by submitting a proposal application, which was verified and approved through written confirmation in the form of an official letter (see Appendix G). After permission was granted to conduct the research, e-mails were sent to principals and PE instructors at the participating schools to acquire permission and discuss availability and willingness to participate. In addition, parent and guardian consent forms were sent to each school with instructions for each PE instructor to read the information to the students and send a copy home with each student willing to participate in the research. The students returned them to their PE teacher, and the instructor forwarded them to the researcher. The consent forms will be kept confidential and locked in a file cabinet for 3 years.

Prior to the execution of the study, the researcher met with the PE teachers at the schools chosen for the research. An overview of the study was discussed, and a verbal tutorial on

FITNESSGRAM and the proper administration of the mile run was conducted. The teachers were encouraged to ask questions, and a practice session was made available to allow the PE instructors to go through the testing protocol for the mile run. A list of supplemental resources related to FITNESSGRAM were also available. The school district had been involved in an ongoing health-related fitness initiative with the state's department of education, and the students and teachers were familiar with the FITNESSGRAM fitness test, reporting software, and protocols. Prior to this study, PE instructors employed by the school district were trained to use the instrument and were familiar with the testing protocols. The supplemental resources the researcher provided served as a review of the protocols and procedures already being implemented in ninth-grade PE courses across the district.

The ATPAS was delivered to each PE instructor at the participating schools a week before the post-mile run assessment. The teachers were instructed to administer the survey after the mile run assessment. Security of confidentiality of the students and their responses were safeguarded by anonymous survey answers and the surveys being returned in an envelope and sealed by each PE instructor before returning them to the researcher. The PE teachers returned completed questionnaires and fitness assessment results to the researcher only. The surveys are locked away in a file cabinet to maintain confidentiality and security for a period of 3 years.

Due to the nature of this static group comparison study, a true random sample could not be obtained, so control and experimental groups were assigned based on scheduling of classes at each school. A baseline fitness test was given to each group shortly after the beginning of the course, but after students had become familiar with the testing protocol and standards related to the HFZ. Physical education instructors assigned to each group administered the test. The baseline mile run assessment was conducted on a standard 440-meter rubberized track (outside).

Students met for 90 minutes Monday thru Friday for 18 weeks. A post-fitness test was conducted 6 weeks after the baseline test during the middle part of the course. The same procedures and protocols were utilized for the posttest as were used during the baseline assessment. The protocols for the mile run assessment were as follows: Students were paired with a partner prior the test, and each alternately served as the scorer and the tester. The scorer and the teacher kept track of the tester's laps and final test time, which was recorded as minutes and seconds. Participating students lined up at the start line, the test began with the words *Ready, Start*, and as the students completed each lap on a standard 440-meter track, each participant was given their elapsed time by the teacher until they finished running and/or walking 1 mile. Ninety minutes was ample time to conduct the assessment during the assigned class period. Students were given a survey examining attitudes toward PA by the PE instructor after the mile run assessment. The survey was designed using a Likert scale, and participating teachers informed all students the test was completely anonymous. The terms *anonymity* and *anonymous* were described to the students in detail to eliminate any misunderstanding. The responses from the surveys, as well as aerobic capacity scores, were coded, transferred into electronic data, and placed into SPSS for Windows for statistical analysis.

Data Analysis

An independent samples *t*-test determined if mean differences existed between single-gender and coeducation learning environments and determined attitudes toward participation in PA. The independent variable was learning environment, and the dependent variable was attitudes toward confidence in one's ability to learn and participate in PA; gender appropriateness for females to see PA as a masculine, neutral, or feminine domain; and usefulness toward PA that measures current beliefs about PA and relationships toward future

participation. The mile run assessment administered by the Physical Education instructors provided aerobic capacity data for the girls in both the experimental and control groups. Descriptive statics produced by SPSS software was used to determine the mean scores for the mile run data for girls taking a single-gender ninth-grade PE course and girls taking a coed PE course with both boys and girls. Pretest mean scores were documented in descriptive statistics, as were the posttest mean scores. In addition, the number of students in the HFZ and those who were NI were identified. The single-gender learning environment served as the control group, and the coed learning environment served as the experimental group.

The independent samples *t*-test was an appropriate statistical analysis for determining attitudes towards PA because it compared the mean scores of two groups (Gall et al., 2007). The researcher assumed equal observations, normality, and homogeneity between the groups, with the understanding that the quasi-experimental design might not meet assumption criteria due to the absence of random sampling (Warner, 2013). Using SPSS software, a data screening was conducted on each group's dependent variables to detect any data entry errors or inconsistencies reflected as outliers. To test the assumption of normality, a histogram (box and whiskers plot), in addition to a Kolmogorov-Smirnov test, was performed. If the $p \leq .05$, a normal distribution is assumed, and the null hypothesis can be rejected (Howell, 2011). In addition, homogeneity of variance was tested between groups using Levene's test. To meet the assumption of equality of variances, values should reflect $p \leq .05$ (Howell, 2011). Homogeneity of variance is used to assess if groups have equal variances because in some cases, by chance, the mean scores will be different even when randomization is used to group subjects (Gall et al., 2007).

CHAPTER FOUR: FINDINGS

Overview

This chapter explains the data, screening and assumption testing, and the results of the study's statistical testing. The purpose of this static group comparison investigation was to determine how learning environment impacted the attitudes of ninth-grade girls toward physical activity. Using an independent samples *t*-test, comparisons were made between the attitudes of ninth-grade females who were taking a single-gender PE course with girls only and ninth-grade girls taking a coed PE course with both boys and girls. The independent variable was learning environment. The dependent variable was attitudes towards PA. A 24-question survey on attitudes toward PA was administered to identify the attitudes of girls toward participating in PA. The ATPAS survey included three subscales that identified gender-appropriate attitudes toward participating with boys, confidence in participating in PA, and the usefulness each subject felt toward continuing to participate later in life. In addition to the static group comparison a pre and post-mile run assessment was administered to determine what the aerobic capacity was between the groups. A mean score was calculated in both the experimental and control group after a pre-mile run assessment and the post-mile run assessment. The number of students in the HFZ and NI were also identified. The sample in this study was taken from four high schools in a school district serving 24,000 students located in South Carolina.

Research Questions

The following research question guided this study:

RQ1: Is there a difference in the attitudes toward participating in physical activity, as measured by an attitude scale, between ninth-grade girls who have completed a single-gender

physical education course and ninth-grade girls who have completed a mixed-gender physical education course?

RQ 2: What is the aerobic capacity of girls taking a ninth grade single gender physical education class and girls taking a ninth grade mixed gender physical education class as measured by FITNESSGRAM?

Null Hypothesis

The null hypothesis in this quantitative research was:

$H_0$1: No statistically significant difference exists between the attitudes of ninth-grade girls taking a single-gender physical education course and the attitudes of ninth-grade girls taking a mixed-gender physical education course as measured by an attitude survey.

Descriptive Statistics

Sample Population and Demographics

The sample consisted of 128 participants comprised of females between the ages of 13 and 17 who were healthy enough to meet the requirements for the mandated high school PE course required for graduation by the SCDE. The sample was split between 64 girls taking a single-gender PE course who served as the control group and 64 females who took PE with both boys and girls comprising the experimental group.

Research Question One

The descriptive statistics and frequencies for the first research question reflecting differences in the attitudes of the control group, or girls taking a ninth-grade single-gender PE course, and the experimental group, or those taking a ninth-grade coed PE course, as measured by the ATPAS are shown in tables 1 and 2. Tables 3 and 4 include the frequency statistics for each ATPAS survey item in both groups. Table 5 reflects the mean scores across all levels of the

dependent variable. The ATPAS was used to quantify attitudes in three areas: confidence, usefulness, and gender appropriateness (see Appendix C). The instrument was a Likert scale, and possible total scores ranged from 8 (least favorable attitudes) to 40 (most favorable attitudes). The range of scores for each question were 5 = *strongly agree*, 4 = *agree*, 3 = *not sure,* 2 = *disagree,* and 1 = *strongly disagree.* This instrument has been used across multiple content areas and demonstrates reliability and validity in the three domains that were investigated: confidence toward PA, usefulness of participating in PA, and the gender appropriateness of PA. Analysis of Cronbach's alpha coefficients showed an overall internal consistency of .90 across all domains (Wilson, 2010). Cronbach's alpha coefficients for confidence in participating in PA, usefulness in participating in PA, and gender appropriateness of PA domains were found to be .88, .81, and .60, respectively (Wilson, 2010).

Table 1

ATPAS Descriptive Statistics for the Control Group in Research Question One

Survey item	Mean	Min	Max	Std. deviation
CQ 1	4.36	3	5	.651
UQ 2	4.23	2	5	.636
GQ 3	4.53	3	5	.590
CQ 4	3.39	1	5	1.163
UQ 5	4.08	2	5	.981
GQ 6	3.92	1	5	1.131
CQ 7	4.13	2	6	.864
UQ 8	4.11	1	5	.893
GQ 9	4.73	3	5	.512
CQ 10	3.94	1	5	1.022
UQ 11	3.84	1	5	1.027
GQ 12	4.61	1	5	.866
CQ 13	4.22	1	5	.723
UQ 14	4.55	3	5	.561
GQ 15	3.69	2	5	1.037
CQ 16	3.47	1	5	1.112
UQ 17	4.25	1	5	.836
GQ 18	2.89	1	5	1.156
CQ 19	3.50	1	5	1.084
UQ 20	3.88	1	5	.882
GQ 21	4.61	2	5	.704
CQ 22	3.70	1	5	1.150
UQ 23	3.92	1	5	1.172
GQ 24	4.23	1	5	1.151

Table 2

ATPAS Descriptive Statistics for the Experimental Group for Research Question One

Survey item	Mean	Min	Max	Std. deviation
CQ 1	4.33	3	5	.536
UQ 2	4.33	1	5	.668
GQ 3	4.53	2	5	.835
CQ 4	3.52	1	5	1.155
UQ 5	3.95	1	5	1.133
GQ 6	3.84	1	5	.946
CQ 7	3.98	1	5	1.031
UQ 8	4.16	2	5	.840
GQ 9	4.66	2	5	.623
CQ 10	3.88	1	5	.984
UQ 11	3.81	1	5	1.006
GQ 12	4.58	1	5	.813
CQ 13	4.38	3	5	.577
UQ 14	4.34	1	5	.801
GQ 15	3.91	2	5	.868
CQ 16	3.11	1	5	1.299
UQ 17	4.25	2	5	.854
GQ 18	2.84	1	5	1.263
CQ 19	2.94	1	5	1.233
UQ 20	3.77	1	5	.904
GQ 21	4.53	2	5	.755
CQ 22	3.38	1	5	1.215
UQ 23	4.09	1	5	1.019
GQ 24	4.22	1	5	.983

Table 3

ATPAS Frequency Statistics for the Control Group for Research Question One

Survey question	1	2	3	4	5
CQ 1	0	0	6	29	27
UQ 2	0	1	4	38	19
GQ 3	0	0	3	24	35
CQ 4	2	16	14	19	11
UQ 5	0	8	4	27	23
GQ 6	3	7	10	20	22
CQ 7	1	4	7	31	19
UQ 8	1	3	7	30	21
GQ 9	0	0	2	13	47
CQ 10	1	5	14	21	21
UQ 11	1	6	15	22	18
GQ 12	1	3	1	10	47
CQ 13	1	0	5	36	20
UQ 14	0	0	2	25	35
GQ 15	0	9	20	17	16
CQ 16	4	10	11	30	7
UQ 17	1	2	4	30	25
GQ 18	6	21	18	12	5
CQ 19	2	10	19	20	11
UQ 20	1	4	11	34	12
GQ 21	1	2	2	15	42
CQ 22	3	6	18	17	18
UQ 23	3	7	8	22	22
GQ 24	4	11	19	12	16

Table 4

ATPAS Frequency Statistics for the Experimental Group for Research Question One

Survey question	1	2	3	4	5
CQ 1	0	0	2	39	23
UQ 2	1	0	1	37	25
GQ 3	0	4	2	14	44
CQ 4	2	14	11	23	14
UQ 5	4	3	9	24	24
GQ 6	1	4	16	26	17
CQ 7	1	7	7	26	23
UQ 8	0	2	12	24	26
GQ 9	0	1	2	15	46
CQ 10	1	6	11	28	18
UQ 11	1	7	12	27	17
GQ 12	1	2	1	15	45
CQ 13	0	10	3	24	27
UQ 14	1	1	4	27	31
GQ 15	0	4	15	28	17
CQ 16	6	21	8	18	11
UQ 17	0	4	5	26	29
GQ 18	8	22	16	8	10
CQ 19	10	15	13	21	5
UQ 20	1	6	11	35	11
GQ 21	0	2	4	16	42
CQ 22	4	13	16	17	14
UQ 23	1	6	6	24	27
GQ 24	2	2	7	22	31

Table 5

Mean Scores Across All Levels of the Dependent Variable in Research Question One

Variable	Learning environment	*n*	*M*	*SD*	SEM
Confidence	Control	62	30.70	5.323	.665
	Experimental	64	29.50	5.329	.674
Usefulness	Control	62	32.86	4.869	.609
	Experimental	64	32.70	4.872	.609
Gender	Control	62	33.72	4.100	.512
	Experimental	64	33.11	3.568	.446

Research Question Two

The descriptive statistics for the second research question reflecting the differences in aerobic capacity for girls taking a ninth-grade single-gender PE course and those taking a ninth-grade coed PE course as measured by FITNESSGRAM are shown in Table 6. The number of students meeting the criterion-referenced standards published by FITNESSGRAM are also noted. The FITNESSGRAM assessment chosen to measure aerobic capacity was the 1-mile run. The 1-mile run assessment showed the highest reliability and validity of the five components of health-related fitness and reflected a reliability of .92 (Morrow et al., 2010).

Table 6

Descriptive Statistics for Research Question Two Reflecting Pretest and Posttest Aerobic Capacity Results for the Control and Experimental Groups

Test	Group	*n*	*M*	HFZ	NI
1	Control	63	12.94	12	51
	Experimental	62	15.64	5	57
2	Control	63	11.35	27	36
	Experimental	62	13.88	7	55

Note. The last two columns indicate the number of students in the healthy fitness zone (HFZ) and those who are not (NI) based on FITNESSGRAM standards.

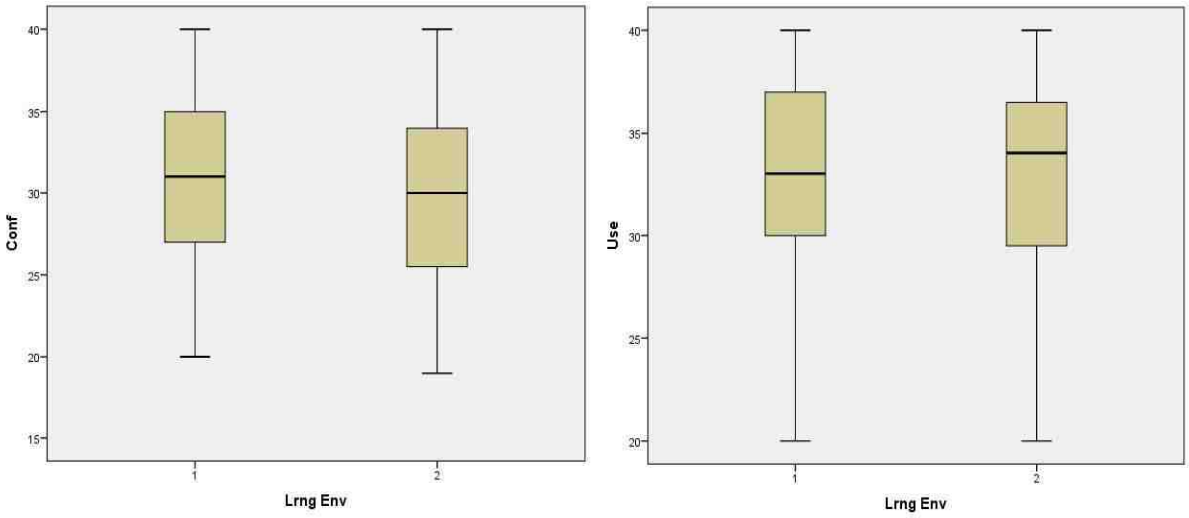
Results

Data Screening

Prior to using SPSS, data screening was conducted across all levels of the dependent variable attitudes toward PA: confidence, usefulness, and gender appropriateness. In addition, a screening was conducted for research question two, aerobic capacity. Screening for any inconsistencies, missing data, or outliers in both the control group with girls only (Group 1) and the experimental group (Group 2) with both boys and girls was conducted. Data were found to be consistent without any missing data. Box and whisker plots were used to identify any outliers in the data set or outliers in the groups.

Research Question One

Data screening. Data screening was conducted for both the control group and the experimental group across all levels of the dependent variable: confidence, usefulness, and gender appropriateness. Data were complete, consistent, and without any abnormalities. However, after screening for outliers for both the control and experimental groups using box and whisker plots, outliers were identified in the area of gender appropriateness within the control group, reducing the sample from 128 (n = 128) to 126 (n = 126), going from 64 (n = 64) to 62 (n = 62) in the sample for the control group. Outliers on line number 92 and 99 in SPSS reflected scores that were lower than the minimum score possible for gender appropriateness. Two questions for gender appropriateness in survey number 92 were not answered, and one question on survey 99 was not answered. The students may have rushed through the survey and missed the question or did not understand the question and chose not to record an answer. Therefore, the researcher felt omitting the outliers was warranted. Box and whisker plots after the omission of outliers for both the control and experimental groups in the three areas—confidence, usefulness, and gender appropriateness—can be viewed in Figure 3.



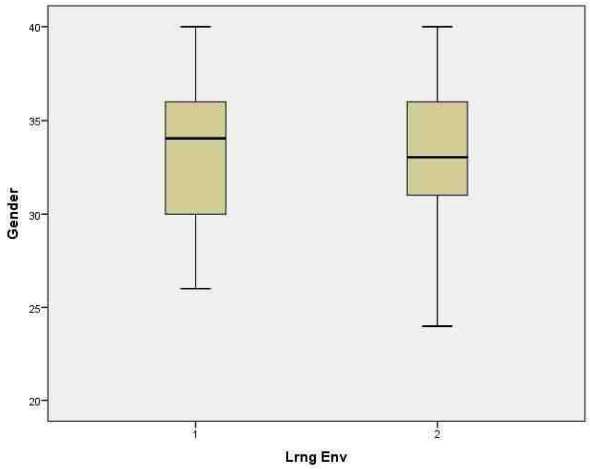


Figure 3. Box and whisker plots for the control and experimental groups in confidence, usefulness, and gender appropriate subscales after the omission of outliers.

Assumptions. Assumption of normality was determined through the use of histograms, Q-Q plots, and the Kolmogorov-Smirnov test. As seen in the distribution of confidence scores in Figure 4, the histogram presented a normal curve, and the Q-Q plots, as seen in Figure 5, reflected data points that were close, if not on the line, for both groups. In addition, the Kolmogorov-Smirnov normality test (see Table 7) presented non-significant results ($p > .05$) and a normal distribution for confidence in both the control and experimental groups.

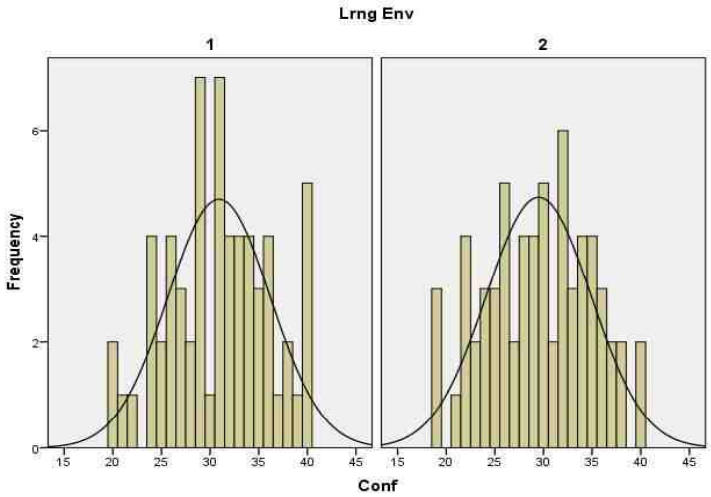


Figure 4. Histogram of attitudes toward confidence in both the control and experimental groups.

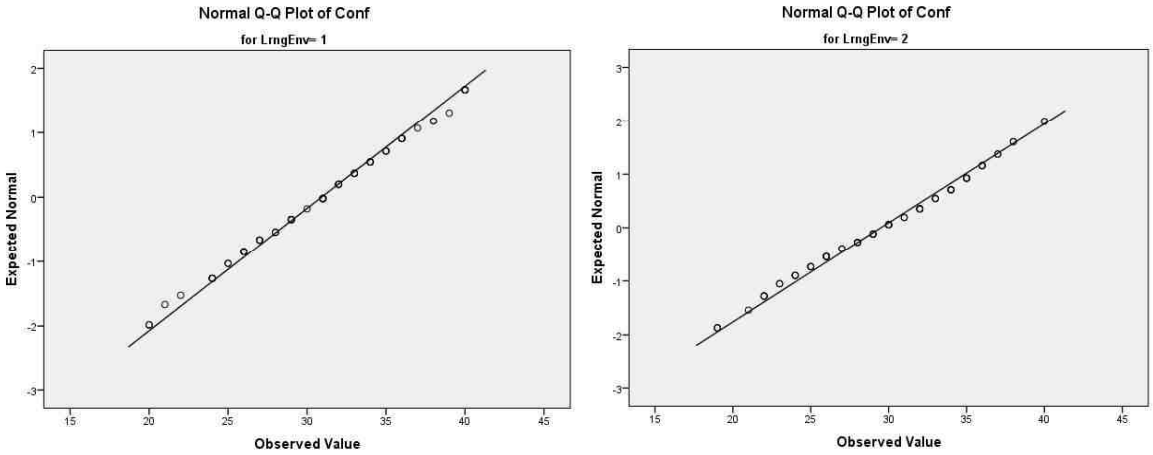


Figure 5. Q-Q plots of attitudes toward confidence in both the control and experimental groups.

The distribution of usefulness toward PA scores seen in the histogram (see Figure 6) presented an approximately symmetric bell curve for the control group and the data points in the Q-Q did not deviate significantly from the line (see Figure 7). The Kolmogorov-Smirnov test (see Table 7) reflected a normal distribution ($p > .05$) for the control group. However, the attitudes toward usefulness of PA scores in the experimental group reflected significant ($p < .05$) results. The histogram for the experimental group (see Figure 6) reflected a moderate negative skew, and the Q-Q plot was approximately normal, with a few data point deviations (see Figure 7) The distribution for the usefulness of PA was moderately skewed but within the limits of -1 to 1 (Gall et al., 2007).

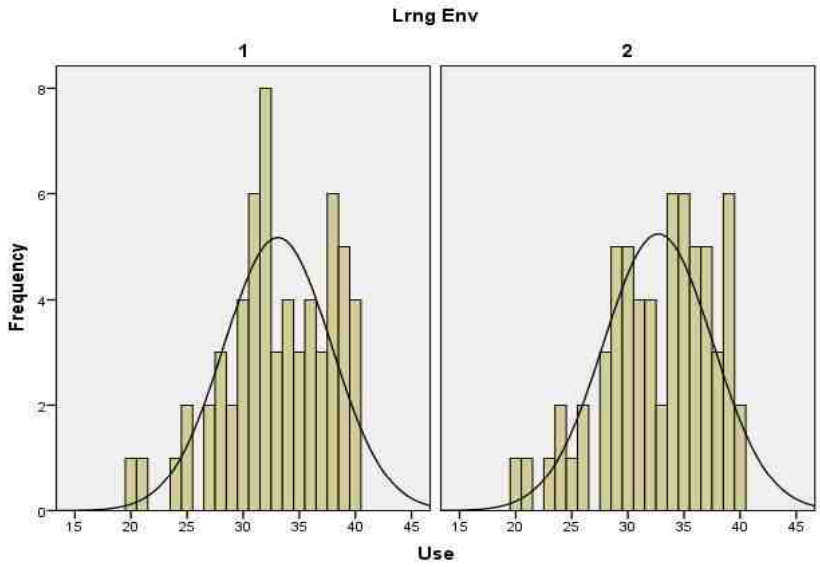


Figure 6. Histogram of attitudes toward usefulness of PA in both the control and experimental groups.

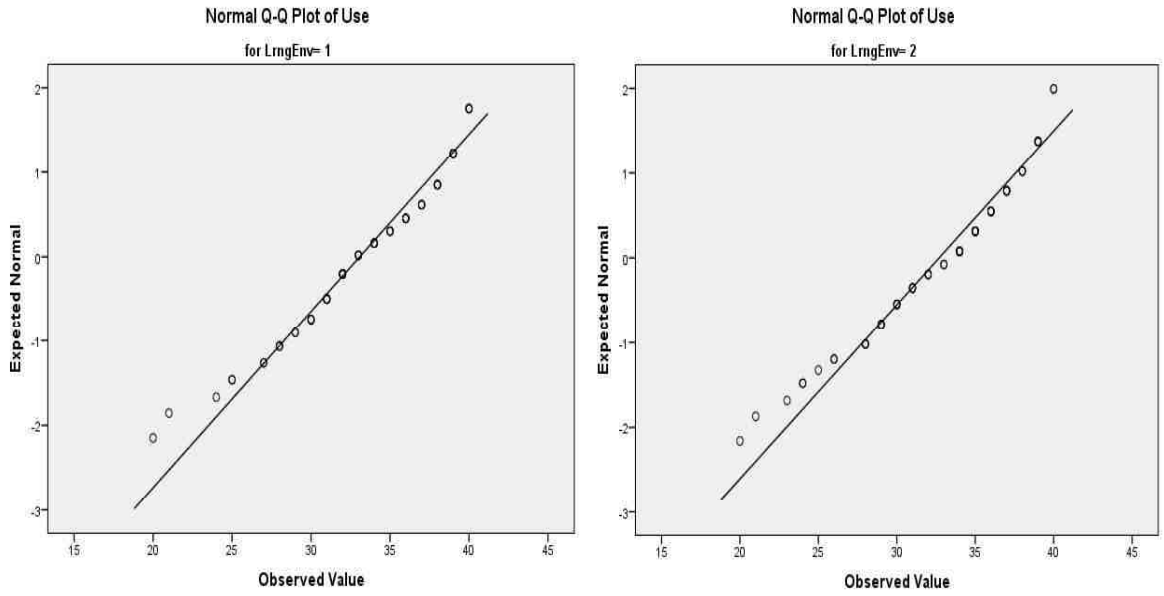


Figure 7. Q-Q plots of attitudes toward usefulness of PA in both the control and experimental groups.

The distribution of scores related to attitudes toward the gender appropriateness of PA appeared approximately symmetric in the histogram (see Figure 8), and the data points in the Q-Q plots (see Figure 7) did not deviate significantly. The results of the Kolmogorov-Smirnov test reflected significant ($p < .05$) results for both the control and experimental groups (see Table

9). According to Gall et al. (2007), the distribution was moderately skewed but within the limits of -1 to 1. As noted, an independent samples *t*-test is robust to violations of some assumptions, and the risk of a type I error does not increase substantially when assumptions are violated (Warner, 2013). Samples ($n > 50$) are fairly resistant to distributions that do not assume normality (Ghasemi & Zahedias, 2012).

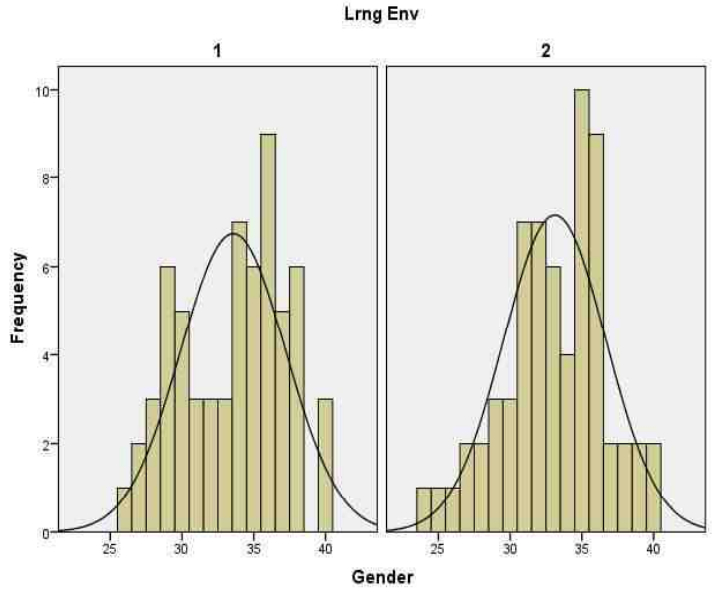


Figure 8. Histogram of attitudes toward gender appropriateness of PA in both the control and experimental groups.

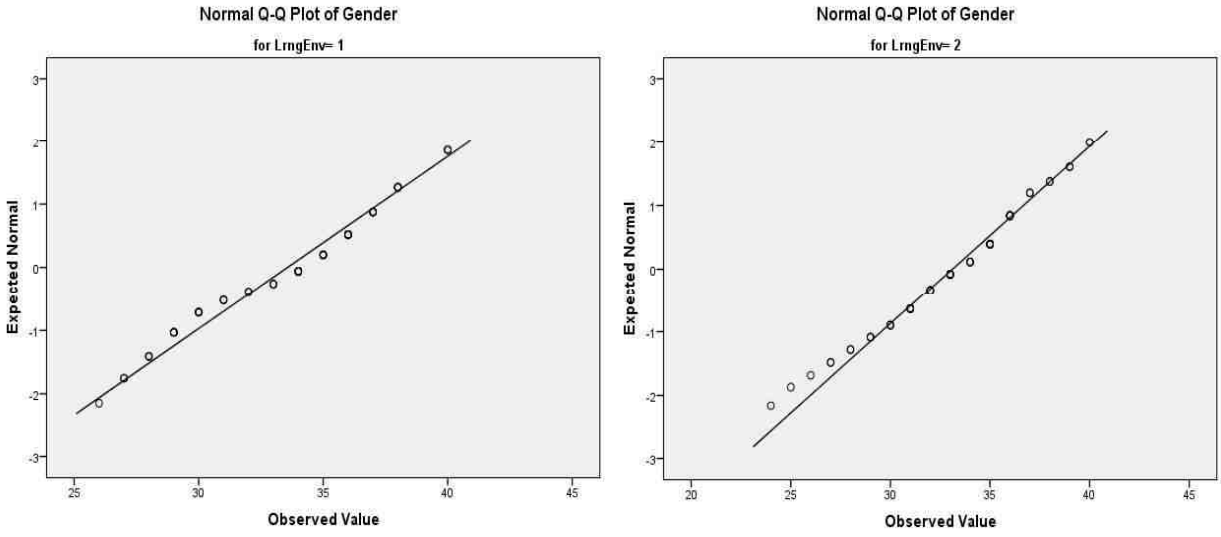


Figure 9. Q-Q plots of attitudes toward gender appropriateness of PA in both the control and experimental groups.

Table 7

Kolmogorov-Smirnov Test Results—Research Question One

Variable	Group	*df*	Sig.	Skewness
Confidence	Control	62	.200	.080
	Experimental	64	.200	.092
Usefulness	Control	62	.200	.555
	Experimental	64	.022	.602
Gender appropriate	Control	62	.013	.240
	Experimental	64	.016	.965

To test the assumption of homogeneity of variances, Levene's test for equality of variances (see Table 8) was conducted for all levels of the dependent variable. The test presented nonsignificant ($p > .05$) results for all three variables, and equal variances can be assumed.

Table 8

Results of the Levene's Test for Equality of Variances—Research Question One

Variable	*F*	*df*	*t*
Confidence	.188	124	1.494
Usefulness	.097	124	.439
Gender appropriate	.515	124	.706

Results. An independent samples *t*-test was conducted to investigate if there was a significant difference in the attitudes of girls taking a ninth-grade single-gender PE course in comparison to girls taking a coed PE course with both boys and girls. The independent variable was learning environment and included a control group (single-gender group) and an experimental group (coed group comprised of girls who took a PE class with both boys and girls). The dependent variable was the attitude presented toward confidence in participating in PA, usefulness in participating in PA throughout life, and the gender appropriateness of viewing PA as a masculine activity.

Results of the independent samples *t*-test presented nonsignificant ($p > .05$) differences at a 95% confidence level between the control and experimental groups in the attitudes of girls toward PA. A statistically significant difference is reflected when $p < .05$ (Gall et al., 2007). In the area of confidence to learn and participate in PA, results were not significant (t [124] = 1.494; $p = .138$ two tailed). Furthermore, there were no significant differences found between the control and experimental groups in regard to attitudes toward the usefulness of PA and participating in PA throughout life (t [124], = .439; $p = .662$ two tailed). In addition, there were no significant differences between the control and experimental groups in the attitudes toward the gender appropriateness of PA being viewed as a masculine activity (t [124], = .706; $p = .482$ two tailed). Using Cohen's *d*, a measure of effect size was calculated for each of the dependent variables. The effect size for confidence was 0.266, for usefulness 0.078, and for gender appropriateness 0.124; all three results had a small effect size (Warner, 2013).

There was no difference between the mean confidence score for the control group ($M = 30.92$, $SD = 5.268$) and the experimental group ($M = 29.50$, $SD = 5.395$). There was no significant difference between the usefulness score of the control group ($M = 33.08$, $SD = 4.781$) and the experimental group ($M = 32.70$, $SD = 4.872$). Furthermore, there was no significant difference in the gender appropriateness score of the control group ($M = 33.56$, $SD = 3.669$) and the experimental group ($M = 33.11$, $SD = 3.568$). The research failed to reject the null hypothesis; therefore the null hypothesis must be accepted across all levels of the dependent variable. The results of the independent samples *t*-test are shown in Table 9.

Table 9

Results of the Independent Samples t-Test for Attitudes Toward Confidence, Usefulness, and Gender Appropriateness of PA

	95% confidence interval of the difference				
Attitudes	*t*	*df*	Sig. (two tailed)	Lower	Upper
Confidence	1.494	124	.138	-.462	3.300
Usefulness	.439	124	.662	-1.325	2.080
Gender Appr	.706	124	.482	-.821	1.731

Research Question Two

Data screening. Data screening was conducted for both the control group and the experimental group for the dependent variable aerobic capacity. Data were complete, consistent, and without any abnormalities. However, box and whisker plots presented multiple outliers in the distribution of aerobic capacity scores. Figure 8 shows that the outliers were the same as the SPSS line number on both the pretest and posttest and warranted exclusion from the data set (Warner, 2013). These outliers indicate that the same students may have been walking during both tests or failed to take the pretest and posttest in earnest. These results would not reflect an accurate presentation of the data. Thus, a decision to omit outliers 50, 103, and 104 were made, reducing the original sample from 128 (n = 128) to 125 (n = 125), with 62 (n = 62) in the experimental group and 63 (n = 63) in the control group. A presentation of the distributions of aerobic capacity scores before the omission of the outliers is seen in Figure 10 and without in Figure 11.

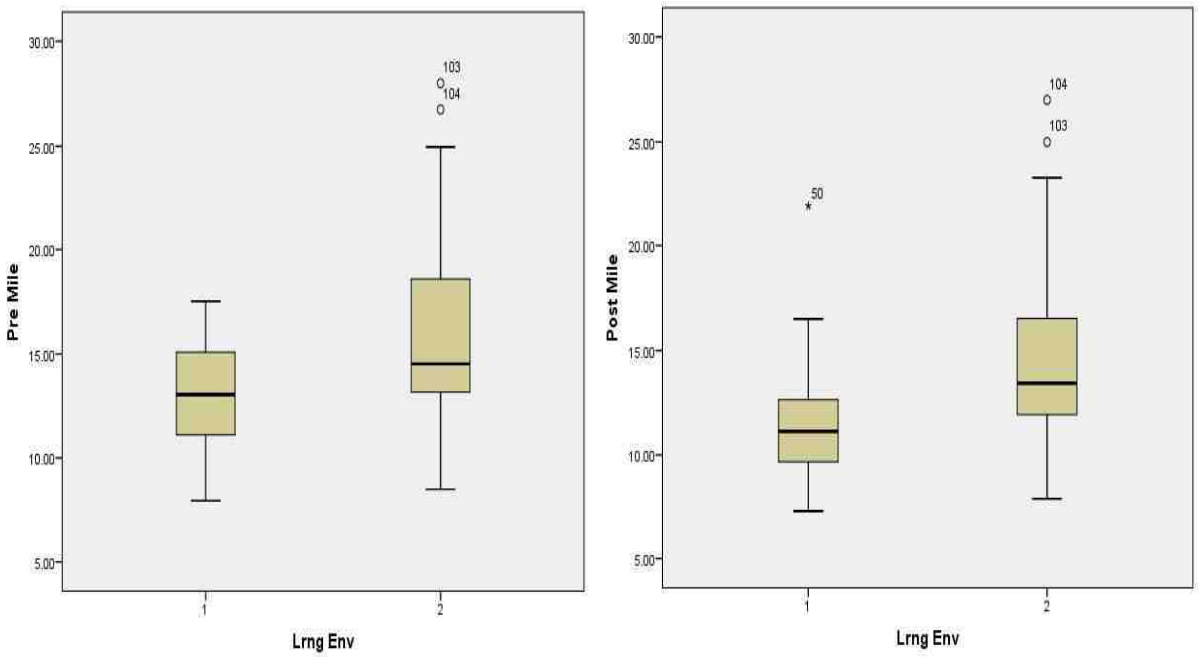


Figure 10. Box and whisker plot for both the control group (group 1) and experimental group (group 2) during the pretest and posttest mile run. The distribution measures aerobic capacity before the omission of the outliers.

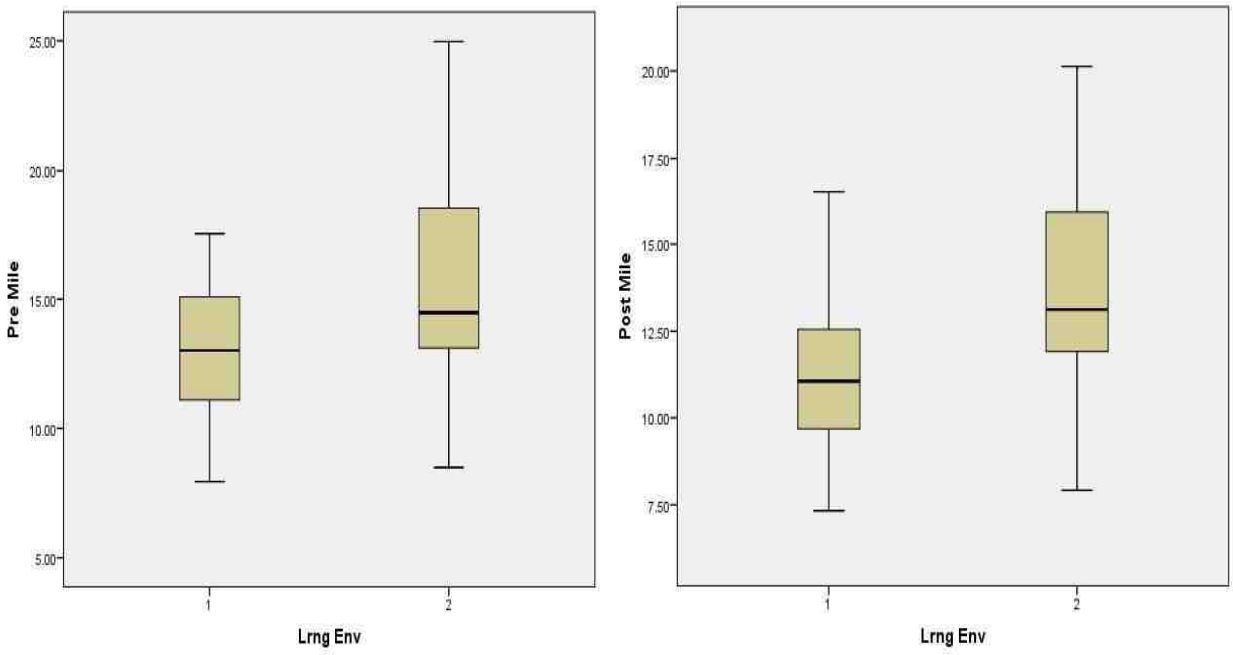


Figure 11. Box and whisker plot for the control and experimental group during the pretest and posttest mile run. The distribution measures aerobic capacity after the omission of the outliers.

Results. An investigation into aerobic capacity was conducted to determine how many females met the health-related fitness standards established by FITNESSGRAM and to

determine the average mile run score for females in both the single gender and coed learning environments using pre and post mile run assessments. The independent variable was learning environment and included a control group (single-gender group) and an experimental group (coed group comprised of girls taking a PE class with both boys and girls). The dependent variable was aerobic capacity as measured using mile run scores and health related fitness criteria published through FITNESSGRAM. The criteria are gender and age specific and a level of fitness that has been identified for lowering the risks associated with sedentary living.

The number of students who met the minimum mile run requirement to achieve the HFZ standards, as well as the number of students who did not meet the minimum requirement (NI) are displayed in Table 10. The mean mile run scores were faster during both the pre-test and post-test within the single gender group when compared with the coed group (see Table 10). The mean pretest aerobic capacity score for the single-gender group (M = 12.95, SD = 2.42*)* was approximately 2.70 minutes faster than the coed group (M = 15.64, SD = 3.81). The mean posttest aerobic capacity score for the single-gender group (M = 11.35, SD = 2.20) was about 2.53 minutes faster than the coed group (M = 13.88, SD = 3.01). In addition, there were more students who met the HFZ standards in the control group than in the experimental group during both the pretest and the posttest (see Table 11).

Table 10

Mean mile run scores for both the single gender and coed groups during the pre and post mile run assessment.

Test	Group	*n*	*M*	*SD*
Pretest	Single gender	63	12.95	2.42
	Coed	62	15.64	3.81
Posttest	Single gender	63	11.35	2.20
	Coed	62	13.88	3.01

Table 11

Students Who Met and Failed to Meet Age and Gender Standards for the HFZ for Aerobic Capacity and Those Who Did Not Meet the Healthy Fitness Zone Standards (NI)

Test	Group	*n*	HFZ	NI	Percent HFZ	Percent NI
Pretest	Single gender	63	12	51	19.05	80.95
	Coed	62	5	57	8.06	91.94
Posttest	Single gender	63	27	36	42.86	57.14
	Coed	62	7	55	11.11	88.71

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter summarizes the findings of this static group comparison research. The implications of the study are discussed, along with limitations that were identified, and prospects for future research are considered. The purpose of this research was to present insight into the performance of girls in the single-gender and coed PE learning environment and into how attitudes toward PA are impacted. The study is consistent with previous research on the benefits of single-gender PE and performance.

Discussion

The purpose of the static group comparison design was to test the relationship between ninth-grade girls' attitudes toward PA in the single-gender versus mixed-gender PE setting. In addition, data was collected to determine the aerobic capacity of girls in both learning environments were. A convenience sample was utilized to assign a control group and experimental group from four different high schools in a school district located in the Southeast. When looking into the first research question, differences in attitudes toward PA, the presence of outliers reduced the sample size from 128 participants to 126. After the omission of outliers, the control group for the first research question comprised 63 participants and the experimental group included 62. The control group for the second research question included 62 participants, and 64 participants were included in the experimental group. The second research question identified how many females in the two groups met the FITNSSGRAM standards and how many did not, in addition to quantifying the mean mile run scores between the groups. Initially, there were 128 participants but the sample was reduced to 125 during data screening due to the presence of multiple outliers.

Unfortunately, despite interventions implemented in PE programs across the country, physical educators and other constituents continue the struggle to encourage students to move (Lindelof, Nielsen, & Pederson, 2012). Adolescents in middle and high school continue to avoid the PE setting, with girls opting out at a much higher rate than boys (CDC, 2017). The research reflects a continued decline in PA among adolescents between the ages of 10 and 18 (CDC, 2017). Examinations into this issue have determined that PE environments lack equality for females due to gender barriers associated with boys (Koco, 2009). Gender barriers have been associated with coed PE classes, and a greater risk of bullying and teasing have been identified as deterrents to females pursuing active lifestyles (Woodson-Smith et al., 2015). Although many researchers have deduced single-gender PE learning environments are more equitable because they provide more opportunities for girls to move and environments that are emotionally safe and prevent ridicule or bullying, there continues to be conflicting arguments for coed PE.

Data were collected with the intention of determining if there was a significant difference in the attitudes of girls toward PA between girls taking a single-gender PE class and those taking a coed PE with both boys and girls. The independent variable was learning environment, and attitudes served as the dependent variable. In addition, determining aerobic capacity within the two groups was intended to provide some insight into performance and the overall cardiovascular health of both groups. The participants for this research were taken from a convenience sample during the 2018-19 school year and were enrolled in the required PE class needed for graduation. There were a variety of physical and academic levels.

Research Question One

There were two research questions in this study: Is there a difference in the attitudes toward participating in physical activity, as measured by an attitude scale, between ninth-grade

girls who have completed a single-gender physical education course and ninth-grade girls who have completed a mixed-gender physical education course?

Although PA lowers the risk of physical, psychological, and emotional problems such as depression, anxiety, and low self-esteem, research has identified that negative attitudes toward PA are frequently presented in adolescent girls and are key factors in the decline of attendance and participation in PE classes (Costigan et al., 2016). Attitudes toward PA are developed through previous experiences that can have a direct impact on self-efficacy beliefs that encourage or discourage the motivation to participate in PA and pursue a physically active lifestyle (Jekauc et al., 2015). Previous research has noted (a) fewer opportunities to participate and disparities in practice opportunities in the coed PE environment (G. M. Hill et al., 2012); (b) social and emotional gender barriers such as teasing (Ra & Cho, 2017); (c) bullying remarks made more in PE about appearance and weight than any other subject area (Quinones & Sierra-Robles, 2015); (d) barriers related to body image derived from puberty, when adolescents are more prone to compare themselves to others and gender roles are associated with the competitive nature of boys and the social aspect of girls (Senin-Caldron et al., 2017); and (e) self-consciousness toward dressing rooms, showers, and wearing athletic clothing (Mitchell et al., 2015).

This research examined attitudes toward confidence in learning and participating in PA, attitudes toward the usefulness of PA, and gender appropriateness of PA as a masculine or feminine activity in both the single-gender and coed PE environment. The study presented nonsignificant results in all three domains of attitudes. The mean (M = 30.92) scores for the attitudes of confidence within the control group and the mean (M = 29.50) scores in the experimental group were similar. Females in the experimental group appeared to be just as

confident in learning skills and participating in PA as the females in the control group. The mean scores in both groups reflect more favorable attitudes toward confidence than unfavorable attitudes.

Although previous research has identified that girls are less competitive and get fewer practice opportunities in coed learning environments, it may not reflect less confidence in females (Menno et al., 2014). Looking into the identity of girls and conversations about femininity, body image, and PE, previous research found that females acknowledged the inequities between boys and girls in the coed PE class and supported the behavior in ways that were consistent to allowing male dominant behavior. However, during discussion groups and journal entries, the same students challenged the dominant behavior of boys by supporting equal opportunities for females (J. Hill, 2015). Although, some research has described the behavior demonstrated by females as consistent with lack of confidence, motivation, and fewer practice opportunities in the coed PE environment, the data in this study, although nonsignificant, may reflect that girls have the desire and confidence to participate, but due to the presence of gender expectations and impediments, they behave accordingly. The learning environment may not be the issue, but understanding gender expectations and the impact on the performance and self-efficacy of females may be something to consider.

Due to the increase of morbidity related to sedentary living over the last 30 years, the rise in childhood obesity, and the continued decline in PA, the attitudes of girls toward the usefulness of PA as a lifelong pursuit was examined. Childhood obesity continues to rise because of the sedentary habits of adolescents and more screen time (Lindelof et al., 2012). Disparities in PA between girls and boys begin as early as fifth grade, with females twice as inactive as males, rendering them more predisposed to heart disease, diabetes, development of psychological and

emotional disorders, and a higher risk of obesity (CDC, 2015). This study presented no significant differences in the attitudes of girls in the control group toward the usefulness of PA compared to the attitudes of girls in the experimental group. The mean (M = 33.08) of the control group was approximately the same as the mean (M = 32.70) in the experimental group. Although there were no significant differences between the two groups, the mean scores did indicate more favorable attitudes toward the usefulness of PA for both groups. The participants for this research appear to have acquired the knowledge to value PA as a healthy lifestyle choice, and knowledge can influence the decision to change behavior (Dewer et al., 2013).

A longitudinal investigation of obese adolescents and attitudes toward PA found many sedentary or obese adolescents have negative attitudes about PA because they find it arduous, and the lack of enjoyment encourages a sedentary lifestyle (Lindelof et al., 2012). Healthy lifestyle habits are more likely to occur when adolescents view it as fun and enjoyable (CDC, 2017). Interestingly, Lindelof et al. (2012) also found that although many of the adolescents in their study acknowledged good nutrition and regular PA as a necessity for healthy living and lowering the risk of disease related to PA, most of them, when given the choice, did not choose to participate in exercise. The current study reflected scores that were more favorable toward the usefulness of PA for both the control and experimental groups. However, although the participants found value in establishing a healthy lifestyle, one should use caution because while the sample acknowledges a healthy lifestyle, it may not necessarily mean a positive attitude has been established toward exercise and a healthy lifestyle will be implemented. A closer look into the experiences student's encounter and their perceptions may provide better insight into how to turn them into lifetime movers.

Gender appropriateness and attitudes toward PA as a masculine, feminine, or neutral domain was the third and final analysis. In addition to attitudes toward confidence and usefulness, attitudes toward gender appropriateness of PA did not reflect a significant difference between the control and experimental group. The mean (M = 33.56) score for the control group was not much different than the mean (M = 33.11) score of the experimental group. Therefore, no evidence is presented that supports or negates that single-gender groups impact the attitudes of girls toward gender appropriateness. However, the mean scores were relatively high and identify more favorable attitudes toward PA being viewed as an appropriate activity for girls in both groups.

This is consistent with previous research suggesting gender barriers that hinder girls from performing at their full potential and being less physically active in coed PE classes with boys due to a fear of being viewed as masculine and being bullied and teased by boys (Craft et al., 2003; McKenzie et al., 2004; Shimone, 2005). In fact, one study identified clothing choices, assuming positions that were underperforming, refraining from moving during activities, and hiding as strategies to avoid physical activity in PE due to being afraid of backlash, such as derogatory remarks from boys about being too masculine or fat instead of athletic (J. Hill, 2015). This suggests that although girls have favorable attitudes toward PA, they are underperforming within environments with boys in order to maintain established gender norms. What may be considered as athletic conflicts with what is valued as feminine; thus, adolescent females appear to not only struggle to develop bodies that align with the expected gender norm, they also underperform and refrain from activities they know they are capable of to avoid consequences associated with breaking gender roles and stereotypes.

This examination into the attitudes of girls toward PA presents no significant differences within the control group versus those in the experimental group. Therefore, the null hypothesis must be accepted across all levels of the dependent variable. Although the results of these data did not reflect any significant differences in the attitudes of girls in the single-gender and coed PE environment, it did provide some plausible insight into the potential advantages of single-gender PE classes for girls versus coed classes.

Research Question Two

The second research question for this study asked the following question: What is the aerobic capacity of girls taking a ninth-grade single gender physical education class and girls taking a ninth grade mixed gender physical education class as measured by FITNESSGRAM?

Previous discussions in Chapter Two described Bandura's SCT as a direct influence on competence, motivation, and self-efficacy (Bandura, 1977). These components must be present to develop positive perceptions of PA and, in addition, are the driving force for performance, success, and lifestyle habits (Ennis, 2014). According to Bandura (1986), personal, environmental, and behavioral determinants are interwoven to impact perceptions that are acquired through experiences, and those experiences influence self-efficacy. Self-efficacy beliefs are the driving force for behavior change, and higher self-efficacy beliefs are associated with more positive PA choices (Alert et al., 2018). Thus, participating in environments that foster fun, positive social interactions, competency, and motivation impact the intention to participate and are the fundamental ideas upon which this dissertation is based.

In this research, the mean pretest mile run times for girls in the control group were significantly faster (M = 12.95) than the mean scores (M = 15.64) of the girls in the experimental group. Furthermore, the mean posttest mile run times were faster within the control group (M =

11.35) than the posttest scores for the girls in the experimental group (M = 13.88). Although, there was an improvement between the pretest and posttest, the girls in the control group performed significantly better on both tests. In addition, the number of students in the HFZ increased from 12 to 27 in the control group during the posttest in contrast to the experimental group, whose numbers reflected only five students meeting the HFZ standards during the pretest and seven during the posttest. This trend indicates the single-gender PE environment may have had a positive impact on the performance of girls in the single-gender groups. In addition, the data were consistent with previous research that posited that single-gender PE environments may be more suitable for promoting participation and performance in girls than the coed PE environment.

Competence, motivation, effort, and perceptions of enjoyment have been associated with single-gender groups (Slingerland et al., 2014). Motivation is driven by self-efficacy beliefs and has also been identified as a necessary component for adolescents to engage in PA and sport (Ortega et al., 2018). Previous research into gender groupings in PE identified that girls felt less competent and moved less frequently in coed groupings. Moreover, in addition to demonstrating more effort in single-gender groups, girls also expressed more enjoyment due to the absence of competition (Slingerland et al., 2014). The pre- and post-mile run scores from this study reflected consistency with the research, because the students in the control group appeared to put forth more effort and were more motivated to perform than the students in the experimental group. Single-gender group scores were much faster than the coed group's scores for both tests, and more students met the HFZ criterion in the single-gender group.

Physical education programs around the country have a significant responsibility for the PA in young people, and the goals that have been established not only encourage regular

physical activity by introducing skills needed to participate in a variety of sports and physical activities, they also promote lifelong health and fitness through emphasis on an emotionally safe and enjoyable atmosphere where students can interact with each other and feel comfortable (SHAPE America, 2015). In a qualitative examination of conversations between girls about femininity, female bodies, and PE, J. Hill (2015) identified that although girls challenged boys dominance in conversations with each other and agreed equal opportunities should be afforded to them, when in the presence of boys, such as in coed PE classes, they behaved in ways that supported inequity. The participants in the study described single-gender PE and sport environments as relaxed and free from the expectations and looks they received from boys, and they felt they could participate to their potential (J. Hill, 2015).

During the mile run assessment in this research, girls in the control group were grouped in girls-only classes and testing environments. The performance of the control group supported the research, reflecting a positive relationship between self-efficacy beliefs, environments free of impediments caused by the presence of males, and performance. It can be inferred that girls in the single-gender learning environment felt more emotionally secure and efficacious without the distraction of boys. Thus, students felt free to perform at their potential as opposed to the girls in the experimental group, who may have felt anxious or emotionally threatened in the presence of boys. Based on the data, interventions should be considered regarding gender grouping and the positive impact the single-gender environment presents on the performance of girls in the PA setting.

Implications

The implications of this research provided some insight into the impact of single-gender PE groups and the performance of adolescent females. It also identified how unhealthy females

are in terms of meeting minimum healthy fitness criteria for aerobic capacity. Much of the previous research into the lack of PA by girls emphasized internal and external factors that impact the decision of girls to participate in PA. Although external environmental factors such as lack of practice time, equipment, and competition encouraged by boys are important factors to consider, the internal stressors of social and cultural norms create gender barriers that are deep-rooted and do not just impact the PE environment but also impact a female's choice to engage in PA outside of school and throughout life.

Although this research did not find significant differences in attitudes toward PA between girls in single-gender classes and those in coed classes, it did confirm that females feel PA is gender appropriate, and they seem to have the understanding that PA is important for lifelong health. Furthermore, the data suggested confidence is not an issue, because the scores from both the single-gender and mixed-gender classes reflected favorable attitudes toward having the confidence to participate and learn skills required for PA. That said, during this study the performance of the pre- and post-aerobic capacity test of the girls in the coed class were much slower than the single-gender class. This demonstrates the impact of gender barriers that seem to be present in a mixed-gender setting and emphasizes the need for activity environments that are emotionally safe and free of the internal and external stressors that boys seem to bring.

Furthermore, this research reinforces the value of the single-gender PE class because it encourages participation of females, which was reflected in better aerobic capacity performance in the single-gender group. The learning environment was perceived more comfortable and less intimidating than the group with both boys and girls. An environment that fosters encouragement and support for females should be considered because it impacts perceptions toward PA and the motivation to participate or withdraw. Learning environments that are

perceived as comfortable and safe encourage girls to feel less anxious, and they are more willing to participate without the fear of negative consequences experienced from boys (Lindelof, 2015). In addition, the likelihood of leading a physically active lifestyle has been shown to diminish due to negative encounters. According to Bandura (1986), positive environments create experiences that influence the likelihood of repeated behavior, which can be directly related to the choice to participate in PA. Environments that foster encouragement and support influence the motivation of girls to perform according to their potential as opposed to holding back to conform to the pressure of societal norms and the fear of backlash—in the form of teasing and bullying—from boys.

Physical educators struggle to motivate females to move, and in addition to the positive impact the single-gender class had on aerobic capacity scores, this research also identified over twice as many students meeting the minimum healthy fitness criteria established by FITNESSGRAM in the single-gender group. However, there is still a long way to go because although there were more students in the HFZ during the posttest, only 43% of the students in the single-gender class and 11% of the students in the coed class met the minimum healthy fitness criteria. Conclusively, such results indicate a need for change in current practices and possibly more family and community involvement.

Gender inequities initiated through societal norms about what is thought to be feminine impacts the motivation to participate in PA or the choice to opt out. It is hoped that the findings from this research initiate discussions among physical educators, administrators, and other constituents in the field of education to consider the benefits of single-gender classes as an avenue to encourage positive experiences related to PA among females. In addition, changes in pedagogy and curriculum and creation of more opportunities for family and community

involvement are needed. Teachers are limited in what they can do to improve the health-related fitness of their students. In fact, other than peers and schooling, the family is one of the most important determinants of healthy behavior in adolescents (Niermann, Kremers, Renner, & Woll, 2015). Nevertheless, although there are a number of determinants impacting healthy behavior, creating positive experiences and providing learning environments that are emotionally and physically equitable for all students must be a priority for physical educators.

Limitations

Although aerobic capacity data presented better performance scores and more females achieved the healthy fitness criteria in the control group for both the pre and post mile run assessments, it was limited to descriptive statistics. A quantitative design such as an ANCOVA would have produced more specific, empirical results. The survey results were insignificant but there were similarities in the control and experimental group's attitude scores toward confidence in learning skills related to PA and the usefulness or the understanding that PA is an important lifestyle choice. In addition, both groups presented favorable views that PA was gender appropriate. However, the survey did not reflect personal experiences that would have been identified or exposed in interviews, discussion groups, or personal diaries that could have offered more insight into their daily experiences in the PE environment. These revelations may have provided the researcher insight into the development of positive or negative perceptions in both environments and possibly explained the differences in the performance scores of both groups.

Another limitation of the research is related to the varied physical ability, maturity levels, and degree of health each student had when enrolling in PE. The PE courses for this research were general classes offered to ninth graders in order to earn a Carnegie unit to graduate. Some students may have been obese or generally unfit, have spoken English as a second language

(ESL), or had an Individual Education Plan (IEP); others may have been athletes, and some may not have been as mature as others. The mile run required students to complete four laps as quickly as possible. Some students may not have wanted to try, or only jogged, or did not run. This may have been displayed through the outliers in the pre- and posttest mile run scores. Two of the same line numbers in SPSS during both the pretest and posttest were extremely high and may have reflected the same two students who chose to walk. In addition, there were also two outliers in the distribution of survey scores that could have reflected ESL students or students with IEPs. Furthermore they could have also represented students who failed to complete the survey or did not read each question, because they did not feel like participating the day the survey was administered.

The research was also only conducted in one school district and in one ninth-grade introductory physical education course. Therefore, the results cannot be generalized to all PE classes. Examining samples from various PE courses such as fitness or weight training classes and from other districts in more than one geographical area could give better insight into the gender as a whole. The attitudes of girls who have autonomy to select activities of their choice may reflect more positive attitudes toward PA and performance in health-related fitness criteria. Unfortunately, the researcher did not have access to this information during the time of this study. However, it would be interesting to look into how autonomy impacts performance and attitudes toward PA and healthy lifestyle choices.

Recommendations for Future Research

There needs to continue to be investigations into the disparities in PA between boys and girls. Unfortunately, due to the epidemic of physical inactivity as seen in previous research and the implications from the FITNESSGRAM results in this study, both genders are predisposed to

morbidity associated with sedentary living. Females will continue to be at higher risk if something is not done to change their perceptions and willingness to participate in PA. The following are recommendations for future research:

1. Although there have been many quantitative designs into gender barriers and attitudes of adolescents toward exercise, a qualitative research design examining gender expectations between boys and girls may provide more concrete answers to the inequities observed in PE classes. What may be considered as athletic may also not be considered feminine. Adolescent females are struggling to meet gender norms but are compromising self-efficacy in doing so. Gaining an understanding of what each gender considers appropriate behavior in the physical activity environment may provide insight into interventions that could be implemented to create a more equitable learning environment. Interviewing students, discussion forums, and diaries could provide more specific answers in terms of experiences and perceptions about participating in PA within the coed learning environment.
2. In addition, research has identified that girls prefer activities related to fitness and weight management, which aligns with societal norms about body size and shape. An investigation into how autonomy impacts the attitudes and perceptions of girls may provide an alternative to a traditional coed PE course where the instructor selects the units. If students have a choice in what they are learning, they may take more initiative in participating.
3. In addition, a quantitative study into girl-friendly units and activities that encourage gameplay, fitness, weight management, and socialization as opposed to competition and traditional team sports may impact attitudes and perceptions of PA and encourage

permanent lifestyle changes. Research has shown that socializing and having fun with peers encourages self-confidence and participation (Mitchel et al., 2015). Determining the types of activities girls choose most often would give physical educators insight into the types of units to incorporate into the curriculum that encourage the participation of girls in the PE settings.

4. Looking into student/teacher behaviors and interactions could provide insight into how instructors support gender inequities. Some research has identified the presence of gender bias in the choices of units taught, verbal cues, and teaching styles that support gender inequities among female students (Koco, 2009). A qualitative investigation into the perceptions of girls toward not only the learning environment but also toward their interactions with teachers may determine teacher behaviors that have a negative impact on the perceptions of girls towards PA, on participating in PE class, and possibly on decisions to participate in PA later in life.

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APPENDIX A: STUDENT SCORE SHEET

One-Mile Run Individual Score Sheet

Runner Name: _____

Scorer Name: _____

Laps Completed (cross off each lap number as your runner completes it)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Finish Time: _____

✂ -

One-Mile Run Individual Score Sheet

Runner Name: _____

Scorer Name: _____

Laps Completed (cross off each lap number as your runner completes it)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Finish Time: _____

FIGURE B.9

From *FITNESSGRAM/ACTIVITYGRAM Test Administration Manual, Updated Fourth Edition* by The Cooper Institute, 2010, Champaign, IL: Human Kinetics.

APPENDIX B: FITNESSGRAM® STANDARDS FOR THE HFZ

TABLE 9.2 FITNESSGRAM® Standards for Healthy Fitness Zone®

GIRLS

Age	Aerobic capacity $\dot{V}O_2$max (ml/kg/min) PACER, one-mile run, and walk test			Percent body fat				Body mass index			
	NI-High Risk	NI-Some Risk	HFZ	Very Lean	HFZ	NI-Some Risk	NI-High Risk	Very Lean	HFZ	NI-Some Risk	NI-High Risk
5				≤9.7	9.8-20.8	20.9	≥28.4	≤13.5	13.6-16.7	16.8	≥17.3
6				≤9.8	9.9-20.8	20.9	≥28.4	≤13.4	13.5-17.0	17.1	≥17.7
7				≤10.0	10.1-20.8	20.9	≥28.4	≤13.4	13.5-17.5	17.6	≥18.3
8				≤10.4	10.5-20.8	20.9	≥28.4	≤13.5	13.6-18.2	18.3	≥19.1
9				≤10.9	11.0-22.6	22.7	≥30.8	≤13.7	13.8-18.9	19.0	≥20.0
10	≤37.3	37.4-40.1	≥40.2	≤11.5	11.6-24.3	24.4	≥33.0	≤14.0	14.1-19.5	19.6	≥21.0
11	≤37.3	37.4-40.1	≥40.2	≤12.1	12.2-25.7	25.8	≥34.5	≤14.4	14.5-20.4	20.5	≥21.9
12	≤37.0	37.1-40.0	≥40.1	≤12.6	12.7-26.7	26.8	≥35.5	≤14.8	14.9-21.2	21.3	≥22.9
13	≤36.6	36.7-39.6	≥39.7	≤13.3	13.4-27.7	27.8	≥36.3	≤15.3	15.4-22.0	22.1	≥23.8
14	≤36.3	36.4-39.3	≥39.4	≤13.9	14.0-28.5	28.6	≥36.8	≤15.8	15.9-22.8	22.9	≥24.6
15	≤36.0	36.1-39.0	≥39.1	≤14.5	14.6-29.1	29.2	≥37.1	≤16.3	16.4-23.5	23.6	≥25.4
16	≤35.8	35.9-38.8	≥38.9	≤15.2	15.3-29.7	29.8	≥37.4	≤16.8	16.9-24.1	24.2	≥26.1
17	≤35.7	35.8-38.7	≥38.8	≤15.8	15.9-30.4	30.5	≥37.9	≤17.2	17.3-24.6	24.7	≥26.7
>17	≤35.3	35.4-38.5	≥38.6	≤16.4	16.5-31.3	31.4	≥38.6	≤17.5	17.6-25.1	25.2	≥27.2

Age	Curl-up (no. completed)	Trunk lift (inches)	90° push-up (no. completed)	Modified pull-up (no. completed)	Flexed arm hang (seconds)	Back-saver sit and reach* (inches)	Shoulder stretch
5	≥2	6-12	≥3	≥2	≥2	9	Healthy Fitness Zone = touching fingertips together behind the back on both the right and left sides.
6	≥2	6-12	≥3	≥2	≥2	9	
7	≥4	6-12	≥4	≥3	≥3	9	
8	≥6	6-12	≥5	≥4	≥3	9	
9	≥9	6-12	≥6	≥4	≥4	9	
10	≥12	9-12	≥7	≥4	≥4	9	
11	≥15	9-12	≥7	≥4	≥6	10	
12	≥18	9-12	≥7	≥4	≥7	10	
13	≥18	9-12	≥7	≥4	≥8	10	
14	≥18	9-12	≥7	≥4	≥8	10	
15	≥18	9-12	≥7	≥4	≥8	12	
16	≥18	9-12	≥7	≥4	≥8	12	
17	≥18	9-12	≥7	≥4	≥8	12	
>17	≥18	9-12	≥7	≥4	≥8	12	

*Test scored Yes/No; must reach this distance on each side to achieve the HFZ.

APPENDIX C: PERMISSION TO USE THE ATPAS INSTRUMENT

RICHLAND SCHOOL DISTRICT TWO

Dawn Fairey <dfairey@richland2.org>

Liberty U./Survey Permission?D.Fairey
3 messages

Dawn Fairey <dfairey@richland2.org>
To: zac.wilson@bartow.k12.ga.us

Fri, Oct 12, 2018 at 12:55 PM

Hi Zac, I am a doctoral student at Liberty University completing a dissertation in Curriculum and Instruction. My research is in the attitudes of H.S. girls towards aerobic capacity and PA. I am writing to ask written permission to use the physical activity survey in your research. Thanks so much!

Dawn Fairey, M.S.S, EdD(c)
Physical Education (NBCT 2006,2016)

"It is the mark of an educated mind
to be able to entertain a thought
without accepting it"
Aristotle

Wilson, Zac <zac.wilson@bartow.k12.ga.us>
To: Dawn Fairey <dfairey@richland2.org>

Fri, Oct 12, 2018 at 1:08 PM

Hi Dawn,

I'm totally fine with that. Let me know if you need me to sign a form or anything. On a side note, I noticed the call I missed was from the Columbia area and you've got a Richland 2 e-mail. I went to USC for my master's degree. I worked at both Eau Claire HS and White Knoll HS while I was there.

Zac Wilson, Ed D

Assistant Principal

Kingston Elementary

Bartow Co. Schools

770-606-5850 ext 4652

From: Dawn Fairey <dfairey@richland2.org>
Sent: Friday, October 12, 2018 12:55 PM

APPENDIX D: FITNESSGRAM® USAGE AGREEMENT

FitnessGram® Privacy Policy

Updated January 26, 2018

I. Introduction

The FitnessGram® Software ("FitnessGram® Software"), a fitness education assessment program software that we include as part of the Services, including any applications, is owned and operated by The Cooper Institute® ("The Cooper Institute®," "we" or "our"). This Privacy Policy ("Policy") includes the following defined terms, in addition to other capitalized words in the Policy:

> "Customer" or "you" means School Districts, State Educational Agencies, students (including Children), and Parents who access data using the FitnessGram® Software under the FitnessGram Hosting Terms of Use, which is available at https://myhealthyzone.fitnessgram.net ("FitnessGram® TOU").
>
> "Child" or "Children" means a child or children under the age of 13.
>
> "FitnessGram® Software" means, collectively, all of the present and future FitnessGram® Software packages or programs including, without limitation, FitnessGram®, MyHealthyZone™, ActivityGram®, Healthy Fitness Zone®, and ActivityLog, and their related components. The FitnessGram® Software is licensed, not sold, only in accordance with the FitnessGram® TOU.
>
> "Parent" means a parent or legal guardian.
>
> "Personal Information" means any student information defined as personally identifiable information under Family Educational Rights and Privacy Act ("FERPA") or as personal information under the Children's Online Privacy Protection Act ("COPPA").
>
> "School District" means a local educational agency, school network, independent school or other school system and its employees.
>
> "State Educational Agency" or "SEA" means the educational agency primarily responsible for the supervision of public elementary and secondary schools in any of the 50 states, the Commonwealth of Puerto Rico, the District of Columbia or other territories and possessions of the United States, as well as a national or regional ministry or department of education in other countries, as applicable.

Our Customers' privacy is important to us, and we recognize that Customers of the FitnessGram® Software may include Children. As required by COPPA, we provide this Policy to inform Parents and other Customers about our privacy practices including how The Cooper Institute® collects, uses, and discloses Personal Information.

In the course of providing the FitnessGram® Software, we take numerous measures to maintain the security and confidentiality of Personal Information collected or stored by the FitnessGram® Software on behalf of our Customers including Children, School Districts, and State Educational Agencies. In doing so, we enable our Customers to control use, access,

sharing and retention of Personal Information in compliance with FERPA, COPPA, and other applicable privacy laws and regulations.

By using the FitnessGram® Software, you expressly agree to the FitnessGram® TOU and consent to the collection, use and disclosure of Personal Information collected on behalf of you as outlined in this Policy. Please read the Policy carefully, and if you have any questions, feel free to contact us using the information provided at the end of the Policy.

A. Scope of this Policy

This Policy describes:

- what information is collected from and on behalf of our Customers via the FitnessGram® Software;
- how the FitnessGram® Software uses that information;
- with whom the FitnessGram® Software shares that information; and
- what steps the FitnessGram® Software takes to safeguard this information and ensure that our Customers remain in control of their data at all times.

1. Types of Information Collected

There are three types of information FitnessGram® Software collects and stores on behalf of our Customers:

- information provided by Customers to support the use of our products;
- information provided by Children, students, teachers and other school personnel in the course of using our products; and
- usage data including date and time of visits, browser type and operating system type.

Information provided by our Customers. The FitnessGram® Software requires some basic information about who is in a classroom and who teaches the class. For example, when a teacher logs into the FitnessGram® Software, a list of students associated with that teacher may be displayed in the application. The FitnessGram® Software references this information from a database that contains roster information (e.g. name, grade level, gender, date of birth, school ID numbers) that the School District supplied to the FitnessGram® Software.

Information collected through our products. Our Customers use the FitnessGram® Software to track student data and provide personalized feedback to students to help promote lifelong health and wellness. Students (including Children) and teachers use our products to engage in a variety of educational experiences. This information falls into several different categories listed below along with examples for each category:

- Fitness data. FitnessGram® collects information on the five components of health-related fitness including aerobic capacity, body composition, muscular strength, muscular endurance, and flexibility. The purpose of the data collected is to educate and create awareness for student's level of fitness.

- Assessment results. Students and/or teachers may enter results for physical fitness and activity assessments. Students and/or teachers may also complete tests, additional activities or trainings that are tracked within the FitnessGram® Software.
- Device performance and status. Device diagnostic information, such as battery level and installed applications may be collected to support the proper functioning of the device.
- Device and Browser Data. Characteristics of device and browser configurations and persistent identifiers, such as IP addresses and device identifiers, are collected along with associated usage data. The use of "cookies," Web beacons, HTML5 local storage and other similar technologies to collect and store such data. This data is collected to support the security mechanisms of the product and our internal operations, as well as to enable analysis of aggregate usage trends and improve the learning experience.
- System usage. The FitnessGram® Software may collect system usage information in order to ensure proper system capacity for all users.

Information collected from Children. The FitnessGram® Software only collects as much information about a Child as is reasonably necessary for the Child to participate in an activity. We do not condition a Child's participation on the disclosure of more Personal Information than is reasonably necessary.

We strongly recommend that our Customers protect their data by not including personally identifiable information such as Social Security numbers in their user IDs. Moreover, we also recommend that, in connection with their use of the FitnessGram® Software, our Customers not disseminate personally identifiable information through unencrypted e-mail.

2. Use of Information

The FitnessGram® Software uses information collected and stored on behalf of our Customers to support the development and usability of the product and to ensure secure and effective operation of our products. In particular, the FitnessGram® Software may use the information collected in the following ways:

- to continually support the FitnessGram® Software and support our Customers' and their end users' activities;
- to respond to the inquiries and fulfill the requests of our Customers and their end users;
- to send administrative and usage information to the appropriate approved application administrator;
- in the case of School District or State Educational Agency personnel (e.g., teachers and administrators), to send product information to such personnel;
- to personalize end users' experience with our products and services;
- to improve the effectiveness of our products and support our product development;
- to report on aggregate trends and usage statistics;
- to enforce product access and security controls; and

APPENDIX E: LIBERTY UNIVERSITY IRB APPROVAL LETTER

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

January 23, 2019

Cynthia D. Fairey
IRB Approval 3608.012319: Attitudes Toward Participation in Physical Activity and Aerobic Capacity of Ninth-Grade Girls Taking Single-Gender Physical Education vs. Those Taking Coed Physical Education

Dear Cynthia D. Fairey,

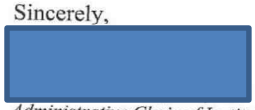
We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

> Your study involves surveying or interviewing minors, or it involves observing the public behavior of minors, and you will participate in the activities being observed.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,



Administrative Chair of Institutional Research
Research Ethics Office

LIBERTY
UNIVERSITY
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APPENDIX F: SCHOOL DISTRICT APPROVAL LETTER

RICHLAND SCHOOL DISTRICT TWO

December 5, 2018

Dawn Fairey
dfairey@richland2.org

Re: Research Request

Ms. Fairey,

The Richland Two Research Committee has approved your application to conduct research in our district. You are authorized to recruit Richland Two physical education teachers and students in their classes to participate in your study. Parents must provide written affirmative consent and the participation of the students will be voluntary and at their own discretion. You must maintain possession of the signed consent form(s) for a minimum of three years following the conclusion of your research. Participation of the teachers will be voluntary and at their own discretion. Provide a copy of this letter to the principal of each school you wish to work with so the principal will know that you have received permission from the Richland Two Research Committee to recruit teachers and students for participation. Please also be aware that each school principal has the final authority to approve research activities on their campus and is under no obligation to do so.

The committee reserves the right to terminate the study at any time if circumstances change or the members feel it is in the best interest of our students. You must complete all research activities in the district on or before June 30, 2019. If you need to conduct research activities beyond that date, you must ask the Richland Two Research Committee for an extension. Finally, you must submit a copy of all final reports, dissertations, or publications based on this research to me upon completion of your study.

Sincerely,

[redacted]

Director of Accountability and Assessment

Location:
763 Fashion Drive
Columbia, SC 29229

Mail:
124 Risdon Way
Columbia, SC 29223

Contact:
(803) 787-1910
www.richland.org

APPENDIX G: PARENT GUARDIAN CONSENT FORM: IRB APPROVAL

PARENT/GUARDIAN CONSENT FORM

Attitudes towards Participation in Physical Activity and Aerobic Capacity of Girls Taking Single-Gender Physical Education vs. those Taking Co-Ed Physical Education

C. Dawn Fairey
Liberty University
School of Education

This research study is being conducted by Dawn Fairey, a doctoral candidate in the School of Education at Liberty University. Your child was selected as a possible participant because your child is a ninth-grade female, between the ages of 13 and 17, and is taking a ninth-grade, general physical education class required for graduation. Please read this form and ask any questions you may have before agreeing to allow her to be in the study.

Why is this study being done?

The purpose of this study is to determine if there is a significant difference in the aerobic capacity and the attitude of girls taking a single gender physical education course vs. those taking co-ed physical education.

What will my child/student be asked to do?

If you agree to allow your child to be in this study, she will be asked to do the following things:

1. Participate in a pre and post test mile run assessment which is part of the health-related fitness test FITNESSGRAM®. The FITNESSGRAM® physical fitness test is the selected health related fitness test for the school district your child is attending. The tests will be administered during your child's regular scheduled class time and will take approximately 30 minutes each time. This assessment is a normal part of the PE class and will occur regardless of the research.
2. Anonymously complete a 24-item multiple choice survey during her regularly scheduled physical education class period. The survey should take approximately 20 minutes to complete.
3. This is an experimental research study and a convenience sample will be used to select a PE class that is girls only and will serve as the control group. In addition, a PE class with both boys and girls will be selected that will serve as the experimental group. Only the girls in this group will participate in the research. Your child may or may not be selected for the single gender grouping, but the same curriculum will be taught in both groups.

What are the risks and benefits of this study?

Risks: The risks involved in this study are minimal, which means they are equal to the risks your child would encounter in everyday life.

Benefits: The FITNESSGRAM® assessment is part of the normal ninth grade PE curriculum that all students participate in. Therefore, there will be no direct benefits for your child in this research.

Will my child be compensated for participating?
Your child will not be compensated for participating in this study.

How will my child's personal information be protected?
The records of this study will be kept private. In any report I may publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records.

- The survey will not include names of participating students. Each student will be given an envelope to seal their surveys before they are collected to ensure they cannot be identified.
- FITNESSGRAM® results will be provided to the researcher stripped of any identifying information. FITNESSGRAM® results will be provided to the researcher stripped of any identifying information.
- Data will be stored in a password protected computer and may be used with future presentations. The data will be kept for three years and then deleted. Survey answer sheets will be locked in a cabinet and after three years the answer sheets will be shredded.

Conflicts of interest disclosure:
The researcher serves as a teacher in Richland School District 2. To limit potential conflicts, the study related to student surveys will be anonymous so the researcher will not know who participated. In addition, a research assistant will ensure that all data related to the mile run is stripped of identifiers before the researcher receives it. This disclosure is made so that you can decide if this relationship will affect your willingness to allow your child to participate in this study. No action will be taken against an individual based on his or her decision to participate in this study.

Is study participation voluntary?
Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect her current or future relations with Liberty University or Richland School District 2. If you decide to allow your child to participate, she is free to not answer any question or withdraw at any time without affecting those relationships.

What should I or my child do if I decide to withdraw him or her or if he or she decides to withdraw from the study?
If you choose to withdraw your child or if your child chooses to withdraw from the study, please do not return a completed survey. Please also notify the PE teacher that you do not want your assessment data to be provided to the researcher. Due to the anonymous nature of the study, surveys cannot be withdrawn once submitted.

Whom do I contact if my child or I have questions or problems?
The researcher conducting this study is C. Dawn Fairey. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at dfairey@richland2.org You may also contact the researcher's faculty advisor Dr. Judy R. Sandlin at jsandlin@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Green Hall 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Signature of Minor Date

Signature of Parent Date

Signature of Investigator Date