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The Relationship Between Middle School Students' Perceptions Of Physical Activity, Student Engagement, And Academic Achievement

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THE RELATIONSHIP BETWEEN MIDDLE SCHOOL STUDENTS’ PERCEPTIONS
OF PHYSICAL ACTIVITY, STUDENT ENGAGEMENT,
AND ACADEMIC ACHIEVEMENT

A Dissertation
Presented to
the Faculty of the Morgridge College of Education
University of Denver

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by
Jeremy D. Moretti
August, 2012
Advisor: Karen Riley, Ph.D.
Abstract

Physical activity is important, and many adolescents are not meeting the recommendation that youth participate in at least 60 minutes of physical activity most days of the week (CDC, 2011). Physical inactivity among middle school students is on the rise and may be a contributing factor to a decline in academic performance. Prior research has focused primarily on bodily health; however, growing evidence supports the benefits of physical activity for academic achievement (Chomitz et al., 2009). This study examined the relationship between middle school students’ perceptions of physical activity and student engagement they relate to academic achievement among 179 middle school students in one suburban middle school. Additionally, this study sought to investigate students’ perceptions of physical activity as well as the context within which these perceptions take place, which may lead to more effective strategies to help improve academic achievement. Propositions from Bronfenbrenner’s ecological theory were used to examine the different factors influencing the relationship between middle school students’ perceptions of physical activity and student engagement as they relate to academic achievement.
This study is predominantly a correlational and regression design, which examines relationships and predictive ability of key variables. This research design will add depth to the study by investigating the social influences in schools regarding the relationship between physical activity, student engagement, and academic achievement.
Acknowledgements

Without the support, patience, and guidance of the following people, this dissertation would not have been completed. It is to them that I owe my deepest gratitude.

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Many thanks to my friends Wynn, Susan, Melissa, Tom, Kris, Emma, Jen, Dawn and Julie, who encouraged me to keep learning and writing. Finally, I would like to dedicate this dissertation to my uncle, Thomas Rumph. Although you no longer walk this earth, you continue to influence me in immeasurable ways...thank you for believing in me.
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Chapter One: An Overview

Introduction

Physical activity has been shown to improve some aspects of mental health such as anxiety, depression, and self-concept, improve learning and cognitive function, and increase academic achievement (Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Ploughman, 2008; Ratey & Hagerman, 2008; Strong et al., 2005; Tomporowski, Davis, Miller, & Naglieri, 2008; Trudeau & Shephard, 2008). Although physical activity is important for the health of the body and brain, many adolescents are not meeting the recommended guidelines. Research has shown a drop in physical activity for students as they enter middle school (Lee, Burgeson, & Fulton, 2007; Ratey & Hagerman, 2008). Since there has been no significant growth in student achievement scores in the last thirty years in spite of increased time devoted to the core academic areas as well as increased overall educational spending, other methods of improving academic achievement need to be explored (McClusky, 2009). Specifically, do students' perceptions of physical activity affect their academic achievement? While the positive consequences of physical activity on health are well known, the effects of perceptions toward physical activity on academic achievement have yet to be investigated.
Research has shown that physical activity does have a positive impact on academic achievement (Trost, 2009); however, there has yet to be a study that investigates middle school students’ perceptions of physical activity and if there is a relationship between these perceptions and academic achievement. Factors such as beliefs, parental involvement, student engagement, and attitudes regarding physical activity are discussed throughout this paper to investigate the relationship between students’ performance, perceptions, and their practices related to physical activity. This information allows for a better understanding of the ways in which students’ perception of physical activity levels may affect their academic achievements.

**Statement of the Problem**

**The decline of fitness.** Currently, physical inactivity is a growing issue among middle school students, and it is also one of the contributing factors in obesity. This is of major concern because the United States is currently being faced with an obesity epidemic among its youth (Trujillo, 2007). With childhood obesity on the rise, interest in the social context is beginning to focus on the indirect relationship between childhood inactivity and reduced academic achievement (Carlson et al., 2008; Castelli et al., 2007; Trujillo, 2007; Wittberg et al., 2009; Wittberg et al., 2010). Davis et al. (2007) discovered that “exercise may be a simple, important method of enhancing children’s cognitive and academic development…” and that “…these results may persuade educators to implement vigorous physical activity curricula during a childhood obesity epidemic” (p. 510).
The improvement of middle school education represents a high priority for educators involved with adolescent development (Sink, 2005). Researchers have characterized middle schools as being in a state of crisis, referring to this grade span as the "forgotten middle" (ACT, 2008, p. 1) and as the "missing middle" (Alliance for Excellent Education, 2007, title). The majority of previous research focused on academic achievement has been concentrated on elementary and high schools. Few studies have been conducted in which the focus was middle school student achievement (Alspaugh, 2004). The National Center for Education Statistics (NCES), the Nation's Report Card represents samples of 343,400 eight-graders who participated in the 2011 National Assessment of Education Progress in mathematics and reading. Results showed that most states improved eight-grade middle school student performance in mathematics and reading by one point since 2009. This change in students' performance over time has not improved much since 1998. While overall academic achievement scores are dropping among middle school students, inactivity for this group is on the rise (Akos, Queen, & Lineberry, 2005). A major concern regarding this pattern is partly due to a lack of opportunity within the middle school curriculum for students to engage in physical activity. This has become most noticeable during the transition from elementary to middle school (Lee, Burgeson, & Fulton, 2007). Decreased academic performance often accompanied middle school students following the transition to middle school (Akos, 2002; Burchinal, Roberts, Zeisel, & Rowley, 2008; Langenkamp, 2010; Simmons et al., 1991). Vars (1998) observed that 88% of all early adolescents experienced academic and social issues following the transition to middle school. Additionally, students
transitioning to middle school are dealing with internal changes in the form of puberty and physical appearance (Akos, 2002; Eccles et al., 1993). As a result, obesity rates among middle school students are increasing when compared to their elementary school counterparts (Akos, Qeen, & Lineberry, 2005).

**Education’s shift in focus.** Limited research has made it difficult to assess how physical education or lack thereof is contributing to the middle school curriculum since the enactment of the No Child Left Behind Act (NCLB) in 2001. NCLB was passed as part of the Federal Elementary and Secondary Education Act (ESEA) of 1965, and its stated purpose is to make certain that all children have the opportunity to obtain a high quality education with an emphasis on the academic aspects of education (Price et al., 2008). NCLB also aims to “boost student achievement, especially among the poor and minority groups” (Bloomfield & Cooper, 2003, p. 6). Even though development of the whole child has been widely accepted in the field of early education (Coople, 2005), including the cognitive, language, physical, and social domains; the NCLB act has forced educational leaders and teachers to narrow their focus solely to students' academic achievement. NCLB mandates that schools and states be held accountable for academic achievement through high stakes testing. This testing has been linked to the schools’ ability to obtain funding (Price et al., 2008; Reed, 2009). Those opposed to this law maintain that schools and districts are already at risk for low scores due to insufficient monetary resources, and limiting these funds will only exacerbate the situation (Lockwood, 2005). This lack of funding has forced school districts to reduce the amount of educational materials and supplies for subject areas, such as physical education, art,
and music that are not tested under NCLB (Reed, 2009). A more focused mindset on academic achievement has hindered the quality and quantity of physical education classes in middle school curriculum. As a result, recess time has decreased and physical inactivity has increased.

**Perceptions of physical activity.** Much of what children learn and understand about the concept of physical activity is acquired through physical education in their schools. Middle school students’ perceptions of physical activity can vary greatly (Sollerhed et al, 2005). Various factors can play a role in framing students' physical education experience that may be detrimental and or cause an aversion to activity. These factors can derive from both social and personal sources of information. Social sources include interactions and feedback from family, peers, teachers, and the environment. Personal sources include experiences with specific tasks, prior experiences, comparisons made by others, race, gender, and SES. Generally, students who show satisfactory participation in a physical activity along with increased skill development and physical conditioning also possess positive self-efficacy (Gao, Lodewyk, & Zhang, 2009, Shen & Chen, 2007; Subramaniam & Silverman, 2007;). Simply stated, self-efficacy is a situation specific self-confidence that indicates the strength and level at which one believes one can successfully perform a skill or task (Bandura, 1977). Therefore, self-efficacy is a judgment of how well one can execute courses of action required to deal with prospective situations. These efficacy expectations can be thought of as both outcome and personal expectations. Although the connection between having a satisfactory experience in a
physical activity and increased skill development and physical conditioning seems simplistic on the surface, the underlying relationship is far more complex.

A major factor in this relationship is the students’ perception of competence, their thoughts or feelings about themselves and his/her ability in a specific domain (Harter, 1982). Perception of competence can be influenced by a variety of factors, including past performance, societal stereotypes, previous experience, and personal beliefs. In addition, previous studies have shown that perception of competence impacts student motivation towards physical activity (Crocker & Ellsworth, 1990; Fox, 2000; Fox & Corbin, 1989; Goudas, Biddle, & Fox, 1994; Harter, 1982; Roberts, Kleiber, & Duda, 1981; Solmon, 2003; Solmon, Lee, Belcher, Harrison, & Wells, 2003; Whitehead, 1995; Williams & Gill, 1995; Xiang & Lee, 1998). For example, a 7th grade student may have a high perception of ability to perform a slap shot in a hockey game when guarded by a student of similar ability, but if guarded by a much larger, highly skilled individual, perceptions of his/her ability to perform the slap shot may be diminished. Thus performance may be reduced by the level of self-efficacy and not a decrease in actual ability on the task. These perceptions are typically reflected over time in attitudes, habits, and participation in physical activity under the concept of student engagement and they affect the students’ well being as they grow into adults (Almqvst et al., 2005; Harter, 1982).

**Purpose of the Study**

Most studies have investigated the relationship between physical activity and academic achievement and have not incorporated the perceptions of students. Moreover, research on adolescent perceptions of physical activity has been limited, with few studies
reporting quantitative or qualitative findings (Allender, Cowburn, & Foster, 2006; Dagkas & Stathi, 2007; Humbert et al., 2006; Tergerson & King, 2002). Understanding students’ perceptions of the role physical activity has on academic achievement may provide additional insight into developing educational and community programs and policies to increase physical activity among middle school students (Kwak et al., 2009; Wittberg et al., 2009).

This study provides valuable information by exploring the relationship between students’ perception of physical activity and their academic achievement through the use of a quantitative research design. This design provides insight into another possible variable, student engagement. Student engagement is considered by some to be a multidimensional construct, however it actually is measured independently and individually. In other studies it is often treated as a single variable defined to help determine why some students do better in school than others. One study using a student engagement variable divided the construct into two different parts: behavior and affect (Finn, 1993). Behavior is mainly how a student participates in class. Affect is the degree to which the student feels he/she belongs in the academic setting. This study utilizes the student engagement construct, which was defined by Finlay et al. (2006), and includes three specific areas of focus. Those engagement areas include: behavioral, emotional, and cognitive. The relationships between physical activity and academic achievement were assessed by exploring students’ perceptions of these two factors along with student engagement, which some argue is an important predictor of academic achievement.
Investigating students’ perceptions of physical activity may also provide a better understanding of what Dzewaltowski et al. (2010) have described as proxy efficacy. According to Dzewaltowski et al. (2010), proxy efficacy is a belief in one’s skills and abilities that may help influence others to provide the environmental conditions necessary to achieve a certain outcome. For instance, children with low proxy efficacy often do not have direct control or influence over their social conditions that would provide the context for their physical activity choices. Therefore, due to low proxy efficacy, students’ perceptions of physical activity may be governed by their lack of control or influence of their environment.

Understanding the way middle school students perceive physical activity can help identify ways in which physical activity influences academic achievement. The growing prevalence of conditions associated with physical inactivity (USDHHS, 2002) has prompted some educators to identify strategies that may increase physical activity levels among middle school students here in the United States. Therefore, investigating and understanding students’ perceptions of physical activity as well as the context within which these perceptions take place may lead to more effective strategies to help improve academic achievement. This study aimed to fill the gap in understanding relationships between middle school students’ perception of physical activity and student engagement as it relates to academic achievement.
Research Questions

Attitudes and perceptions must be defined in order to better understand middle school students’ perceptions of physical activity and how these relate to academic performance. The interpretation used for this study was adopted from Brustad (1993), who has defined a scale of emotional responses to physical activity, called the Children’s Attraction to Physical Activity scale (CAPA), to measure children’s attraction to various activities (Brustad, 1993). Academic achievement and academic performance are used interchangeably throughout this study, and they will be defined as the extent to which students meet educational goals, based on school and state standards at the conclusion of the regular school year.

This study was guided by the following questions:

1. What are the attitudes of middle school students toward physical activity?
2. Are attitudes toward physical activity, as measured by the Children’s Attraction to Physical Activity (CAPA) scale, related to academic achievement?
3. Does attitude toward physical activity contribute to prediction of academic achievement when gender, parent’s education, and grade of students are controlled?
4. Is student engagement a significant mediator between physical activity and academic achievement?
The following chapter reviews literature from several areas relevant to this study, including the benefits of physical activity, children’s lack of physical activity, development of the self, attitudes, and parental influence.
Chapter Two: Literature Review

Theoretical Framework of the Study

The relationship between physical activity and academic achievement in middle and high school students has been a topic of investigation among educators, parents, and the medical community for many years. Much of the prior research has involved a compilation of social-emotional components (Beaulieu, 2008; Reed, 2009; Kwak et al., 2009; Wittberg et al., 2009; Taras, 2005, Tremblay et al., 2000). These components are vital to understanding the period of development termed adolescence – a conglomerate of macro and micro influences, assembled from historical and cultural contexts as well as interpersonal interactions and relationships (Grotevant, 1989). Bronfenbrenner’s (1977, 1989) ecological model incorporates these components and lends itself to the study of physical activity and academic achievement and its relationship with the environment. Throughout this study, the ecological approach has helped to advance the understanding of how the youth population perceives physical activity, which may shed some light for childhood professionals on the behavior of physical inactivity and its relationship with childhood obesity and academic achievement (Reed, 2009; Beaulieu, 2008).

Overview of the ecological framework. Theoretical frameworks are paradigms that exist in literature and provide a context for examining and bridging the links between
concepts (Gliner & Morgan, 2000). Many of life’s events involve experiences that are both biological and environmental in nature, and the social systems of today’s youth influence their functioning and well being (Pajares & Urdan, 2006). Having studied the current trends in education, Pajares and Urdan (2006) have predicted an inevitable decline of our nation’s school systems along with the health of today’s youth.

The rapid pace of technology and the shift to a global community have changed the way individuals communicate (Pajares & Urdan, 2006). For example, children are saturated with new forms of social interaction such as text messaging and chat sites, and these have reshaped how children view themselves and the world (Oksman & Turtianen, 2004). These private interactions allow for more independence, less physical activity, and potentially harmful misconceptions, because of the freedom to create virtual realities (Pajares & Urdan, 2006). This new technology has also significantly influenced the way children undertake recreational exercise during their leisure time (Frank et al., 2003). This argument is based on the observation that children's play now often occurs indoors and consists of computer activities and video games. With access to such resources, contemporary play patterns limit children's peer group interaction, which is very important to childhood development, including physical activity from playing with other children in social settings outdoors. This implies a change in the way we think about, organize, and implement learning designs in schools for both teachers and students. Similarly, it is important to examine the structural form of today’s living habitat to determine how it contributes to decreased physical activity, obesity, and low academic achievement (Power & Schulkin, 2009). All of these components contribute to our
current condition, an obesogenic environment, which has also been influenced by the built environment (Power & Schulkin, 2009).

Definition of an obesogenic environment. An obesogenic environment is described as the sum of influences that provide opportunities or conditions for overconsumption of energy dense foods (i.e., foods that are high in fat and sugar) that promote obesity in individuals or populations (Kirk, et al., 2009; James, 2002; Fitzgerald et al., 2008; Frank et al., 2003). The obesogenic environment is difficult to define, because the factors that influence individual weight gain vary greatly (Kirk et al., 2009). Researchers, however, have highlighted certain factors in our current society that have contributed to an environment that promotes weight gain and negatively impacts access to physical activity and health-promoting foods in the population as a whole (Fleck & Petersmarck, 2008). These include:

1. The practical elimination of the need for physical activity as part of employment for most people, coupled with an increase in time spent commuting, up to an average of 87 minutes per day behind the wheel in 2005 (U.S. Department of Transportation, 2004; Langer, 2005).

2. An increased demand on time leading to a greater reliance on fast foods and a trend for sleep deprivation (Kirk et al., 2005).

3. A reduction in safe places for children and adults to be physically active secondary to sprawl and urban crime (Gill, 2007).

4. The universal availability of low-cost, highly palatable foods with high fat content and relatively low nutrient density (Drewnowski & Darmon, 2005).
5. Increased portion sizes in the 1980s and 1990s and an increase in available calories in the food supply (Young & Nestle, 2002).

6. Increases in major depressive disorders within the population and the corresponding use of prescription medications that cause weight gain (Hasin et al., 2005; Schwartz et al., 2004).

7. A rising consumption of high caloric sweetened beverages (Bray, 2003; Nielsen, & Popkin, 2003).

**Definition of a built environment.** The built environment is described as everything humanly created, modified, or maintained (Bartuska, 2007). The built environment is intended to meet the needs of humans as well as their wants and values. The built environment includes homes, schools, workplaces, parks, recreation areas, greenways, business areas and transportation systems. It extends into non-tangibles in the form of pollution and electric transmission lines, such as radio waves and satellite reception (Kelty et al., 2008). It also includes land-use planning and policies that impact our communities in urban, rural and suburban areas (Frank et al., 2003).

Additionally, the built environment dictates physical activity patterns through the creation and distribution of open space where sports and their activities can take place (Frank et al., 2003). Aspects of the built environment, therefore, can either hinder or facilitate an active lifestyle (Sallis & Glanz, 2006). For example, several studies have found that children and adolescents were more likely to engage in cycling or walking from home to school and home to recreational facilities when more paths were present (Boarnet et al., 2005; Evenson et al., 2007; Ewing, et al., 2004; and McMillan, 2007). In
the past, the built environment positively influenced recreational exercise; however, there are fewer and fewer parks or facilities available for recreational activity. Moreover, the few facilities that still exist are underutilized and are in poor condition (Frank et al., 2003). Therefore, the current built environment has created little opportunity or incentive for physical activity.

**Bronfenbrenner’s ecological model.** Understanding the complex web of relationships between the child, family, school, social support systems and the environment is crucial to understanding the link between adolescents’ health related issues and academic achievement. Urie Bronfenbrenner’s (1979) ecological model (Figure 1) visually depicts the interactions between genetic heritage, psychological dispositions, and behavioral patterns that help shape individual development through everyday experiences, from childhood throughout adulthood. According to Bronfenbrenner, each system is governed and formed by dyads. These dyads are relationships created between two participating people in a given setting, which contain the roles, norms, and rules that shape human development. These relationships evolve throughout a person’s lifetime, and conflicts or changes within these relations affect other systems, either positively or negatively.

In addition, Bronfenbrenner (1979) believed that dyads and development must be studied in schools, neighborhoods, and communities where they take place. The following paragraphs will outline and define the factors contributing to Bronfenbrenner’s ecological model (see Figure 1), further explaining the mechanisms by which the social
environment may influence physical activity as it relates to academic achievement (Santrock, 2007).

Figure 1. Bronfenbrenner’s ecological model.

**The microsystem.** Bronfenbrenner (1979) has described the structure of the microsystem as immediate interpersonal experiences, such as the home, neighborhood, and school within settings that are biological in nature. According to Bronfenbrenner’s (1979) theory, the interaction at home between the parent(s) and the child is viewed as most important, as it is at this level that the established relationships have the most influence. For example, the parent(s) may affect the child’s beliefs and behaviors about physical activity; however, it is equally true that the child may affect the behaviors and beliefs of the parent(s). Bronfenbrenner referred to this as “bidirectional”. These
interactions may lead to advances in cognitive, social, psychological, and emotional development throughout the child’s life. Similarly, Manning & Bear (2006) have demonstrated that a positive parent-child interaction, one that recognizes and supports a child’s strengths, may influence and eventually elicit a healthy self-esteem and self-concept.

Bronfenbrenner (1979) also believed that increasing the size of the microsystem provides more complex and meaningful interactions and ultimately enhances the child’s development. These increases typically occur as the child ages and is given the opportunity to interact with other people among a variety of settings, such as day care and school.

**The mesosystem.** According to Bronfenbrenner’s (1979) model, the mesosystem encompasses the interrelations between the various microsystems, and similar to his view of the microsystem, the interrelationship between the home (i.e., the child’s and parent’s involvement) and the school plays a major role in determining the quality of the child’s mesosystem. For example, having an enriched environment that includes access to playgrounds and outdoor activities may influence the child’s experiences and success in other microsystems, such as school (Wittberg et al., 2009). Conversely, a child who spends time at each of his divorced parents’ houses, living in separate neighborhoods, may undergo a change and conflict between relationships within the family, school, and peer groups. This change may influence the child’s attitude, motivation, and perception towards physical activity.
**The exosystem.** The exosystem refers to the interrelationships among settings or events that do not directly involve the child, but still influence the developing child and those who interact with the child, such as the parents’ workplace, school communities and social service agencies (Bronfenbrenner, 1979). When there is chaos in the exosystem, its effects are far-reaching, and the child is ultimately, indirectly or maybe directly affected. Such chaos may take the form of friction at the work place, heath concerns (i.e., an obesity epidemic or low academic achievement), war, or an economic recession. During these times, a group or individual may feel compelled to act differently, and these acts also indirectly affect the core of the microsystem. For example, a parent is mandated to work long hours, which negatively influences the amount of time the parent spends with the child. As a result, the relationship or dyad between the parent and child is negatively affected.

**The macrosystem and chronosystem.** The macrosystem includes the attitudes and ideologies (e.g., the spiritual and religious values, legal and political practices, and technological advances) shared by a cultural group that affect and shape human development (Bronfenbrenner, 1979). These roles are constantly changing over time, depicted by the chronosystem in Bronfenbrenner’s (1979) model. As an example, in American culture, women’s roles in the workplace have been shifting, requiring men to participate more in family affairs (Maccoby, 2002; Bukatko & Daehler, 2001). The effects of cultural changes are also evident throughout our schools and communities, as minority populations continue to increase (Cushner et al., 2006; Decker & Decker, 2001). This change has brought about expectations for parents as well as teachers, as individuals
are required to understand and collaborate with an infinite variety of ethnic and social groups (Cushner et al., 2006; Roopnarine & Johnson, 2000).

**Adolescent Development**

Early adolescence is a unique and fascinating time in child development, and it presents varying challenges. This period of great transition marks the end of childhood and the introduction into young adulthood, both biologically and socially (Silber as cited in Batshaw et al., 2007). During this time, children typically have the desire to separate from their parents and begin to realize their own potential, learning from their mistakes as well as their accomplishments (Bukatko & Daehler, 2001). As children make the transformation into adulthood, many biological and social developmental changes occur, including accelerated growth, the emergence of new thinking patterns, and changes in social roles (Adams & Gullotta, 1989; Hill & Monks, 1997; Pajares & Urdan, 2006; Turnbull & Turnbull, 2001). In the developing adolescent, these changes are classified into three different domains: biological, social, and cognitive.

**The biological domain.** At some time during late childhood and early adolescence, many physical changes begin to take place and the body changes from that of a child into an adult. This period, often referred to as pubescence, is marked by an increase in the level of sex hormones and includes rapid physical changes in height and weight (i.e., the “growth spurt”). However, the timing of the puberty process differs for males and females (Atwater, 1983; Manning, 1993; Pajaras & Urdan, 2006; Schickedanz et al., 1998). Females experience their growth spurt between the ages of 9 and 12 years, while boys average between 11 and 12 years (Bukatko & Daehler, 2001; Tanner, 1978).
Accompanying this growth spurt, skeletal, tissue, and organ growth all occur (Bukatko & Daehler, 2001). Girls gain twice the amount of fatty tissue as boys, and boys gain twice as much muscle tissue as girls (Poplawska et al., 2006). Although adolescents continue to grow as they reach adulthood, it is not with the same intensity as the initial, pubescent growth period.

The social domain. Although the phenomenon of physical maturation begins the process of adolescence, each child’s experiences are shaped by the current social culture and shifts in expectations (Grotevant, 1989). Research has been devoted to identifying the varied links between today’s youth and the current social culture to better understand adolescent development today (Cooper, 1994; Cooper & Cooper, 1992; MacDonald & Parke, 1984; Parke & Ladd, 1992). According to Steinberg (2001), early adolescence is an important time, as youth strive for autonomy amidst changing peer and family relationships.

For the early adolescent, family relationships begin to take on new meaning. Often, young pubescents feel imprisoned by the values and guidelines of the parents, as they attempt to redefine their roles, rules, and boundaries within their family systems; however, it is the existence of these roles, rules, and boundaries that ultimately help to form cohesion and adaptability within the family (Bornstein & Sawyer, 2006; Turnbull & Turnbull, 2001). Adolescents must walk a fine line between maintaining ties with family members and searching for appropriate levels of autonomy (Darling, 1999; Grotevant, 1989; Steinberg, 2001).
Peer relationships also take on new meanings during adolescence. As Tate (2001) has described, “peer influence is a powerful factor in adolescent development [and can be harnessed to produce] orderly, productive, and positive academic and rehabilitative environments” (p. 216). Frequently, the pattern of peer acceptance is established, because adolescents choose friends whose qualities, interests, attitudes, values, and personalities match their own (Bukatko & Daehler, 2001). Similarly, Harter (1998) has suggested that the roles that adolescents assume within their peer groups affect their behavior toward social choices. These relationships, cultivated during adolescence, have important repercussions for adulthood and may create positive behaviors that extend into the individuals’ physical and cognitive domains (Bukatko & Daehler, 2001).

The cognitive domain. Jean Piaget articulated one of the most influential explanations of the intellectual development of children, from birth through adolescence. His theories described the connection between children’s biological development and their ensuing cognitive development, using four developmental stages: sensory motor (birth to age 2), preoperational (ages 2 to 7), concrete operational (ages 7 to 12), and formal operational (ages 12+) (Bukatko & Daehler, 2001; Snow & McGaha, 2003).

Central to Piaget’s concrete operational stage is a child’s ability to understand cause and effect (Bukatko & Daehler, 2001). As an example, at this stage, children are capable of classifying items into categories, taking all aspects of a situation into account. Classification includes the understanding of conservation theory, which is the ability to recognize that two equal quantities of a substance remain equal, even if the substance is
rearranged, as long as nothing is added or taken away (Bukatko & Daehler, 2001; Fischer, 1980; Knight & Sutton, 2004; Rogoff, 1990; Snow & McGaha, 2003).

Adolescence normally begins within the concrete operational stage and extends into the formal operational period. The formal operational stage includes the ability to think abstractly. During this stage, early adolescents are able to work out a hypothesis and systematically go about testing that hypothesis, much like scientists approach an experiment (Bukatko & Daehler, 2001; Knight & Sutton, 2004; Snow & McGaha, 2003). During this period, children begin to think more logically and become less egocentric (For example, they begin to separate their own individual perspectives from those of others) (Bukatko & Daehler, 2001; Knight & Sutton, 2004; Snow & McGaha, 2003).

**Adolescence and the Self**

The component of self is shown to be related to awareness, and the ability to critically evaluate the self may emerge throughout early childhood into adulthood (Harter, 1999; Selman, 1976). Developmental perspectives on the self-system have been extensively studied for the past three decades; however, the interest in the self-processes and roots of self-development can be traced back to Greek philosophy, as disclosed in the aphorism to “know thyself” (Jacobs et al., 2003).

Many developmental psychologists pay homage to several scholars, such as James Mark Baldwin (1925), Charles Horton Cooley (1902), and George Herbert Mead (1934) (Jacobs et al, 2003). These individuals set the conceptual stage upon which the self in social interaction has been constructed.
**The history of self-concept.** The contributions of James (1925) were of major importance, because of his distinction between the “I” and the “Me,” the self as subject and the self as object (Harter, 1983). For James, the “I” (i.e., self as subject) is the knower, which represents the active agent that constructs the “Me” (i.e., self as object) (Harter, 1983). The “Me” represents an observed collection of things objectively known about the self (Harter). The “Me” self, as James described, can be divided into components demonstrated as the material self, social self, and spiritual self (Harter, 1983). It is the “Me” that came to be labeled as the self-concept and has received the most attention. According to Harter (1993), self-concept is how individuals perceive themselves, otherwise known as self-perception (Jacobs et al., 2003).

The resurgence of interest in the self as it applies to adolescence is characterized by Harter’s (1999) espoused notion of the self. According to Harter (1999), the I-self becomes aware of (and uses) the Me-self as the object of reflection and emotional evaluation throughout adolescence. The I-self, therefore, is capable of being proud of the Me-self. However, the I-self may become ashamed of the Me-self, depending on personal experiences. While adolescents can exhibit these emotions, understanding them involves a higher cognitive order.

**Self-concept through physical activity.** For this study, understanding adolescents’ self-perceptions and competencies as they relate to physical activity may provide the necessary knowledge to facilitate and improve academic achievement. Harter (1993) espoused that individuals perceive their competency across four domains: social, academic, personal, and physical development (Harter, 1990). Specific to the physical
domain, four self-conceptions have been identified: sport competence, physical strength, physical conditioning and body attractiveness (Fox, & Corbin, 1989). It is through these self-conceptions that individuals acquire high self-esteem, if they perceive themselves competent. These self-conceptions may also lead to later life satisfaction and happiness (Harter, 1998; Bukatko & Daehler, 2001).

Similarly, the construct of self-efficacy can be described “as a belief about what a person can do rather than personal judgments about one’s physical or personality attributes” (Pajares & Urdan, 2006, p.47). In other words, self-efficacy helps explain how well someone can do something; rather than “what am I like?” (Pajares & Urdan, 2006). Efforts to improve self-efficacy in young teens may require both a supportive social environment and understanding of children’s motivation as it relates to physical fitness (Bagoien & Halvari, 2005).

Physical Activity and the Adolescent

Physical activity begins early in life, and the desire to move about is often motivated by children’s propensity to explore and learn about their surroundings (Snow & McGaha, 2003). With this in mind, the importance of children’s play has been investigated as a meaningful form of physical activity (Bukatko & Daehler, 2001; Slade & Wolf, 1994). Physical activity through play provides children with the ability to develop coordination of muscles and cognitive development (Adolph, 2008; Bushnell & Doudreau, 1993; Snow & McGaha, 2003). Additionally, according to Snow and McGaha (2003), Bukatko & Daehler (2001), and Reed (2009), physical activity displayed during times of play enhances children’s social-emotional capacity and language development.
through self-talk, spatial skills, turn taking, expression of needs, listening, following directions, problem solving, self-esteem, self-confidence, and sharing. In spite of this, however, many children are still more inclined to sit in front of their computers or televisions and are less likely to play games that involve movement, resulting in an increase in childhood obesity in the United States (Fjortoft, 2001).

According to the American National Center for Health statistics (2007), between 1962 and 2000, the number of obese children and adults in the United States has increased from 13% to an alarming 31%. Among preschool children aged 2-5, obesity rates increased from 5% to 10.4% between 1976-1980 (CDC, 2010). From 2007-2008, among those aged 6-11, rates increased from 6.5% to 19.6%. These rates are the most compelling reason for reversing what is now considered to be a childhood obesity pandemic by medical and fitness professionals nationwide. One method of preventing childhood obesity is to promote physical activity among children (IOM, 2005).

A history of physical activity in the 21st century. Just as standards for academic achievement have changed over time, so has the movement for physical activity within schools in the United States. Overall attempts to improve children’s diets, exercise regimes, and physical fitness began during the beginning of the 20th century, when the United States became involved in World War I. The absence of physically fit soldiers during this period prompted action which resulted in institutionalized recreation (Sealander, 2003). City officials supported and convinced state legislatures to redesign school curricula to include mandatory physical training after World War I, resulting in a new profession within the educational system, the youth recreation specialist (Sealander,
Between 1915 and 1919, most states passed legislation requiring military training for every boy who attended a public high school. The response to this movement eventually led to a generation of fit soldiers during World War II (Sealander, 2003). Many factors influenced the effectiveness of these programs, such as times of financial hardship (e.g., the depression during the late 1920s through early 1940s), when most families were more concerned with putting food on the table than partaking in organized sports (Sealander, 2003).

Throughout the 1960s, youth fitness returned as a national policy, especially during John F. Kennedy’s presidency. In addition, a Fitness Council was created, and while this group eventually faded from view, a tradition was established (Sealander, 2003). This movement continued to gain strength when physical education was acknowledged as an important part of the middle school curriculum (Alexander & George, 1981; Alexander et al., 1968; Eichhorn, 1966). In response to this direction, middle school pioneers John H. Lounsbury and Gordon F. Vars (1978) wrote that

“the marked physical growth of young people during the middle school years, together with attendant health concerns, has earned this area a firm place in any middle school curriculum” (p. 83).

**Benefits of physical activity.** Physical activity is often defined as any movement that requires the use of muscles to expend energy. It includes running, walking, Pilates, and/or weight lifting. According to the United States Department of Health and the National Institutes of Health, physical activity is defined as “any body movement that works your muscles and uses more energy than you use when you are resting. Walking, running, dancing, swimming, yoga, and gardening are examples of physical activity”
(NIH, 2011). Several positive changes occur with increased physical activity, including a reduced risk of heart disease, high blood pressure, anxiety, and depression, as well as enhanced learning through neurogenesis (i.e., the addition of new neurons within certain areas of the brain) (Acevedo & Ekkekakis, 2006). Additionally, physical activity in children may also result in increased self-esteem and perceived physical competence, both of which enable children to cope with mental stress (Kelty et al., 2008).

**Physical activity and optimal fitness.** Optimal physical fitness or activity may be described as two principles. The first principle relates to one’s general health and well-being, and the second principle relates to specificity training. According to Webster’s Dictionary, general health is described as the “condition of the body or mind with reference to soundness and vigor or free from disease or ailment,” which performs its vital functions normally and properly. Specificity training is defined as specific demands imposed upon the body during exercise, which result in specific neuro-physiological adjustments/adaptations to those demands (Meriwether et al., 2008). For instance, performing a cardiovascular endurance exercise is not very effective for engaging and developing an optimal balance of muscular strength. Conversely, flexibility training usually increases the range of motion about a specific joint, but it is not effective in improving cardiovascular endurance. According to Meriwether et al. (2008), optimal physical fitness should include a lifestyle that leads to the development of optimal cardiovascular endurance, muscular strength, core development, balance, healthy eating habits, and flexibility.
The American Academy of Pediatrics issued a policy statement (2003) on the prevention of pediatric obesity, including recommendations for exercise along with suggestions for promoting physical activities among children. These recommendations include, but are not limited to, the following:

- Engaging in at least 60 minutes of moderate exercise most days of the week.
- Planning family activities that provide everyone with exercise and enjoyment.
- Providing a safe environment for children and their friends to play actively; encouraging swimming, biking, skating, ball sports, and other fun activities.
- Emphasizing the positive aspects of physical activity for children such as being more energetic and having fun.
- Supporting opportunities for children with all levels of physical abilities to enjoy moving their bodies.
- Encouraging non-competitive activities and sports.
- Reducing the amount of time children and their families spend in sedentary activities, such as watching television or playing video games.

It is generally agreed that being physically fit means more than the simple absence of disease, and a more contemporary perspective of physical fitness is that of a multi-dimensional concept made up of different domains that are not necessarily part of the biomedical model (Almqvst et al, 2005; Davis et al, 2000). The more holistic approach currently being used today to describe health and/or wellness includes physical fitness, proper nutrition, stress management, self-responsibility, and social,
psychological, and spiritual well-being, and this approach has become the focal point of many health related fitness programs (Almqvst et al., 2005 & Davis et al., 2000).

According to Taryn Bagrosky (Miss Fitness USA, 2010, Miss Fitness Colorado, 2011, and Fitness Professional), physical activity or fitness means: Having the vessel to go through life in the way life should be led with energy, happiness, and health. Having a fit self gives you the physical and mental energy to enjoy a more fulfilling existence. Fitness is a gift that we can all give our children! It can give them the strength and confidence to build a strong foundation (both inside and out). That well being leads to a sense of empowerment which leads to being a confident individual in society. It is a great cycle to have; one that you can carry with you for your entire life. (personal communication, June 1, 2010)

**Physical activity and academic achievement.** Many researchers believe that current obesity rates and a lack of physical activity are also becoming consistent predictors of children’s academic achievement (Chomitz et al., 2009; Coe, 2006; Datar et al., 2004, 2006; Stevens et al., 2008). For instance, a random assignment study conducted by Coe et al. (2006), which examined the association between both physical education and activity and academic achievement, found that students who participated in vigorous activity, as defined by Healthy People 2010 guidelines, had significantly higher grades than those who reported no vigorous activity across two semesters.

Similarly, results from a study conducted by Chomitz et al. (2009) showed a significant positive relationship between fitness and academic achievement. This cross-
sectional study, which used public school data from 2004 to 2005, assessed academic achievement as a passing score on the Massachusetts Comprehensive Assessment System (MCAS) achievement test in mathematics. Chomitz et al. (2009) assessed the mathematics scores of fourth, sixth, and eight grade students (n=1103) and the English scores for fourth and seventh grade students (n=744). Fitness achievement was assessed using five domains constructed from the Amateur Athletic Union (AAU), and Fitnessgram® was used to measure the number of physical fitness tests passed during physical education. Multivariate logistic regression analyses were conducted to assess the probability of passing the MCAS tests, while controlling for students’ weight status (BMI z score), ethnicity, gender, grade, and socioeconomic status. The results of this study showed that the odds of students passing both the MCAS tests for mathematics increased as the number of fitness tests passed increased (p<.0001 and p<.05, respectively). Chomitz et al. stated that, while more research is required, promoting fitness by increasing students’ opportunities for physical activity during physical education, recess, and extracurricular activities might support academic achievement.

Martin et al. (2007) studied students in grades three (n=2049), five (n=2169), six (n=948), and eight (n=681) from 46 elementary schools, nine middle schools, and five alternative K-8/K-12 schools in a Seattle School District during the 2000-2001 academic year. Martin et al. examined the relationship between scores on the President’s Challenge Youth Physical Fitness Program (PCYPFP), a norm referenced assessment with eleven separate tests, and the Iowa Test of Basic Skills (ITBS), also a norm referenced test with multiple forms. Only those students with complete sets of scores for both tests were
included in the study. Third and sixth graders were administered the “basic skills” version, while fifth and eighth graders were given the “integrated writing” version of the ITBS. While the Pearson coefficient of correlation between mean fitness and academic achievement percentile scores was $r = .19$, $p < .05$, the researchers stated that the relationship between the two measures must be looked at with caution, since a causal link could not be concluded.

Researchers have also examined the effects of exercise regimens of varying intensities on the academic performance of younger students (Shepard & Trudeau, 2005). In the Trois-Rivieres study, 564 primary school children were either assigned to an additional five hours of quality physical education or a minimal physical education program (Shepard & Trudeau, 2005). The collected data supported a positive impact on academic achievement, despite a 14% reduction in academic time allotment. Researchers found that one hour per day of additional physical education was related to improvements in standardized math test scores for grades 2, 3, 5, and 6; however, there was no difference in other subjects.

In another study, researchers administered a questionnaire, the 1996 Elementary School Climate study, to 6,923 students in grade six in New Brunswick, Canada (Tremblay et al., 1996). The purpose of the questionnaire was to determine students’ participation in physical activity, the academic and social climate of their classrooms, and several affective measures, including self-esteem. The dependent variables in this study included students’ math and reading scores, their BMI (which was procured by students’ responses to questions about their height and weight), and general measures of self-
esteem. Additionally, measures of physical activity were conducted using four questions regarding students’ regular participation in physical activities in and out of school, and the self-esteem measures were based on a 16-item Self-Description Questionnaire (with a Cronbach’s alpha of 0.88). The analysis showed that increased levels of physical activity corresponded to lower BMIs, and these higher levels of physical activity were also weakly related to academic achievement in both math and reading. One explanation for the weak statistical relationship found in the study was the use of the children’s self-reported measures of physical activity, as the scores reflected inconsistent information or low reliability. The findings also highlighted that physical activity levels were significantly related to self-esteem ($p < .001$). Moreover, the differences between males and females (in regards to their levels of self-esteem) were reduced after including physical activity data. These results suggest that females who are physically active are less likely to experience low levels of self-esteem, which is a common issue for females during early adolescence.

Another large, key study conducted through the California Department of Education (CDE, 2002) examined the relationship between physical fitness and academic performance. The study included a sample of 954,000 students in grades five (353,000), seven (322,000), and nine (279,000). Using Fitnessgram®, a six-faceted measure of overall fitness, and students’ grades on the Stanford Achievement Test-Ninth Edition (SAT-9) students were evaluated. The researchers found that those students with higher levels of fitness scored higher on the SAT-9 in all three grade levels. Additionally, higher academic performance was positively related to higher levels of fitness for those students
who met three or more physical fitness challenges. Physical activity has been shown to have a positive relationship with academic achievement; however, there is a lack of research examining adolescents' perceptions of physical activity to explain the relationship (Trost, 2009). Physical activity is important, and many adolescents are not meeting the recommendation; therefore, it is important to explore the adolescent perceptions of physical activity to better understand which factors influence academic achievement as a possible explanation.

**Physical activity and cognition.** Since the time period of the ancient Greeks, there have been beliefs that physical activity is linked to intellectual capabilities. For example, the ancient Greeks and Romans described the mind-body connection as “mens sana” in “corpore sana” (i.e., “a sound mind” in “a sound body”) (Tomporowski, 2008). However, the relationship between physical activity or physical fitness and academic achievement was not researched thoroughly until the 1950’s. Since then, many have learned that a healthy lifestyle, including physical activity, can improve academic achievement.

Sibley et al. (2003) conducted a meta-analysis showing a positive correlation between physical activity and seven categories of cognitive functioning. The types of cognitive measures examined were tests of perception skills, IQ, academic readiness, math, verbal, and memory among school-aged children. Sibley et al. found that regular physical activity can improve the cognitive function of children and adolescents. Additionally, they found significant improvements in perceptual skills, IQ, achievement scores on verbal and mathematics tests, concentration, memory, achievement, and
academic readiness. The results indicated a significant effect size (ES) in both meta-
analyses ranging from .25 (n=134 studies, 1,260 ESs) to .32 (n=45 studies, 107 ESs),
respectively.

Another noteworthy research study was conducted by Tomporowski et al. (2008),
The study was conducted as part of a larger research study that evaluated the effects of
exercise training on the cognitive abilities of overweight children (Davis et al., 2007). A
sample of 69 overweight children (36 girls and 33 boys) between seven and 11 years of
age (mean=9.2, SD=1.2) participated in the study. Of the 69 children, 55% were African
American and 45% were Caucasian. Prior to the start of the testing, the children’s
cognitive functioning was measured by the Cognitive Assessment System (CAS; Naglieri
& Das, 1997) and all were within the normal range. The children were asked to perform
category-decision tasks followed by a 23-minute walk on the treadmill and additional
tasks. The researchers hypothesized that the exercise bout would facilitate the children’s
executive functioning, which would result in reduced switch costs and fewer response
errors. Findings showed that acute bouts of physical activity did influence the children’s
global switch cost scores and produced fewer error rates. Additionally, researchers found
that physical activity increased mental functioning, specifically in the frontal lobe of the
brain, where tasks that involve executive function and reasoning are regulated.

Effects of attitude and perceptions on physical activity. The benefits of
physical activity for children and adolescents can be far reaching — affecting academic
achievement, boosting cognitive development, and improving psychological health;
however, not all youth perceive physical activity to be important to their well-being. The
challenge is how to foster positive attitudes toward physical activity that may manifest in a desire to be physically active in and outside of school. Humbert et al. (2006) found the most important factors for adolescents participating in physical activities were if the activities were fun and if friends were involved. These two factors made adolescents more likely to participate. Perceptions and attitudes, therefore, play a major role in children’s willingness to participate in physical activities, and research suggests that several variables influence children’s attitudes toward physical activity (Subramaniam & Silverman, 2002).

**Attitude and perceptions from an ecological view.** Children’s early perceptions of health, which are based on both environmental and personal factors, have been related to their understanding of health concepts that focus on sickness and various illnesses (Daigle et al, 2007). These perceptions are typically reflected over time in attitudes and habits of health behavior, which will eventually affect their well being as they grow into adults (Almqvst et al., 2005).

When children are young, a parent’s or caregiver’s involvement holds the most influence for encouraging young children and early adolescents to live a healthy lifestyle. For example, parents control their children’s environment by deciding the types of foods that are brought home, which create healthy eating habits (Frelut & Flodmark, 2002). Additionally, parents may guide children to live a healthier lifestyle by including physical activity (exercise) as a natural part of life (i.e., encouraging biking to school instead of riding the bus) (Frelut & Flodmark, 2002). Parents also may exert considerable influence on their children's desire to be involved in various forms of physical activity by signing
them up for sports. According to Dorsch et al. (2009) when parents sign their children up for sports as part of an educational and social experience they describe their children having an increased interest in sports and positive health behaviors. Parents also reported a more positive relationship with their child. As parents are their children’s first teachers, they can provide a strong foundation for healthy doses of physical activity by showing their interest and modeling how to be more physically active (Van Deventer, 2000; Virgilio, 1990). Parental support for physical education during childhood and adolescence is particularly significant because it influences children’s physical development, as well as their cognitive, social, and psychological development (Bailey, 2006; Ellis, 2001).

As children grow, their focus shifts from being parent-centered to friend- and school- centered. Adolescence is a period of growth in which young teens are trying to determine their functioning role outside the family. As might be expected, this growth creates interpersonal challenges for parents with respect to finding ways to maintain and attend to adolescents’ academic and physical needs. Mendelson et al. (1985) found that overweight and obese girls reported lower cohesion, expressiveness, and independence in their families. Conversely, overweight and obese adolescent boys reported no such difference. However, findings did show that underweight boys expressed the same family characteristics as reported by the overweight girls. Pierce & Wardle (1993) have reported shared parental dissatisfaction with the health issues of overweight preadolescent girls and underweight boys. These studies have implications for how families can negatively contribute to the physical development of an adolescent. Guralnick (2006) found that
maintaining an adolescent’s good health, with emphasis on preventive care (i.e., immunizations), allows adolescents to take advantage of and participate in a myriad of physical activities.

**Other factors affecting attitude and perceptions.** Motivation also plays an important role in forming children’s attitudes. As described by Wigfield & Eccles (2000), the expectancy-value model of achievement motivation (see Figure 2) is based on children’s desires to participate in an activity, how much effort they are willing to put forth into the activity, and their levels of persistence in the activity. These three measures are all determined by their beliefs about how well they will perform the activity (i.e., expectancy beliefs) and the value that the activity holds for him. Expectancy-value theory expounds on the importance of numerous factors that affect academic achievement, and one of the most influential is motivation. However, it is not easy to understand what motivates students to learn. According to Ryan and Deci (2000), to be motivated means

“To be moved to do something. A person who feels no impetus or inspiration to act is thus characterized as unmotivated, whereas someone who is energized or activated toward an end is considered motivated. Most everyone who works or plays with others is, accordingly, concerned with motivation…” (p. 54).

This model, along with other similar constructs (i.e., competence beliefs, expectancy beliefs, self-efficacy, and perceived behavior control), may help researchers gain knowledge about the multiple aspects of motivational constructs and their relationship with achievement goals as they relate to physical fitness.
Figure 2. The Eccles et al. expectancy-value model of achievement.

Additionally, Harter’s (1987) mediational model of global self-worth depicts three main motives for children and adolescents participating in various activities, and this model was adopted and customized for the physical activity domain (see Figure 3). Harter has espoused that perceived competence, social support, and enjoyment represent determinants of self-esteem, and that levels of self-esteem affect physical activity behavior. First, many children want to develop and demonstrate physical competence through athletic skills, fitness level, and appearance. Perceived competence is similar to
self-efficacy in that it refers to individuals’ judgments about specific areas, such as school, peer relationships, and physical activity (Weiss, 2003, 2004). Secondly, reinforcing social acceptance and support through peer group, friendship acceptance and approval, and encouragement by influential adults (i.e., parents, teachers, and coaches) are vital to initiating and continuing participation in physical activities. Lastly, implicit enjoyment from participation helps maximize positive experiences while minimizing negative experiences (Harter, 1987).

Figure 3. Susan Harter’s (1987) mediational model of global self-worth customized for the physical domain.

Another study, conducted by Xiang et al. (2008), examined how children’s motivation and performance changed in required running programs. This study was guided by the expectancy-value model of achievement choices. This study examined whether or not the expectancy-value and beliefs changed across grade levels and by gender. Xiang et al. (2008) found that the mean levels of children’s expectancy beliefs in
regards to running did not decline over time; instead, the children held similar beliefs in their competence as they progressed from fourth to sixth grade. The lack of decline observed may have been a result of natural physical maturation.

In a third study, Subramaniam & Silverman (2007) measured middle school students’ attitudes toward physical education. Student attitude was investigated based on the two-component view of attitude (enjoyment [affect] and perceived usefulness [cognition]). The researchers believed that to better understand what influences attitude, an examination of the components and how they differ among students was required. Findings showed that students in higher grades experienced less enjoyment (affective) compared to students in grades 6 and 7. One possible explanation for this finding could be that students in higher grades are repeating the same activities every year in the physical education curriculum. Carlson (1995) also found that students became bored as a result of the repetitive nature of activities, due to the lack of challenge the activity presented. However, Chen, Darst, and Pangrazi (1999), found that the newness and challenge of physical activities are elements of enjoyment that promote extended interest in other physical activities.

**Student Engagement and Academic Achievement**

**Definition of student engagement.** Student engagement provides one avenue for understanding, measuring, and improving academic achievement by observing the underlying motivation that is instrumental in learning. Despite the multiple contexts and definitions at play, the present study defines student engagement as when behavior reflects the energy and drive to learn, work effectively, and achieve one's potential at
school (Martin, 2010). Students take pride not simply in earning the formal indicators of success (i.e., grades), but in understanding the material and incorporating or internalizing it in their daily life. Moreover, student engagement transpires when children show sustained behavioral involvement in learning activities accompanied by a positive emotional tone. Much of the research and literature on engagement is an attempt to define the several different factors that explain why some students learn more successfully than others. It has been shown that students with higher engagement in classroom activities are responding to some environmental factors that improve their functioning in the school setting (Shernoff & Schmidt, 2008). Connell (1990) has argued that levels of student engagement vary depending on the educational setting. Ultimately, those students deemed as “disengaged” generally have poorer academic outcomes than those students who are “engaged.”

The concept of academic engagement and its link to student achievement may provide a new perspective from which to examine the academic achievement decline. Studies of engagement can be especially hopeful because engagement is responsive to variations in environment (Connell, 1990; Finn & Rock, 1997; Fredricks, Blumenfeld, and Paris, 2004). Yair’s (2000) research has shown support for student engagement. In schools where students feel cared about and supported in believing that they can succeed, and where academic success is an important goal, students have higher levels of academic achievement (Yair, 2000).

**The three facets of engagement.** Student engagement is a multidimensional construct, yet in studies it is often treated as a single variable defined to help determine
why some students do better in school than others. Additionally, previous research did not deal with school engagement as a multidimensional construct (Fredricks et al., 2004). Recent studies of school engagement, however, are treating engagement as a multi-faceted construct with three specific areas of focus: behavioral, emotional, and cognitive (Finlay, 2006; Espelage & Holt, 2001). Fredricks, Blumenfeld, Friedel, & Paris (2005) have developed a conceptual Venn diagram to depict this model of student engagement, and this is shown in Figure 4.

![Venn Diagram of School Engagement](image)

*Figure 4. Diagram of school engagement by Fredricks, Blumenufeld, Friedel, & Paris.*

Behavioral engagement, the first construct, draws on the idea of participation. It includes active involvement in the classroom (i.e., completing homework, complying with school rules of being absent/tardy or off task), and it is considered crucial for achieving positive academic achievement and preventing drop out. Emotional engagement, the second construct, encompasses a compilation of positive and negative
reactions to teachers, classmates, academics, and school, and it involves regulating feelings of frustration, boredom, interest, anger, satisfaction, student-teacher relations, and school work. Cognitive engagement, the final construct, is the ability to incorporate thoughtfulness and willingness to exert the effort necessary to comprehend simple and complex ideas and master new skill sets.

In studies in which these different aspects are significant to researchers, especially those examining student engagement and achievement, these different aspects are often measured independently and individually. A study conducted by Finn (1993) examined student engagement and divided the construct into two different parts: behavior and affect. According to Finn (1993), behavior was defined as how students participated in class; logically, the more students participated, the more they were engaged, and ultimately, the more likely they were to achieve. Affect was described as the degree to which students feel they belong in the academic setting. Factors contributing to higher levels of affect are the effectiveness and warmth of staff and fellow students’ accepting nature. A clear relationship with other students, teachers, and the overall school culture was a large portion of the affect measurement.

Exploring how adolescents perceive their engagement in school may provide an avenue for better understanding what factors may influence student academic outcomes. Such research may also provide an opportunity for increasing student achievement as well as contribute useful information for policy makers about positive ways to address the dropout problem.
**Instruments used to measure student engagement.** Some instruments currently used to measure student engagement include the Student School Engagement (SSE), Appleton’s Student Engagement Instrument (ASEI), Finlay’s Student Engagement Survey (FSES), which was used for this study, the Fredricks’ School Engagement Instrument (FSEI), and Huebner’s Student Life Satisfaction Survey (SLSS). Specific to this study is the FSES, which was designed by selecting items from eight different sources, including journal articles, previous instruments, and national surveys. The FSES was used in this study to help provide a better understanding of the mediating factor student engagement has between the relationship of perceptions of physical activity and academic achievement. The FSES is the best fit for this study, because the items have seemingly strong validity and reliability and cover a range of content that may relate to perceptions of physical activity.

**Instruments used to measure perception of physical activity.** While the consequences of physical activity on health are well known, the outcomes on achievement are not yet fully understood. It has been shown that physical activity has a positive relationship with academic achievement; however, few studies have examined the perceptions of adolescents to explain the relationship (Trost, 2009). Most studies on physical activity and academic achievement have been quantitative in nature and have not explored the perceptions of students. Research on adolescents’ perceptions toward physical activity has also been largely quantitative with a few studies reporting qualitative findings (Allender, Cowburn, & Foster, 2006; Dagkas & Stathi, 2007; Humbert et al., 2006; Tergerson & King, 2002).
For the purpose of this study, the Children’s Attraction to Physical Activity scale (CAPA; Brustad, 1993) was utilized to measure children’s overall interest in and attraction to physical activity. This multi-dimensional scale was designed to measure dimensions (cognitive and emotional states) identified by Brustad (1993) that evaluate a child’s attraction to physical activity. Brustad’s (1993) definition of emotional response was used to measure children’s perception and attitude toward physical activity.

The current literature reveals results of studies that have shown positive correlations between physical activity, student engagement, and noted improved performances in academic achievement. These studies strongly suggest the direct relationship between physical activity and academic achievement as well as overall health. The use of Bronfenbrenner's ecological model provided valuable insight into understanding adolescents' perception toward physical activity and student engagement. This perspective might suggest that the environmental factors and individual characteristics plays a central role in understanding the relationship between physical activity, student engagement, and promoting academic achievement.
Chapter Three: Method

This chapter describes the design of the current study including selection of participants, measures, and the procedure used to investigate perceptions of physical activity among middle school students. The purpose of this study was to investigate the relationship between perception of physical activity, student engagement, and academic achievement using quantitative data. Quantitative data were used to explore student perceptions of physical activity, student engagement, and academic achievement. Student perceptions of physical activity were used to help explain the relationship between student engagement, and academic achievement.

This study was guided by the following research questions:

1. What are the attitudes of middle school students toward physical activity?
2. Are attitudes toward physical activity as measured by the Children’s Attraction to Physical Activity (CAPA) scale related to academic achievement?
3. Does attitude toward physical activity contribute to prediction of academic achievement when gender, parent's education, and grade of students are controlled?
4. Is student engagement a significant mediator between physical activity and academic achievement?

**Setting and Participants**

**Setting.** Participants were selected from one public middle school in a suburban area. A stratified sample was employed, specifically middle school students of one urban public middle school serving 6th, 7th, and 8th grade with a population of approximately 1,200 students. An attempt was made to obtain a sample that was diverse in terms of grade, race/ethnicity, SES, and gender. For the purpose of data analysis, a pseudonym was assigned to the public middle school that participated in this research study in order to maintain anonymity. Prior to the administration of the survey, the purpose, benefits, and risks of the study were addressed by the researcher.

The Rumph school district is nationally recognized for excellence in academics, the arts, athletics, and activities for students. The middle school is one of 60 Rumph schools located in Colorado’s suburban area. The Rumph school district continues to excel in its tradition of excellence through community engagement, safety, supportive learning environments, and high quality well-rounded educational programs for all Rumph students. The Rumph school district has a total of 51,005 students with an increasingly diverse population which includes: 1) 62% White, 2) 15% African-American, 3) 14% Hispanic, 4) 8% Asian/Pacific Islander, 5) 1% American Indian/Alaskan Native. Relevant to this study is the Rumph school district’s promotion of physical activity through the Rumph Fitness Challenge and the Rumph Schools Family Wellness Summit. Each program promotes, educates, and encourages students from
elementary school through high school to participate in some type of physical activity for health purposes.

An *a priori* power analysis was conducted, to determine the appropriate sample size required to achieve adequate power necessary for this study. The results indicated that a minimum sample size of 166 participants was required to achieve statistical power of .80 at the .05 Type I error level with a medium effect size when utilizing nine predictors in a regression model. The intended nine predictors were: 1) gender; 2) student engagement; 3) SES; 4) race; and 5) the Children's Attraction to Physical Activity scale five sub-domains noted later in this chapter. Statistical power shows, in probability terms, the capability of a test to detect a significant effect (Bobko, 2001). That is, it tells us how often one can reach a correct interpretation about the effect, if the test were repeated several times.

**Participants.** Middle school students from one school participated in taking the surveys. Overall, 194 students agreed to participate in the surveys; however, only 179 responses were obtained and used. The response rate of 92% and the number of participants were both adequate for data analysis and supported the generalizability of the study. Data were collected via written surveys that the students completed using paper and pencil. Table 1 provides a description of the demographic characteristics of the sample. Initial descriptive statistics indicate that the obtained results are most likely generalized for similar middle schools given similar demographic attributes.
Table 1

Demographic Characteristics by Site for Survey Participants

<table>
<thead>
<tr>
<th>%</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants (n)</td>
<td>179</td>
</tr>
<tr>
<td>Gender (%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>57.5</td>
</tr>
<tr>
<td>Male</td>
<td>42.5</td>
</tr>
<tr>
<td>Grade (%)</td>
<td></td>
</tr>
<tr>
<td>Sixth Graders</td>
<td>25.7</td>
</tr>
<tr>
<td>Seventh Graders</td>
<td>39.7</td>
</tr>
<tr>
<td>Eighth Graders</td>
<td>34.6</td>
</tr>
<tr>
<td>Ethnicity (%)</td>
<td></td>
</tr>
<tr>
<td>White/Anglo</td>
<td>57</td>
</tr>
<tr>
<td>African American</td>
<td>14</td>
</tr>
<tr>
<td>Hispanic/Latino (a)</td>
<td>12.8</td>
</tr>
<tr>
<td>American Indian</td>
<td>.6</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>10.1</td>
</tr>
<tr>
<td>Other</td>
<td>5.6</td>
</tr>
<tr>
<td>Parental Level of Education (SES) (%)</td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>12.8</td>
</tr>
<tr>
<td>Some College</td>
<td>19.6</td>
</tr>
<tr>
<td>College Degree</td>
<td>67.6</td>
</tr>
</tbody>
</table>

Key: Rumph = Rumph Middle School

*Note: the percentages are base on N = 179 participants

The study used a convenience sample of 179 6th, 7th, and 8th grade students from a middle school population of approximately 1,200. The initial step of recruiting participants required finding a day that many students had physical education class. Students were enrolled in a physical education class required by the school in winter semester. Following the gathering of 6th, 7th, and 8th grade students, the researcher administered two surveys during the class period, taking 20 minutes of class time.
Instrumentation

Physical activity scale.

The Children’s Attraction to Physical Activity scale (CAPA; Brustad, 1993) was utilized to measure children’s overall interest in and attraction to physical activity. There are five domains that fall under the banner of attraction to physical activity including: 1) peer acceptance in games and sports, 2) importance of exercise, 3) liking of games and sports, 4) liking of physical exertion and exercise, 5) and liking of vigorous physical activity. This multidimensional scale was designed to measure dimensions (cognitive and emotional states) identified by Brustad (1993) that evaluate a child’s attraction to physical activity. The importance of exercise subscale focuses on children’s cognitions about attraction to physical activity and the three liking subscales relate to the enjoyment and fun element of children’s attraction to physical activity. The peer acceptance subscale is defined as how children view themselves among their peers and to what degree they are liked by other children (Harter, 1999). For the current study, peer acceptance was defined as children’s perception of their popularity with their peers throughout their involvement in games and sports (Brustad, 1993). The CAPA was developed using open-ended interviews with children about factors related to physical activity that they liked and disliked. Table 2 represents the breakdown of items for each of the five domains within the CAPA scale.
Table 2

**CAPA Scale Items**

<table>
<thead>
<tr>
<th>CAPA Scale Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Peer acceptance in games and sports</td>
</tr>
<tr>
<td>- Some kids are popular with other kids when they play games and sports BUT other kids are not very popular with other kids when they play games and sports</td>
</tr>
<tr>
<td>- Some kids get teased by other kids when they play games and sports BUT Other kids don't get teased when they play games and sports</td>
</tr>
<tr>
<td>- Some kids get told by other kids that they are not very good at games and sports BUT Other kids are told that they are good at games and sports</td>
</tr>
<tr>
<td>2. Importance of exercise</td>
</tr>
<tr>
<td>- Some kids don't like to exercise very much BUT Other kids like to exercise a whole lot</td>
</tr>
<tr>
<td>- Some kids think that the more exercise they get the better BUT Other kids think that it is not good to get a whole lot of exercise</td>
</tr>
<tr>
<td>- Some kids think it is very important to always be in good shape BUT Other kids don't think it is so important to always be in good shape</td>
</tr>
<tr>
<td>3. Liking of games and sports</td>
</tr>
<tr>
<td>- Some kids have more fun playing games and sports than anything else BUT Other kids like doing other things</td>
</tr>
<tr>
<td>- For some kids playing games and sports is their favorite thing BUT Other kids like other things more than games and sports</td>
</tr>
<tr>
<td>- Some kids look forward to playing games and sports BUT Other kids don't look forward to playing games and sports</td>
</tr>
<tr>
<td>4. Liking of physical exertion and exercise</td>
</tr>
<tr>
<td>- Some kids don't like to run very much BUT Other kids do like to run a whole lot</td>
</tr>
<tr>
<td>- Some kids don't like getting out of breath after they play hard BUT Other kids don't mind getting out of breath after they play hard</td>
</tr>
<tr>
<td>- Some kids really don't like to exercise BUT Other kids do like</td>
</tr>
<tr>
<td>5. Liking of vigorous physical activity</td>
</tr>
<tr>
<td>- Some kids don't enjoy exercise very much BUT Other kids enjoy exercise a whole lot</td>
</tr>
<tr>
<td>- Some kids feel bad when they run hard BUT Other kids feels good when they run hard</td>
</tr>
<tr>
<td>- Some kids try hard to stay in shape BUT Other kids don't try hard to stay in good shape</td>
</tr>
</tbody>
</table>

For the purpose of this study, Brustad’s (1993) definition of emotional response was used to measure children’s perception and attitude toward physical activity. There are two versions of the CAPA. For the purpose of this study, each sub-domain of CAPA was used as a predictor in the model similar to the original version where specific aspects of attraction (i.e., liking vigorous physical activity relative to gender or body composition) were utilized. For each question, students were presented with two choices and asked to select the choice that was most like them. In answering these questions,
students could choose between “sort of true, really true, or not true for me” for each choice. It should be noted that the researcher modified the CAPA scale based on the school district's request, and the item "not true for me" was added on each side. When processing the results, the response "not true for me" was recorded as "5" on one side of the scale and "6" on the other; it was not part of the original CAPA.

Most students completed the 15-item questionnaire in 7-10 minutes. The response scale is defined by behavioral attraction as a reflection of positive feelings toward a skill or subject. Items on the attraction to physical activity scale were rated on a 4-point response scale in which the children are presented with two choices and they determine which choice is more like them. They then must decide if that statement is "sort of true or really true" for the side or choice that best reflects them. Some sample items are shown in figure 5.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>___</td>
<td>___</td>
<td>Some kids have more fun playing games and sports than anything else</td>
</tr>
<tr>
<td>2.</td>
<td>___</td>
<td>___</td>
<td>Some kids don't like to exercise very much</td>
</tr>
</tbody>
</table>

Figure 5. Sample item from the original CAPA scale from the liking of vigorous physical activity subscale (Brustad, 1993).

It is important to note that the researcher assigned two additional points to each answer on the scale to give numerical value to the data in the survey results. This modification to the CAPA scale was based on the school district's request, and the item
"not true for me" was added for each answer. The data were converted so that each question presented two additional choices "5" and "6". Support for reliability and validity of the CAPA (Brustad, 1993) scale has been found in previous use. The 15-item total scale has Cronbach’s alpha internal consistency reliability estimates that range from .50 to .95. The CAPA demonstrates good concurrent validity in that it correlates highly with other measures of physical activity motivation (i.e., r = .88) as well as good predictive validity in that it is a good predictor of children’s actual subsequent physical activity levels (i.e., r = .66; Rose et al., 2009).

**Student engagement survey.** The second measure utilized for this research study was the Finlay Student Engagement Survey (FSES) (Finlay et al., 2006). The engagement questions were developed by the National Center for School Engagement (NCSE) for the 40-item School Engagement Survey (Finlay et al.). The FSES, a 15-item scale, was constructed by selecting items from eight different sources, including previous instruments (particularly Fredrick’s Student Engagement Survey), journal articles, the Colorado Core Measures book (CSAP, 2001), and national surveys. Finlay et al. categorized the items into behavioral, cognitive, and emotional engagement domains. The objective was to select items that seemingly had strong validity and reliability and covered a range of content. Additionally, convergent validity was claimed with intercorrelations between the three different engagement subscales. The scale consists of 15 items and 3 subscales (Behavioral, Emotional, and Cognitive). Items on the engagement scale were rated on a 5-point Likert response scale. The total combined score of all 3 measures of behavioral, emotional, and cognitive engagement
operationalized the construct of the FSES. Most students were able to complete the 15-item questionnaire in 7 to 10 minutes. Items on the engagement scale were correlated in research in three different sites (Houston, Jacksonville, and Seattle) for reliability. Cronbach’s alpha remained above .79 for each of the sites and for each of the three subscales with the exception of behavioral engagement in Jacksonville (alpha = .49). Table 3 depicts the items for Finlay’s Student Engagement Survey that was administered (Fredricks et al., 2004).

**Additional study variables.** To assess academic achievement, grade point averages (GPA) were obtained from school records. Grade point average for this study included the students’ cumulative middle school GPA. In the current study, the first set of independent variables included the five CAPA sub-domains (Brustad, 1993) and the dependent variable was GPA. The second independent variable was the total score on the FSES (Finlay et al., 2006) and the dependent variable was GPA. Additionally, FSES total score was used as a mediator variable to describe the relationship between the independent variable (attitudes toward physical activity) and the dependent variable (GPA). The researcher was aware that grade point averages may lack reliability and validity, due to confounding and uncontrollable variables including individual teachers' grading policies. Lastly, the demographic variables SES, gender, and race of student were used as control variables in assessing relationships of CAPA scores with GPA.
Table 3

*Finlay’s Student Engagement Survey*

1. I follow the rules at school.
2. I get in trouble at school.
3. When I am in class, I just act as if I am working.
4. I pay attention in class.
5. I complete my work on time.
6. I like being at school.
7. I feel excited by my work at school.
8. My classroom is a fun place to be.
9. I am interested in the work at school.
10. I feel happy in school.
11. I feel bored in school.
12. I read extra books to learn more about things we do in school.
13. I try to watch TV shows about things we do in school.
14. I talk to people outside of school about what I am learning in class.
15. I check my homework for mistakes.
16. I study at home even when I don’t have a test.
17. When I read a book, I ask myself questions to make sure I understand what it is.
18. If I don’t know what a word means when I am reading, I do something to figure it out.
19. If I don’t understand what I read, I go back and read it over again.

**Procedures**

First, the researcher acted in compliance with the University of Denver’s Institutional Review Board (IRB) policies for permission to conduct this research study.
Permission was obtained from both parents and students by way of a signed informed consent form before participating in this research study. The researcher surveyed middle school students at their school in one session that lasted 25 minutes on average. Surveys were administered by the researcher of this study, in a group setting during physical education class. Students in grades six, seven, and eight participated throughout the day. The school is considered a traditional track school and the researcher administered the surveys during the third week of second semester. The surveys were administered using pencil and paper as the method of data collection and analysis. Survey research is a system for collecting information from people, such as opinions, knowledge, attitude, behavior, preferences, gender, and age (Creswell, 2002; Fowler, 2002). The CAPA (Brustad, 1993) and FSES were administered to 6th, 7th, and 8th grade students at Thomas Middle School located in the Rumph School District. The researcher explained directions explicitly to the middle school children about the surveys. The researcher used developmentally appropriate language in explaining to each grade level how to fill out the survey. In other words, the researcher took into consideration the grade level of the group before giving instructions, so as not to use language students would not understand. This study used the English version of the CAPA . The researcher also explained that no individual information would be reported to the teacher and that students could skip any item they did not wish to answer. To ensure student confidentiality, completed forms were placed directly into an envelope.


**Research Design**

This study utilized cross-sectional data to investigate students’ liking for physical activity and student engagement as it relates to academic achievement. The researcher used quantitative methods to select participants, generate questions, and obtain numerical responses; therefore, this study was predominantly a correlational design, which examines relationships and the predictive ability of key variables. This research design investigated the relationship between physical activity, engagement, and academic achievement. Findings provide educators with information as to the nature of the issue in their educational setting and are intended to promote positive changes. Pearson product-moment correlations and multiple regression analysis explicated linear (line of best fit) prediction of attitudes toward physical activity and provide population estimates of parameters.

**Data Analysis**

The data analysis for this study was based on correlational analysis, hierarchical regression, and mediation modeling. The correlational design involves the quantitative investigation of possible relationships between two or more variables without manipulating them; this analysis does not indicate or imply causation.

The following statistical analyses were used to answer the first research question: What are the attitudes of middle school students toward physical activity? The data gathered were analyzed using descriptive statistics (i.e., frequencies, means, standard deviations, skewness, kurtosis) computed to explore students’ attitudes/liking toward physical activity on the CAPA. Descriptive statistics helped the researcher describe
responses to each question in the database and determine the distribution of the data. When using descriptive statistics the researcher determined the attitude of students on the CAPA scale and student engagement on the FSES. Descriptive statistics were computed for different levels of student demographics to display student attitudes by demographic groups.

The second research question was, are attitudes toward physical activity (independent variable) as measured by the Children’s Attraction to Physical Activity (CAPA) sub-scales related to academic achievement (dependent variable)? Pearson product-moment correlation coefficients were used to describe the degree of relationship between variables. Second, a multiple regression analysis was used to examine the relationship of middle school students’ attitude toward physical activity as it relates to academic achievement while controlling for gender, grade, SES, and race. Multiple regression analysis is a statistical procedure used for examining combined relationships of multiple independent variables with a single dependent variable (Creswell, 2002). To control for the aforementioned variables, a hierarchical multiple regression with two blocks was constructed. Block two comprised the main study independent variable while block one included the control variables.

In order to further explore the relationships between physical activity and academic achievement, student engagement was tested as a mediating variable. Mediation modeling was used to evaluate whether the theoretical model examining the relationship between physical activity, student engagement, and academic achievement was supported by the data. The purpose of this technique is to attempt to explain the
relationship between an independent and dependent variable based on the inclusion of an explanatory variable. This is accomplished using a series of regression analyses. In the first regression, the outcome variable (academic achievement) is regressed on the independent variable (physical activity). In the second and third regressions, the mediating variable is regressed on the independent variable and the outcome (academic achievement) is regressed on the mediator (student engagement). Finally, the direct and indirect paths between the independent variable and outcome are compared. Total direct and indirect effects for the mediation model are calculated. The amount of mediation or indirect effects (product of paths coefficient A and B) measures the reduction of the effect of the initial variable on the dependent variable. The direct or total effect (coefficient C) measures the relationship between the dependent variable and independent variable (see Figure 6).

![Mediation model](image-url)

*Figure 6. Mediation model.*
Limitations and Assumptions

Every statistical test is based on assumptions about the variables used in the analysis. This section describes the three important assumptions made in multiple regression, which are normality of distribution, linearity, and homoscedasticity of residuals. When these assumptions are violated the results may not be trustworthy, resulting in inflation of Type I or Type II errors, and over or under estimation of the significance or effect size (Bobko, 2001; Creswell, 2002).

Regression assumes that variables or data are normally distributed around the predicted dependent variable scores (Bobko, 2001; Creswell, 2002). Non-normally distributed variables, such as highly skewed or kurtotic variables, can distort the relationship between variables. Violation of this assumption can be assessed through visual inspection of plots, and examination of skewness and kurtosis (Bobko, 2001; Creswell, 2002). Moreover, outliers can also be identified by way of visual inspection of histograms and computation of Mahalanobis distances. It is essential to examine the scatterplots to evaluate the assumption of linearity. If the relationship between the independent variable and the dependent variable is not linear, the results of the regression analysis will underestimate the true relationship (Bobko, 2001; Creswell, 2002).

The assumption of homoscedasticity means that the variance around the regression line is constant across observations. Heteroscedasticity is detected when residuals are not evenly scattered around the line. This can lead to serious distortion of findings and even weaken the analysis, thus increasing the possibility of a Type I error.
This assumption can be assessed by visual examination of the residuals or errors on scatterplots (Bobko, 2001; Creswell, 2002).

Another methodological assumption in this study focuses on the effective utility of two scales, the CAPA and FSES. It was assumed that the CAPA scale would provide reliable data regarding participants’ attitudes toward physical activity. A significant component of these methodological assumptions is that a sample size of 178 participants in this study is sufficiently large enough to yield significant results. It was presumed that the participants who completed the CAPA and FSES scales confidentially would be truthful in their responses and it was assumed that the research participants would accurately report their responses on the instrument.

Indicating the limitations of the study identifies potential weaknesses in the research (Creswell, 2002). The primary limitation of this study is that it is non-experimental research, with no control group to compare outcomes and findings, and no pre and post-testing. Further, the major conceptual limitation of all regression techniques is that one can only demonstrate and ascertain relationships, and it is important to keep in mind that correlation does not establish causation (Glicken, 2003). For this reason, this study can only point to relationships between variables without drawing inferences about causation (Leedy & Ormrod, 2004).

Although the CAPA scale has been supported as a good measure of children’s attraction toward physical activity, it has its own limitations regarding ethnicity. Brustad (1996) utilized the CAPA scale in a study with a sample population of primarily Latino and Caucasian children of low SES. He reported that ethnicity was not a significant
factor in the differences among children in patterns of attraction to physical activity (Brustad, 1996). This finding provided preliminary evidence that attraction to physical activity can be measured in children of various ethnic backgrounds using the CAPA scale without introducing cultural bias, with the assumption that one group of Latino children would provide sufficient insight to make this generalization. In contrast, Harter (1985) noted that the findings used to validate the Self Perception Profile for Children were drawn from samples of primarily (90%) White subjects from lower middle to upper middle class (Harter, 1985). Cultural bias may have been introduced when transferring a scale that was created based on the experiences of a primarily White sample to this study involving a primarily Black or African American sample. The study created to validate the Physical Activity Questionnaire for Children did not report racial or ethnic statistics, however it was validated on a sample from a Canadian public school system (Kowalski et al., 1997).
Chapter 4: Results

The purpose of this study was to examine the relationship between middle school students’ perceptions of physical activity, student engagement, and academic achievement. Students’ perceptions of physical activity, as well as their levels of engagement and their GPAs were reported. Following this, descriptive statistics were analyzed and correlations, hierarchical regression, and meditation modeling were performed.

This chapter is organized by a description of the responses to the surveys that were administered and then results of analyses informing the research questions used to frame this study. A summary of the data collected through the two surveys is presented in this chapter, through the use of tables and figures whenever possible. A demographic description of the respondents and the response rate information is presented first, followed by the results of the survey.

Research Question #1

“What are the attitudes of middle school students toward physical activity?”

This question forms the basis of this study. The Children's Attraction to Physical Activity (CAPA) scale was designed to assess children's interest and attitude towards physical activity that tapped into 5 domains (Brustad, 1993). The five domains are: peer
acceptance in games and sports, importance of exercise, liking of games and sports, liking of physical exertion and exercise, and liking of vigorous physical activity.

As stated in chapter three, the response scale for the CAPA was converted from a 4-point to a 6-point scale in order to comply with the school district IRB requirements. As a result, the internal consistency reliability coefficient (Cronbach’s Alpha) was calculated for the CAPA instrument before and after scale conversion (see Table 4).

Table 4
*Cronbach’s Alpha for the CAPA Domains and Total Scale (N = 179)*

<table>
<thead>
<tr>
<th>Domains</th>
<th>Item N</th>
<th>α (Pre Scale Conversion)</th>
<th>α (Post Scale Conversion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like Vigorous Activity</td>
<td>3</td>
<td>0.654</td>
<td>0.629</td>
</tr>
<tr>
<td>Like Exertion Exercise</td>
<td>3</td>
<td>0.619</td>
<td>0.663</td>
</tr>
<tr>
<td>Like Games Sports Importance</td>
<td>3</td>
<td>0.533</td>
<td>0.686</td>
</tr>
<tr>
<td>Exercise</td>
<td>3</td>
<td>0.522</td>
<td>0.344</td>
</tr>
<tr>
<td>Peer acceptance</td>
<td>3</td>
<td>0.524</td>
<td>0.325</td>
</tr>
<tr>
<td>CAPA Total</td>
<td>5</td>
<td>0.873</td>
<td>0.843</td>
</tr>
</tbody>
</table>

Table 4 shows the reliability coefficients for the sub-domains of CAPA vary from .52 to .65, pre scale conversion with a total reliability coefficient of .87; however, the scale reliability was reduced after the conversion and ranges from .32 to .84 with a total CAPA scale reliability of .84.

Findings showed "importance of exercise" as having the highest mean (M=15.01) followed by "liking games and sports" (M=14.28). The lowest mean was for the item "liking of exertion exercise" (M=13.22; see Table 5 and Appendix A).
Table 5

Descriptive Analysis of Participants

<table>
<thead>
<tr>
<th></th>
<th>Like Vigorous Activity</th>
<th>Like Exercise Exertion</th>
<th>Like Games</th>
<th>Importance of Exercise</th>
<th>Peer acceptance</th>
<th>FSES Total</th>
<th>CAPA Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>13.6983</td>
<td>13.2235</td>
<td>14.2849</td>
<td>15.0168</td>
<td>13.2514</td>
<td>54.84</td>
<td>69.4749</td>
</tr>
<tr>
<td>Skew</td>
<td>-.375</td>
<td>-.273</td>
<td>-.724</td>
<td>-.965</td>
<td>-.148</td>
<td>-.775</td>
<td>-.168</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-1.009</td>
<td>-1.239</td>
<td>-.524</td>
<td>.860</td>
<td>-1.012</td>
<td>.891</td>
<td>-1.099</td>
</tr>
</tbody>
</table>

Total N = 179

Research Question #2

“Are attitudes toward physical activity, as measured by the Children’s Attraction to Physical Activity (CAPA) scale, related to academic achievement?”

This question assesses middle school students’ perceptions of physical activity. Items on the Children’s Attraction to Physical Activity (CAPA) were rated on a six-point response scale. A correlation matrix was produced relating scores on the CAPA sub-domains, FSES, and GPA to assess the degree and direction of the relationship between the above measures. Table 6 provides these correlations.

No statistically significant correlations were found between the perceptions of physical activity and academic achievement.

Research Question #3

“Does attitude toward physical activity contribute to prediction of academic achievement when gender, parent's education, and grade of students are controlled?”
### Table 6

**Correlation Matrix of Scores on the CAPA Sub-Domains, FSES and GPA**

<table>
<thead>
<tr>
<th></th>
<th>Like Vigorous Activity</th>
<th>Like Exertion Exercise</th>
<th>Like Games Sports</th>
<th>Importance of Exercise</th>
<th>Peer acceptance</th>
<th>GPA</th>
<th>FSES Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like Vigorous Activity</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Like Exertion Exercise</td>
<td>.794</td>
<td>1</td>
<td></td>
<td><strong>.000</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Like Sports</td>
<td>.525</td>
<td>.470</td>
<td>1</td>
<td><strong>.000</strong></td>
<td><strong>.000</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of Exercise</td>
<td>.599</td>
<td>.458</td>
<td>.407</td>
<td><strong>.000</strong></td>
<td><strong>.000</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer acceptance</td>
<td>.505</td>
<td>.610</td>
<td>.448</td>
<td>.369</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>.042</td>
<td>.054</td>
<td>.092</td>
<td>.042</td>
<td>.122</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSES Total</td>
<td>.144</td>
<td>.266</td>
<td>.133</td>
<td>.046</td>
<td>.228</td>
<td>.454</td>
<td>1</td>
</tr>
<tr>
<td>Total CAPA</td>
<td>.877</td>
<td>.863</td>
<td>.739</td>
<td>.691</td>
<td>.745</td>
<td>.089</td>
<td>0.215</td>
</tr>
</tbody>
</table>

Total N = 179

**. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

In order to address this question a hierarchical regression was performed. All multiple regression assumptions were tested and checked including examination of
outliers, normality, independence, multicollinearity, and homoscedasticity. The normality of the residuals was tested using the p-p plot. Moreover, there are two points to be made with the above numbers: (1) the correlation coefficient is given in the first row, and (2) the exact p-value is given in the second row.

Figure 7 demonstrates the results in that the residuals are within the accepted range of normality as they are along the diagonal.

\[ \text{Normal P-P Plot of Regression Standardized Residual} \]

\[ \text{Dependent Variable: GPA} \]

\[ \text{Expected Cum Prob} \]

\[ \text{Observed Cum Prob} \]

\[ 0.0 \quad 0.2 \quad 0.4 \quad 0.6 \quad 0.8 \quad 1.0 \]

\[ 0.0 \quad 0.2 \quad 0.4 \quad 0.6 \quad 0.8 \quad 1.0 \]

\textit{Figure 7.} Normal P-P Plot of Regression Standardized Residual Dependent Variable: GPA.
Next, the assumption of homoscedasticity (constant variance) was tested and the results showed homoscedastic patterns of residuals. Figure 8 shows that there are no patterns in the residuals.

![Scatterplot](image)

**Figure 8.** Scatterplot Dependent Variable: GPA.

The assumption of independence was tested using the Durbin Watson test and the results were also within the accepted range of 1.5-2.5 (1.96) (Tabachnick & Fidell, 2001). Multicollinearity was checked using the variance inflation factor (VIF). The results were in the accepted range of <.25. Lastly, the descriptive statistics conducted on the data using skewness and kurtosis did not reveal any evidence of outliers.
The regression results revealed SES as measured by parental educational level to be the only significant predictor of academic achievement (GPA) while none of the CAPA sub-domains was predictive of GPA (see Table 7). It should be noted that participants who indicated their parents as having a college degree were coded as high SES, and those who indicated their parents as having a high school diploma were coded as low SES.

Table 7

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>5.50</td>
<td>3</td>
<td>1.83</td>
<td>3.36</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>95.49</td>
<td>175</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.99</td>
<td>178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Regression</td>
<td>6.59</td>
<td>7</td>
<td>.94</td>
<td>1.70</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>94.40</td>
<td>171</td>
<td>.55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.99</td>
<td>178</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SES, Sex, Race
b. Predictors: (Constant), SES, Sex, Race, Like_Vigorous_Activity1, Like_Games_Sports1, Importance_Exercise1, Like_Exertion_Exercise1
c. Dependent Variable: GPA

**Research Question #4**

“Is student engagement a significant mediator between physical activity and academic achievement?”
To answer this quantitative research question, the Finlay Student Engagement Scale (FSES) was used to explore students’ school engagement and the ensuing relationships between physical activity and academic achievement. The correlation matrix depicted in Table 6 show a significant relationship between the FSES scale and the CAPA on the sub-domain of "Liking Physical Exertion and Exercise" and academic achievement as measured by GPA.

A mediation model analysis was performed through a series of regression analyses (see Figure 9). The following steps discuss the process of mediation modeling used to answer the above research question.

![Mediation path model](image)

*Figure 9. Mediation path model.*

Step one, a regression model was run to test the total effect (path c) of CAPA sub-domains on GPA, where CAPA sub-domains were used as the independent variables and GPA was used as the dependent variable. This model tested whether there was an effect that may be mediated. The results indicated there was no significant total effect of CAPA sub-domains on GPA as stated earlier from research question one. Table 8 depicts the results.
Step two was to run a regression model to test the correlation between CAPA sub-domains and student school engagement (path a). This model treated the mediator (FSES) as the dependent variable. The results (see Table 9) indicated there was a significant effect of CAPA sub-domain of liking exertion of exercise on FSES.

Table 9

Results of a Regression Model Testing the Correlation Between CAPA Sub-Domains and Student School Engagement

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like Vigorous Activity</td>
<td>-.411</td>
<td>.353</td>
<td>-.158</td>
<td>.246</td>
</tr>
<tr>
<td>Like Exertion Exercise</td>
<td>.813</td>
<td>.312</td>
<td>.340</td>
<td>0.001**</td>
</tr>
<tr>
<td>Like Games Sports</td>
<td>.088</td>
<td>.219</td>
<td>.036</td>
<td>.688</td>
</tr>
<tr>
<td>Importance of Exercise</td>
<td>-.240</td>
<td>.313</td>
<td>-.070</td>
<td>.444</td>
</tr>
<tr>
<td>Peer acceptance</td>
<td>.315</td>
<td>.270</td>
<td>.110</td>
<td>.244</td>
</tr>
</tbody>
</table>

R^2 0.094
In step three, a regression model to test the correlation between GPA and student school engagement (path b) was run. This model treated the mediator (FSES) as the independent variable. The results (see Table 10) indicated there was a significant effect of the mediating variable (FSES) on the dependent variable (GPA) as demonstrated by the correlation matrix in earlier steps.

Table 10

*Results of a Regression Model Testing the Correlation Between GPA and Student School Engagement*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSES</td>
<td>.038</td>
<td>.006</td>
<td>.454</td>
<td>0.001**</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.206</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lastly, a regression model was conducted to determine if the FSES completely mediates the relationship between CAPA and GPA controlling for FSES (path c; see Table 11).

The amount of mediation, also termed the indirect effect, is conceptualized as the reduction of the effect of the initial variable, in this case, the CAPA scale, on the outcome variable, academic achievement. As mentioned, only steps two and three are met in this process. According to Kenny, Kashy, and Bolger (1998), only steps two and three must be met to establish partial mediation. Thus, it can be concluded that student engagement as measured by FSES total score is a significant *partial* mediator between attitude toward physical activity and academic achievement. Essentially, while student engagement partially mediates the relationship between attitude toward physical activity (CAPA) and
academic achievement (GPA), it is not a huge contributor to the relationship between the two variables. As such, attitude toward physical activity as measured by the CAPA scale only contributes a very small amount in helping explain the variance in academic achievement (GPA) when the mediator (student engagement) is introduced.

Table 11.

Results of a Regression Model Testing the Prediction of GPA from CAPA Sub-Domains, Student Engagement, and GPA

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSES</td>
<td>.040</td>
<td>.006</td>
<td>.474</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Like Vigorous Activity</td>
<td>.009</td>
<td>.028</td>
<td>.039</td>
<td>.760</td>
</tr>
<tr>
<td>Like Exertion Exercise</td>
<td>-.038</td>
<td>.025</td>
<td>-.188</td>
<td>.131</td>
</tr>
<tr>
<td>Like Games Sports</td>
<td>.010</td>
<td>.017</td>
<td>.049</td>
<td>.555</td>
</tr>
<tr>
<td>Importance of Exercise</td>
<td>.010</td>
<td>.025</td>
<td>.036</td>
<td>.675</td>
</tr>
<tr>
<td>Peer acceptance</td>
<td>.018</td>
<td>.021</td>
<td>.074</td>
<td>.403</td>
</tr>
</tbody>
</table>

$R^2 = 0.222$
Chapter 5: Discussion

Introduction

There are many factors that influence academic achievement, some difficult to define. With the increasing number of children in the United States suffering from being overweight or obese more research is warranted to study the relationship between physical activity and academic achievement, as well as other factors among middle school children (Hall, 2007). This study examined the relationship between middle school students' perception of physical activity, student engagement, and academic achievement. The primary purpose was to assist in strengthening the understanding of the relationship between physical activity and academic achievement (Castelli et al., 2007; Shepard & Trudeau, 2005).

This chapter provides a summary of each of the chapters followed by a discussion of the study, conclusions, and discussion for each research question. The chapter concludes with limitations of the study and implications for further research based on the completed study.

In Chapter 1, the purpose of the study, statement of the problem, and research questions were discussed. These headings described the overall organization of the study and identified the aim of the study, which was to fill the gap in understanding the relationship between middle school students' perception of physical activity, student
engagement, and academic achievement. The key areas of concern were then expanded and discussed in the literature review.

In Chapter 2, the researcher provided a review of the literature in the following areas: theoretical framework of the study, adolescent development, adolescent and the self, physical activity and the adolescent, and student engagement and academic achievement. The chapter provided a better understanding of the way middle school students perceive physical activity which may help in identifying ways physical activity influences academic achievement. This chapter summarized literature that informed the research design discussed in Chapter 3.

In Chapter 3, the methods and design of the study were discussed. The chapter also describes the study design including the selection of participants, instrumentation (reliability and validity), data collection, and data analysis procedures used to investigate perceptions of physical activity among middle school students. The study was guided by these four research questions:

1. What are the attitudes of middle school students toward physical activity?
2. Are attitudes toward physical activity as measured by the Children’s Attraction to Physical Activity (CAPA) scale related to academic achievement?
3. Does attitude toward physical activity contribute to prediction of academic achievement when gender, parent's education, and grade of students are controlled?
4. Is student engagement a significant mediator between physical activity and academic achievement?

In Chapter 4, results of the research study were presented. The chapter provided a restatement of each research question and the statistical method used to analyze the questions on the surveys.

**Discussion**

The benefits of physical activity have been clearly defined and well documented. These include decreased obesity, increased energy levels, increased motivation, increased self-esteem, reduced stress, and improved academic achievement. Examining other factors influencing student academic achievement such as perceptions of physical activity and student engagement is the next logical step if school districts are to meet the growing academic challenges of all students. The intent of this study was to provide additional insight into understanding the factors that influence adolescents’ perceptions of physical activity and student engagement as they relate to academic achievement. This could benefit communities nationwide by improving educational programs and policies that would help in increasing physical activity among middle school students. This study was conducted in one suburban middle school. One middle school was selected and a total of 179 students participated in the study:

1. The study examined the relationship between middle school students’ perception of physical activity, student engagement, and academic achievement.
2. The data were analyzed using a Pearson product-moment correlation to examine these relationships. A multiple regression analysis was used to determine if variables explained academic achievement.

3. The study used mediation modeling to examine student engagement as a mediator between perception of physical activity and academic achievement.

Conclusion

This study examined the relationships between the perception of physical activity, student engagement, and academic achievement by administering two surveys, gathering data on GPA and demographic characteristics. Many researchers have found and believe in the relationship between the variables physical activity and academic achievement, but this study found otherwise. This study was based on the belief that students' perception of physical activity can have an impact on their academic abilities. At the conclusion of the study, the results found that statistical analyses for the CAPA did not find any statistically significant relationships. However, the researcher did find a partial mediation effect on GPA through FSES. It is possible that extraneous variables that were not identified could have affected the results of this study. Results showed that student engagement as measured by the FSES was a mediating predictor of GPA. This study supported the review of literature that students deemed as "disengaged" generally have poorer academic outcomes than those students who are "engaged" (Connell, 1990) and that this link may provide a new perspective from which to examine the academic achievement decline (Fredricks, Blumenfeld, and Paris, 2004; Shernoff & Schmidt, 2009). Although a full mediating effect of student school engagement could not be established via the analysis,
due to the low level of relationship among the CAPA scale and the GPA; a partial mediation was established when the mediator was introduced. The conclusion reached may be of assistance in the validation of the use of other mediating variables.

Limitations

The researcher anticipated finding a relationship between perceptions of physical activity, student engagement, and academic achievement. Even though this particular study did not demonstrate such results, this study adds to the existing body of literature and knowledge regarding physical activity and academic achievement. There are limitations to this study; therefore, the results from this study should be interpreted cautiously. A conceptual limitation of all regression techniques is that you can only demonstrate and ascertain relationships, and it is important to keep in mind that correlation does not establish causation (Glicken, 2003). For this reason, this study can only point to relationships between variables without drawing inferences about causation (Leedy & Ormrod, 2004).

Additionally, this study utilized surveys as a system for collecting information about students in order to describe, compare, and explain their attitudes, knowledge, or behaviors. Like all measures in all sciences, survey measurement is not error free. A limitation to conducting surveys includes the way the data are obtained, such as subjective self-reporting. The exclusive use of self-report was a limitation of this study. Although subjective accounts or self-reporting are characteristic of responses to the CAPA and FSES scales, factors such as participants’ self-awareness and intentions in responding to the survey must be considered. By making the survey confidential, it is
assumed that participants did not have any reason to misrepresent themselves. Therefore, the procedures used to conduct these surveys in this study suggest that the resulting data has usefully and accurately described what it was intended to describe.

This study was also limited by the fact that the participating middle school was the only school used in the study; therefore, the results cannot be generalized for other schools. Additionally, the students used in this study were sixth, seventh, and grade students; therefore, the results cannot be generalized to other grade levels. Grade point average was the only measure of academic achievement used in this study; therefore, the results may not be generalized to other instruments that measure academic achievement. Unfortunately, a limited diversity existed among the students; therefore, the results cannot be generalized to other educational settings. Finally, it is possible that extraneous variables could have affected the results of this study that were not evaluated in this study.

**Implications**

The researcher intended to find a significant relationship between perception of physical activity, student engagement, and academic achievement. Literature suggests that there is a myriad number of factors that could potentially affect students' academic achievement. The results of this study could be different than expected because of other confounding variables that can effect academic achievement were uncontrollable by the researcher. Several implications are provided below in hopes of offering suggestions for future practice and research on the relationship between perception of physical activity, student engagement, and academic achievement.
This study has provided insight into adolescents' perceptions of physical activity and the relationship between physical activity, student engagement, and academic achievement. This study recorded students' responses by grade, gender, SES, and race and compared their perceptions of physical activity and student engagement to academic achievement. Subsequent studies that identify the variable student engagement as a mediating factor between perceptions of physical activity and academic achievement may provide a better understanding of the environment needed to promote positive influences that would support positive perceptions of physical activity and encourage academic achievement. Moreover, since this study did not yield significant findings relating attitudes toward physical activity and achievement using survey methodology the researcher suggests a need for future studies which investigates the use of focus groups to help provide more meaningful and accurate information to help explain the quantitative data.

The increasing prevalence of physical inactivity, obesity, and its adverse impact on the academic achievement gap demands a swift response from teachers, educators, and parents, who have historically advocated and fought for students. The findings of this study should prompt attention from the educational and school psychology profession to conduct similar studies, as well as take a prominent leadership role in health promotion and student engagement efforts. Although, school psychologists’ traditional role within the school arena continues to change, the profession must embrace this opportunity to help redefine the future health of our society.
One major contribution of this study was to explore students' perception and recognize the role student engagement plays in academic achievement. It is believed that no research to date has explored students' perceptions to explain the relationship between physical activity, student engagement, and academic achievement. However, this study did find a significant relationship between student engagement and academic achievement.

In depth focus group interviews with sixth, seventh, and grade students may obtain qualitative data that extends and enriches the quantitative results. Focus group interviews are interviews with small groups of people on a specific topic (Creswell, 2007). Groups are typically 6 to 10 people with similar backgrounds who participate in the interview for approximately one to two hours (Creswell, 2007). The researcher would use a focus group interview as a method to collect data from middle school students in grade six, seven and eight.

The objective of the focus group interview would be to personally engage students in conversation about what they think physical activity means and if it affects their academic achievement. According to Berg (2004) and Glesne (1999), focus groups are well suited for data gathering techniques for young people. Glesne (1999) advised that students find comfort in having other students present when discussing a topic. This method would be less intimidating than a one-to-one interview and addresses the ethical concern regarding authority versus a subordinate role in research. In addition, if students are comfortable, they are more likely to express the truth even if they believe it is not what the researcher hopes to hear, which will increase the trustworthiness of the data.
Advantages to conducting a focus group interviews include that data collection may provide information about health concerns, educational issues, environmental issues, policy issues, and the method is cost effective. For example, in one hour a researcher can collect information from eight people instead of one. Secondly, interactions among participants enhance data quality (Krueger & Casey, 2000). Responses to the focus group questions could be coded and calculated using the statistical software AtlasTi to determine if there is saturation. These data would then be used to identify and explain the relationship between attitudes toward physical activity, engagement, and academic achievement in future research.

The results of this study are intended for several audiences. These results can be used to inform parents, physical education teachers, school administrators, and the community. They can also be viewed as a platform for future research. This study did not yield significant results in determining a relationship between perception of physical activity and academic achievement. However, when student engagement acted as a mediating variable, the study answered some of the research questions. However, there was no direct effect of perception of physical activity on academic achievement. Therefore, an investment into more research that reinforces the knowledge and understanding of adolescent perceptions toward physical activity and academic achievement is needed. Recognizing students' perceptions toward the relationship between physical activity, student engagement, and academic achievement and knowing how ecological factors influence physical activity participation may aid in program development to enhance student motivation. At this time, however, pressures from
legislative and funding mandates to continually increase test scores have reduced quality
physical activity/education programs, and the voices of the students who are directly
affected by these decisions have been ignored.

Recommendations for Future Research

With the issue of physical activity and academic achievement among our youth at
the forefront of our nation's concern, countless questions are possible, thereby creating
options for future research. Some questions that remain unanswered in this study include:

1. Would the results of this study be different if the population consisted of other
   and more schools?
2. Would a focus group which consisted of male and females think there is a
   relationship between physical activity, student engagement, and academic
   achievement? What ecological factors are influencing beliefs?
3. How much of an effect would perception of physical activity have if it were a
   mediator and student engagement was the independent variable?
4. Would focus groups provide additional information about health concerns,
   educational issues, environmental issues, and policy issues?

These and other factors could contribute to higher levels of student academic
achievement. These include parental involvement levels, students' motivation levels, and
students' peer support network. It is quite clear that further research is necessary in the
area of the relationship between perception of physical activity, student engagement, and
academic achievement. This study needs to be replicated at other schools in other states.
Other common academic measures with high reliability and validity should be used in
future studies to see if results vary or achieve the same results as this study. Since this study did not find a significant correlation between perception of physical activity and academic achievement and previous studies have, more research is deemed necessary to offer validation on this relationship. Moreover, just as testing has increased in the academic realm, similar testing must be conducted using larger, more diverse populations to clearly determine the need for physical activity. Investigation of students' perceptions about physical activity, whether based on the assumptions of the relationship to academic achievement or based on needs for daily physical activity deserves further consideration and warrants unyielding advocacy from adults.

Summary

As our current lifestyle has dictated, young children are characterized as living more and more sedentary lives, with physical activity often substituted by television viewing, internet surfing, and video game playing (Sibley & Etnier, 2003). According to Sibley and Etnier (2003), Hillman, and Buck (2005), and Taras (2005), incorporating physical activity within schools is likely to remedy the physical health status of children, as well as improve academic achievement. The literature lacks a specific examination of perception of physical activity as it relates to academic achievement among middle school students. The primary purpose of this study was to examine the relationship between the perception of physical activity, student engagement, and academic achievement among middle school students. This study used quantitative approaches to examine students' perception of physical activity as it related to academic achievement. The two quantitative measures used to determine the level of relationship were the CAPA
and FSES. Moreover, the proposed theoretical framework provided a better understanding of how the youth population perceives physical activity and its relationship to academic achievement. This framework may shed some light for childhood professionals on the behavior of physical inactivity and its relationship with academic achievement.
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Appendix A

Student Engagement Survey

We would like to find out a little more about you and how you feel about school. Your answers to the following questions will help us to do this. It will take you about 15 minutes to complete this survey. If you are unsure of how to answer a question, please answer it as best you can and then write a comment in the margin. All the information you provide is confidential. It will only be used to help us learn about how to keep children interested in completing school.

1. Your ethnicity (please check all that apply): □ White/Anglo □ African American □ Hispanic/Latino □ American Indian □ Asian/Pacific Islander □ Other, describe __________
   a. What is your parent’s level of education? (Please check all that apply): □ High School Diploma □ Some college □ College degree

2. Your primary language: __________________ Second language: __________________

3. How much do you agree with each of the following statements?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I come to class prepared.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I treat my classmates with respect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I complete my work on time.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I treat my teachers with respect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I follow the rules at school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

4. How often are the following statements true for you?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never/Almost Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always/Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel excited by the work in school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am interested in the work I get to do in my classes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I talk with people outside of school about what I am learning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I check my schoolwork for mistakes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I learn a lot from my classes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. How often are the following statements true for you?</td>
<td>Never/Almost Never</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Often</td>
<td>Always/Almost Always</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>--------</td>
<td>-----------</td>
<td>-------</td>
<td>----------------------</td>
</tr>
<tr>
<td>I enjoy the work I do in class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel I can go to my teachers with the things that I need to talk about.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My classroom is a fun place to be.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Most of my teachers praise me when I work hard.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Most of my teachers understand me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

THANK YOU FOR COMPLETING THIS SURVEY!
Appendix B

CAPA Scale

<table>
<thead>
<tr>
<th>CAPA Scale</th>
<th>WHAT I AM LIKE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### EXAMPLE

A. **Really true for me**

Some kids like to eat ice cream more than anything else

**BUT**

Other kids like other foods more than ice cream

1. **Sort of true for me**

Some kids have more fun playing games and sports than anything else

**BUT**

Other kids like doing other things

2. **Not true for me**

Some kids don’t like to exercise very much

**BUT**

Other kids like to exercise a whole lot

3. **Really true for me**

Some kids get told by other kids that they are not very good at games and sports

**BUT**

Other kids are told that they are good at games and sports

4. **Sort of true for me**

Some kids get teased by other kids when they play games and sports

**BUT**

Other kids don’t get teased when they play games and sports

5. **Not true for me**

Some kids think that the more exercise they get the better

**BUT**

Other kids think that it is not good to get a whole lot of exercise

6. **Really true for me**

Some kids don’t enjoy exercise very much

**BUT**

Other kids enjoy exercising a whole lot

7. **Sort of true for me**

Some kids don’t like to run very much

**BUT**

Other kids do like to run a whole lot

8. **Not true for me**

Some kids don’t like getting out of breath after they play hard

**BUT**

Other kids don’t mind getting out of breath after they play hard

9. **Really true for me**

Some kids think it is very important to always be in good shape

**BUT**

Other kids don’t think it is so important to always be in good shape
10. ___ ___ ___ For some kids, playing games and sports is their favorite thing BUT Other kids like other ___ ___ ___

11. ___ ___ ___ Some kids are popular with other kids when they play games and sports BUT Other kids are not very popular with other kids when they play games and sports

12. ___ ___ ___ Some kids look forward to playing games and sports BUT Other kids don’t look forward to playing games and sports

13. ___ ___ ___ Some kids really don’t like to exercise BUT Other kids do like to exercise

14. ___ ___ ___ Some kids feel bad when they run hard BUT Other kids feel good when they run hard

15. ___ ___ ___ Some kids try hard to stay in good shape BUT Other kids don’t try hard to stay in good shape
## Appendix C

### Initial Descriptive Statistics for Each Question on the CAPA

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Really true for me</th>
<th>Sort of true for me</th>
<th>Really true for me</th>
<th>Not true for me</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Some kids have more fun playing games and sports than anything else&lt;br&gt;<strong>BUT</strong>&lt;br&gt;Other kids like doing other things</td>
<td>1.7</td>
<td>10.6</td>
<td>25.1</td>
<td>0</td>
<td>17.9</td>
<td>44.7</td>
</tr>
<tr>
<td>2</td>
<td>Some kids don’t like to exercise very much&lt;br&gt;<strong>BUT</strong>&lt;br&gt;Other kids like to exercise a whole lot</td>
<td>0</td>
<td>19</td>
<td>10.6</td>
<td>7.8</td>
<td>27.4</td>
<td>35.2</td>
</tr>
<tr>
<td>3</td>
<td>Some kids get told by other kids that they are not very good at games and sports&lt;br&gt;<strong>BUT</strong>&lt;br&gt;Other kids are told that they are good at games and sports</td>
<td>1.1</td>
<td>17.9</td>
<td>13.4</td>
<td>8.9</td>
<td>27.4</td>
<td>31.3</td>
</tr>
<tr>
<td>4</td>
<td>Some kids get teased by other kids when they play games and sports&lt;br&gt;<strong>BUT</strong>&lt;br&gt;Other kids don’t get teased when they play games and sports</td>
<td>1.1</td>
<td>19</td>
<td>7.3</td>
<td>14.</td>
<td>20.7</td>
<td>38.</td>
</tr>
<tr>
<td>5</td>
<td>Some kids think that the more exercise they get the better&lt;br&gt;<strong>BUT</strong>&lt;br&gt;It is not good to get a whole lot of exercise</td>
<td>1.1</td>
<td>5.6</td>
<td>5.0</td>
<td>.6</td>
<td>30.7</td>
<td>57.</td>
</tr>
<tr>
<td>6</td>
<td>Some kids don’t enjoy exercise very much&lt;br&gt;<strong>BUT</strong>&lt;br&gt;Other kids enjoy exercise a whole lot</td>
<td>.6</td>
<td>21.8</td>
<td>8.9</td>
<td>7.3</td>
<td>22.9</td>
<td>38.5</td>
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<tr>
<td>Item</td>
<td>Description</td>
<td>Really true for me</td>
<td>Sort of true for me</td>
<td>Sort of true for me</td>
<td>Really true for me</td>
<td>Not true for me</td>
<td>Not true for me</td>
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<tr>
<td>7</td>
<td>Some kids don’t like to run very much</td>
<td>0</td>
<td>20.1</td>
<td>13.4</td>
<td>10.1</td>
<td>22.3</td>
<td>34.1</td>
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<td></td>
<td>BUT</td>
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<td></td>
<td>Other kids do like to run a whole lot</td>
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<tr>
<td>8</td>
<td>Some kids don’t like getting out of breath after they play hard</td>
<td>2.8</td>
<td>16.2</td>
<td>22.9</td>
<td>4.5</td>
<td>12.8</td>
<td>40.8</td>
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<td></td>
<td>Other kids don’t mind getting out of breath after they play hard</td>
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<td>9</td>
<td>Some kids think it is very important to always be in good shape</td>
<td>2.2</td>
<td>6.1</td>
<td>2.2</td>
<td>.6</td>
<td>29.1</td>
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<td>BUT</td>
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<tr>
<td></td>
<td>Other kids don’t think it is so important to always be in good shape</td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>For some kids, playing games and sports is their favorite thing</td>
<td>3.4</td>
<td>8.4</td>
<td>10.1</td>
<td>3.4</td>
<td>26.3</td>
<td>48.6</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Other kids like other things more than games and sports</td>
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<tr>
<td>11</td>
<td>Some kids are popular with other kids when they play games and sports</td>
<td>8.4</td>
<td>10.6</td>
<td>11.2</td>
<td>6.7</td>
<td>29.1</td>
<td>34.1</td>
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<td></td>
<td>Other kids are not very popular with other kids when they play games and sports</td>
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<td>12</td>
<td>Some kids look forward to playing games and sports</td>
<td>3.4</td>
<td>11.2</td>
<td>7.8</td>
<td>1.1</td>
<td>26.8</td>
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<td></td>
<td>Other kids don’t look forward to playing games and sports</td>
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<tr>
<td>Item</td>
<td>Description</td>
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<td>Sort of true for me</td>
<td>Sort of true for me</td>
<td>Really true for me</td>
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<tr>
<td>13</td>
<td>Some kids really don’t like exercise</td>
<td>0</td>
<td>20.1</td>
<td>9.5</td>
<td>9.5</td>
<td>17.3</td>
<td>43.6</td>
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<td></td>
<td>BUT</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other kids do like to exercise</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Some kids feel bad when they run hard</td>
<td>1.7</td>
<td>21.2</td>
<td>14.5</td>
<td>13.4</td>
<td>19.6</td>
<td>29.6</td>
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<td></td>
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<td></td>
<td>Other kids feel good when they run hard</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Some kids try hard to stay in good shape</td>
<td>2.2</td>
<td>6.1</td>
<td>6.7</td>
<td>1.7</td>
<td>33.5</td>
<td>49.7</td>
</tr>
<tr>
<td></td>
<td>BUT</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Other kids don’t try hard to stay in good shape</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note. 1 = Really true for me, 2 = Sort of true for me, 3 = Sort of true for me, 4 = Really true for me, 5 = Not true for me. Numbers in cells represent percentages of respondents.
Appendix D

Student Informed Consent For Surveys

STUDENT INFORMED CONSENT FOR SURVEYS

THE RELATIONSHIP BETWEEN MIDDLE SCHOOL STUDENTS’ PERCEPTION OF PHYSICAL ACTIVITY, SCHOOL ENGAGEMENT, AND ACADEMIC ACHIEVEMENT

Invitation to Participate in the Study

You have been invited to participate in a study that will examine middle school students’ perception of physical activity and student engagement, as it relates to academic achievement. In addition, this study is being conducted to fulfill the requirements of a doctoral degree. The study is conducted by Jeremy Moretti. Results will be used to provide insights and information about students’ perceptions of physical activity and student engagement as it relates to academic achievement. Additionally, results of this research study will be used to provide suggestions to educators and community leaders on how to incorporate more physical activity into the lives of middle school students to improve health and academic achievement. The following information is provided in order to help you make an informed decision on whether or not you want to participate. If you have any questions please do not hesitate to ask. Jeremy Moretti can be reached at 720-495-7306 or by e-mail at jitterom@gmail.com. This project is supervised by the dissertation advisor, Dr. Karen Riley, Morgridge College of Education, University of Denver, Denver, CO 80208, 303-871-2490 or by e-mail Karen.Riley@du.edu.

Description of the Procedure for the Study

Participation in this study should take about 20-30 minutes of your time. Participation will involve responding to 15 questions on two separate surveys about perceptions of physical activity and student engagement. Participation in this project is strictly voluntary. The risks associated with this project are minimal. If, however, you experience discomfort you may discontinue the study at any time. I respect your right to choose not to answer any questions that may make you feel uncomfortable. Refusal to participate or withdrawal from participation will involve no penalty or loss of benefits to which you are otherwise entitled.
Confidentiality

Your responses will be identified by code number only and will be kept separate from information that could identify you. This is done to protect the confidentiality of your responses. Only the researcher will have access to your data and any reports generated as a result of this study will use only group averages and paraphrased wording. However, should any information contained in this study be the subject of a court order or lawful subpoena, the University of Denver might not be able to avoid compliance with the order or subpoena. Although no questions in this interview address it, I am required by law to tell you that if information is revealed concerning suicide, homicide, or child abuse and neglect, it is required by law that this be reported to the proper authorities.

Contacts, Questions, or Concerns

If you have any questions, concerns, or complaints about how you were treated during the research study, please contact Paul Olk, Chair, Institutional Review Board for the Protection of Human Subjects, at 303-871-4531, or Sylk Sotto-Santiago, Office of Research and Sponsored Programs at 303-871-4052, or write to either at the University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121.

You may keep this page for your records. Please sign the next page if you understand and agree to the above. If you do not understand any part of the above statement, please ask the researcher any questions you may have.
Appendix E
Parent Informed Consent For Surveys

PARENT INFORMED CONSENT FOR SURVEYS

THE RELATIONSHIP BETWEEN MIDDLE SCHOOL STUDENTS’ PERCEPTION OF PHYSICAL ACTIVITY, SCHOOL ENGAGEMENT, AND ACADEMIC ACHIEVEMENT

Invitation to Participate in the Study
Your child is invited to participate in a study that will examine middle school students’ perception of physical activity and student engagement, as it relates to academic achievement. In addition, this study is being conducted to fulfill the requirements of a doctoral degree. The study is conducted by Jeremy Moretti. Results will be used to provide insights and information about students’ perceptions of physical activity and student engagement as it relates to academic achievement. Additionally, results of this research study will be used to provide suggestions to educators and community leaders on how to incorporate more physical activity into the lives of middle school students to improve health and academic achievement. The following information is provided in order to help you and your child make an informed decision on whether or not you want them to participate. If you have any questions please do not hesitate to ask. Jeremy Moretti can be reached at 720-495-7306 or by e-mail at jitterom@gmail.com. This project is supervised by the dissertation advisor, Dr. Karen Riley, Morgridge College of Education, University of Denver, Denver, CO 80208, 303-871-2490 or by e-mail Karen.Riley@du.edu.

Description of the Procedure for the Study
Participation in this study should take about 20-30 minutes of your child’s time. Participation will involve responding to 15 questions on two separate surveys about perceptions of physical activity and student engagement. Participation in this project is strictly voluntary. The risks associated with this project are minimal. If, however, your child experiences discomfort they may discontinue the study at any time. I respect your child’s right to choose not to answer any questions that may make them feel uncomfortable. Refusal to participate or withdrawal from participation will involve no penalty or loss of benefits to which your child is otherwise entitled.

Confidentiality
Your child’s responses will be identified by code number only and will be kept separate from information that could identify your child. This is done to protect the confidentiality of your child’s responses. Only the researcher will have access to your child’s data and any reports generated as a result of this study will use only group averages and paraphrased wording. However, should any information contained in this study be the subject of a court order or lawful subpoena, the University of Denver might not be able to avoid compliance with the order or subpoena. Although no questions in this interview address it, I am required by law to tell you that if information is revealed concerning suicide, homicide, or child abuse and neglect, it is required by law that this be reported to the proper authorities.

Contacts, Questions, or Concerns

If you have any questions, concerns, or complaints about how you or your child were treated during the research study, please contact Paul Olk, Chair, Institutional Review Board for the Protection of Human Subjects, at 303-871-4531, or Sylk Sotto-Santiago, Office of Research and Sponsored Programs at 303-871-4052, or write to either at the University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121.

You may keep this page for your records. Please sign the next page if you understand and agree to the above. If you do not understand any part of the above statement, please ask the researcher any questions you may have.