Physical Fitness Differences Between Fifth-Grade Elementary School Students as Measured by Selected FitnessGram® Assessments and Categorized by Gender and Title I School Status

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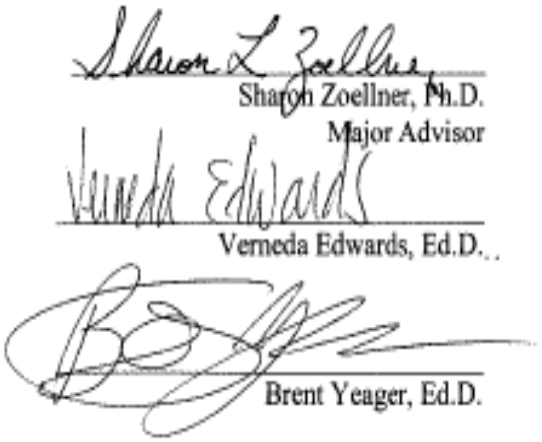

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Abstract

The purpose of this study was to determine the relationship between the level of fitness among fifth-grade students who attended Title I schools and those who did not attend Title I schools. A quantitative research design was utilized to examine the relationship between independent and dependent variables. The two-group categorical independent variables were Title I status and gender. The dependent variables were aerobic capacity, left and right leg lower body flexibility, and muscular strength. The population of this study was comprised of fifth-grade boys and girls whose fitness levels were tested in their physical education classes. The current study was conducted in a Midwest suburban school district during the 2015-2016 school year. Fitness levels were tested using the FitnessGram® assesements, which consisted of the Progressive Aerobic Cardiovascular Endurance Run (PACER) test to measure aerobic capacity, the back saver sit-and-reach test to measure flexibility, and the push-up test to measure muscular strength. Hypotheses regarding the relationship between gender and Title I school status were developed. The current study utilized a non-parametric research design with four categorical variables, and the fitness tests were conducted by certified, elementary physical education teachers. Participants were categorized by their achievement of the Healthy Fitness Zone (HFZ) or Needs Improvement (NI) in aerobic capacity, left and right leg lower body flexibility, and muscular strength based on their individual assessment results from the 2015-2016 fitness testing session.

Based on the results related to the research questions it was discovered that for all fifth-grade students, there was a statistically significant difference in three fitness levels of Title I and non-Title I students in aerobic capacity, right leg lower body flexibility, and

muscular strength. The percentage of Title I students in the HFZ was significantly lower than the percentage of non-Title I students in the HFZ. No statistically significant difference was found in left leg lower body flexibility.

The other independent variable was gender. Boys and girls were analyzed by Title I school status but were not directly compared with each other. The results showed significant differences in fitness levels. For boys, there was a significant difference in aerobic capacity, right leg lower body flexibility, and muscular strength. There was no significant difference in fitness levels in left leg lower body flexibility for boys in Title I and non-Title I schools. For girls, there was a significant difference in aerobic capacity and muscular strength, however, there was no significant difference in fitness levels in left and right leg lower body flexibility for girls.

Dedication

This dissertation is dedicated to the special people in my life. For my wife Jennifer, this journey has been a test of patience and determination for both of us. Thank you for everything you did to help get me to the finish line including the countless times you took the girls so I could write, for listening to me gripe, and for reminding me that failure wasn't an option. I literally could not have done this without you as my partner in life. I love you so much. For my daughters Lainey, Lila and Maren, if I was able to write and defend a dissertation, the sky is the limit for what you can achieve in life. You all are so smart, and it's been exciting to watch each one of you grow and learn, but in your own personal way. Lainey, you are someone who sincerely cares about people and someone who has always given great big hugs. I hope you really do grow up to be a "shark scientist" even if you don't want to swim with them. Lila, you have been making me laugh since you were only a year old. You have such a passion for life and I hope you continue to entertain people as you get older. Maren, even though you just turned 1, I am getting to know you better with each day that passes and have a strong feeling that you are going to do special things with your life. If you do what makes you happy, work hard, never give up, and show kindness and compassion to others, you will be able to achieve whatever you want to in life. I hope that by completing this dissertation, it served as an example of what your mom and I went through in order to accomplish this overwhelming task. As parents who were trying to balance work, life, and family, it took hard work, sacrifice, dedication, perseverance, flexibility, and grit by both of us. Beans, Luchador, and Merv, I'm proud of all three of you and love you girls more than you'll ever know.

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Chapter 1

Introduction

Life expectancy rates in the United States had been increasing since the early 1800s, but on Tuesday March 2nd, 2004, Surgeon General Dr. Richard Carmona sounded a warning at a United States Senate hearing: "Because of the increasing rates of obesity, unhealthy eating habits, and physical inactivity, we may see the first generation that will be less healthy and have a shorter life expectancy than their parents" (Carmona, 2004). Declining fitness levels in children, physical inactivity and sedentary behavior, and the epidemic of childhood obesity were societal problems that needed to be addressed. Although fitness and childhood obesity levels have been linked by research (Kohl & Cook, 2013), the emphasis of research has been on childhood obesity and body mass index (BMI), and not the fitness levels of children. In addition to BMI, other components that impacted fitness levels of children included aerobic capacity, flexibility, and muscular strength and endurance. It was important that these fitness components be studied to better understand the role they played in the broad view of general health and fitness levels in children.

Stakeholders from Title I and non-Title I schools, which included administrators, educators, parents, and community members, had a shared goal. That goal was children and students living successful, healthy lives. In 1977, school administrators and parents were showing an increased interest in a reporting system for physical fitness similar to those who assessed academic achievement (Plowman et al., 2006). Strong et al. (2005) found that physical activity was an important component to achieving healthy fitness levels in boys and girls. Strong also provided evidence demonstrating the benefits of

physical activity for school-aged youth. Additionally, while many researchers have reported changes in adult fitness over time, very few have analyzed the fitness levels of elementary school boys and girls (Kemper, Twisk, & Mechelen, 2013). Bai et al. (2015) found that aside from the well-documented statistics on childhood obesity, little research focused on the fitness levels of United States children. Even less research has been conducted on student fitness and the Title I status of the school they attended.

Interest in knowing fitness levels of boys and girls in kindergarten through twelfth grade in the United States eventually led to the creation of FitnessGram®, which was the assessment tool utilized in the current study to evaluate fitness levels of fifth-grade students (Plowman & Meredith, 2013). FitnessGram® was an assessment tool developed by the Cooper Institute to measure student fitness levels through a series of corresponding fitness tests. The tests measured students' aerobic capacity, body composition, muscular endurance, muscular flexibility, and muscular strength. By 2013, thousands of professionally trained physical educators used FitnessGram® assessments and reporting software (Plowman & Meredith, 2013). This reporting software could provide students, parents, and educators a report on important aspects of health-related student fitness. The current study's focus was to determine if there was a difference in health-related fitness levels of students based on gender and Title I or non-Title I school attendance.

Background

This study took place in a suburban school district in the state of Kansas that had 35 elementary schools. According to the Kansas State Department of Education (KSDE) (2016) report, the population of the school district in this study was 29,567 for the 2015-

2016 school year. Of the 35 elementary schools, 11 were Title I schools and 24 were non-Title I schools. Title I referred to schools that served students and families with lower income levels. Schools received schoolwide assistance from the state if over 40% of their students qualified for free or reduced lunch (KSDE, 2016). As reported by the KSDE (2016), a schoolwide Title I program was a complete reform plan designed to upgrade not just the school, but the entire educational program. The primary goal of a Title I schoolwide program was to ensure that all students, regardless of socioeconomic status (SES) and particularly those who were low achieving, demonstrated proficiency on state academic achievement standards. In the current study, all the Title I schools that provided student fitness testing data qualified for the schoolwide Title I program.

The current study's focus was the fitness levels of boys and girls in Title I schools and boys and girls in non-Title I schools. However, as stated in the Society of Health and Physical Educator's (SHAPE) National report (2016), the state of Kansas did not require student assessment in physical education for the 2015-2016 school year. Physical fitness testing was required for every fifth-grade student in the suburban school district used in the current study, regardless of school status. The fitness testing data used in the current study consisted of aerobic capacity, left and right leg lower body flexibility, and muscular strength. During the 2015-2016 school year, the suburban school district utilized annual fitness testing protocol and followed the guidelines as outlined by FitnessGram®. Physical educators administered the Progressive Aerobic Cardiovascular Endurance Run (PACER) to measure aerobic capacity, the sit-and-reach test to measure left and right leg flexibility, and the push-up test to measure muscular strength. Additionally, all student

fitness testing data used for the current study came from schools within the same suburban school district.

Statement of the Problem

The problem the current study addressed was the lack of knowledge regarding the fitness level differences of elementary boys and girls in Title I and non-Title I schools. More specifically, the current study assessed the lack of knowledge in fitness levels of boys and girls in Title I and non-Title I schools. The fitness levels addressed in the current study included aerobic capacity, left and right leg lower body flexibility, and muscular strength.

Without knowing student fitness levels, it would be much more difficult for stakeholders such as physical educators and parents to identify, address, and report the potential negative impacts of low fitness levels. De Greeff et al. (2014) stated that it could only be hypothesized that economically disadvantaged children had relatively low fitness levels compared to children without an economic disadvantage. Much of the research was focused on obesity and physical activity and not on fitness levels (Joseph, Alonso-Alonso, Bond, Pascual-Leone, & Blackburn, 2011). It was important to examine the difference in fitness levels between students in Title I schools and non-Title I schools because of the health-enhancing benefits associated with good fitness.

While research on fitness levels of boys and girls had been conducted, fewer studies addressed the variables of gender and Title I or non-Title I school status. The problem the current study addressed was the lack of knowledge regarding the fitness level differences of elementary boys and girls in Title I and non-Title I schools.

Purpose of the Study

The purpose of this study was to determine the relationship between the fitness levels among fifth-grade boys and girls who attended Title I schools and fifth-grade boys and girls who did not attend Title I schools. More specifically, the purpose of the current study was to determine to what degree there was a relationship between student fitness levels of aerobic capacity, muscular strength, and flexibility in Title I and non-Title I schools.

Significance of the Study

The significance of this study was to expand the body of knowledge regarding fitness levels of boys and girls in Title I and non-Title I elementary schools. Additionally, this study could provide information that would encourage district leaders to examine both the type and the amount of physical activity that boys and girls were receiving in Title I and non-Title I schools. The impact that physical activity programs offered during the school day have on boys and girls could be explored. During the school day programs, activities could include physical education classes, recess, and opportunities for students to move in the classroom. The impact that before and after school physical activity programs have on student fitness levels could be explored. Most schools in the current study offered before and after school sponsored activities and included walking programs, sports clubs, and before and after school care.

Based on the results of the study, administrators, educators, and parents could create and promote additional opportunities for physical activity for students in both Title I and non-Title I schools. Providing more opportunities for students to be engaged in

moderate and vigorous physical activity (MVPA), both during school and outside of the school day, could have a positive impact on student fitness levels.

Delimitations

Lunenburg and Irby (2008) define delimitations as "self-imposed boundaries set by the researcher on the purpose and scope of the study" (p. 134). The current study included fifth-grade student fitness testing data from a suburban Midwest school district. Specific 2015-2016 data was used from schools that chose to participate. Generalizations could not be made about other grade levels, school districts, or school years.

Assumptions

According to Lunenburg and Irby (2008), assumptions are proposals that are accepted as effective for the purpose of the study. The following assumptions were made when conducting this study.

1. All students participated in the full 60 minutes of physical education class per week.
2. All students attended physical education class on a regular basis.
3. Physical education programs were based on the state and national standards.
4. All students had equal opportunity to participate in the FitnessGram® 20-meter PACER test, sit-and-reach test, and push-up test.
5. All FitnessGram® fitness tests were conducted with fidelity using the FitnessGram® protocol and guidelines.
6. Students put forth maximum effort when taking the FitnessGram® 20-meter PACER test, sit-and-reach test, and push-up test.

7. The data collected from the FitnessGram® 20-meter PACER test, sit-and-reach test, and push-up tests were accurate.
8. Physical education teachers were properly trained to administer the PACER test, sit-and reach test, and push-up test according to FitnessGram® guidelines and protocol.
9. Enrollment from the 2015-2016 school year was accurate.
10. The school district properly reported families who were qualified for free and reduced lunches, which determined whether or not schools qualified as a Title I school.

Research Questions

The following research questions were generated to determine the differences in student fitness levels in order to address the emphasis of this study:

RQ1. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school students dependent on Title I or non-Title I school status?

RQ2. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school boys dependent on Title I or non-Title I school status?

RQ3. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school girls dependent on Title I or non-Title I school status?

Definition of Terms

The definition of terms used was provided to help the reader accurately understand the components of this study.

Aerobic capacity. Aerobic capacity reflects the maximum rate that oxygen can be taken up and utilized by the body during exercise and is most commonly expressed relative to body weight to account for differences in body size (Plowman & Meredith, 2013).

Back-saver sit and reach. To assess lower body flexibility, students sit on the floor with one knee bent and one leg extended against a measuring box. They place one hand on top of the other, extend their arms, and reach forward with their hands on the box as far as they can, while a measurement is taken about how far they have reached (Plowman & Meredith, 2013).

Flexibility. A health and performance related component of physical fitness is the range of motion possible at a joint. Flexibility is specific to each joint and depends on a number of specific variables, including but not limited to the tightness of specific ligaments and tendons. Flexibility exercises enhance the ability of a joint to move through its full range of motion (Centers for Disease Control (CDC), 2017).

Health enhancing physical activity. Activity that, when added to baseline activity, produces health benefits (CDC, 2017).

Healthy Fitness Zone (HFZ). The HFZ is a health-related standard created by FitnessGram® and was used to evaluate fitness levels. The desired performance standard for each fitness test is the HFZ. This standard also represents the level of fitness associated with good health (FitnessGram® Performance Standards, 2017).

Moderate Physical Activity (MPA). An activity that elevates heart rate and increases breathing. An individual can still talk during moderate physical activity but would not be able to sing. On an absolute scale, physical activity that is done at 3.0 to 5.9 times the intensity of rest. On a scale relative to an individual's personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0 to 10 (CDC, 2017).

Muscular strength. A health and performance component of physical fitness that demonstrates the ability of a muscle or muscle group to exert force (Glossary of Terms. *Physical Activity*, 2015).

Needs Improvement (NI). The NI zone is a health-related standard created by FitnessGram® and was used to evaluate fitness levels. The desired performance standard for each fitness test is the HFZ. Students who did not attain this standard were categorized in the NI zone and were not associated with good health (FitnessGram® Performance Standards, 2017).

PACER (Progressive Aerobic Cardiovascular Endurance Run) Test. This aerobic capacity test is a paced, 20-meter shuttle run increasing in intensity as time progresses (Plowman & Meredith, 2013).

Physical activity. Any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level. In these guidelines, physical activity generally refers to the subset of physical activity that enhances health (CDC, 2017).

Physical fitness. The ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies. Physical fitness includes a number of components consisting of

cardiorespiratory endurance (aerobic power), skeletal muscle endurance, skeletal muscle strength, skeletal muscle power, flexibility, balance, speed of movement, reaction time, and body composition (CDC, 2017).

Push up test. This test measures upper body muscular strength. Students bring their body to a 90-degree elbow angle and then push themselves back up to starting position. Students complete as many repetitions as possible (Plowman & Meredith, 2013).

SHAPE America. The Society of Health and Physical Educators (SHAPE) is an organization that is committed to ensuring all children lead healthy, physically active lives (NASPE, 2016).

Vigorous physical activity. Activity that makes the heart rate increase more than moderate physical activity. Individuals working at this level won't be able to say more than a few words without pausing for a breath. On an absolute scale, vigorous physical activity is defined as 6.0 or more times the degree of rest. On a scale relative to an individual's capacity, vigorous-intensity physical activity is typically a 7 or 8 on a range of 0 to 10 (Plowman & Meredith, 2013).

Organization of the Study

This study is organized into five chapters. Chapter 1 contains an introduction to the study, the background of the problem, and the problem itself, as well as the purpose of the study, significance, delimitations, assumptions, the research questions and definitions of terms used in this study. Chapter 2 is a review of literature and research pertinent to student fitness levels. Chapter 3 contains detail about the methodology used

to conduct the study. The results of this study are presented in chapter 4. Chapter 5 consists of the analysis of and recommendations for future studies in this field.

Chapter Two

Review of the Literature

Children in the United States have become less fit than previous generations. According to Olds, Ridley, & Tomkinson (2007), fitness levels have declined by about 5% among U.S. children since 1975. The researchers used running speed to measure aerobic fitness and cardiovascular health. Only one in three children were physically active every day and the potential effects that inactivity, a lack of fitness, and obesity had on youth have been documented. According to Pandit and Seth (2015), a study by the Centers for Disease Control and Prevention (CDC) found that by the time students reached age 12, most were in poor cardiovascular shape due to a lack of physical activity. Approximately 450 boys and girls participated in the CDC study. Fitness levels were tested, and it was found that the obese subjects in the study had lower fitness levels compared to the subjects of normal weight.

Equally concerning was not just the decline in fitness, but the rate at which fitness among children seemed to be declining. The total percentage of children at a satisfactory fitness level who were tested between 1999 through 2000, including boys and girls, was 52% (Gahche et al., 2014). In 12 years, those rates dropped to just 42%, which indicated a steady decline in the trend of acceptable fitness levels of children. One reason for the increase in the lack of physical activity was attributed to the increase in electronics and devices. Rideout, Foehr, and Roberts (2010) found that the typical child spent at least seven and a half hours on a phone or in front of a tablet, computer, or TV screen.

Chapter 2 contains a brief history of the physical education fitness standards, the impact of fitness levels on elementary students, contributing factors to fitness levels such as sedentary behavior, physical activity, obesity, family income, and the national school lunch program (NSLP). Title I school status, gender, and FitnessGram® fitness testing will also be discussed in the literature review.

According to Guedes (2007), physical education was introduced into academics and the school curriculum in the late 1700s and early 1800s. At that time, America was trying to create social norms and address other issues that would impact society. Two of these issues were the prevention of disease and the concern of the overall health and wellness of the population. The idea to merge intellectual and physical development, led to the creation of physical education.

Body movement has been a pillar of the physical education curriculum since the early 19th century with a child's ability to use his or her body for self-expression as the focus (Abels & Bridges, 2010). In 1986, a NASPE committee was appointed to answer the question of what physically educated students should know and be able to do (Young, 1997). The committee came up with a definition that included five major focus standards that have been periodically revised. In 2014, the Physical Education National Standards and Grade-Level Outcomes were updated by SHAPE America to emphasize physical literacy and consisted of the following:

- Standard 1- The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.
- Standard 2- The physically literate individual applies knowledge of concepts, principles, strategies, and tactics related to movement and performance.

- Standard 3- The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.
- Standard 4- The physically literate individual exhibits responsible personal and social behavior that respects self and others.
- Standard 5- The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction. (p. 5)

According to a SHAPE report (2016), meeting the national physical education fitness standards by the end of fifth grade will help boys and girls understand the benefits of fitness and physical activity.

> By the end of grade 5, the learner will demonstrate competence in fundamental motor skills and selected combinations of skills; use basic movement concepts in dance, gymnastics, and small-sided practice tasks; identify basic health-related fitness concepts; exhibit acceptance of self and others in physical activities; and identify the benefits of a physically active lifestyle. (p. 26)

To help students understand the need to meet the national standards for physical education, students practiced the knowledge and skills they had learned in physical education through physical activity. The anticipated result and desired outcome was to help children develop a better understanding of the crucial role physical activity and fitness had for a healthy, wellness-oriented lifestyle.

The emphasis of the third standard was on students to achieve and maintain a health-enhancing level of physical activity and fitness. According to the NASPE

standards for physical education, effective physical education programs assessed student fitness levels on a yearly basis to determine fitness levels of students (2016). In addition to increased health and fitness, other skills taught within a physical education program were greater student responsibility, improved social skills, and leadership capacity. (Guedes, 2007).

Impact of Fitness on Elementary School Students

Story and French (2005) noted that no institution other than schools had as much continuous and intensive contact with children and were in the unique position to help fight obesity by offering physical education classes, recess, healthy school breakfasts and lunches, health education, and school health services. According to a nationwide survey, parents, teachers, and administrators sought ways to fight childhood obesity by utilizing the public school system more frequently than from health care providers and government agencies(Kropski, Keckley, & Jensen, 2008).

One of the primary benefits of physical education was the opportunity for youth and adolescents to engage in a health-enhancing level of physical activity. According to Toschke, von Kries, Rosenfeld, and Toschke, (2007); and Zieff, Guedes, and Wiley (2006), the lack of physical activity caused by sedentary behavior was one of the most apparent causes of type 2 diabetes and cardiovascular diseases among children. According to 2017 "physical activity facts" researched and promoted by the CDC, consequences of the lack of physical activity could lead to an energy imbalance and increase the risk of becoming overweight or obese (CDC, 2017). Additional risk factors, according to the CDC, of physical inactivity included low bone density, cancer, and high blood pressure.

Physical activity and fitness provided benefits to more than just a child's overall health. In a meta-analysis on the relationship between physical activity and cognition in school children, Sibley and Etnier (2003) found “that physical activity may actually be related to improved cognitive performance and academic achievement and provides evidence for the argument that physical activity should be a part of the school day for both its physical health and cognitive benefits” (p. 253). Esteban-Cornejo et al. (2014) found that physical activity played a fundamental role in brain health and academic performance in youths. Although all fitness components were important in determining overall health, not all were linked to improving academic performance. Esteban-Cornejo et al (2014) also noted that, "Cardiorespiratory capacity and motor ability were independently associated with all academic variables in youth, whereas muscular strength was not associated with academic performance independent of the other two physical fitness components" (p. 1).

Students' academic performance differed significantly by gender, ethnicity, socioeconomic status (SES), and the number of healthy fitness zones achieved (Blom, Alvarez, Zhang, & Kolbo, 2011). Females and Caucasian students tended to demonstrate high academic achievement. Elevated academic achievement was also exhibited by students with high SES status. These high achievers were students who did not receive free or reduced price lunch. Additionally, gender, ethnicity, and SES were significant predictors of high academic achievement. According to Blom et al. (2011), girls had a much greater chance of achieving higher academic achievement than boys. Additionally, students with high SES were two and a half times more likely to have higher academic achievement than students with low SES.

Trudeau and Shephard (2008) found that physical activity affected the physiology of the brain by increasing cerebral capillary growth, blood flow, and oxygenation. These changes in the brain could have been linked to improved cognitive functions including attention, information processing, storage and retrieval of information, enhanced coping, and reduced sensations of craving and pain. Best (2010) concluded that cognitive function and executive functioning were enhanced through aerobic physical activity. Best (2010) also found that the impact of physical activity on elementary children resulted in improved concentration, response accuracy, reading comprehension, task accuracy, and task completion. Ratey and Loehr (2011) concluded that physical activity continued to have positive cognitive benefits over a lifetime and suggested that learning the basic skills necessary to engage in physical activity at a young age would be beneficial for future cognitive functioning.

The CDC's Physical Activity Guidelines for Americans (2017) recommended that children should accumulate at least 60 or more minutes of moderate to vigorous physical activity every day to keep their bodies healthy and to maintain or improve their current fitness level. This type of physical activity has been shown to help improve fitness levels in the components of aerobic capacity, flexibility, and muscle and bone strength (Kohl & Cook, 2013). Hubbard et al. (2016) at found that only 15% of children achieved the recommended 60 minutes of moderate to vigorous physical activity. When looking specifically at gender, they found that girls were far less likely than boys to meet these guidelines.

Powell et al., (2009) found that although it was clear that children attained health benefits from physical activity, the average fitness levels of fifth-grade boys and girls in

the United States were declining. This could have been due in part to declining levels of daily physical activity in children. One study revealed a dramatic decline in moderate to vigorous physical activity (MVPA) during childhood to adolescence (Troiano et al., 2008).

There is a positive association between physical activity, cognition, and academic achievement (Howie & Pate, 2012). Although little to no evidence suggested a negative relationship between physical activity and academic achievement, the strength of research has made it difficult to draw strong conclusions between physical activity and academic achievement. According to Howie and Pate (2012),

> Researchers have made considerable progress in examining physical activity and academics in the past 5 years, yet results are still inconsistent. The overwhelming majority of published articles report positive associations between physical activity and cognition, particularly executive functions, and academic achievement. (p. 166)

The researchers also found little to no evidence that suggested a negative relationship between physical activity and academic achievement.

Contributing Factors to Fitness Levels

Contributing factors to fitness levels consisted of an examination of sedentary behavior, physical activity, obesity, SES, ethnicity, and the NSLP. One major contributor to less fit and lower achieving students had been the shift to a sedentary lifestyle and physical inactivity. According to Abadie and Brown (2010), "The detrimental effects of physical inactivity within children have enormous personal health consequences" (p. 1).

Sedentary behavior increased the risk for childhood obesity, making children more likely to have risk factors for cardiovascular disease (CDC, 2017).

Sedentary behavior. Children and adolescents in developed countries have lead sedentary lifestyles (Chen, et al., 2005). Children in developed countries had a reduced amount of active leisure activities and an increased reliance on sedentary lifestyles (Gopinath, Hardy, Baur, Burlutsky, & Mitchell, 2012). Independent of physical activity levels, sedentary activities, especially those based on the use of electronic devices, are associated with an increased risk of obesity and a reduction in physical conditioning, self-esteem, and social behavior. In contrast, other studies have shown a positive association between physical activity and fitness levels and the physical, emotional, mental, and social health of children and adolescents (Janssen & LeBlanc, 2015; Ortega, Ruiz, Castillo, & Sjöström, 2007).

Physical activity. According to the *2008 Physical Activity Guidelines for Americans* published by the U.S. Department of Health and Human Services (2008), 60 minutes of moderate to vigorous physical activity was recommended every day for children and adolescents age 6-17. This included aerobic exercise, muscle-strengthening, and bone-strengthening exercises. These guidelines also encouraged children and adolescents to participate in physical activities that were suitable for their age, that were fun, and that offered variety. Participating in physical education was one way for students to engage in regular physical activity and help them meet the physical activity guidelines.

Since 1987, the Society of Health and Physical Education (SHAPE) America, previously known as the American Alliance of Health, Physical Education, Recreation,

and Dance, compiled the "Shape of the Nation" report to measure physical education policies in the American education system. The most recent report (SHAPE, 2016) on the status of physical education in the United States revealed that only the state of Oregon and the District of Columbia met the national recommendations for weekly time in physical education for both elementary and middle school levels. Despite the need for students to engage in 60 minutes of daily physical activity, mandatory participation in physical education varied from state to state.

The report also revealed that only 19 states mandated a minimum amount of time that elementary students must participate in physical education each week. A research committee was assigned to develop a United States Report Card on Physical Activity for Children and Youth (SHAPE, 2016). One purpose of the report was to determine which indicators should be included when measuring a quality physical education program for elementary, middle, and high school students. The national report card assigned grades ranging from A to F and determined that the primary indicator of physical education was a grade of C minus. This grade meant that schools were succeeding with about half of children at the goal of impacting the amount of their physical activity. While 90% to 94% of U.S. school districts required elementary, middle, and high school physical education, many elementary physical education classes were being taught by untrained classroom teachers or without an activity-based physical education curriculum (U.S. Department of Education (USDOE), 2014). The result of untrained teachers and non-activity-based curricula was less activity for children, which had negative effects on the amount of physical activity they received in physical education classes (USDOE, 2014). The purpose of physical education classes was not only to provide cardiovascular,

muscular, and other health benefits but also to significantly increase students' daily amounts of physical activity (Task Force on Community Preventative Services, 2002).

There were numerous benefits to regular, daily physical activity (CDC, 2017). It was noted that regular physical activity in children and adolescents promoted health and fitness. Compared with children who were not active, physically active youth had higher levels of cardiorespiratory fitness and stronger muscles. Children who were more active also had lower percentages of body fat, their bones were denser, and they were reported to have reduced symptoms of anxiety and depression.

Obesity. Numerous studies have been conducted on the prevalence of overweight and obese children in the United States (Dehghan, Danesh, & Merchant, 2013; Lobstein, Baur, & Uauy, 2004). According to Ogden, Carroll, Kit, and Flegal (2014), the percentage of obese children in the United States has more than tripled since the 1970s. According to the CDC (2017), obesity in children is determined by the following:

> Body mass index (BMI) is a measure used to determine childhood overweight and obesity. Overweight is defined as a BMI at or above the 85th percentile and below the 95th percentile for children and teens of the same age and sex. Obesity is defined as a BMI at or above the 95th percentile for children and teens of the same age and sex. BMI is calculated by dividing a person's weight in kilograms by the square of height in meters. For children and teens, BMI is age- and sex-specific and is often referred to as BMI-for-age. A child's weight status is determined using an age- and sex-specific percentile for BMI rather than the BMI categories used for adults. This is because children's body composition varies as they age and varies between boys and girls. Therefore, BMI levels among

> children and teens need to be expressed relative to other children of the same age and sex. (p. 1)

A Department of Health and Human Services *Physical Activity Guidelines Advisory Committee* report (2008) stated that regular physical activity helped to reduce the risk of developing obesity and chronic diseases, such as diabetes, cardiovascular disease, and colon cancer. To help curb obesity and promote physical activity, the World Health Organization (WHO), the AHA, and the CDC had called on schools to assume a leadership role in promoting physical activity among children and adolescents (Kohl & Cook, 2013).

The increase in childhood obesity escalated between 1980 and 1988 and continued to rise during the 1990s and into the 21st century (Anderson & Butcher, 2006). During this period, children's environments changed in multiple ways that might have contributed to the obesity epidemic. Over this time, calorie-dense convenience foods and soft drinks were both increasingly available to children at home and school (Anderson & Butcher, 2006). Additionally, Anderson and Butcher found that companies were directly advertising these products to children. They also found that children consumed more sugary drinks, processed food, and food away from home. An increase in dual-career or single-parent working families could have driven up demand for convenience. A multitude of environmental changes also contributed to reducing children's activity levels over the period in question. Children traveled more in cars and were less likely to walk to school than they had in the early 1970s (Anderson & Butcher, 2006).

Skinner, Steiner, and Perrin (2012) found that diet and nutrition played a role in childhood obesity. However, obese children often consumed the same number of calories

as their normal-weight counterparts. These findings were important because it suggested that increased physical activity in youth might have been crucial in reducing the prevalence of and rise in childhood obesity. Additional research by Kohl and Cook (2013) indicated that a lack of vigorous physical activity, rather than excessive caloric intake, was related to body fat in adolescents.

Childhood obesity was the result of an imbalance between the calories a child consumed as food and beverages and the calories a child used to support normal growth and development, metabolism, and physical activity (Ogden, Carroll, Curtin, Lamb, & Flegal, 2012). The imbalance between calories consumed and calories used resulted from the influences and interactions of many factors, including genetic, behavioral, and environmental factors. The findings on childhood obesity emphasized the need to target obesity prevention strategies and policies at an early age (Aryana, Li, & Bommer, 2012).

Although obesity affected both boys and girls, students who were classified as lower income were more at risk for being obese (Cheung, Cunningham, Kramer, & Venkat Narayan, 2016). They also evaluated the incidence of low income students who were obese. Cheung et al. found that children from the wealthiest 20% of families had a lower prevalence of obesity in kindergarten than children in all the other socioeconomic groups.

Fitness, academic achievement, and SES status of children. Drenowatz et al., (2010) found that children from a low SES showed a trend of lower physical activity levels and spent more time in sedentary behavior than high SES children. Johnston, Delve, and O'Malley (2007) found that schools with a higher percentage of students who were categorized as higher SES were more likely to require students to take physical

education than schools with a higher percentage of students with lower SES. These findings suggested that differences existed in how physical education programs were administered in schools of varying economic levels. However, data on the differences in the percentage of students taking physical education by SES were scarce (Kohl & Cook, 2013). Other research indicated that children from low-SES households and communities developed academic skills slower than children from higher SES groups (Morgan, Farkas, Hillemeier, & Maczuga, 2009). Additionally, there was a lack of research on fitness levels of boys and girls in Title I and non-Title I schools and there was a need to address and examine these variables more closely.

Ethnicity and SES are additional demographic variables that may influence the fitness-academic performance relationship as they have been found to be independently linked to physical activity and standardized test scores, but they have been rarely examined (Singh, Kogan, Siahpush, & van Dyck, 2008). For example, low SES minority children have been found to be less active than higher SES children due to the likelihood that the former may not have access to safe, outdoor play areas or financial resources to participate in formal team or individual sports (Evans & Kantrowitz, 2002; Frost, Wortham, & Reifel, 2008). Low SES groups of children have also been found to score lower on standardized tests, whereas a strong fitness-academic performance link on standardized tests for students from higher socioeconomic backgrounds has been reported (Chomitz et al., 2009). Due to the potential for these socio-demographic variables to influence the fitness-academic performance relationship it appeared that the role of SES as it relates to Title I status needed further analyses (Fulton, Carlson, Kohl, & Dietz, 2006).

In the United States, schools have played an essential role in improving the health and nutrition of students. Schools were well suited to help instill health-enhancing fitness and healthy principles in all students regardless of SES, race, and ethnicity since most children attended school five days a week (Hollar et al., 2010). To help support health-enhancing fitness the National School Lunch Program (NSLP) was created.

The NSLP made it possible for schools to serve nutritious, inexpensive lunches to students who were actively enrolled in a public school that participated in the federal program. The qualifications for free lunches were determined by family income with eligibility for free school lunch when the household income was at or below 130% of the poverty level. The reduced-price lunches were characterized by incomes that ranged from 130% to 185% of the poverty level (U.S. Department of Agriculture, 2017).

Title I

According to the U.S. Department of Education (2015a), Title I, Part A of the Elementary and Secondary Education Act gives financial help to local educational agencies (LEAs) with high percentages of youth from low-income households. This financial aid was to help ensure all children meet challenging state academic standards. In 2015, more than 56,000 public schools across the nation accepted Title I funds to provide additional academic assistance and learning opportunities to help low-achieving children master challenging academics and meet state standards in mathematics and language arts. Title I assistance was provided for more than 21 million students. Of these students, nearly 59% were in kindergarten through fifth grade. The program served an estimated 25 million students in nearly 60% of public schools in 2015. In addition to the Title I program, the Elementary and Secondary Education Act (ESEA) as amended,

provided financial support to schools with large numbers or higher percentages of children from low-income families to help all children meet state academic standards. Research by Jin and Jones-Smith (2015) found that children with lower family incomes tended to have a lower level of physical fitness

Title I programs benefitted students in two ways: a targeted aid plan that helped supplement the regular education program for those students believed to be most in need of special assistance, or a schoolwide plan that allowed schools to use Title I funds in conjunction with other funds from local, state, and federal agencies. The objective was to improve the overall instructional program for each student. To qualify for the schoolwide program, a school had to serve at least 40% of students from low-income families (U.S. Department of Education, 2015b).

As reported by the KSDE (2016), a schoolwide program was a complete reform plan designed to upgrade the entire educational program in a Title I school. Its primary goal was to ensure all students, particularly those who were low achieving, demonstrated proficiency on state academic achievement standards. Schools could receive schoolwide assistance if over 40% of their students qualified for free or reduced lunch. In the current study, all the Title I schools qualified for the schoolwide program.

Title I schoolwide programs addressed the needs of all students in an integrated way. The fundamental elements of a Title I schoolwide program included a comprehensive needs assessment, schoolwide reform strategies, instruction by highly qualified staff, on-going professional development for teachers, and procedures to hire and retain high quality teachers (KSDE, 2016). Additional elements of Title I school wide programs were strategies to increase parent involvement, and transition plans for

preschool children to enter local elementary schools. Title I teachers were provided opportunities for instructor decision-making using formative and summative data points, activities designed to provide effective, timely, and measurable assistance to those students at risk of failure.

Title I, Part A, funds were distributed through four separate formulas. The formulas were based on the number of children from low-income families in each LEA. Each formula also contained the LEA's poverty rate and state per-pupil expenses for education. Additional students counted for allocation purposes and included children in families above the poverty line receiving Temporary Assistance for Needy Families, children in local institutions for neglected and delinquent children, and children in foster homes. Eligible LEAs received funding under one or more of the formulas, but the outcome of the federal-state allocation process was a single Title I, Part A award to each qualifying LEA (U.S. Department of Education, 2015a).

Fitness and Academic Performance of Children Based on Gender

With respect to gender, several studies have found differences in the fitness-academic performance relationship between boys and girls (Chomitz et al., 2009; Grissom, 2005; Kwak et al., 2009), but there were no specific patterns between gender and academic performance (CDC, 2010). Grissom (2005) found that girls demonstrated a stronger fitness-academic performance relationship than boys. However, Chomitz et al. (2009) found that gender difference was found only with English test scores. In addition, Kwak et al. (2009) identified vigorous physical activity to be the important link in the gender-fitness-academic performance relationship. Differences in psychological growth rates and motivational factors have been hypothesized to potentially explain why there is

usually less variance in the amount of time boys spend participating in vigorous activity compared to girls (Kwak et al., 2009).

To increase fitness, boys and girls engaged in different types of physical activity. Basketball was the most common activity reported among active boys, followed by running, football, bike riding, and walking (Fakhouri, Hughes, Brody, Kit, & Ogden, 2013). Running was the most common activity among active girls, followed by walking, basketball, and dancing. Although not a statistically significant difference, 27.0% of boys and 22.5% of girls engaged in moderate-to-vigorous physical activity for 60 minutes or more on every day of the week in 2012 (Fakhouri et al., 2013).

Fakhouri et al. (2013) also found that boys were more physically active than girls. Compared with normal-weight boys, a smaller percentage of obese boys were active on every day of the week for at least 60 minutes per day. Similarly, Fakhouri et al. (2013) noted that a smaller percentage of obese girls, compared with normal-weight girls, were active on every day of the week for at least 60 minutes per day; however, this difference was not statistically significant. Keller (2008) noted that it was unclear to what extent a child's environment versus their genetics accounted for gender differences in fitness.

FitnessGram® fitness tests

FitnessGram® was developed by the Cooper Institute in 1977 and made it possible for physical educators to assess children on their fitness levels on aerobic capacity, muscular strength and endurance, muscular flexibility, and body composition (Plowman & Meredith, 2013). In the late 1970s and early 1980s, school districts began to mandate fitness testing as concerns deepened about rising obesity levels. These mandates created

a greater need for a reliable and valid fitness assessment tool that could be used to measure student fitness. An alliance between the President's Council on Fitness, Sports & Nutrition (PCFSN) and the Cooper Institute formed in 2012. This partnership ultimately led to the President's Youth Fitness Program (PYFP) which officially launched in 2012 (Plowman & Meredith, 2013).

The PYFP was an organization that collaborated with the CDC, PCFSN, the Cooper Institute, and SHAPE America. The PYFP's primary purpose was to help schools achieve excellence in physical education by improving fitness education to support student health-related fitness assessments using FitnessGram® as the evaluation tool. According to Plowman and Meredith (2013), by monitoring student fitness data, schools and states could begin to identify fitness levels, describe trends in weight and fitness, and create awareness among school staff and administrators of the need to improve physical education. Schools could then take steps to help increase physical activity for students, identify demographic groups that were at greater risk of low fitness, and evaluate the effects and efforts to improve fitness and address obesity.

Physical education programs could help prevent disease, promote lifetime wellness, help fight obesity, promote lifelong physical fitness, provide unique opportunities for activity, teach self-management and motor skills, promote learning in other content areas, and improve the education of the total child (Le Masurier & Corbin, 2006). The third physical education standard included the need for students to demonstrate the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness. According to Kohl and Cook (2013), obtaining a health-enhancing level of fitness encourages muscular and cardiovascular health and can help

prevent chronic conditions. Medical professionals at the Institute of Medicine also found that health-related fitness might be an indicator of overall health and wellness or health risks in children and youth.

To help students understand the need to meet the national standards for physical education, specifically to obtain a health-enhancing level of fitness, students practiced the knowledge and skills they had learned in physical education through physical activity. The anticipated result and desired outcome was to help children develop a better understanding of the crucial role physical activity and fitness had for a healthier, wellness-oriented lifestyle. According to SHAPE (2014), meeting these standards by the end of fifth grade would help boys and girls understand the benefits of fitness and physical activity.

Although all the fitness components helped to identify overall fitness levels in boys and girls, according to Kohl and Cook (2013), of the various fitness components that were tested and measured by FitnessGram®, aerobic capacity was most directly linked to the overall health and wellness of students. Studies in California, Massachusetts, and West Virginia revealed a significant positive association between the number of FitnessGram® tests passed and academic achievement test performance (Wittberg, Northrup, & Cottrell, 2012). The assessments in these studies measured three health-related fitness areas: (1) aerobic capacity, (2) body composition, and (3) muscular strength, endurance, and flexibility and were marked by criterion-referenced standards. Wittberg et al. (2012) also noted that academic achievement was most associated with student fitness levels of aerobic capacity, specifically the FitnessGram® mile run or the PACER test. Scudder et al. (2014) also conducted research on aerobic capacity and

cognitive control in elementary school children. The researchers' findings supported the positive association between aerobic fitness and multiple aspects of cognitive control in a large sample of children, using a widely implemented and reliable estimate of aerobic capacity.

Wittberg et al. (2012) found that students who stayed in the HFZ for aerobic capacity in the fifth grade had significantly higher test scores than students who stayed in the NI zone. Although aerobic capacity has been more closely tied to academic achievement and overall health and wellness, muscular flexibility and muscular strength were important fitness components that could help determine the overall fitness levels of boys and girls (Warburton, 2006; Wolfe, 2006). Proper functioning of the muscular system required muscles that could exert force and move freely through a full range of motion. There was also evidence that suggested enhanced muscular strength and flexibility were associated with an improvement in overall health and a reduction of risk for chronic disease and disability for children (Gale, Martyn, Cooper & Sayer, 2006). In another study conducted by Peterson, Saltarelli, Visich, and Gordon (2014), researchers found that muscular strength was independently associated with lower cardiometabolic risk in boys and girls.

Although national guidelines for physical education existed, no federal policies required physical education or fitness testing (SHAPE, 2016). Most states required physical education, but the number of days and time required varied by state, local district, the amount of physical education required by grade level and for high school graduation (Kohl & Cook, 2013). Elementary students in the state of Kansas were not required to take physical education; however, schools were required to offer physical

education. Additionally, there were no requirements on how many minutes per week elementary students must participate in physical education, nor did KSDE require fitness testing according to the state profile offered by SHAPE (SHAPE, 2016).

The Kansas Health Foundation (KHF) funded a Healthy Kansas Schools project named Kansas Fitness Information Tracking (K-FIT) to enhance the understanding of the relationships between fitness components including aerobic capacity, muscular endurance, flexibility, and individual academic indicators (Kansas Health Foundation, 2014). The K-FIT project's goal was to validate further the importance of physical education and physical activity to the academic mission of schools. K-FIT was an opportunity for physical educators to help Kansas students set and work toward personal fitness goals through the use of FitnessGram® (KHF, 2014). Key findings of the study showed that students who were physically fit scored above state academic standards on Kansas reading, math and science assessments.

Summary

In addition to an overview of physical education, chapter 2 addressed student fitness levels, physical activity, and the impact of gender and SES on student fitness. First, the impact of fitness levels on elementary students was explored. Contributing factors on fitness, sedentary behavior, physical activity, and obesity were examined. Fitness levels and SES were examined, followed by Title I school status. Finally, fitness and academic performance of children based on gender were reviewed.

Chapter 3 contains the research design, selection of participants, measurement, and data collection procedures. This chapter also contains data analysis and hypothesis testing, as well as limitations of the current study.

Chapter 3

Methods

This study was designed to explore whether fitness levels of fifth-grade students were dependent upon attendance at a Title I or non-Title I school. The three fitness components were aerobic capacity, left and right leg lower body flexibility, and muscular strength. This study was also designed to explore fitness levels between boys and between girls in Title I and non-Title I schools. Chapter 3 includes the research design, selection of participants, measurement, and data collection procedures. This chapter also contains data analysis and hypothesis testing, as well as limitations of the current study.

Research Design

The purpose of this investigation was to determine if fitness levels among fifth-grade students was dependent upon the Title I status of the school they attended. Specifically, the researcher sought to determine the proportional distribution equity of percentages of students in the HFZ and NI zone in fitness levels among the fitness components of aerobic capacity, left and right leg lower body flexibility, and muscular strength. A secondary objective was to examine the impact that school status had on fitness levels between boys and girls in Title I and non-Title I schools. The categorical data utilized in this research was generated from FitnessGram® assessment scores of fifth-grade students attending Title I and non-Title I schools in a suburban school district.

The current study utilized a non-parametric research design with four categorical variables. The four fitness variables that were studied were aerobic capacity as measured by the FitnessGram® PACER test, left and right leg lower body flexibility as measured by the FitnessGram® back saver sit-and-reach test, and muscular strength as measured by the

FitnessGram® push-up test. The fitness tests were conducted by certified, elementary physical education teachers. Each participant was categorized by achievement of the HFZ or NI in aerobic capacity, left and right leg lower body flexibility, and muscular strength based on results from the 2015-2016 fitness testing session.

Selection of Participants

Participants were selected based on their attendance in a Title I school or a non-Title I school in a Midwestern suburban school district. The elementary schools in the district that provided data were a representative sample size of 200 boys and 166 girls. Participant data from three Title I schools (n= 140) were collected and data from five non-Title I schools (n= 226) were collected. This sample of participants was a convenience sample due to the availability of data to the researcher.

Measurement

The concepts of reliability and validity are crucial to understanding and trusting the results with criterion-referenced testing. With criterion-referenced measurement, reliability was viewed as "classification consistency" because of the concentration and consistency of students classified as either healthy or unhealthy on recurring administrations of a test (Plowman & Meredith, 2013). Also, according to Plowman and Meredith (2013), FitnessGram® tests were developed on a scientific basis by experts with widespread authority in youth fitness. The board of advisors that was assembled by the Cooper Institute met regularly to consider the scientific basis for including health-related fitness standards and fitness test components. The board published a reference guide to explain the scientific basis for the program and, provided information about how the tests and standards were developed, as well as guidelines for how to use FitnessGram®

software. FitnessGram® used criterion-referenced health standards to help physical educators determine the fitness levels of their students. These criterion-referenced health standards were based on the best evidence available of a score's relationship to current and future health of the student. Health-related fitness and health-related fitness standards had been widely endorsed and reiterated in the Institute for Medicine report, (Kohl and Cook, 2013).

FitnessGram® tests were administered to determine whether students met the HFZ standard for each dependent variable: aerobic capacity, left and right leg lower body flexibility, and muscular strength. One objective of physical educators was to help all youth score in the HFZ on all components of fitness. If improvement could be tracked and followed over time for each component, students, teachers, and parents would then be able to see changes in student fitness levels year after year (Plowman & Meredith, 2013).

The PACER test was the assessment used to measure aerobic capacity. Students were required to complete a certain number of laps prescribed by the PACER test to reach the HFZ standard. The following is how the PACER test was described in the fourth edition of the FitnessGram® Reference Guide:

> The PACER is a multistage test adapted from the 20-meter shuttle run test published by Leger and Lambert (1982) and revised in 1988 (Leger, Mercier, Gadoury, & Lambert). It involves running back and forth across a 20-meter course in time to music played from an audio recording. Beeps on the sound track indicate when a person should reach the ends of the course. The test begins at a slow pace, and each minute the pace increases. A participant continues running

> until the pace can no longer be maintained. This test is like a graded exercise test on the treadmill in which the treadmill speed is increased at regular intervals. The longer a person continues, the higher the rate of estimated oxygen uptake. In the FitnessGram® software, VO2max is predicted from the number of laps completed during the test and a test equating procedure (Zhu, Plowman & Park, 2010), which converts PACER laps into comparable one-mile run times which, are then used to predict VO2max. The PACER is a fun alternative to distance run tests, and is recommended for children, adolescents, and young adults. (Plowman & Meredith, p. 6-4)

A proprietary formula for estimating oxygen uptake consisted of total laps completed, age, and gender of each student (Plowman & Meredith, 2013). These scores were categorized into levels of the HFZ or NI zone.

The procedure used to measure left and right leg lower body flexibility was the back-saver sit and reach test. Students were instructed to reach a specified distance, starting in a sitting position with the right leg bent and the left leg extended with the foot flat against a measurement box. All students were instructed to reach as far as they could and hold for one second. The distance reached was recorded to the nearest inch up to a maximum of 12 inches. The same method was repeated for the right leg.

The assessment used to measure muscular strength was the push-up test. Students were instructed to complete as many 90-degree push-ups as possible at a specified pace of about one push-up every three seconds (Plowman & Meredith, 2013). Students were finished after reaching 75 push-ups, when the second break in form occurred, or when

they experienced an excessive amount of distress. The total number of push-ups were recorded and compared to the HFZ standard.

Data Collection Procedures

Before the collection of data began, a request was sent to the district's elementary physical education facilitator on February 16, 2017, to determine if fitness testing data would be available and if the facilitator would be willing to collect the data (see Appendix A). After the elementary physical education facilitator agreed to forward a data request, an email was sent to all elementary physical educators requesting fitness testing data on aerobic capacity, left and right leg lower body flexibility, and muscular strength for the 2015-2016 school year (see Appendix B). Of the 35 elementary schools, three Title I schools and five non-Title I responded to the request for fitness testing data. The district physical education facilitator submitted the fitness data to the district's director of assessment and research on June 29, 2017.

An application for conducting research was submitted to Baker University's Institutional Review Board (IRB) on June 15, 2017, which was approved on June 18, 2017 (see Appendix C). An internal application was sent to the district's director of assessment and research on June 20, 2017 for permission to conduct research and use district fitness testing data (see Appendix D). The internal request included an approval letter from the researcher's advisor (see Appendix E). The request was approved on June 21, 2017 (see Appendix F).

Upon approval to conduct the study from Baker's IRB and the district's director of assessment and research, data consisting of Title I status, gender, and physical fitness testing data for aerobic capacity, left and right leg lower body flexibility, and muscular

strength was compiled in an Excel spreadsheet. All school names and names of students were removed. Raw fitness testing scores for aerobic capacity, left and right leg lower body flexibility, and muscular strength were converted to categorical data for students who achieved HFZ (1) and students who were in the NI zone (2).

Data Analysis and Hypothesis Testing

In the current study, multiple independent and dependent variables were used to explain observed differences in fifth-grade student fitness between Title I and non-Title I elementary schools. A total of six variables were selected for this study. Two independent variables; 1) Title I school status and 2) student gender were studied. Both independent variables were categorical in nature each with two categories: Title I status referred to either a Title I school or non-Title I school. Gender referred to students being either boys or girls. Four dependent variables on student fitness measurements were taken with the FitnessGram® assessments; 1) aerobic capacity, 2) left leg lower body flexibility, 3) right leg lower body flexibility, and 4) muscular strength. All dependent variables had two categories 1) Healthy Fitness Zone, and 2) Needs Improvement.

The following research questions and corresponding hypotheses addressed the emphasis of this study in determining the difference in fitness levels of students in Title I and non-Title I schools.

RQ1. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school students dependent on Title I or non-Title I school status?

***H1*.** Fitness levels of aerobic capacity of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

***H2*.** Fitness levels of left leg lower body flexibility of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

***H3*.** Fitness levels of right leg lower body flexibility of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

***H4*.** Fitness levels of muscular strength of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

The results of the hypothesis testing were examined to address RQ1. The corresponding hypothesis tests and results followed each research question. JASP (Love, et al., 2015) significance output tables were explored to answer each alternative hypothesis statement. First, the overall level of significance was checked using an Alpha criterion of .05. The JASP Chi Square Tests output table's *p* column was used to determine the level of significance when compared to the Alpha criterion. Proportional distribution results were reported in JASP output contingency tables. If a statistically significant difference in percentage was found, then follow-up procedures were applied to identify where the difference was located.

RQ 2. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school boys dependent on Title I and non-Title I school status?

***H5*.** Fitness levels of aerobic capacity of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

***H6*.** Fitness levels of left leg lower body flexibility of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

***H7*.** Fitness levels of right leg lower body flexibility of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

***H8*.** Fitness levels of muscular strength of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

The results of the hypothesis testing were examined to address RQ2. The corresponding hypothesis tests and results followed each research question. JASP (Love, et al., 2015) significance output tables were explored to answer each alternative hypothesis statement. First, the overall level of significance was checked using an Alpha criterion of .05. The JASP Chi Square Tests output table's *p* column was used to determine the level of significance when compared to the Alpha criterion. Proportional distribution results were reported in JASP output contingency tables. If a statistically significant difference in percentage was found, then follow-up procedures were applied to identify where the difference was located.

RQ 3. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school girls dependent on Title I and non-Title I school status?

***H9*.** Fitness levels of aerobic capacity of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

***H10*.** Fitness levels of left leg lower body flexibility of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

***H11*.** Fitness levels of right leg lower body flexibility of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

***H12*.** Fitness levels of muscular strength of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

The results of the hypothesis testing were examined to address RQ3. The corresponding hypothesis tests and results followed each research question. JASP (Love, J., et al. 2015) significance output tables were explored to answer each alternative hypothesis statement. First, the overall level of significance was checked using an Alpha criterion of .05. The JASP Chi Square Tests output table's *p* column was used to determine the level of significance when compared to the Alpha criterion. Proportional distribution results were reported in JASP output contingency tables. If a statistically significant difference in percentage was found, then follow-up procedures were applied to identify where the difference was located.

Limitations

Limitations are factors that may influence how the findings were interpreted. Lunenburg and Irby (2008) highlighted the importance of providing the reader with information on limitations to avoid misinterpretation of the research and the impact it could have on recommendations for future study. The limitations for this study consisted of the following:

1. Fitness testing data was gathered from one assessment method for one grade level.
2. Fitness testing data was gathered from one school year.
3. Fitness testing data was gathered from the 20-meter PACER test to measure aerobic capacity.

4. Fitness testing data was gathered from the push-up test to measure muscular strength.
5. Fitness testing data was gathered from the sit-and-reach test to measure left and right leg flexibility.
6. Student fitness levels may have been influenced by a variety of factors including participation in before and after school activities, physical activity clubs, and non-school affiliated sports clubs.
7. Physical education instruction, test administration, the testing environment, and expectations may vary from school to school.

Summary

Research design, selection of participants, measurement, and data collection procedures were provided in chapter 3. Chapter 3 also included information regarding data analysis and hypothesis testing, as well as limitations of the current study. Results of the quantitative data analysis are presented in chapter 4.

Chapter Four

Results

The purpose of this study was to address the gap in knowledge about fitness levels of students in Title I schools and non-Title I schools. This was accomplished by determining the differences between the level of fitness among fifth-grade students who attended Title I schools and those who did not attend Title I schools, as measured by FitnessGram® assessments. The second purpose was to identify fitness differences between boys and fitness differences between girls. The three fitness components addressed were aerobic capacity, left and right leg flexibility, and muscular strength. The fitness components were measured by converting student fitness test scores into categories of levels into the HFZ or NI zone. Tests of statistical significant differences for the two independent variables, Title I school status and gender, were computed using JASP computer software, version 0.7 (Love et al., 2015). Categorical cell percentages were found in the JASP output labeled Contingency Tables when broken down by categories within each independent variable.

Descriptive Statistics

Lunenburg and Irby (2008) defined descriptive statistics as the "mathematical procedures for organizing and summarizing numerical data" (p. 63). The sample used for the current study was students who were continuously enrolled in the same Title I or non-Title I elementary school for the 2015-2016 school year. Although the request for voluntary data was sent to all schools in the district, the current study consisted of representative sample of data from Title I and non-Title I schools who responded to the request. The students in this study were all fifth-grade students.

All girls and boys in this study participated in the FitnessGram® fitness assessments, which measured aerobic capacity, left and right leg flexibility, and muscular strength. Of 366 students, 166 were girls and 200 were boys. For each fitness assessment, student scores were used to evaluate their fitness level and determine which of the two categories, Healthy Fitness Zone (HFZ) or Needs Improvement (NI) zone, they were placed in based on their performance on the test. For the 20-meter PACER test, both boys and girls needed to complete 23 laps to achieve the HFZ for aerobic capacity. Students with a score of 22 or below fell into the NI zone. For boys to obtain the HFZ in lower body flexibility for the left and right leg sit and reach assessment, they were required to reach to 8 inches. Any boy with a score of 7 inches or below fell into the NI zone. For girls to obtain the HFZ in lower body flexibility for the left and right leg sit and reach assessment, they were required to reach to 10 inches. Any girls with a score of 9 inches or less fell into the NI zone. For boys to achieve the HFZ in muscular strength, they were required to complete at least 10 push-ups on the 90-degree push-up test. Boys who completed 9 or fewer push-ups fell into the NI zone. For girls to achieve the HFZ in muscular strength, they were required to complete at least 7 push-ups in the 90-degree push-up test. Girls who completed 6 or fewer push-ups fell into the NI zone.

As shown in Table 1, most fifth-grade students in this study were enrolled in non-Title I schools (61.7%) and the remaining students were enrolled in Title I schools (38.3%). The percentage of fifth-grade female students in the study was 45.4%, with 54.6% male.

Table 1

Summary Frequency and Percent Response Student Demographic Characteristics Analysis Results for Independent Variables

Source	Categories	Frequency	Percent
Gender	Girls	166	45.4%
	Boys	200	54.6%
School Status	Non-Title I	226	61.7%
	Title I	140	38.3%
Total		366	100.0%

The Chi Square Test of Independence was used to explore differences between two independent variables and among four dependent variables, with all data being nominal in nature. A non-parametric Chi Square Test of Independence was used to answer all research questions and corresponding alternative hypotheses. According to Creswell (2008), the two-way Chi Square Test of Independence was used to generate proportional tests of significant difference when nominal data had been collected. JASP (Love et al., 2015) software was used to calculate output crosstab contingency tables. Results were generated for all hypothesized comparisons as JASP analysis protocol was followed and contingency tables software option was selected for all data analysis.

Hypothesis Testing

In this section, the results of the hypothesis testing were examined to address RQ1, RQ2, and RQ3. The corresponding hypothesis tests and results follow each

research question. JASP significance output tables were explored to answer each hypothesis statement. The overall level of significance was checked using an Alpha criterion of .05. The JASP Chi Square Tests output table's *p* column was used to determine the level of significance when compared to the Alpha criterion. Proportional distribution results were reported in JASP output contingency tables. If a statistically significant difference in percentage was found, then follow-up procedures were applied to identify where the difference was located.

RQ1. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school students dependent on Title I or non-Title I school status?

***H1*.** Fitness levels of aerobic capacity of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

As shown in Table 2, aerobic capacity for students was found to be dependent on school status. A statistically significant difference was found ($X^2 = 29.2$, $p < .001$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 2

Summary Percentage Contingency Table for School Status v Aerobic Capacity

Fitness Level	School Status	
	Title I (n=140)	Non-Title I (n=226)
Healthy Fitness Zone	65.7%	88.9%
Needs Improvement	34.3%	11.1%

Note: Test of Significance $X^2 = 29.2$, $p < .001$

Fitness levels of aerobic capacity for students enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

***H2*.** Fitness levels of left leg lower body flexibility of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

As shown in Table 3, left leg lower body flexibility for students was not found to be dependent on school status. A statistically significant difference was not found (X^2 = 1.187, p = .276) and therefore, the hypothesis was not supported.

Table 3

Summary Percentage Contingency Table for School Status v Left Leg Lower Body Flexibility

Fitness Level	School Status	
	Title I (n=140)	Non-Title I (n=226)
Healthy Fitness Zone	88.6%	84.5%
Needs Improvement	11.4%	15.5%

Note: Test of Significance X^2 = 1.187, p = .276

Fitness levels of left leg lower body flexibility for students enrolled in Title I and non-Title I schools were not statistically significant. Students in Title I and non-Title I schools were almost as likely to be categorized in the NI zone and in the HFZ.

***H3*.** Fitness levels of right leg lower body flexibility of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

As shown in Table 4, right leg lower body flexibility for students was found to be dependent on school status. A statistically significant difference was found ($X^2 = 7.537$, $p = .006$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 4

Summary Percentage Contingency Table for School Status v Right Leg Lower Body Flexibility

Fitness Level	School Status	
	Title I (n=140)	Non-Title I (n=226)
Healthy Fitness Zone	87.9%	95.6%
Needs Improvement	12.1%	4.4%

Note: Test of Significance $X^2 = 7.537$, $p = .006$

Fitness levels of right leg lower body flexibility for students enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

H4. Fitness levels of muscular strength of fifth-grade elementary school students were dependent on Title I or non-Title I school status.

As shown in Table 5, muscular strength for students was found to be dependent on school status. A statistically significant difference was found ($X^2 = 10.79$, $p < .001$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 5

Summary Percentage Contingency Table for School Status v Muscular Strength

Fitness Level	School Status	
	Title I (n=140)	Non-Title I (n=226)
Healthy Fitness Zone	50.0%	67.3%
Needs Improvement	50.0%	32.7%

Note: Test of Significance $X^2 = 10.79$, $p < .001$

Fitness levels of muscular strength for students enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

RQ 2. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school boys dependent on Title I and non-Title I school status?

***H5*.** Fitness levels of aerobic capacity of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

As shown in Table 6, aerobic capacity for boys was found to be dependent on school status. A statistically significant difference was found ($X^2 = 17.2$, $p < .001$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 6

Summary Percentage Contingency Table for School Status v Boy's Aerobic Capacity

Fitness Level of Boys	School Status	
	Title I (n=80)	Non-Title I (n=120)
Healthy Fitness Zone	65.0%	89.2%
Needs Improvement	35.0%	10.8%

Note: Test of Significance $X^2 = 17.2$, $p < .001$

Fitness levels of aerobic capacity for boys enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

H6. Fitness levels of left leg lower body flexibility of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

As shown in Table 7, left leg lower body flexibility for boys was not found to be dependent on school status. A statistically significant difference was not found ($X^2 = 2.388$, $p = .122$) and therefore, the hypothesis was not supported.

Table 7

Summary Percentage Contingency Table for School Status v Boy's Left Leg Lower Body Flexibility

Fitness Level of Boys	School Status	
	Title I (n=80)	Non-Title I (n=120)
Healthy Fitness Zone	86.3%	77.5%
Needs Improvement	13.8%	22.5%

Note: Test of Significance $X^2 = 2.388$, $p = .122$)

Fitness levels of left leg lower body flexibility for boys enrolled in Title I and non-Title I schools were not statistically significant. Boys in Title I and non-Title I schools were almost as likely to be categorized in the NI zone and in the HFZ.

H7. Fitness levels of right leg lower body flexibility of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

As shown in Table 8, right leg lower body flexibility for boys was found to be dependent on the school status. A statistically significant difference was found ($X^2 = 10.81$, $p = .001$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 8

Summary Percentage Contingency Table for School Status v Boy's Right Leg Lower Body Flexibility

Fitness Level of Boys	School Status	
	Title I (n=80)	Non-Title I (n=120)
Healthy Fitness Zone	85.0%	97.5%
Needs Improvement	15%	2.5%

Note: Test of Significance $X^2 = 10.81$, $p = .001$

Fitness levels of right leg lower body flexibility for boys enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

H8. Fitness levels of muscular strength of fifth-grade elementary school boys were dependent on Title I or non-Title I school status.

As shown in Table 9, muscular strength for boys was found to be dependent on the school status. A statistically significant difference was found ($X^2 = 6.961$, $p = .008$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 9

Summary Percentage Contingency Table for School Status v Boy's Muscular Strength

Fitness Level of Boys	School Status	
	Title I (n=80)	Non-Title I (n=120)
Healthy Fitness Zone	52.5%	70.8%
Needs Improvement	47.5%	29.2%

Note: Test of Significance $X^2 = 6.961$, $p = .008$

Fitness levels of muscular strength for boys enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

RQ 3. Were fitness levels of aerobic capacity, left and right leg lower body flexibility, and muscular strength of fifth-grade elementary school girls dependent on Title I and non-Title I school status?

***H9*.** Fitness levels of aerobic capacity of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

As shown in Table 10, aerobic capacity for girls was found to be dependent on school status. A statistically significant difference was found ($X^2 = 11.93$, $p < .001$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 10

Summary Percentage Contingency Table for School Status v Girls Aerobic Capacity

Fitness Level of Girls	School Status	
	Title I (n=60)	Non-Title I (n=106)
Healthy Fitness Zone	66.7%	88.7%
Needs Improvement	33.3%	11.3%

Note: Test of Significance $X^2 = 11.93$, $p < .001$

Fitness levels of aerobic capacity for girls enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

***H10*.** Fitness levels of left leg lower body flexibility of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

As shown in Table 11, left leg lower body flexibility for girls was not found to be dependent on school status. A statistically significant difference was not found ($X^2 = 0.033$, $p = .856$) and therefore, the hypothesis was not supported.

Table 11

Summary Percentage Contingency Table for School Status v Girls' Left Leg Lower Body Flexibility

Fitness Level of Girls	School Status	
	Title I (n=60)	Non-Title I (n=106)
Healthy Fitness Zone	91.7%	92.5%
Needs Improvement	8.3%	7.5%

Note: Test of Significance $X^2 = 0.033$, $p = .856$

Fitness levels of left leg lower body flexibility for girls enrolled in Title I and non-Title I schools were not statistically significant. Girls enrolled in Title I and non-Title I schools were almost as likely to be categorized in the NI zone and in the HFZ.

H11. Fitness levels of right leg lower body flexibility of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

As shown in Table 12, right leg lower body flexibility for girls was not found to be dependent on school status. A statistically significant difference was not found ($X^2 = 0.171$, $p = .679$) and therefore, the hypothesis was not supported.

Table 12

Summary Percentage Contingency Table for School Status v Girls' Right Leg Lower Body Flexibility

Fitness Level of Girls	School Status	
	Title I (n=60)	Non-Title I (n=106)
Healthy Fitness Zone	91.7%	93.4%
Needs Improvement	8.3%	6.6%

Note: Test of Significance $X^2 = 0.171$, $p = .679$)

Fitness levels of right leg lower body flexibility for girls enrolled in Title I and non-Title I schools were not statistically significant. Girls enrolled in Title I and non-Title I schools were almost as likely to be categorized in the NI zone and in the HFZ.

***H12*.** Fitness levels of muscular strength of fifth-grade elementary school girls were dependent on Title I or non-Title I school status.

As shown in Table 13, muscular strength for girls was found to be dependent on the school status. A statistically significant difference was found ($X^2 = 4.283$, $p = .039$) and therefore, the hypothesis was supported. Follow up procedures were conducted to identify where the differences were located.

Table 13

Summary Percentage Contingency Table for School Status v Girls' Muscular Strength

Fitness Level of Girls	School Status	
	Title I (n=60)	Non-Title I (n=106)
Healthy Fitness Zone	46.7%	63.2%
Needs Improvement	53.3%	36.8%

Note: Test of Significance $X^2 = 4.283$, $p = .039$

Fitness levels of muscular strength for girls enrolled in Title I and non-Title I schools were statistically significant. A significantly higher percentage of students in Title I schools were categorized in the NI zone, whereas a significantly higher percentage of students in non-Title I schools were categorized in the HFZ.

Included in this section were the research questions and results of the corresponding hypotheses. Contingency tables were used to provide the statistical

information for all the independent and dependent variables. Each hypothesis was either supported or not through a Chi Square Test of Independence.

Summary

Chapter 4 began with an overview of the sample size, independent and dependent variables, and statistics used to analyze the data. This chapter also contained a section on descriptive statistics, which included information on the current study's sample size and how the categorical data was organized and analyzed.

Interpretation and recommendations will be discussed in chapter 5, including an overview of the problem, a purpose statement and research questions, a review of the methodology, and major findings. There is also a conclusions section in chapter 5 that contains implications for action, recommendations for future research, and concluding remarks.

Chapter Five

Interpretation and Recommendations

The preceding chapter consisted of data analysis and results for the current study. Chapter 5 summarizes the study by reiterating the overview of the problem, the purpose statement and research questions, the review of the methodology, and major findings. Findings related to the literature and conclusions follow. Finally, there are implications for action, recommendations for future research, and concluding remarks.

Study Summary

The study summary contains an overview of the problem concerning the lack of knowledge regarding the fitness level differences of elementary boys and girls based on the Title I status of the school they attended. The following section revisits the current study's purpose statement and research questions. The study summary concludes with a review of the methodology and major findings.

Overview of the problem. Elementary student fitness levels were declining and school districts across the country were trying to address the issue (Olds, Ridley, & Tomkinson, 2007). However, this was especially troubling because relatively little was known about fitness levels of students in Title I and non-Title I schools. In the suburban school district used for the current study, there were opportunities for all elementary students to be engaged in physical activity before, during, and after school, but access to these activities may be limited to certain groups of students because of a variety of factors.

The CDC's Physical Activity Guidelines for Americans (2017) recommends that children should accumulate at least 60 or more minutes of moderate to vigorous physical

activity every day to keep their bodies healthy and to maintain or improve their current fitness level. However, researchers at Tufts University in Massachusetts found that only 15% of children achieved 60 minutes of moderate to vigorous physical activity (Hubbard et al., 2016). When looking specifically at gender, they found that girls were far less likely than boys to meet these guidelines.

Purpose statement and research questions. The purposes of this study were to address the gap in knowledge about fitness levels of students in Title I and non-Title I schools and to determine the relationship between the level of fitness among fifth-grade boys and girls who attended Title I schools and boys and girls who did not attend Title I schools. The fitness components of aerobic capacity, left and right leg lower body flexibility, and muscular strength were addressed. An additional purpose was to determine the relationship of fitness levels between boys and girls in Title I and non-Title I schools.

Review of the methodology. The students used for this study were fifth-grade boys and girls enrolled in Title I and non-Title I elementary schools in a Midwest suburban school district. Fitness testing data consisted of schools that responded to a voluntary request for data. The analysis was conducted using fitness testing data from all students who were continuously enrolled in either Title I or non-Title I elementary schools and participated in fitness testing for the 2015-2016 school year. The purposive sample of participants was selected based on a request for fitness testing data. In the current study, student fitness levels were assessed on aerobic capacity, left and right leg lower body flexibility, and muscular strength. Fitness testing scores were converted into categories based on achievement of the HFZ or NI zone.

A cross tab analysis was used for this non-parametric data and a Chi Square Test of Independence was used to determine if fitness levels were dependent on Title I school status or gender of the student. The hypothesis tests and results followed each research question. JASP significance output tables were explored to answer each hypothesis statement. The overall level of significance was checked using an Alpha criterion of .05. The JASP Chi Square Tests output table's *p* column was used to determine the level of significance when compared with the Alpha criterion (Love et al, 2015).

Major findings. Results related to the research questions revealed that there was a statistically significant difference in the fitness levels of students in Title I and non-Title I schools for boys and girls. Specifically, Title I schools had a significantly lower number of students in the HFZ in aerobic capacity, right leg lower body flexibility and muscular strength than students who attended non-Title I schools. There were no significant differences in the fitness levels of left leg lower body flexibility for students in Title I and non-Title I schools. Research questions two and three addressed the independent variable of gender. Boys and girls were analyzed separately, and the two groups were not compared. However, each gender was analyzed by Title I and non-Title I school status. The results showed significant differences in fitness levels. For boys, a significant difference of fitness levels was found in aerobic capacity, right leg lower body flexibility, and muscular strength, but no significant difference of fitness levels was found in left leg lower body flexibility. For girls, a significant difference of fitness levels was found in aerobic capacity and muscular strength, but no significant difference of fitness levels was found in both left and right leg lower body flexibility.

Based on the data, it was discovered that for all fifth-grade students, there was a statistically significant difference in three fitness levels of Title I and non-Title I students: aerobic capacity, right leg lower body flexibility, and muscular strength. The percentage of Title I students in the HFZ was significantly lower than the percentage of non-Title I students. No statistically significant difference was found in left leg lower body flexibility.

The other independent variable the current study addressed was gender. Boys and girls were analyzed by Title I school status, but the two genders were not directly compared with each other. The results showed significant differences in fitness levels. For boys, there was a significant difference in aerobic capacity, right leg lower body flexibility, and muscular strength. There was no significant difference in fitness levels in left leg lower body flexibility for boys in Title I and non-Title I schools. For girls, there was a significant difference in aerobic capacity and muscular strength. There was no significant difference in fitness levels in left and right leg lower body flexibility for girls.

Findings Related to the Literature

This section of chapter 5 explores the findings of the study as they relate to other studies regarding fitness levels of elementary school students. The current study specifically examined fitness levels of boys and girls in Title I and non-Title I schools. The research on fitness levels of boys and girls enrolled in Title I and non-Title I schools is limited, but this study supported research conducted by Drenowatz et al., (2010) who found that children from families with lower income environments showed a trend of lower physical activity levels and spent more time in sedentary behavior than children from higher income environments.

The findings from the current study were consistent with research by Jin and Jones-Smith (2015) who found that children with lower family incomes tended to have a lower level of physical fitness. The current study addressed fitness levels of children with lower family incomes. Results of the current study indicated that children enrolled in Title I schools had significantly lower fitness levels in aerobic capacity, right leg flexibility, and muscular strength than children enrolled in non-Title I schools. The only fitness component in the current study that wasn't influenced by the Title I status of the school was left leg flexibility.

The current study found that both boys and girls enrolled in Title I schools had significantly lower fitness in aerobic capacity. Other research indicated that children from low-SES households and communities developed academic skills slower than children from higher SES groups (Morgan, Farkas, Hillemeier, & Maczuga, 2009). It was also found that low SES in childhood was related to poor cognitive development, memory, language, socioemotional processing, and poor health in adulthood.

Conclusions

This section provides conclusions drawn from the current study's focus on fitness levels of fifth-grade boys and girls in Title I and non-Title I schools. Implications for action and recommendations for further research are included in this section. Finally, concluding remarks complete this section of chapter 5.

Implications for action. Based on the results of the current study, there are significant differences in the fitness levels of boys and girls who attend Title I and non-Title I schools. Students who attend Title I schools have significantly lower fitness levels

in aerobic capacity, right leg flexibility, and muscular strength than their non-Title I school peers.

The results of the current study had implications for action that included teachers, building and district administrators, and parents or guardians, as well as the students themselves. It is essential that school and district administrators across the country not only assess the fitness levels of the students they serve, but provide opportunities for elementary students to be physically active before, during, and after school hours, especially in Title I schools. In terms of student fitness, students in Title I schools appear to be lagging their peers.

Based on the data, some students attending Title I schools had significantly lower fitness levels in aerobic capacity, right leg lower body flexibility, and muscular strength. School district leaders need to analyze the effectiveness of physical education programs, recess, opportunities for classroom activity, and before and after school activities. To maintain or increase fitness levels, students need to be physically active at least 60 minutes a day (CDC, 2017). Many students were not able to achieve this; however, district leaders can help create opportunities for all students to be physically active for at least 60 minutes a day regardless of the Title I status of the school in which they are enrolled.

Recommendations for future research. While there is considerable research on the relationship between childhood obesity and academic achievement as stated in chapter 2, there is very little research on the specific fitness levels of fifth-grade students in Title I and non-Title I schools. Additional quantitative and qualitative research should be conducted with elementary students that are related to sedentary behaviors, limited

access to opportunities for physical activity, and the amount of physical activity students are engaged in during physical education and recess.

The current study analyzed the level of fitness of fifth-grade students in Title I and non-Title I schools. A future study could measure the actual amount of time students participate in activities that raise their heart rate to a health-enhancing level. Future research could also include looking at fitness levels of students between physical education programs that meet more days a week than others. Future research could examine the additional fitness components that are typically tested in FitnessGram® assessments that include muscular endurance and upper body flexibility. A future study could also examine fitness levels of all grade levels. In the suburban school district utilized for the current study, students in grades four through 10 completed physical fitness testing on an annual basis. One final recommendation for future studies would be to expand the research of fitness levels related to academic achievement of students over the course of their school careers. This would allow researchers to see a broader perspective of the impact fitness levels have on academic achievement of students over time.

Concluding remarks. The current study's results contributed to the body of knowledge conducted by other researchers related to fitness levels of boys and girls in Title I and non-Title I schools. Based on the results of the current study, it was found that boys and girls who attended Title I schools had lower fitness levels in aerobic capacity, right leg flexibility, and muscular strength than boys and girls who attended non-Title I schools. The results indicated that the only fitness component that was not found to be statistically significant and dependent on Title I school status was left leg flexibility.

Girls in Title I schools had significantly lower fitness levels in aerobic capacity and muscular strength. No statistically significant difference was found for left or right leg lower body flexibility for girls. Boys in Title I schools had significantly lower fitness levels in aerobic capacity, right leg flexibility, and muscular strength. No statistically significant difference was found for left leg flexibility for boys.

As indicated in chapter 2, fitness levels play a key role in children's overall health, their ability to achieve academically, and could be an indicator of health and their potential to achieve their goals into adulthood. This study supported previous research that students from families with lower income environments were less fit. School district administrators, school leaders, teachers, and parents should closely examine the fitness levels of their students and children so that practices could be put in place to help prevent students from the associated risks of having low fitness as a child, including potentially life-threatening health conditions, and low academic achievement.

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Appendices

Appendix A: Data Request to District Facilitator

Sent Items

Great! I'll send you a message and if you will forward it on that would be awesome.

From:
Sent: Thursday, February 16, 2017 8:36 AM
To: Matt Koskela
Subject: RE: favor

Do you want me to forward this message to them or do you want to make one up? I will be happy to send it out.

From: Matt Koskela
Sent: Thursday, February 16, 2017 8:32 AM
To:
Subject: favor

Hey ,

I have a favor to ask. Since you are would you be willing to send out a request to everyone for any schools who have fitness testing data from last fall or spring (2015-2016) to send it to you either electronically or by inter school mail? I can't look at the data before I go through a process with Baker and but my advisor asked me if someone other than myself could collect it so I can have it all together when I'm ready to use it.

I'll take any and all data that anyone is willing to share. My previous email said I just needed Pacer score, Height and Weight, but I'm going to try to look at muscular strength and flexibility as well. Thanks and if this isn't going to work for you, that's cool. Just let me know so I can ask the next person on my list. Thanks for considering!

Matt

Appendix B: District Data Request to District Physical Education Staff

From: Matt Koskela
Sent: Thursday, February 16, 2017 8:58 AM
To:
Subject: Fitness Test data Request

Good morning,

For those of you who offered to share your fitness test results from last school year, would you please send those to ? I need any and all fitness testing data you have from the 2015-2016 school year. I won't be using student names

Ideally, I would like Pacer score, Curl up/Sit up score, Push up score, Trunk lift and Sit and Reach. If you don't have all of that information, that's fine please send what you have.

Again, if you can send this information to either electronically or via Inter-school mail sometime within the next week or so. I know you guys are really busy and I really appreciate your time and help with this. Thanks!

Matt

Appendix C: Baker University IRB Application and Approval Letter

Baker University Institutional Review Board

June 15, 2017

Dear Matt Koskela and Dr. Zoellner,

The Baker University IRB has reviewed your research project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at EMorris@BakerU.edu or 785.594.7881.

Sincerely,

Erin R. Morris

Erin Morris PhD
Chair, Baker University IRB

Baker University IRB Committee
Joe Watson PhD
Nate Poell MA
Susan Rogers PhD
Scott Crenshaw

Appendix D: District Internal Research Application Request

Research Application Request-Internal

Applications to conduct research are accepted at three different points during the school year (refer to submission dates). Applications received after the submission date will be denied but may be resubmitted during the next window. For course work that does not fall within one of the submission windows exceptions will be made on an as needed basis. Allow a minimum of two (2) weeks for completion of the review process.

Submission Dates:

- Research Submission 1: If you are wishing to conduct research during the Fall Semester – applications may be submitted September 1 through September 15. Any applications submitted after September 15 will be denied.
- Research Submission 2: If you are wishing to conduct research during the Spring Semester – applications may be submitted January 15 - through January 30. Any applications submitted after January 30 will be denied.
- Research Submission 3: If you are wishing to conduct research during the Summer Semester – applications may be submitted May 1 through June 5. Any applications submitted after June 5 will be denied.

INSTRUCTIONS:

Your final application should include submission of the following requirements:

(1) The completed application (required for all types of research) – must be typed.

(2) If conducting research as a means to secure an advanced degree (doctorate or masters), include a copy of the university/college Human Experimentation Committee project review and approval letter (if applicable), and a letter from your academic advisor/committee (or other appropriate university/college official) indicating that the research project has been reviewed and approved.

(3) If conducting research and/or a survey for the purpose of research that is associated with a college class assignment please include documentation from that class regarding purpose and verification of assignment. Include a letter from the instructor and from your principal indicating they give you permission to conduct the research/survey for the college class assignment.

(4) Acknowledgement that you will abide by the [redacted] Public Schools Student Privacy IDAE policy.

(5) You will not use or reference the [redacted] Public Schools (district or individual school) by name in your study.

(6) All requirements can be scanned and sent as attachments through email to [redacted]

1. **Applicant(s) Name:** Matthew Koskela
2. **Position:** 7th Grade Science
3. **School/Location:** [redacted]
4. **Telephone:** [redacted]
5. **Email Address** [redacted]

6. **Project Title:** Physical Fitness Differences Between Title 1 Status and Gender in Elementary Students as Measured by FitnessGram® Assessments Aerobic Capacity, Muscular Strength, and Flexibility

7. **The proposed research is for:** The proposed research is for partial fulfillment for the degree of Doctor of Education in Educational Leadership

Seeking an advanced degree: Yes X No

Conducting research as part of a college class assignment: Yes No X

College Semester: Fall Spring Summer X

Other: please explain

University/College Affiliation Name: Baker University

University/College Name: Department: School of Professional and Graduate Studies

Street Address: 7301 College Blvd., Ste. 120

City, State and Zip Code: Overland Park, KS 66210

Phone Number: (913) 491-4432

Fax Number: (913) 491-0470

8. **Anticipated Dates:**
Beginning Date: June 21, 2017

Ending Date: August 31st, 2017

Date Final Report Available/Provided to [redacted] Public Schools: August 31st, 2017

9. **Participant Description:**
    - Educational Level of Students involved in the study (preschool, elementary, middle level, high school): Archived data from 5th grade boys and girls from the 2015-2016 school year
    - Number of schools involved in the study: No school will be directly involved as archived data will be used
    - Names of schools you would like to involve in your study: NA
    - Number of teachers involved in the study: No teachers are in involved in the study as archived data will be used
    - Number of students involved in the study: Archived student data will be used by teachers who were willing to respond to the data request

10. Has the project been submitted to a Human Experimentation Committee? Respond Yes X or No.

10a. If no, please explain why your project has not been submitted to a committee on human experimentation.

10b. Paste a copy of the letter from the Human Experimentation Committee regarding your study (Word format)

Below or attach a scanned copy along with your request.

-A copy of the IRB approval letter is attached to the application request email sent to [redacted]

11. **Brief review of the literature:**

-Much research has been conducted on physical activity, overweight and obese children. Much less research has been conducted on fitness levels. Literature review includes an overview of physical education, student fitness levels, physical activity, and the impact socioeconomic status has on fitness levels.

Children in the United States have become less fit than previous generations, according to preliminary research presented at the American Heart Association's (AHA) Scientific Sessions in 2013. Fitness levels have declined about 6% among U.S. children in every decade from 1970-2000 (AHA, 2013).

One major contributor to less fit and lower achieving students has been the shift to a sedentary lifestyle and physical inactivity. According to Abadie and Brown (2010), "The detrimental effects of physical inactivity within children have enormous personal health consequences" (p. 1.). Sedentary behavior increases the risk for childhood obesity, therefore children are more likely to have risk factors for cardiovascular disease (CDC, 2009).

Fitnessgram was developed by the Cooper Institute in 1977 and made it possible for physical educators to assess their students on the major fitness components including the following: aerobic capacity, muscular strength and endurance, flexibility, and body composition (Plowman, 2013).

12. Major research questions and purpose of the study:

RQ1. To what extent were there main effects and interaction effects for selected fitnessgram aerobic capacity, muscular strength, and flexibility scores between and within title status schools and gender for fifth grade students

The purpose of this study was to determine the strength of the relationship between the level of fitness among fifth-grade boys and girls who attended Title 1 schools and those who did not attend Title 1 schools. The fitness components of aerobic capacity, muscular strength, and flexibility were addressed.

13. Methodology (be specific) If administering a survey include survey instrument:

This study was designed to explore the mean differences in the relationship among student fitness levels of fifth-grade students attending and Title 1 non-Title 1 schools. The three fitness components included aerobic capacity, muscular strength, and flexibility as measured by FitnessGram® test administration protocols. This study was also designed to explore the mean differences of fitness levels as impacted by gender.

14. Method Summary:

Prior to collecting any fitness testing data, the researcher submitted the research proposal form to obtain permission from [redacted] Public Schools. The researcher has obtained permission from Baker University by submitting an Institutional Review Board (IRB) request. Upon approval, the district's Director of Assessment and Research will send a set of the requested fitness testing data to the researcher. The Microsoft Excel spreadsheet would include the following data for 5th grade boys and girls from the 2015-2016 school year: Title 1 status of the student, gender, height, weight, PACER score, push-up score, and left and right leg sit-and-reach score. No names will be used in the study as students and names of schools will remain anonymous.

15. Research Design/Data Analysis:

A multivariate factorial design was selected to explore the research design. MANOVA is an efficient methodology for the analysis of complex designs. The objective in using MANOVA was to determine if dependent variables are altered by independent variables. In this study multiple, independent and dependent variable were used to explore fifth-grade student fitness. Based on a review of the literature, a total of five

variables were selected for this study. There were two independent variables; 1) school title status and 2) student gender. Both independent variables were categorical in nature each with two categories (title 1 school; non-title 1 school; and boys and girls). Three dependent variables were measured using the "Fitness" assessment; 1) aerobic capacity, 2) muscular strength, and 3) flexibility. All measurements were continuous in nature.

16. **Perceived Benefits of the Project:**

    This study has the potential to educate teachers, administrators, and parents about the fitness levels of students who attend Title 1 and Non-Title 1 schools. Additionally, the findings of this study could help administrators determine how many opportunities students have to be physically active and determine the effectiveness of before and after school programs currently offered to students.

17. **Project Dissemination Plan:**

    The results of this research project will be shared with district administrators.

18. **Briefly describe how this research project supports [redacted] District curriculum, a district goal, and/or individual school's improvement plan.**
    This study addresses the district's goal *to maintain and enhance the physical and emotional health* of each student. [redacted] Vision is [redacted] [redacted] Preparing students for their future includes the overall health and wellbeing of each student.

19. **Please provide a letter from your faculty advisor/committee or other appropriate offic ial indicating that the**
    research project has been reviewed and the researcher has met all requirements necessary to conduct the proposed research. Paste an electronic copy of the letter into this section or attach a scanned copy along with your request.

    This research project has been approved by my advisor, Dr. Sharon Zoellner. Chapters 1 and 3 of this dissertation have been reviewed by both Dr. Zoellner and Dr. Phil Messner who is the researcher's research analyst. The letter of approval for this project is attached to the application request email sent to [redacted]

20. **Please provide a copy of your class syllabus if you are conducting research as part of a class project. Paste an electronic copy of the document into this section or provide a scanned copy when submitting your application.**

    NA

21. **I/We acknowledge that we have read and will abide by the Olathe Public Schools Student Privacy IDAE policy.**

Respond: Yes X or No

Any other comments regarding your application?

Thank you for your consideration!

Appendix E: District Internal Research Support Letter from Major Advisor

SCHOOL OF EDUCATION
Baldwin City,
Overland Park,
Wichita,
Topeka, Kansas City and Lee's Summit

June 15, 2017

[redacted]
Director of Assessment and Research
Instructional Resource Center
[redacted]

Dear [redacted]

This letter is written as confirmation that as Matt Koskela's major advisor at Baker University, I have reviewed and approved his study *Physical Fitness Differences Between Title 1 and Non-Title 1 School Elementary Students as Measured by FitnessGram® Assessments Aerobic Capacity, Muscular Strength, and Flexibility as Impacted by Gender.* Additionally, I can confirm that his study has been reviewed and approved by Baker University Research Analyst, Dr. Phil Messner. If you have any questions please don't hesitate to contact me.

Sincerely,

Sharon L Zoellner

Sharon Zoellner, Ph.D
Department Chair, Graduate School of Education

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GRADUATE CAMPUS | 8001 College Boulevard, Suite 100, Overland Park, Kansas 66210 913.491.4432 | fax 913.696.1997 | www.bakerU.edu

Appendix F: School District Approval for Internal Research

Inbox

Good morning, Matt.

Thank you for your research submission. I am pleased to let you know that your research request has been approved. As you continue in the process, please let me know what we can do to support you. Additionally, when you have completed your research, I would love to see your results!

Best of luck,

Sent from my iPad