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Correlates of Physical Activity among Adolescent Males and Females

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CORRELATES OF PHYSICAL ACTIVITY AMONG ADOLESCENT MALES AND FEMALES

An Abstract of a Thesis

Submitted

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

Rhonda Baumann

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ABSTRACT

The primary purpose of this study was to examine the relationship between physical fitness measures, selected psychosocial correlates of physical activity, and self-reported physical activity among seventh and eighth-grade students in rural Iowa. Computerized physical fitness measures were obtained by the HealthFirst Trifit™ computer system, attitudes about physical activity were measured by the Correlates of Physical Activity in Children (CPAC) questionnaire, and physical activity levels were measured by the Physical Activity Questionnaire-Adolescents (PAQ-A). All subjects were enrolled at Tilford Middle School in Vinton, Iowa.

Data were collected on 253 seventh and eighth grade students enrolled at Tilford Middle School in Vinton, Iowa during Spring semester 2002. The study sample included 117 girls and 136 boys. Students ranged in age from 12 to 15 years, with a mean age of 13.2 years. Parents of all participants provided a signed informed consent and children provided verbal assent.

The study showed that male adolescents are more physically active, usually at a higher exercise intensity, than female adolescents. The most common activity participated in for both boys and girls was running or jogging. The majority of the adolescents in this study spend at least two hours every day viewing television, watching videos, or using a computer. A large majority of middle school adolescents in the present study report being "very active" in physical education, although there is an indication that the boys are somewhat more active than girls in physical education class. "Attraction to Physical Activity" was found to be the single most important correlate of physical

activity for both boys and girls. It is noteworthy to point out, however, that over half of the variance associated with children's physical activity was not explained by the two-factor prediction model that emerged from this study. Clearly there are many factors that influence the decision of an adolescent youth to engage in physical activity or not, many of which were not examined in this study.

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TABLE OF CONTENTS

PAGE

LIST OF TABLES

TABLE PAGE

LIST OF FIGURES

FIGURE PAGE

CHAPTER I

INTRODUCTION

Obesity due to a sedentary lifestyle has been termed an "epidemic," "decay of society" and a "silent killer." It has driven national health care costs up to $117 billion dollars in 2000 (U.S Department of Health and Human Services [USDHHS], 2001) and it affects 59 million adults and one in four children (Nicklas, Baranowski, Cullen, and Berenson, 2001). According to McGinnis J.M., and Foege, W.H. (1993), overweight and physical inactivity are responsible for more than 300,000 people in the United States per year, effecting 65 percent of adults and 15 percent of young people in the United States (USDHHS, 2001). Regardless of the terminology and its destruction, it is a largely preventable disease caused by a sedentary lifestyle. The prevalence of obesity, caused by a sedentary lifestyle choice, has nearly tripled for adolescents in the past 20 years. As children enter adolescence, there is a significant decline in physical activity over the course of their four years of high school, according to information collected from the Youth Risk Behavior Survey (USDHHS, 2001). The prevalence of inactivity is even more common for girls than boys as they move through adolescence.

The statistics related to sedentary lifestyle choice and obesity are alarming and growing. Statistics present the problem clearly, but the reasons become complicated, as do the solutions. Obesity is a preventable disease because it comes down to a choice, but societal influences appear too great for more than half of American adults and nearly one quarter of American youth. It is difficult to understand in a country so advanced, powerful, and educated, why Americans don't take care of their bodies as they should.

Experts agree that obesity and being overweight result from an energy imbalance, that is, excessive calorie consumption and/or inadequate physical activity. Health risks can be drastically reduced with at least 30 minutes of moderate to vigorous physical activity most days of the week (USDHHS, 1996). In the United States, less than one third of adults engage in the recommended amounts of physical activity and nearly half of American youths are not vigorously active at all on a regular basis (USDHHS, 1996). Genetics play a role in being overweight and obese, yet the main factors are lifestyle related and can be overcome by setting healthy patterns early in life. Behavioral and environmental factors contribute greatly to obesity. Unhealthy behaviors are introduced to children and reinforced by society throughout childhood and into adolescence.

One of the biggest factors contributing to inactivity and obesity is the amount of time children spend viewing television, using computers, and playing video games. Research by Nicklas et al. (2001) showed the prevalence of overweight and obesity among children in 1994 was approximately twofold than in 1974. The yearly increases in being overweight and obese increased by 50 percent from 1983-1994. Ironically, video and computer games increased in popularity during that same period. The United States Department of Health and Human Services (2001) stated that 43 percent of adolescents view more than two hours of television each day. The A. C. Nielsen Company (1990) reported that United States children, 6 to 11 years old, average more than 23 hours of television viewing per week. Not surprisingly, students who view television or play video games for three or more hours per day are more likely to be more inactive than those who view and play less than this amount (Pate, Trost, Felton, Ward, Dowda, and

Saunders, 1996). The amount of time children view television and play video games is directly related to measures of their body fat, increasing 2 percent for each additional hour of television viewed per day (Dietz and Gortmaker, 1985). Excessive playing of video games, computer games, and viewing television contributes to obesity due to inactivity and may influence caloric intake because foods high in sugar and fat are heavily advertised during children programming hours.

There may be a connection between increased body fat trends and increased calorie consumption. Nicklas et al. (2001) showed that since 1973 calorie consumption has not increased. However, the type of calorie intake has changed. The authors reported that many of the calories in adolescents' diets today are coming from snacks, fast foods, and soft drinks. Furthermore, levels of polyunsaturated fatty acids increased when other healthy fats decreased. Overall, the quality of diet has worsened over time.

Research gives reason for optimism for overcoming some deterrents to physical inactivity. Studies by Sallis and Hovell (1990) revealed the positive association between parental encouragement in physical activities and children's activity levels. Epstein, Meyers, Raynor, & Saelens (1998) found that by reducing access to sedentary behavior and increasing opportunities for physical activity, the amount of time spent in physical activity increases. In many cases, parents and guardians do not realize the implications of their activity and health behaviors and how they influence their young children. The evidence from years of research shows that when parents and guardians monitor television-viewing and video game playing, along with encouragement to be active, they can create a home environment conducive for physical activity.

Support and encouragement to be active begins at home, but equally important, adolescents need a healthy level of encouragement about physical activity from other sources outside the home. Parents and guardians are not the only ones who can create an environment conducive to physical activity. Based on the research conducted by Trost, Pate, Dowda, Saunders, Ward, and Felton (1999), the authors suggested that to increase activity-related self-esteem, school and community-based programs should:

- provide enjoyable, developmentally appropriate activities that enable all participants to experience success;
- create opportunities for youth to observe influential role models;
- verbally encourage children to participate in physical activities; and
- reduce any anxiety associated with participation in physical activity by significantly reducing or eliminating competition from planned activities.

It is natural to get involved in enjoyable activities. The same is true for physical activity. Most children become involved in physical activity because it is enjoyable to them (McKenzie, Alcaraz, and Sallis, 1994). Leslie, Owen, and Sallis (1999) found young men and women were most highly motivated to exercise by increased energy, feeling good about themselves, enjoyment/satisfaction, and looking better. The least motivating to them was organized competition. In related studies (Strauss, Rodzilsky, Burack, and Colin, 2001; Welk, Corbin, and Lewis, 1995), high self-efficacy was found to be positively correlated with higher activity levels and low self-efficacy was found to be correlated with low levels of activity.

Statement of the Problem

The primary purpose of this study was to examine the relationship between physical fitness measures, selected psychosocial correlates of physical activity, gender, and self-reported physical activity among seventh and eighth-grade students in rural Iowa. Computerized physical fitness measures were obtained by the HealthFirst Trifit™ computer system, attitudes about physical activity were measured by the Correlates of Physical Activity in Children (CPAC) questionnaire and physical activity levels were measured by the Physical Activity Questionnaire-Adolescents (PAQ-A).

Significance of Study

Because of the increased number of sedentary lifestyle choices that contribute to increased rates of obesity and overweight among adults and children in the United States, it is imperative to investigate factors that influence one's decision to be active on a regular basis. The problem cannot be ignored. Obesity and sedentary lifestyles are responsible for 300,000 deaths each year in the United States and create an economic burden that has cost citizens approximately $117 million in 2000 (USDHHS, 2001).

The greatest decline in activity begins at age 9 or 10 and continues to decline 83 percent by age 18 or 19 (Kimm, Glynn, Kriska, Barton, Kronsberg, Daniels, Crawford, Sabry, and Liu, 2002; USDHHS, 2001). Likewise, the most logical age group to target for answers regarding inactivity behaviors and attitudes about physical exercise would be adolescence. The examination of adolescents' individual fitness assessments, behaviors/attitudes about physical activity, and how they relate to their actual level of physical activity may give a new outlook for the future. Little research has been done

involving a multidimensional approach to investigating physical activity behaviors. The dimensions of this research include individual fitness measures, reported behaviors of physical activity and reported attitudes about physical activity. There is an existing need to investigate the relationship of all elements involving physical activity and inactivity.

Delimitations

This study was delimited to:

1. One hundred seventeen female and 136 male middle school students, ages 12 to 15 years.

2. The study sample consisted of 253 students enrolled at Tilford Middle School in Vinton, Iowa, during the 2001-2002 school year.

3. The use of the Correlates of Physical Activity in Children (CPAC) questionnaire to measure attitudes about physical activity.

4. The use of the Physical Activity Questionnaire-Adolescents (PAQ-A) to measure physical activity levels.

5. The use of HealthFirst's TriFit™ to assess individualized physical fitness measures.

Limitations

The findings of the present study were limited by the following:

1. The ability of subjects to read and understand survey items.

2. The honesty and accuracy of subjects' responses to each question.

3. The validity and reliability of the questionnaires used in the study.

4. The validity and reliability of fitness assessment equipment.

5. The consistency of instructors conducting computerized fitness assessment equipment.

6. A convenience sampling that influenced the generalizability of results.

Assumptions

This study was conducted under the following assumptions:

1. The questionnaires used for data collection were valid instruments.

2. The fitness equipment instrumentation and procedure used for data collection were valid.

3. The subjects understood the instructions fully and willingly completed the questionnaires.

4. The subjects answered the surveys honestly and accurately, to the best of their ability.

Hypothesis

The following outcomes were postulated for the present study:

1. Boys will report a higher level of physical activity than girls.

2. The psychosocial construct, "attraction to physical activity," will be the best single predictor of physical activity for both boys and girls.

3. Cardiovascular efficiency, as measured by the 1-mile walk/run measure, will be the best predictor of physical activity among the various physical fitness measures for both boys and girls.

Definition of Terms

At Risk for Overweight: Body mass index (BMI) at or above the 85th percentile for age and gender based on the revised Centers for Disease Control and Prevention (CDC) growth charts.

Body Mass Index: A measure of weight in relation to height. BMI is calculated as weight in kilograms divided by the square of the height in meters.

Moderate-to-Vigorous Activity: Physical activities likely to enhance physical fitness and usually differentiated by estimates of energy expenditure or intensity (Kimiecik and Horn, 1998)

Overweight: Body mass index at or above the 95th percentile for age and gender based on the revised Centers for Disease Control and Prevention (CDC) growth charts.

Physical Activity: Body movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure (USDHHS, 1996).

Physical Fitness: A set of attributes that people have or achieve that relates to the ability to perform physical activity (USDHHS, 1996).

Physical Inactivity (Sedentary): No reported leisure-time physical activity during the preceding 7 days (USDHHS, 1996).

CHAPTER II

REVIEW OF LITERATURE

The primary purpose of this study was to examine the relationship between physical fitness measures, selected psychosocial correlates of physical activity, and self-reported physical activity among seventh and eighth-grade students in rural Iowa. Computerized physical fitness measures were obtained by the HealthFirst Trifit™ computer system, attitudes about physical activity were measured by the Correlates of Physical Activity in Children (CPAC) questionnaire, and physical activity levels were measured by the Physical Activity Questionnaire-Adolescents (PAQ-A). All subjects were enrolled at Tilford Middle School in Vinton, Iowa. The review of literature focuses on physical activity of youth in the United States and a variety of factors known to be related to physical activity, including television viewing, family influences, dietary influences, gender, self-efficacy, behaviors, and attitudes.

Physical Activity Trends in the United States

Life in the United States has much to offer in reference to material luxuries and modern technologies providing immediate gratification for almost everyone. In many situations, these conveniences to which Americans have grown accustomed have been positive, but there are negative results, too. Signs of health decay due to sedentary lifestyle choices are placing burdens on the health care system, taking away the quality of life and, most devastating of all, taking lives. Despite health risk warnings of a sedentary lifestyle, the United States Department of Health and Human Services (1996) reported 61 percent of United States adults are overweight or obese, as are 13 percent of United

States adolescents. According to the United States Department of Health and Human Services (2001), more than 15 percent of young Americans are overweight, triple the prevalence from the early 1970's. At the same time, adult obesity has doubled since 1980, now affecting over 61 percent of the population. Poor diet and lack of physical activity kill 300,000 people in the United States per year, second only to tobacco use (USDHSS, 1996, 2001). Just 30 minutes of moderate to vigorous physical activity on most days of the week could decrease risks of cardiovascular disease, reduce body fat, increase muscle and bone strength, increase life expectancy and reduce chances of cancer, diabetes, and depression (USDHSS, 1996, 2001). Unfortunately, healthy diets and regular vigorous exercise are not seen as priorities for most American adults and their children. According to the United States Department of Health and Human Services (1996, 2001), nearly half of American young people from the ages of 12 and 21 are not vigorously active on a regular basis. About 14 percent of young people report no recent physical activity, and inactivity is more common in females than males. The report also cited that participation in all types of physical activity declines strikingly as age or grade in school increases. Since the 1996 Surgeon General's Report, physical activity levels among young people have continued to decrease. According to data collected from the 2001 Youth Risk Behavior Survey (USDHSS, 2001), young people in the United States reported a significant decline in physical activity over the course of their four years of high school. About 10 to 15 percent of the young people in the survey reported no physical activity whatsoever. Since adolescence may be a pivotal age for preventing sedentary behaviors even into adulthood, every effort should be made to encourage

adolescents to live a physically active and healthy life. Equally important is developing an understanding why so many adolescents, especially girls, choose to live a sedentary lifestyle, despite the health risks.

Television Viewing

Theorists have studied the reasons adolescents are becoming more and more physically inactive. Television viewing among adolescents appears to be on the rise by alarming rates. The A.C. Nielsen Company reported in 1990 that United States children ages 6 to 11 average more that 23 hours of television viewing per week. With that much television viewing, adolescents have little time to spend elsewhere. Many studies showed that viewing television and playing video games contributed to the increasing inactivity among adolescents (Armstrong, Sallis, Alcaraz, Kolody, McKenzie, and Hovell, 1998; Pate et al. 1997; USDHHS, 2001).

Pate et al., (1997) studied 361 fifth-grade students to identify correlates of physical activity. Students completed a "Previous Day Physical Activity Recall" to estimate the average amount of time spent viewing television or playing video games. The authors reported a strong association between reported television viewing time and low physical activity. Students who viewed television or played video games for three or more hours after school were 2.9 and 2.3 times, respectively, more likely to be labeled in the "low-active" category than those who spent less time viewing television or playing video games.

Dietz and Gortmaker (1985) were pioneers on the subject of children and television viewing. They found the amount of television children viewed was directly associated

with measures of their body fat percent, increasing 2 percent for each additional hour of television viewed per day. Dietz and Gortmaker (1985) also identified two possible theories that may explain the association between television viewing and higher body fat percentage and obesity. First, television viewing may affect energy expenditure because less energy is expended while viewing television than being involved in physical activity. Second, television viewing may influence caloric intake because foods high in sugar and fat are heavily advertised during children programming hours.

Armstrong et al., (1998) followed in Dietz and Gortmaker's footsteps and conducted a similar study examining not only body fat percentage associations with television viewing among children, but also considered multiple measures of health-related fitness. Fourth-grade students from seven suburban schools, consisting of 284 girls and 304 boys were surveyed, as were their parents, and the students were then evaluated in body fat percentage, cardiovascular fitness, muscular strength/endurance, and muscular flexibility using the FITNESSGRAM testing protocols. Results showed boys who viewed high amounts of television demonstrated significantly higher amounts of body fat through both skinfold and BMI measures than did boys in the moderate and low television viewing groups. The study also found boys in the high television-viewing group performed significantly poorer in the mile run compared to boys in the moderate to low groups. Girls also demonstrated significantly higher BMI scores in the high television-viewing group than girls in the moderate and low groups. However, girls demonstrated a significant difference in body fat percentages only between the high and low television-viewing groups. The girls' mile run performance showed similar results, with high

television-viewing group performing significantly poorer than the low television-viewing group. The other health-related fitness areas examined, flexibility and muscular strength/endurance, showed no significant relationship with television viewing.

Dietary Influences

Deitz and Gortmaker (1985) provided evidence that television viewing may influence caloric intake because foods high in sugar and fat are heavily advertised during children programming hours. Furthermore, adults who eat fast food more than twice a week and spend at least two and a half hours a day viewing television triple their risk of obesity (Pereira, 2003). The diet trends in the United States have been changing in the past decades along with the increased prevalence of obesity in youth and adults. Many authorities are speculating on the relationship between obesity and changing diet trends in the United States. Because obesity is a deterrent to activity, it is important to look at dietary influence changes and their relationship to obesity.

Nicklas et al. (2001) conducted longitudinal research with children over two decades focusing on weight and adiposity, and the relationship to dietary food intake. There was clear documentation showing an increased weight among research participants throughout the decades. Nicklas et al. found in their eating patterns research that in the 1970's and 1980's the average increase in body weight of children was 2.5 kilograms. During the 1980's and 1990's, the increase was 5 kilograms. Height increases were not significant. The percent of 10-year-olds who were considered overweight increased from 13 percent in 1973 and 1974 to 39 percent in 1993 and 1994. Additionally, the percentage of obese 10-year-olds increased from 4 percent in 1973 and 1974 to 21

percent in 1993 and 1994. Nicklas et al. were focused on finding out why these increases were occurring and what might be the cause.

Contrary to what many researchers theorized, Nicklas et al. (2001) found that since 1973 total calorie or energy intake has not changed. The difference is the type of food consumed. The percentage of energy from saturated and monounsaturated fatty acids (animal fat, eggs, milk) has decreased, while energy from polyunsaturated fatty acids (snacks, packaged foods, deep fried/fast foods) has increased. Dietary quality has not improved. The biggest transformation has been in the increase of the soft drink category. Consumption of soft drinks increased drastically over the past two decades, with adolescent boys' and girls' daily consumption up by 74 percent and 65 percent, respectively. As a result, consumption of dairy products has decreased. Unfortunately, Nicklas et al. found that only 1 percent of 2 through 19-year-olds met all the food group recommendations and only 44 percent of schoolchildren consumed servings from all five food groups at least two times a day. This could be summarized by the idea that consumption of soft drinks could be replacing much of the needed nutrition in an adolescent's diet. Welsch, Cogswell, Rogers, Rockett, Mei, and Grummer-Strawn (2005) supported these findings in a study involving preschoolers. There was a clear association between consumption of sweet drinks (including soft drinks) and being overweight and obese. Welsch et al. (2005) concluded that simply reducing sweet drink consumption may be one strategy to managing weight in preschoolers.

There are a number of reasons for these alarming statistics according to Nicklas et al. (2001). One of the biggest contributing factors is that the traditional behavior of the

family eating at the kitchen table has reduced significantly. About 46 percent of the family food expenditures were spent on food and beverages outside the home, and 34 percent of the total food dollars were spent on fast food.

Speculation has grown that the serving size in restaurants, especially fast-food restaurants, has contributed to the obesity problem. Nicklas et al. (2001) found that larger fast-food portions could be a contributing factor to overweight children. The typical fast-food hamburger in 1957 contained about one ounce of cooked meat, as compared to 6 ounces in 1997. The average soft drink size in 1957 was 8 ounces, whereas in 1997 the average size ranged from 32 to 64 ounces. Nicklas et al. reported that when children and adults are presented with greater serving sizes, they would consume more food.

Although 98 percent of Nicklas et al. (2001) subjects consumed at least three meals per day, the practice of snacking between meals is on the rise. The percentage of students snacking between meals has increased from 60 percent in 1978 to 75 percent in 1996. Unfortunately, what the students were snacking on was not mentioned. Healthful dietary patterns, according to Nicklas et al. include eating a healthy breakfast on a regular basis, eating meals as a family, and eating with a consistent meal pattern. Adolescents who practiced consistent healthful dietary patterns were found to be leaner than those who did not.

Family and Home-Life Influences

Although research shows that dietary influences, along with television viewing and video game playing, are major contributors to adolescent inactivity, research also

indicates there may be other, more subtle determinants to their inactivity. Habits start at a very young age, and children learn by example. Sallis and Hovell (1990), in their studies of physical activity determinants, have created a model based on the Social Learning Theory. Although behavior can be complex, the Sallis and Hovell (1990) study showed health-related behaviors, particularly social modeling and vicarious learning, are influenced at a young age. Parents and guardians are the first health-related and activity-related models to which children are introduced. Sallis and Hovell (1990) also noted parents have a strong influence on the physical activity levels of their children. Their work cites the positive association between parental encouragement in physical activities and children's activity levels.

Behavior also can be determined by the choices an individual makes. The Behavior Choice Theory describes interactions between individual persons and the environment. Epstein et al., (1998) applied the Behavior Choice Theory to study physical activity behaviors and sedentary behavior choices among overweight children (Epstein et al., 1998). Epstein et al. (1998) found by reducing access to sedentary behaviors and increasing opportunities and reinforcement of physical activity behaviors, the amount of time spent in physical activity increases. Parents and guardians are the ones who have primary control over what type of activity their child or children are exposed to in the home.

Much research has been done on parent/guardian influence on activity levels of their children, but there are so many inter-twining elements to this topic, definitive conclusions are difficult to research. The Family Influence Model, which can lead to the

understanding of children's moderate-to-vigorous physical activity and serve as a guide for future physical activity behaviors, was developed by Kimiecik, Horn, and Shurin (1996). The model is based partly on Bandura's (1986) Social-Cognitive Theory and Eccles' (1987) Expectancy-Value Model for understanding children's achievement-related behavior in academic settings. The model implies that the home environment is the most important part for understanding family influences on a child's moderate-to-vigorous physical activity. See Table 1 for an illustration of the Family Influence Model.

Table 1

Family Influence Model

↓	Environment Outside Home Significant Others Peers Community School	↓	
Home Environment Parents Siblings Beliefs Beliefs → Family Process Parents Siblings Behavior Behavior	Child Perceptions of Parent and/or sibling beliefs →	Child Belief About MVPA → Child MVPA Behavior	Cardio-vascular Functioning & CVD Risk FActors
↑	Demographic & Family Characteristics Gender SES Ethnicity Family Size Family Type Living Location	↑	

In an attempt to establish the validity of their model, Kimiecik et al. (1996) conducted a study to examine family influence on children's moderate-to-vigorous physical activity involving 81 children between the ages of 11 to 15. Essentially, the results of this study supported the element of the Family Influence Model. The results showed children's perceptions of their fitness competence and task orientation were significantly related to their self-reported physical activity. The authors further concluded that children's beliefs about physical activity were related to the perceptions of their parents' beliefs regarding their moderate-to-vigorous physical activity involvement.

In a larger, related study, Kimiecik, Horn, and Shurin (1996) focused on four specific aspects of the Family Influence Model. First, they wanted to understand parents' beliefs concerning their child's participation in physical activity. Second, they wanted to see if parents' beliefs concerning their child's participation in physical activity varied according to their own gender and the gender of their child. The third aspect of this study was to evaluate the relationship between the parents' physical activity level and their child's activity level. Finally, the study sought to identify a relationship between parents' beliefs concerning fitness activities and their child's physical activity levels. Findings showed that parents reported that "fun" was the foremost reason for their child participating in a physical activity and "preparation for the sport" was the lowest-rated reason. Mothers and fathers did not significantly differ from each other in their perceptions of their child's physical competence, the relative value they attached to their child's participation in fitness activities, or the degree to which they held a task or ego

orientation toward their child's fitness activities. Mothers and fathers did significantly differ on reasons they might want their child to participate in fitness activities. The mothers wanted their children to participate for reasons such as physical health, mental health, weight control, and fun, whereas fathers scored lower in these categories. Surprisingly, parents' self-reported levels of physical activity did not seem to be significantly related to, or significantly predictive of their child's self-reported moderate-to-vigorous physical activity levels. This did not support the role-modeling hypothesis, which suggests that children learn to be physically active as a result of their physically active parents. The study also revealed that children whose parents believe they are competent in relation to physical fitness tend to be more physically active than those children whose parents have lower perceptions of their child's fitness competence. The overall result of this study indicated parents significantly influence their children's moderate-to-vigorous physical activity levels. A parent may not exercise regularly, but belief in his or her child's physical ability was enough to keep the child active. Sallis, Prochaska, and Taylor (2000) also found direct parental support was more consistently and significantly related to adolescent physical activity than parents' actual activity levels.

Studies have shown conflicting results regarding the influence of parental physical activity. Unlike the Kimiecik et al. (1996) study, Kalakanis, Goldfield, Paluch, & Epstein (2001) found that parents' activity levels significantly and independently predict physical activity levels and amounts of moderate-to-vigorous physical activity sessions beyond other determinants of obese children's activity levels. The study

involved 51 families, all with a child who was considered obese and body mass index greater than the 85th percentile on the CDC growth chart. Regression models showed parent activity improved the prediction of obese children's activity levels. When parents were physically active, their child's physical activity level went up from 9.5 percent to 19.7 percent. Similarly, children's bouts of activity increased with parents' activity bouts from 4.6 percent to 17.3 percent. These results suggest that programs to increase physical activity in obese children should attempt to increase parental physical activity.

Other studies revealed similar findings. Pate, Trost, Felton, Ward, Dowda, & Saunders (1997) used results of the National Children and Youth Fitness Study II consisting of 2,352 third-grade and fourth-grade students. Participating students also took part in a battery of strength and flexibility measures, and results were compared to the results of the National Children and Youth Fitness Study II. The results of the study found parental activity variables to be significantly associated with the child's skinfold thickness, but they were less likely to be strongly associated with the 1.6-kilometer walk/run time.

The evidence from years of research clearly reveals parents and guardians can create a home environment conducive for physical activity. Monitoring television-viewing and video game playing, providing access to exercise equipment at home, participating in physical activity along with children, and encouraging children to be physically active are all part of creating a home environment that is conducive to the promotion of physical activity. There are so many variables to raising children motivated to be physically active. This review of literature will now explore the possible determinants of adolescent

physical activity and inactivity behaviors beyond the home environment.

Gender

Research is beginning to show one determinant of adolescent physical inactivity appears to be as random as a person's gender. Since the early 1960s, obesity in female adolescents in the United States has more than doubled, especially among African-American girls (Kimm, et al. 2002). Although the diets of adolescent girls have not changed significantly, both African-American and Caucasian girls have become increasingly sedentary with age, beginning as early as 10 years old. The 1990 Youth Risk Behavior Survey revealed only 25 percent of high school-aged girls participated in vigorous physical activity three or more days per week as compared to 50 percent for high school-aged boys (USDHHS, 2001). Until recently, the factors associated with the decline in activity during adolescence remained unknown. Kimm, et al. followed 1,213 African-Americans girls and 1,166 Caucasian girls annually from the ages of 9 or 10 years (year one of study) to 18 or 19 years (year 10 of study). The goal of the longitudinal study was to explore the underlying reasons for adolescent girls to become sedentary with age. The data collected in this study included results from the Habitual Activity Questionnaire, socioeconomic status information, body mass index of each girl at various ages, information on pregnancy and smoking, and school dropout rates. The results of this study showed that throughout the study period African-American girls had significantly higher body mass index scores than Caucasian girls. By year 8 of the study (age 16 or 17), the frequency of pregnancy among African-American girls was higher,

which was associated with lower activity levels. Likewise, the frequency of cigarette smoking was higher among Caucasian girls, which was associated with lower activity levels. Although school dropout rates were similar, more African-Americans girls came from a single-parent, lower-income household with parents who had lower levels of education. When focusing on the group as a whole, activity levels decreased by 83 percent from year 1 (age 9 or 10) of the study to year 10 (age 18 or 19). The decrease in median activity levels among African-American girls was 100 percent and 64 percent for Caucasian girls during the same period (year 1 to year10). The greatest decline in activity among both groups took place in year 10 (ages 18 or 19). The study also revealed heavier girls of both ethnic backgrounds had a sharper decline in activity levels than less-heavy girls. The authors concluded that the decline of physical activity among adolescent girls might be contributed to higher body-mass index, pregnancy, and smoking.

In a related study, Trost et al. (1996) studied 365 predominately African-American fifth-grade students from three elementary schools. They wanted to determine if gender differences in physical activity were accounted for by differences in physiologic, psychosocial, and environmental determinants of physical activity behavior. The results of this study could only account for a small percent of the differences between the genders in physical activity levels. The age of these students puts them at the beginning of the decline of physical activity age group; therefore, explaining a small percentage of differences in physical activity was not surprising. One of the most meaningful results of this study was that boys scored significantly higher than girls did on the self-efficacy

(overcoming barriers) subscale. This may suggest boys become more physically active than girls, at least in part, because they are more confident in their ability to overcome barriers to physical activities such as fatigue or poor weather. Building self-efficacy and confidence in girls needs to start at an early age with the support of family, school, and community.

Self-Efficacy

There is a significant amount of research on the topic of self-efficacy and how it relates to physical activity levels of varying age groups and populations. One of the most commonly applied theories to understanding activity and inactivity behaviors is Bandura's Social Cognitive Theory (Bandura, 1986). One of the motivating factors identified in the Social Cognitive Theory of is self-efficacy. Self-efficacy, according to Bandura, is the belief in one's capabilities to successfully execute necessary courses of action to satisfy situational demands. The beliefs and judgments of capabilities become important determinants of the choice of activities in which a person decides to participate, the amount of effort expended, and the degree of persistence. Self-efficacy can act as both a determinant and a consequence of physical activity participant (Bandura, 1986).

Trost, et al. (1999) set out to identify the psychosocial and environmental correlates of objectively measured physical activity behavior among a sample of 198 sixth-graders. Data were collected on demographics, psychosocial factors, and environmental information using questionnaires and activity monitors to measure activity for a seven-day period. This study claims to be the first to report a significant association between self-efficacy and objectively measured physical activity behavior in children. The results

found a significant correlation between vigorous physical activity and self-efficacy along with beliefs regarding physical activity among the sixth-grade girls in this study. For the girls, it is worth noting that physical activity self-efficacy was the only significant predictor of daily vigorous physical activity. For the boys, physical activity self-efficacy, social norms regarding physical activity, and involvement in community-based physical activity organizations were significantly associated with daily participation in vigorous physical activity. Trost, et al. suggested in order to increase physical activity self-efficacy, school and community-based intervention programs should: (1) provide enjoyable, developmentally appropriate activities that enable all participants to experience success; (2) create opportunities for youth to observe influential role models; (3) verbally encourage children to participate in physical activity, and; (4) reduce any anxiety associated with participation in physical activity by significantly reducing or eliminating competition from planned activities.

In a related study, Strauss et al. (2001) explored the relationship between health beliefs, self-efficacy, social support, sedentary activities, and physical activity levels in 92 children from the ages of 10 to 16. Like many studies, they found adolescents are largely sedentary, but this study reported an interesting finding. Self-efficacy and social influences were positively correlated with only high-level and intense physical activity. Increased high-level physical activity was found to be an important component in the development of self-efficacy in children. Self-efficacy scores were not significantly correlated with only moderate activity. Self-efficacy scores were significantly lower in children with low levels of physical activity. The study remained supportive of

Bandura's Social Cognitive Theory, however, only high levels of physical activity resulted in high levels of self-efficacy among adolescents studied. It is also important to note that self-efficacy scores were significantly lower in children with low levels of activity. There is evidence from this study that activity levels can significantly influence self-efficacy in children.

Because there is evidence that high levels of physical activity significantly correlates with high levels of self-efficacy, it would seem appropriate to study athletes and their self-efficacy, assuming athletes have high levels of physical activity. Seven hundred sixty high school athletes from13 to 18 years of age were given the Physical Self-Perception Profile to assess perceptions of sport competence, physical conditioning, strength, and body attractiveness. Welk, Corbin, & Lewis (1995) wanted to evaluate the validity of the children's version of the Physical Self-Perception Profile for high school athletes. Unfortunately, the results were equivocal regarding which version of the Physical Self-Perception Profile (adult or children) was more appropriate for the adolescent population. In relation to this review of literature, Welk et al. found both male and female athletes in their study tended to have stronger physical self-perceptions compared to other populations, particularly in the skills and conditioning domains. It is hard to know why athletes may choose to be involved in sports. It could be because of their physical competence and associated positive self-perceptions, or sports involvement may develop positive feelings of physical self-worth. The strong physical self-perceptions of the athletes in this study, especially in the skills and conditioning domains, may have had a major influence on their decision to participate in high school athletics.

Enjoyment of Physical Activity

Although there are relatively few studies on the topic of why athletes or even non-athletes choose to be involved in activity, most agree that children become involved because it is enjoyable to them (McKenzie, Alcaraz, & Sallis 1994). McKenzie et al. studied 242 fourth-grade and fifth-grade students over an eight-month period. They examined the ratings reported by students on how much they liked physical education lessons in eight coeducational classes. In this study, it appeared the students "liked" or enjoyed all of the activities in the curriculum. The average student felt all activities were between good and excellent. These are encouraging results, but in this study all classes were taught by a credentialed physical education specialist who was hired, trained, and supervised by the investigators. Both teachers were female and had master's degrees with a minimum of four years experience teaching physical education. Adequate space and availability at each site, and similar amounts and types of equipment were provided to implement the curriculum at each school. This situation is ideal, but is not a reality in most schools across the United States. Unfortunately, there was not a control group to compare student evaluations involved in other curricula.

McKenzie et al. (1994) reported an unexpected finding in the results of their study. The ratings of the activities did not change over time as the units progressed. They expected that with improved skills and frequent praise, it would lead to greater enjoyment of physical activity. There was a clear preference for skill-related activities over health-related activities. Health-related activities were more strenuous and did not involve

"playing" with equipment, unlike skill-related activities. This study indicates that a quality physical education program, taught by qualified instructors, may increase a student's liking for physical activity. Liking an activity and actually doing an activity in one's own leisure time are two different things.

Leslie, Owen, & Sallis (1999) sampled 2,729 inactive Australian college students to examine which physical activity they preferred, sources of assistance to be more active, and motivators for activity. Data were obtained from a cross-sectional survey administered to students attending two metropolitan and two rural college campuses. Although this study did not take place in the United States, it did involve students closer to the age group of rapid decline in physical activity. The five favorite sports were swimming, aerobics, team sports, weight training, and walking. The men preferred weight training and team sports, and the women preferred aerobics, walking, and dance. This could be because the men were more motivated by muscle gain, while women were more concerned with weight loss and looking better. Women were more likely than men to exercise in a group as a form of assistance, where men were more likely than women to choose no form of assistance. All students in the study were most highly motivated to exercise by increased energy, feeling good about themselves, enjoyment/satisfaction, and looking better. It is interesting to note that for both men and women, the least motivating factor for exercising was organized competition.

Youth Physical Activity Promotion Model

Children's physical activity patterns are influenced by numerous factors. In an attempt to tie the various factors or correlates together in an organizational framework,

Welk (1999) proposed the Youth Physical Activity Promotion (YPAP) model (Figure 1). This conceptual model is organized around a social-ecological framework that considers various personal, social, and environmental influences on children's physical activity. Correlates of physical activity are categorized into predisposing, enabling, and reinforcing factors. Collectively, these factors have been shown to influence children's physical activity directly, as well as indirectly. Predisposing factors, such as attitudes, beliefs, self-efficacy, and enjoyment of physical activity, are thought to have the most direct influence on the likelihood that a child will be physically active. Reinforcing factors include those variables that reinforce or support a child's physical activity behavior. This would include factors such as parental influence and peer influence as well as the effect a teacher or coach might have on a child. Enabling factors include both environmental and biological variables that serve to affect children's physical activity. Environmental variables include things such as the weather, access to facilities, equipment, and physical activity programs, whereas biological variables include one's motor skills as well as physical fitness and body morphology. The YPAP Model serves as the theoretical framework for the present study and provides guidance for the development of intervention strategies to promote physical activity among children.

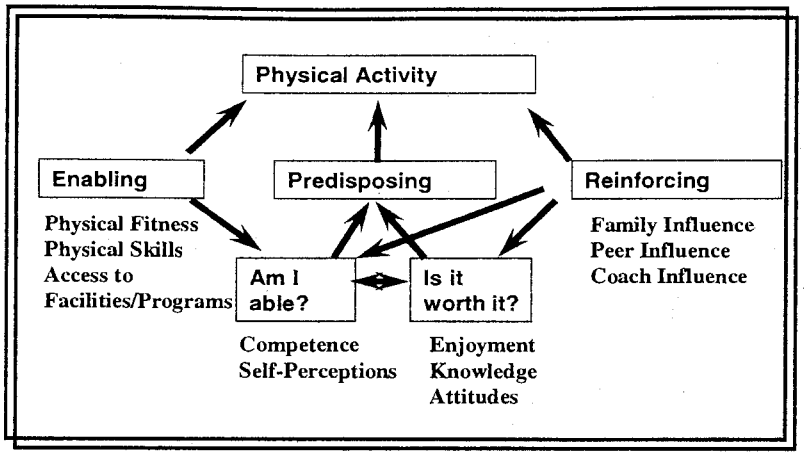

Figure 1. Youth physical activity promotion model.

Summary

It may never be fully understood what influences an individual, especially an adolescent, to become physically active or inactive. At any age, an individual develops his or her own set of views, beliefs, likes, dislikes, goals, and opinions about physical activity. Research has shown that other individuals, past experiences, and circumstances, can influence this set of beliefs. Most importantly, research has shown that every individual, regardless of age, gender, ethnic background, or family background, has the ability to make a choice regarding their own physical activity. The prevailing questions are where the responsibility lies, and how physical activity effectively is promoted to the youth, increasing the probability that they will grow to adulthood living a physically active and healthy lifestyle. Most children begin life with an eagerness to run and play. As they age, other influences creep in to change behaviors. Such influences could be family, television, peer pressure, sociological, cultural, self-efficacy, accessibility, community, pregnancy, smoking, drugs and alcohol, and the list continues to grow. By

the time an adolescent has entered high school, chances are nearly half that they will not be physically active on a regular basis. This is especially true for adolescent girls. As the individual becomes an adult, the sedentary trend continues, putting him or her in danger of obesity, type II diabetes, cardiovascular disease, bone and joint complications, depression, and even death. Physical activity patterns set at an early age are likely to be carried into adulthood. Since adolescence may be the pivotal age for preventing sedentary behaviors, it is important to study the age group's activity patterns to insure healthy lifestyles for future generations.

CHAPTER III

METHODS

The prevalence of obesity among adolescents has nearly tripled over the last 20 years. Experts agree that obesity and overweight result from an energy imbalance, that is, excessive caloric intake combined with inadequate caloric expenditure, largely through low levels of physical activity. Adolescence is a critical period in an individual's life when physical activity levels begin to decline. The majority of male and female adolescents do not achieve the recommended amounts of participation in moderate to vigorous physical activity. Limited research has been done to investigate the many factors influencing physical activity among adolescents. While both behavioral and environmental factors influence one's decision to be active or not, a better understanding of the influences on physical activity among adolescents will enable program providers to more effectively deliver meaningful physical activity interventions. Accordingly, the purpose of this study was to examine the relationship between physical fitness measures, selected psychosocial correlates of physical activity, and self-reported physical activity among seventh and eighth grade students in rural Iowa.

Research Design

The design of this study was correlational in nature. Measures were collected regarding various psychosocial correlates of youth physical activity by using the Children's Physical Activity Correlates (CPAC) scale (Welk, Wood, & Morss, 2003). Physical activity levels were measured by using the Physical Activity Questionnaire-Adolescents (PAQ-A; Kowalski, Crocker, & Faulkner, 1997). HealthFirst's TriFit™

computerized fitness measurement system was used for individual fitness measures, and Polar™ heart rate monitors were used to monitor heart rate responses during the one-mile run/walk measure. All data were collected from seventh-grade and eighth-grade students at Tilford Middle School in Vinton, Iowa.

Research Participants

Participants for this study were seventh and eighth-grade students, 12 to 15 years old, enrolled at Tilford Middle School in Vinton, Iowa, during the spring semester of the 2001-2002 academic year. The participating school was selected based on convenience, as the researcher was a teacher there at the time of the study. All children in the seventh and eighth grades were invited to participate in the study. Participation in the study was encouraged, but was not mandatory and each student's identity was kept confidential. Permission to conduct this study was granted by the superintendent of the Vinton-Shellsburg School District and ethics approval was given by the University of Northern Iowa's Institutional Review Board (IRB). Parents or guardians of the children provided informed consent for the participation of their children and each child also provided verbal assent.

Instrumentation

. The Physical Activity Questionnaire – Adolescents (PAQ-A) was used to measure each participant's typical level of physical activity. The self-administered questionnaire consisted of nine questions designed to assess a child's physical activity in a variety of situations and times (e.g., school, recess, after school, weekend, etc.) during the previous seven days. Scoring is based on a 5-point Likert-type scale with higher scores indicating

a greater level of physical activity. The Physical Activity Questionnaire-Adolescents (PAQ-A) provides a summary physical activity score derived from eight items that was used as the criterion physical activity score in this study. The PAQ-A has been shown to possess moderate convergent validity (Kowalski et al., 1997) and is widely used as a field technique for assessing physical activity among older adolescents. The decision to use the PAQ-A instead of the children's version was based on the fact that it was age-appropriate for the majority of the participants in this study and the "recess" items were removed in the adolescent version which corresponds with the absence of recess at the participating school.

The Children's Physical Activity Correlates (CPAC) scale was used to assess various psychosocial measures related to children's physical activity (Welk, Wood, & Schaben, 2003). The self-administered instrument includes 44 items that assess various psychosocial correlates of physical activity in children. The instrument uses a 4-point structured-alternative format to minimize the likelihood for socially desirable responses. The CPAC combines items from a number of other validated scales into one instrument that can be used to evaluate correlates of physical activity in children. The instrument includes 15 items from the Children's Attraction to Physical Activity (CAPA) scale (Brustad, 1993), five items from Harter's perceived competence scale (1982), 6 items from Rosenberg's self-esteem scale (1965), and 18 items from 4 separate scales designed to measure parental influence. Ten separate subscales are obtained from the CPAC:

- liking of games and sports,
- fun of physical exertion,

- liking of exercise,
- importance of exercise,
- peer acceptance,
- perceived competence,
- self-esteem,
- perceptions of parental role modeling,
- perceptions of parental support, and
- perceptions of parental encouragement.

In addition, two summary variables are derived, parental influence and attraction to physical activity. Welk, Wood, & Schaben (2003) provide a full description of the development of the CPAC scale. In addition, the reliability of the scales and the predictive validity of the CPAC have been shown to be good across a broad age range (Schaben, Joens-Matre, Hensley, & Welk, 2004).

The fitness measurments were conducted using HealthFirst's TriFit™ Computer System over a period of 1 month. The TriFit™ Computer System is an on-line fitness assessment center, which measures individual biometrics, strength, flexibility, cardiovascular, and body composition. The biometric measurements included the child's height, weight, forced vital capacity, resting blood pressure, and heart rate. Strength measurements conducted were biceps strength, maximum push-ups, 60-second sit-ups, and maximum pull-ups. The modified sit-and-reach was the only flexibility measurement conducted and was performed using a standard sit-and-reach box. The 1-mile walk/run test was used as the only cardiovascular assessment. Using Polar Heart Rate Monitors™

for the cardiovascular assessment, participants were instructed to keep their heart rates between 160 and 180 beats per minute for the duration of the mile unless medical conditions prevented it. The time required to complete the 1-mile distance was used as the criterion score on this test. This was considered a submaximal test to measure cardiovascular efficiency and may not represent a true measure of aerobic capacity. Although students were instructed to self-regulate their performance to maintain their heart rate within the target zone, the amount of time outside the target zone was not a consideration in deriving a score on the 1-mile walk/run test. The two-site youth skinfold test using the electronic Skyndex™ calipers was used to collect body composition measurements. Measurements were taken at the calf and triceps skinfold sites.

Procedures

Approval to conduct the study was first obtained from the superintendent of the Vinton-Shellsburg School District. Following IRB approval, recruitment of research participants commenced. Written information letters were sent home to parents or guardians to obtain required parental consent. Upon obtaining parental approval for their child to participate in the study, child assent was obtained. During scheduled class time, students were given a brief explanation of the research being conducted and rationale for the study. Participants were reminded that to ensure anonymity and confidentiality, no identifying information would be collected. Students agreeing to participate in the study were first administered each of the self-report questionnaires during a single day in a classroom setting. The PAQ-A was administered first and then followed by the administration of the CPAC. Participants were instructed to answer all the questions

honestly and completely. The class instructors closely followed directions for successful administration of the questionnaires. Students were given as much time as they needed to complete each questionnaire, although it required only approximately 15-20 minutes for each instrument.

The HealthFirst's TriFit™ fitness measurements were conducted in accordance with standardized directions over the course of one month. The fitness measurements were conducted approximately two weeks after the completion of the questionnaires. The 1-mile run test was conducted first and it took place on an outdoor track. Approximately 25 to 30 students ran or walked the mile at a time with staggered start times to reduce crowding. Each student was wearing a heart rate monitor and was instructed to keep their target heart rate between 160 and 180 beats per minute. On a separate day, push-up and curl-up tests were administered and height measured. Pull-ups and forced vital capacity were tested on yet another day. The final day consisted of measuring blood pressure, biceps strength, weight, body fat percent, and flexibility (i.e., sit-and-reach test). The class instructors followed the HealthFirst's TriFit™ and Polar Heart Rate Monitors™ instructions closely and equipment was calibrated on a daily basis. All students were familiar with each test and had participated in the identical test at least one time prior to the testing used for this study. All students were allowed two attempts for each test item and their best score was used as the data for this study.

CHAPTER IV

RESULTS AND DISCUSSION

The primary purpose of this study was to examine the relationship between physical fitness measures, selected psychosocial correlates of physical activity, and self-reported physical activity among seventh and eighth-grade students in rural Iowa. Computerized physical fitness measures were obtained by the HealthFirst Trifit™ computer system, attitudes about physical activity were measured by the Correlates of Physical Activity in Children (CPAC) questionnaire, and physical activity levels were measured by the Physical Activity Questionnaire-Adolescents (PAQ-A). All subjects were enrolled at Tilford Middle School in Vinton, Iowa.

Descriptive Characteristics

Data were collected on 253 seventh and eighth grade students enrolled at Tilford Middle School in Vinton, Iowa during Spring semester 2002. The study sample included 117 girls and 136 boys. Students ranged in age from 12 to 15 years, with a mean age of 13.2 years.

Physical Fitness Attributes

In general, boys were slightly heavier and possessed a lower percentage of body fat than the girls. Moreover, with the exception of the sit-and-reach measure, boys performed better on each of the physical fitness measure items. Descriptive statistics for the physical fitness variables measured through the use of the HealthFirst TriFit™ computerized fitness measure system are presented in Table 2.

Table 2

Descriptive statistics on physical fitness variables

	Boys		Girls		
Variables	M	SD	M	SD	t
Height (in)	64.41	3.94	63.41	2.55	0.32
Weight (lbs)	127.16	37.67	125.73	32.52	2.36*
Body fat (%)	21.94	10.65	25.75	7.16	-3.28*
Mile run (min)	8.23	1.96	9.51	2.03	-5.08*
Sit-&-Reach (cm)	9.74	3.23	13.46	3.36	-8.95*
Biceps strength (lbs)	60.27	15.31	47.50	9.99	7.69*
Curl-ups (#)	54.47	11.80	49.58	11.61	3.31*
Push-ups (#)	24.00	15.02	14.70	9.42	5.65*

* $p < .05$

Significant differences between gender groups are noted in Table 2. The results reported in Table 2 are consistent with related studies. For instance, Armstrong et al. (1998) found 4th grade boys to have faster mile run times and lower percent body fat than girls. Additionally, boys out-performed the girls in the sit-up and pull-up tests, but not significantly. Armstrong also found that girls performed better than the boys in the sit-and-reach test, but not significantly. Trost et al. (1996) found in their study involving 5th grade students that the girls' body fatness measures were 4.1% higher than that of the

boys. This compares closely with the results found in this study in which the percent body fat for girls was 3.8% higher than the percent body fat for boys.

Physical Activity Behaviors

The Physical Activity Questionnaire for Adolescents (PAQ-A) was used to measure the student's typical level of physical activity. The instrument uses eight questions to assess a child's physical activity in a variety of situations and times (e.g., school, after school, evening, weekend, etc.). A composite physical activity index is obtained by computing the average score across the eight items. Item means and standard deviations as well as the composite summary score are presented in Table 3. Note that each item is scored on a 5-point scale with a higher value indicating a higher activity level.

Table 3

Means and SD for individual items on PAQ-A according to gender

	Boys		Girls	
Item	M	SD	M	SD
1. Activity list	1.71	0.44	1.65	0.37
2. PE class	4.27	0.73	4.08	0.83
3. Lunch	2.28	1.47	1.78	1.10
4. After school	3.76	1.55	3.92	1.72
5. Evenings	3.32	1.30	3.30	1.21
6. Weekend	3.26	1.33	3.21	1.09
7. Best describes	3.53	1.32	3.17	1.11
8. Daily activity	3.62	0.96	3.47	0.91
Composite PA score	3.21	0.78	3.07	0.65

Overall, boys and girls in the current study reported similar levels of physical activity as shown by a composite physical activity score of 3.21 for boys and 3.07 for girls. Although the magnitude of the difference indicates that boys are more active than girls, this difference was not significant. This finding is somewhat surprising since most studies report adolescent boys being more active than girls. Boys in the present study, however, report being more active during physical education class and during the lunch period than do girls. Moreover, careful inspection of the response patterns to these questions suggests that the boys exercise somewhat more frequently and at a higher intensity level than the girls. The specific pattern of physical activity is revealed by the mean scores on the various scale items. In addition, Figures 2-7 illustrate the response patterns of both boys and girls to selected items from the PAQ-A.

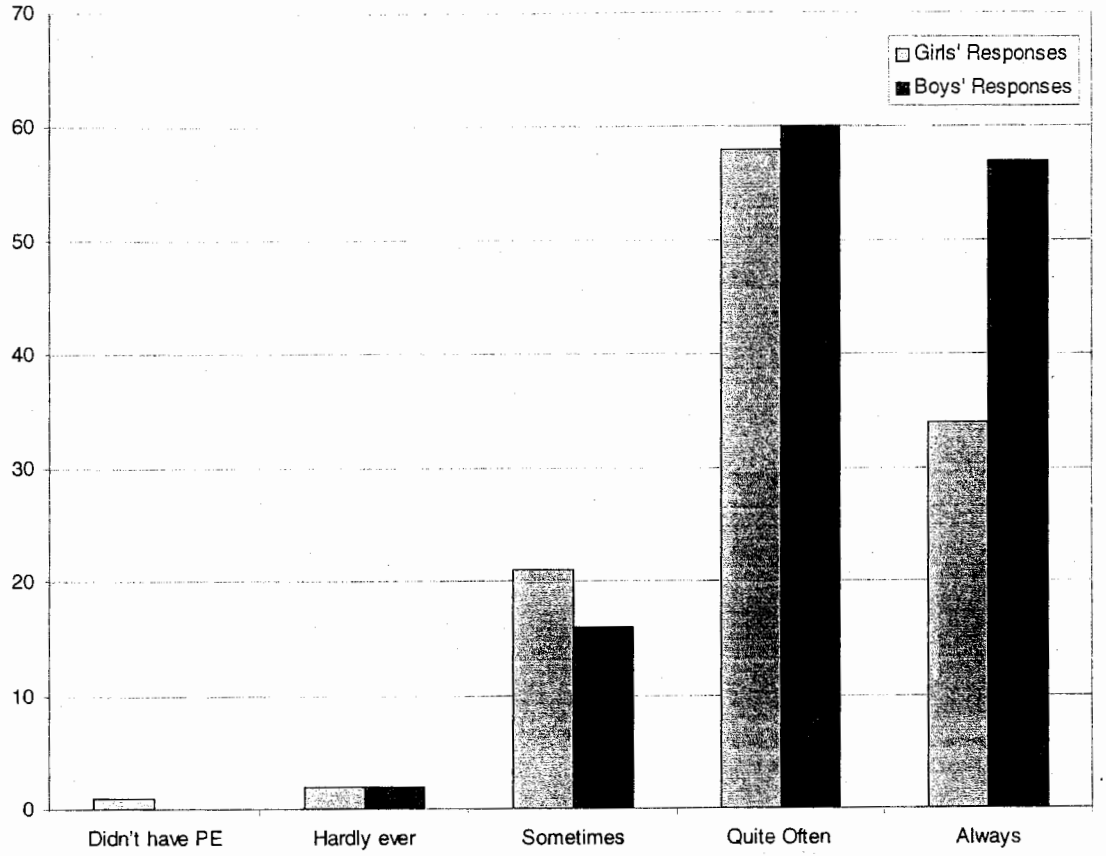

Figure 2. In the last 7 days, during your physical education classes, how often were you very active?

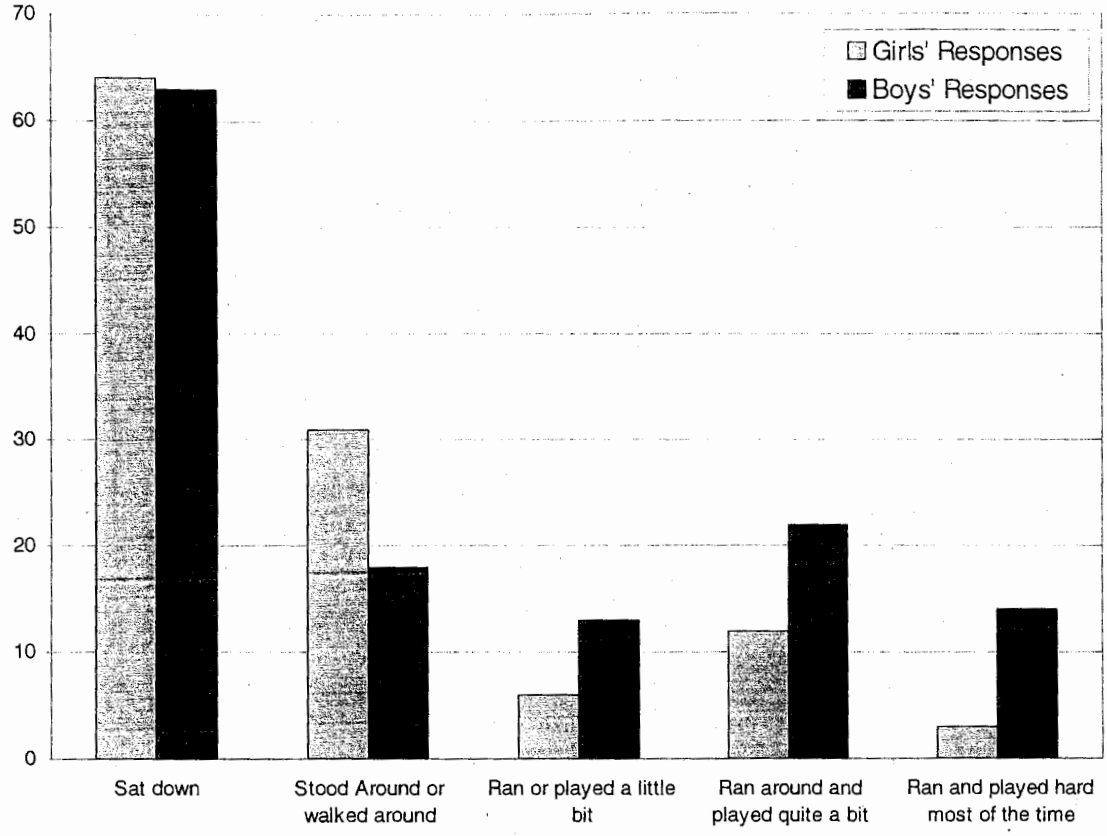

Figure 3. In the last 7 days, what did you normally do at lunch?

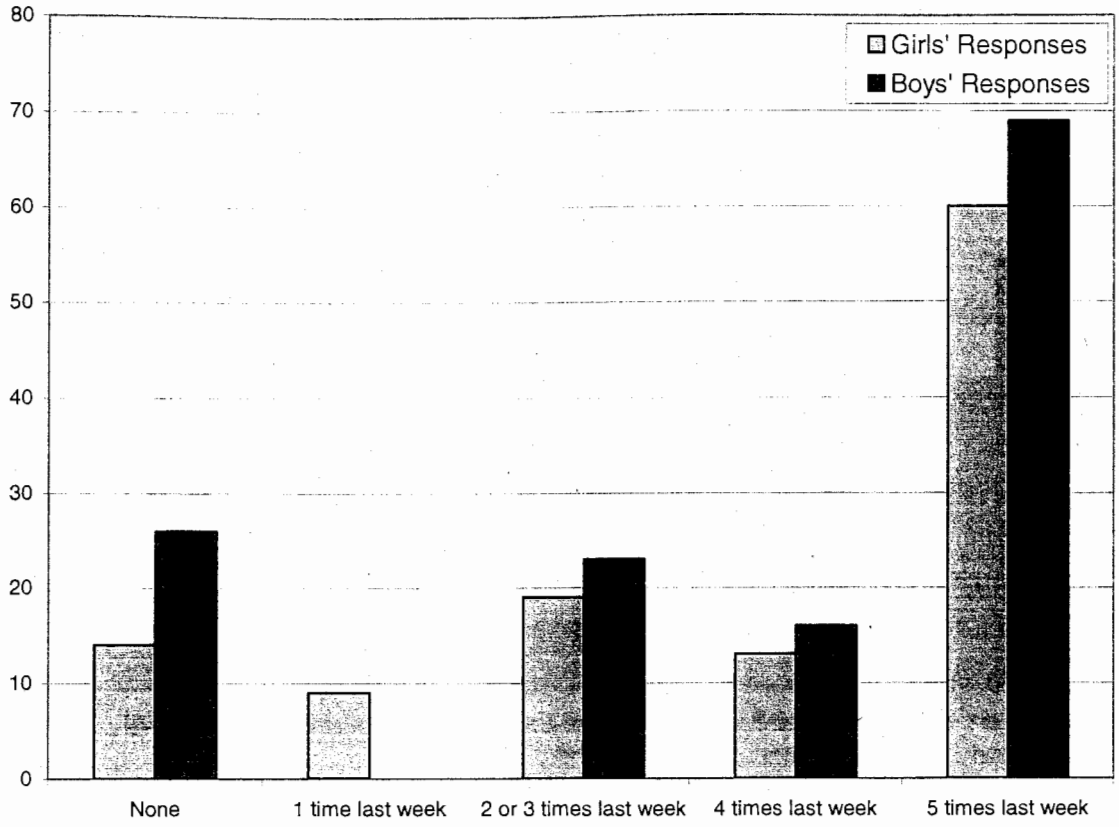

Figure 4. In the last 7 days, how many days right after school did you do sports, dance, or play games in which you were very active?

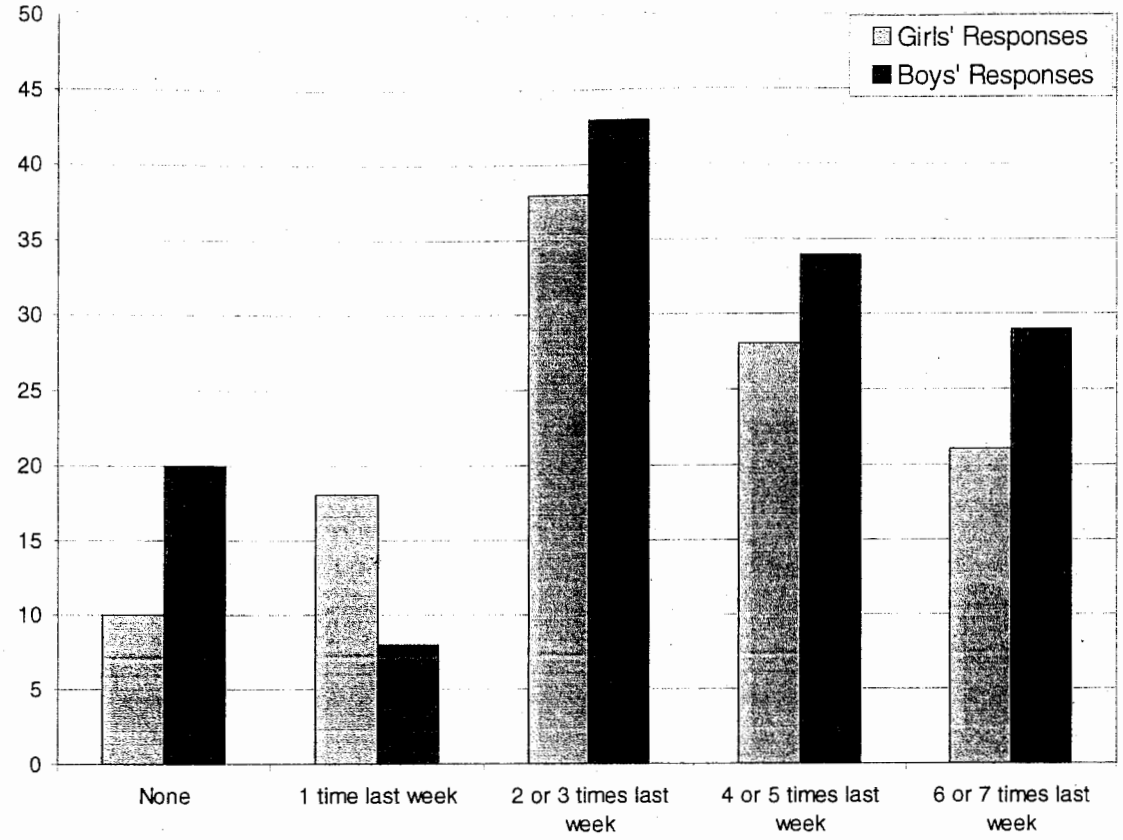

Figure 5. In the last 7 days, on how many evenings did you do sports, dance, or play games in which you were very active?

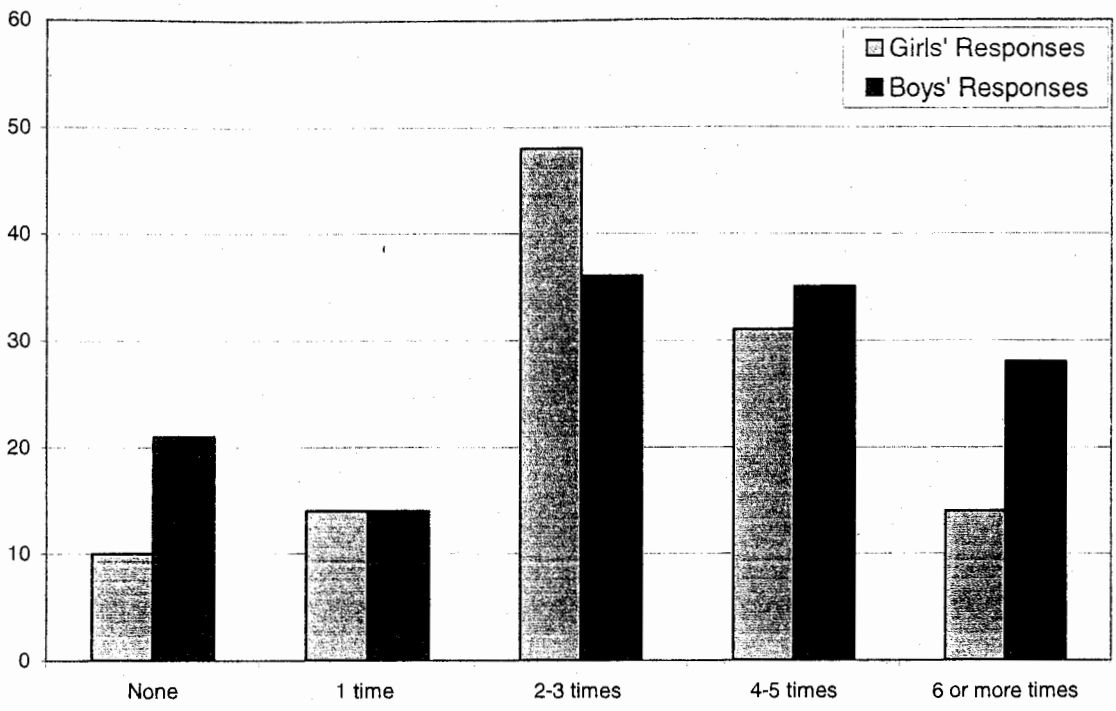

Figure 6. On the last weekend, how many times did you so sports, dance, or play games in which you were very active?

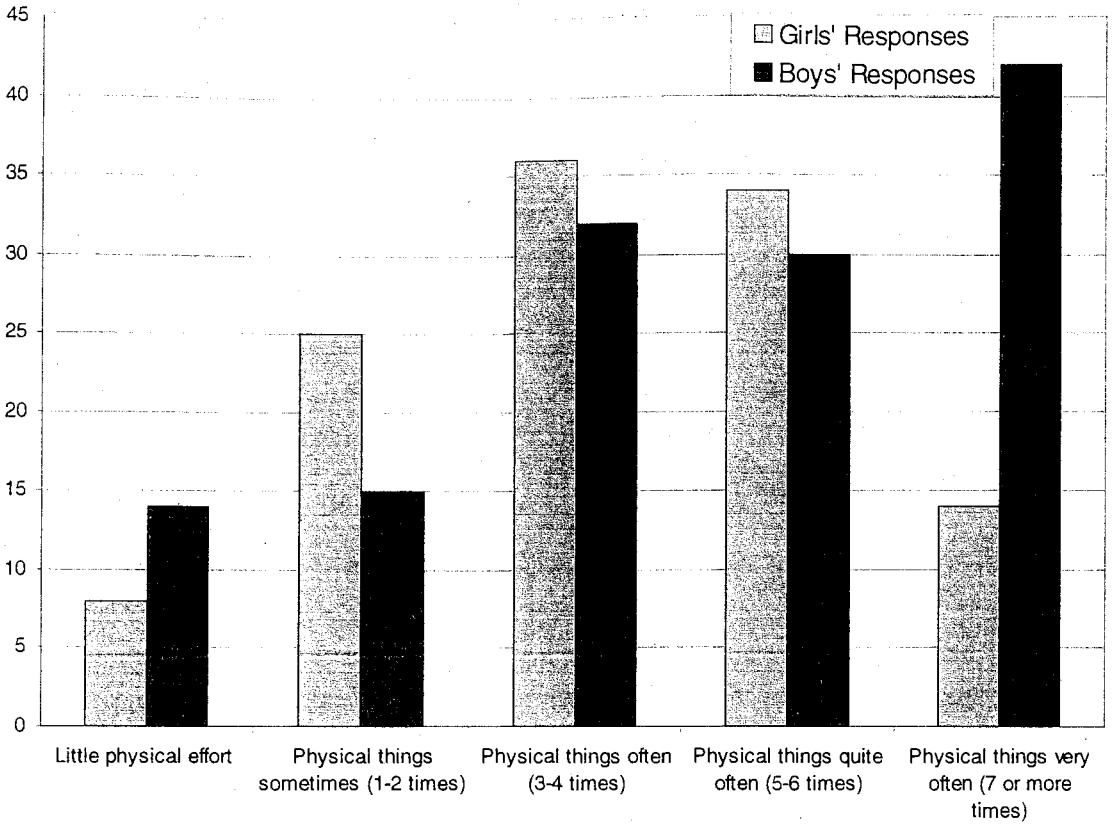

Figure 7. Which one of the following best describes you best for the last 7 days?

Boys and girls were least active during the lunch period. The highest activity level for both boys and girls was reported to occur during physical education classes. Both boys and girls reported to be more active on Friday than any other day of the week. Saturday was the second most active day, with the least amount of activity occurring on Sunday and Monday.

Table 4 contains a listing of 22 activities and the proportion of study participants reporting participation during the past seven days. The specific choice of activity varied

somewhat according to gender, but both boys and girls reported that running/jogging was the activity in which they most frequently participated. The top six activities reported by boys and girls are listed in Table 5.

Table 4

Frequency of participation in selected activities during previous 7 days

	≥ 3 times		≥ 5 times	
Activity	Boys	Girls	Boys	Girls
Skipping	20.6%	16.3%	12.5%	6.9%
Rowing/Canoeing	1.7%	1.7%	1.7%	1.7%
In-line skating	14.7%	7.7%	9.6%	5.1%
Golf	8.5%	0	4.4%	0
Walking	45.9%	59.8%	24.5%	35.9%
Bicycling	65.6%	34.2%	46.1%	18.0%
Jogging/Running	68.0%	68.7%	46.6%	48.7%
Aerobics	12.1%	12.4%	6.8%	2.8%
Swimming	10.5%	7.0%	7.5%	3.5%
Baseball/Softball	39.2%	13.7%	28.1%	6.0%
Dance	2.2%	32.5%	2.2%	18.8%
Football	28.1%	2.6%	17.0%	2.6%
Badminton	4.6%	4.3%	3.8%	3.4%
Skateboarding	10.4%	2.6%	6.7%	0
Soccer	6.1%	9.5%	3.8%	1.8%
Wrestling	14.7%	4.3%	6.6%	2.6%
Volleyball	5.9%	31.1%	1.5%	14.7%
Tennis/Racquetball	4.4%	9.8%	1.4%	4.5%
Basketball	55.2%	37.1%	32.4%	14.7%
Ice Skating	1.4%	0.9%	0.7%	0.9%
Cross-country	0.8%	0.9%	0	0.9%
Ice Skating	2.3%	1.8%	1.5%	1.8%

Note: Values represent percentage reporting participating in activity

Table 5

Top six activities according to gender

Ranking	Boys	Girls
1.	Running/jogging	Running/jogging
2.	Basketball	Walking for exercise
3.	Biking	Basketball
4.	Walking for exercise	Biking
5.	Baseball	Dancing
6.	Football	Volleyball

The results suggested both boys and girls were more active in running or jogging compared to any other activity. It was impossible to determine whether the running or jogging activity was competitive in nature or simply leisurely activity. Furthermore, walking and biking were also very frequently participated in by both girls and boys in this study. By nature, walking, biking, and even jogging and running are noncompetitive, individual activities. Basketball was reported to be the competitive sport with the highest levels of participation for both boys and girls. Boys also reported high levels of participation in baseball, whereas girls reported volleyball as another sport in which they frequently participated. Girls also reported participating in dance quite often.

An additional question was added to the PAQ-A to determine the amount of time the study participants viewed television, watched videos, or played/worked on the

computer. Approximately 70.5% of boys and 59.8% of girls reported spending two or more hours per day viewing television, watching videos, or playing/working on the computer. Furthermore, it is noted that a higher number of middle school boys spent more time viewing television, watching video games or using the computer than did the girls. As shown in Figure 8, two hours was the most common response for both boys and girls. This finding is consistent with other studies that have investigated television-viewing behaviors of children (Armstrong et al., 1998).

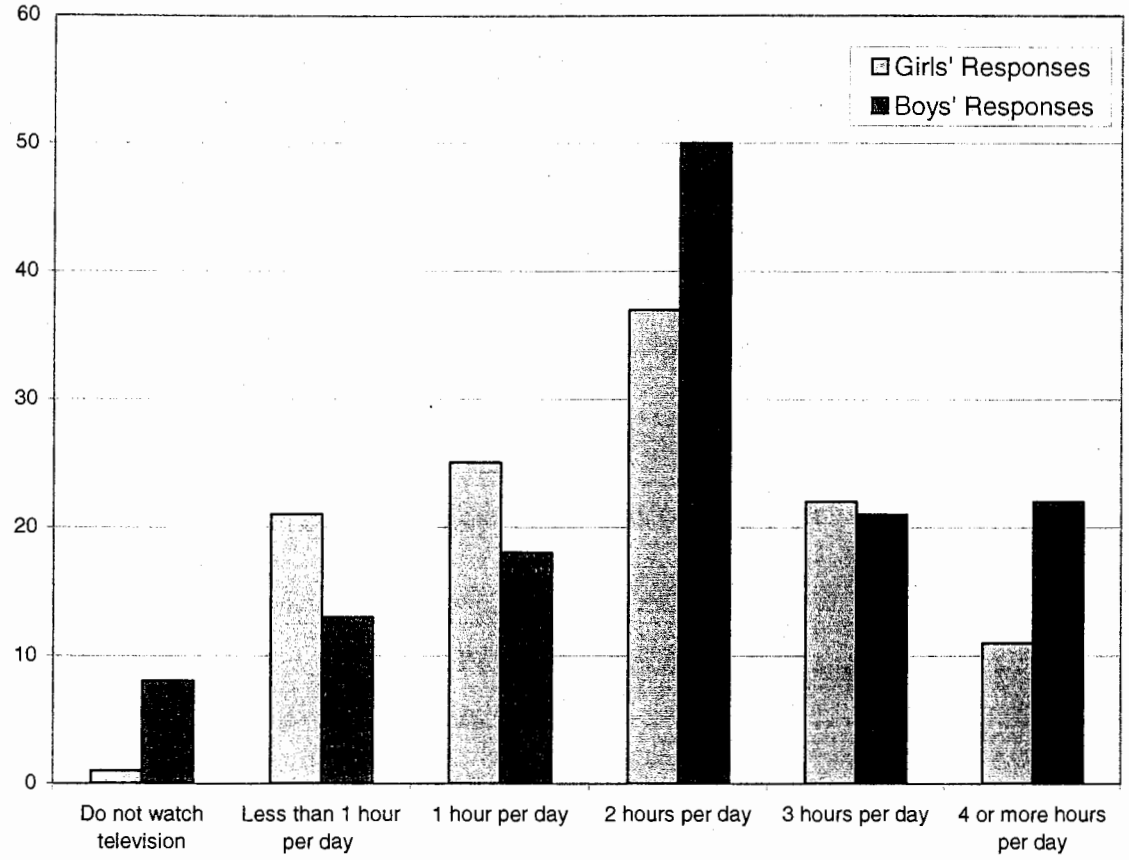

Figure 8. On a typical day, how many total hours outside of school do you watch TV, view videos, or work/play on the computer?

Psychosocial Characteristics

The Children's Physical Activity Correlates (CPAC) scale was used to assess various psychosocial factors presumed to influence physical activity in children. Mean scores for each of the ten subscales of the CPAC as well as the two summary variables, parental influence and attraction to physical activity, are shown in Table 6.

Table 6

Descriptive statistics for psychosocial measures from CPAC

	Boys		Girls		
Subscales	M	SD	M	SD	t
Liking of games/sports	3.34	0.75	3.09	0.71	2.56*
Fun of physical exertion	3.01	0.80	2.76	0.79	2.67*
Liking of exercise	2.94	0.83	3.02	0.77	-0.76
Important of exercise	3.29	0.65	3.37	0.60	-1.02
Peer acceptance	2.89	0.71	2.96	0.68	-0.72
Perceived competence	3.09	0.56	2.88	0.60	2.93*
Self-esteem	3.19	0.60	3.01	0.76	2.10*
Parental role modeling	2.82	0.58	2.75	0.72	0.95
Parental support	3.00	0.59	2.95	0.88	0.45
Parental encouragement	3.36	0.49	3.31	0.54	0.66
Parental influence	3.06	0.45	3.00	0.58	0.78
Attraction to PA	3.10	0.57	3.04	0.28	0.82

* $p < .05$

Relationship to Physical Activity

In order to investigate the primary question of interest in the present study, Pearson-product moment correlations were calculated between the CPAC subscale scores, the various physical fitness measures, and the composite physical activity score derived from the PAQ-A. For practical purposes of this study, the composite physical activity score was determined by the Physical Activity Questionnaire (PAQ-A) and identified as the Physical Activity Index (PAINDEX). The absolute magnitude of the correlations ranged from .02 to .63. Eleven variables were found to be significantly related to girl's self-reported physical activity and 14 variables to boy's self-reported physical activity. Attraction to physical activity (Attract) had the highest simple correlation with PAINDEX for both girls ($r = .63$) and boys ($r = .62$). For girls, the next highest correlation was associated with "Fun of Physical Exertion" (FunExert) with a correlation of $r = .56$. For boys, "Liking of Exercise" (LikeExer) had the second highest correlation with a value of $r = .62$. Among the physical fitness measures, time on the mile-run demonstrated the highest relationship with PAINDEX for both girls ($r = -.31$) and boys ($r = -.28$). It was interesting to note that none of the measures of body fatness (i.e., weight, % body fat, or BMI) were significantly related to children's physical activity for either girls or boys. For the most part, the same variables were significantly related to physical activity for both girls and boys, having correlations of similar magnitude. Notable exceptions to that included the pushup test (a measure of upper body strength/endurance), which was significantly related to PAINDEX for girls, but not for boys, and "Parental Support" (ParSup), which was significantly related to physical

activity among boys, but not girls. Correlations among the variables of interest (physical fitness measures and psychosocial factors) and the composite physical activity score are reported separately for boys and girls in Table 7.

Table 7.

Correlations of key variables with physical activity (PAINDEX) for boys and girls

	Girls - PAINDEX	Boys - PAINDEX
1. Weight	-.03	-.15
2. % body fat	-.06	-.10
3. BMI	-.03	-.16
4. Mile-run	-.31*	-.28*
5. Biceps	.16	-.02
6. Curlups	.15	.18*
7. Pushups	.30*	.14
8. LikeGame	.49*	.50*
9. FunExert	.56*	.47*
10. LikeExer	.49*	.62*
11. ImpExer	.40*	.49*
12. PeerAcc	.38*	.27*
13. PerComp	.42*	.45*
14. SE	.17	.19*
15. ParRole	.25*	.18*
16. ParSup	.15	.37*
17. ParEnc	.35*	.33*
18. Attract	.63*	.62*
19. ParInf	.29*	.36*

* $p < .05$

In order to determine those variables that best predict children's physical activity, stepwise linear regression was used to regress the primary outcome variable (PAINDEX) on the various measures of physical fitness as well as the psychosocial variables. For females, attraction to physical activity and self-esteem emerged as the only significant predictor variables, collectively accounting for 42% of the variance in the child's activity behavior. None of the remaining variables met the minimum criteria for entrance into the regression equation. Standardized beta weights were calculated for each of the significant predictor variables in order to assess the relative importance of each in the prediction of physical activity. Attraction was found to be the best single predictor of PAINDEX (beta = .72), followed by self-esteem (beta = .19). For boys, attraction to physical activity and peer acceptance emerged as the only significant predictor variables, collectively accounting for 43% of the variance associated with the child's physical activity. Once again, attraction was found to contribute the largest amount of unique variance to the model (beta = .80), followed by peer acceptance (beta = .26). It is interesting to note that although boys were more active that girls, a child's overall interest in and attraction to physical activity, as operationalized by the attraction variable, was determined to be the most important predictor variable in the present study. In addition, it was somewhat surprising that none of the physical fitness measures nor parental influence measures made significant unique contributions to the explanation of physical activity. In a study of elementary school children, Welk, Wood, & Morss (2003) reported that parents influence children's physical activity both directly and indirectly. Perhaps the unique contribution of parental influence to a child's physical activity is substantially

substantially reduced by adolescence, or that parental influence manifests itself through the attraction variable. Table 8 provides summary statistics from the regression analysis for both girls and boys.

Table 8

Regression analysis model summary

		Females			
Dep. Variable	Predictor	R	R^2	Beta	t
PAINDEX	Attraction	.63	.39	.72	8.79*
	Self-esteem	.65	.42	.19	2.32*
		Males			
Dep. Variable	Predictor	R	R^2	Beta	t
PAINDEX	Attraction	.63	.39	.80	8.99*
	Peer Acceptance	.66	.43	.26	2.94*

* $p < .05$

These findings are consistent with other authors that have investigated the association of children's physical activity to various psychosocial variables as well as physical fitness measures and provide support for the utility of the Youth Physical Activity Promotion Model in explaining children's physical activity (Sallis et al., 2000; Welk, 1999). Since attraction in the present study was a composite construct incorporating several different scales that measure various dimensions of overall attraction to physical activity, it was no surprise that it emerged as the best predictor variable. This is consistent with conclusions of McKenzie, Alcaraz, & Sallis (1994), among others, who point out that children become involved in physical activity because it is enjoyable to them.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

A substantial amount of research has documented the health risks associated with inadequate physical activity, excessive calorie consumption and overall poor lifestyle choices. This problem has become more prevalent within the past 20 years. What used to be a primarily "adult" problem has filtered down into the adolescent years, tripling its prevalence in the past 20 years (USDHHS, 2001). Evidence further indicates that as children enter adolescence, there is a significant decline in physical activity over the course of their high school years. Inactivity is even more common among girls as they move through adolescence.

Experts overwhelmingly agree health risks associated with poor lifestyle choices can be drastically reduced, if not eradicated, with a healthy, well-balanced diet and regular moderate to vigorous physical activity most days of the week. Unfortunately, less than one-third of adults and nearly half of American youths do not engage in the recommended amounts of physical activity (USDHHS, 2001). Some studies have shown one contributing factor to inactivity and obesity is the large quantities of time children spend viewing television, using computers and playing video games. Other studies show a correlation between increased calorie consumption and soft drink consumption. There is research supporting a variety of factors influencing activity levels in adolescents, for example, home environment, parental support, self-efficacy, community and school-

based programs, and even gender-related factors. Whereas many factors associated with physical inactivity have been identified at the individual level, the problem seems to be multidimensional by nature. The Youth Physical Activity Promotion (YPAP) Model proposes a conceptual framework that considers various personal, social, and environmental influences on children's physical activity (Welk, 1999). Using the YPAP Model as the theoretical framework, the purpose of this study was to examine the relationship between physical fitness measures, selected psychosocial correlates of physical activity, and self-reported physical activity among seventh and eighth-grade students in rural Iowa. The Correlates of Physical Activity in Children (CPAC) questionnaire measured selected psychosocial factors thought to influence physical activity, the Physical Activity Questionnaire-Adolescents (PAQ-A) measured their reported physical activity levels, and their actual physical fitness and physical condition was measured by the HealthFirst TriFit™ system.

Conclusions

Based upon the findings of the current study and in consideration of the inherent limitations, the following conclusions are put forward:

1. The results from the Physical Activity Questionnaire-Adolescents (PAQ-A) provide support for the hypothesis that boys are more active than girls.

2. The second hypothesis was also confirmed as the regression analysis revealed that "attraction to physical activity" was the best single predictor of children's physical activity behavior.

3. Although none of physical fitness measures were significant predictors of children's physical activity in the regression model that emerged, it is noted that among the physical fitness measures, time on the 1-mile run test had the highest simple correlation with physical activity.

In summary, the current study shows that male adolescents are more physically active, usually at a higher exercise intensity level, than female adolescents. The most common activity participated in for both boys and girls was running or jogging. The majority of the adolescents in this study spend at least two hours every day viewing television, watching videos, or using a computer. A large majority of middle school adolescents in the present study report being "very active" in physical education, although there is an indication that the boys are somewhat more active than girls in physical education class. As hypothesized, "Attraction to Physical Activity" was found to be the single most important correlate of physical activity for both boys and girls. It is noteworthy to point out, however, that over half of the variance associated with children's physical activity was not explained by the two-factor prediction model that emerged from this study. Clearly there are many factors that influence the decision of an adolescent youth to engage in physical activity or not, many of which were not examined in this study.

Implications for Professional Practice

Due to the growing urgency to the problem of sedentary lifestyles and its association to all the health-related risks of being overweight and obese, it has created a major financial burden and increased death tolls in the United States. Research indicates that many of these lifestyle behaviors are learned at a young age. The question remains however: what predicts attitudes and behaviors about physical activity? The findings of this study indicate that the strongest predictor to being physically active among adolescents is to have an attraction to the activity, whether it is simply liking the activity or having fun while participating in the activity or exercise. Although the strongest predictor of physical activity in this study was having an attraction to an activity, there are many other contributing variables to being an active adolescent. The middle school students in this study indicated that peer influence is relatively unimportant to their physical activity participation. Basically, if the adolescents like the activity, if it is fun, and if parents provide some type of support, they will participate in physical activity.

The 21st century is a time of technological complexity and the health and fitness industries are no exception. Adolescents of the 21st century have many more recreational opportunities than previous generations. It is interesting to note that the adolescent middle school students in this study preferred simple, traditional, and inexpensive activities to participate in when they were physically active. The first choice for boys and girls was running and jogging. Boys most frequently choose basketball, biking, walking, baseball, and football to participate in when physically active. Girls choose walking,

basketball, biking, dancing, and volleyball. It is noteworthy that the male and female adolescents in this study received physical activity most frequently from their physical education classes. The results of this study were consistent with previous research, indicating that boys are more physically active than girls. The adolescent boys scored higher than the girls in strength tests and faster than the girls in the mile run. Likewise, the girl's flexibility scores were considerably higher than the boys. The girls' and the boys' height, weight, and body fat percentages did not deviate, as significantly however, the boys were slightly taller, weighed slightly more with less body fat percent than the girls. The findings of this study indicate that the adolescents of this study are motivated to participated in physical activities that are fun, attractive, and traditional by nature.

Recommendations for Further Research

Based on the findings of this study and in consideration of the need for additional research on the determinants of physical activity among adolescents, the following recommendations for further research are provided:

1. Replicate this study using a larger sample size in different parts of country representing a more diversified population.

2. Conduct a longitudinal study on the growing and maturing determinants to physical activity.

3. Conduct a study focusing on the details of parental/guardian and family influences on physical activity.

4. Include a comparison group evaluating the roll of competition and its influence on physical activity.

5. Include a comparison group of female influences to physical activity from male influences to physical activity.

6. Include the element of diet practices as they relate to the variables physical activity, parental/guardian influences and physical assessments.

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APPENDIX A

CORRELATES OF PHYSICAL ACTIVITY IN CHILDREN'S (CPAC)

YOUTH PHYSICAL ACTIVITY SURVEY

Youth Physical Activity Survey

The following questions ask you about your interests in physical activity
Instructions:

Please read the sample question below.
Decide which of the two children is most like you (A or B).
Once you pick a side, decide whether this is "really true" or just "sort of true" for you.
Please choose only one answer.

Remember *There are no right or wrong answers*
Simply mark the box you think is most true for you

Really true for me	Sort of true for me	A	SAMPLE	B	Sort of true for me	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	☐	☐

Really true for me	Sort of true for me	A		B	Sort of true for me	Really true for me
☐	☐	Some kids like playing outdoor games and sports	BUT	Other kids would rather play indoors	☐	☐
☐	☐	Some kids don't like getting sweaty when they exercise or play hard	BUT	Other kids don't mind getting sweaty when they exercise or play hard	☐	☐
☐	☐	Some kids have more fun playing games and sports than anything else	BUT	Other kids like doing other things rather than playing games and sports	☐	☐
☐	☐	Some kids don't like to exercise very much	BUT	Other kids like to exercise a whole lot	☐	☐
☐	☐	Some kids have parents who get a lot of exercise	BUT	Other kids have parents who don't get a lot of exercise	☐	☐
☐	☐	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	☐	☐

CPAC

	Really true for me	Sort of true for me	A		B	Sort of true for me	Really true for me
7	☐	☐	Some kids are happy with themselves as a person	BUT	Other kids are often unhappy with themselves as a person	☐	☐
8	☐	☐	Some kids do very well at all kinds of games and sports	BUT	Other kids don't feel very good when it comes to games and sports	☐	☐
9	☐	☐	Some kids have parents who let them play on school or community sports teams	BUT	Other kids have parents who don't let them play on school or community sports teams	☐	☐
10	☐	☐	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	☐	☐
11	☐	☐	Some kids have parents who play games and sports with them	BUT	Other kids have parents who don't play games and sports with them	☐	☐
12	☐	☐	Some kids are very happy being the way they are now	BUT	Other kids wish they were different	☐	☐
13	☐	☐	Some kids have parents who are in really good shape	BUT	Other kids have parents who aren't is such good shape	☐	☐
14	☐	☐	Some kids have parents who don't help them much with sports	BUT	Other kids have parents who help them a lot with sports	☐	☐
15	☐	☐	Some kids don't enjoy exercise very much	BUT	Other kids enjoy exercise a whole lot	☐	☐
16	☐	☐	Some kids try hard to stay in good shape	BUT	Other kids don't try hard to stay in good shape	☐	☐
17	☐	☐	Some kids feel they are better than other kids their age at games and sports	BUT	Other kids don't feel they can play as well as other kids their age at games and sports	☐	☐
18	☐	☐	Some kids have parents who buy them a lot of sports equipment	BUT	Other kids have parents who don't buy them much sports equipment	☐	☐
19	☐	☐	Some kids have parents who don't take them to parks or playgrounds very much	BUT	Other kids have parents who take them to parks or playgrounds a lot	☐	☐
20	☐	☐	Some kids have parents who tell them that they are good at games and sports	BUT	Other kids have parents who don't tell them that they are good at games and sports	☐	☐

CPAC

	Really true for me	Sort of true for me	A		B	Sort of true for me	Really true for me
21	☐	☐	Some kids don't like getting out of breath when they play hard	BUT	Other kids don't mind getting out of breath when they play hard	☐	☐
22	☐	☐	Some kids think it is very important to be in good shape	BUT	Other kids don't think it is important to always be in good shape	☐	☐
23	☐	☐	Some kids have parents who don't encourage them to play outside	BUT	Other kids have parents who frequently encourage them to play outside	☐	☐
24	☐	☐	For some kids, games and sports is their favorite thing	BUT	Other kids like other things more than games and sports	☐	☐
25	☐	☐	Some kids have parents who practice games and sports skills with them a lot	BUT	Other kids have parents who don't practice games and sports skills with them very much	☐	☐
26	☐	☐	Some kids don't think that exercise is important for their health	BUT	Other kids think that exercise is very important for their health	☐	☐
27	☐	☐	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	☐	☐
28	☐	☐	Some kids have parents who like to walk for exercise	BUT	Other kids have parents who don't like to walk for exercise	☐	☐
29	☐	☐	Some kids are pretty sure that they are a good athlete	BUT	Other kids don't think they are a good athlete	☐	☐
30	☐	☐	Some kids really don't like to exercise	BUT	Other kids do like to exercise	☐	☐
31	☐	☐	Some kids feel bad when they run hard	BUT	Other kids feel good when they run hard	☐	☐
32	☐	☐	Some kids have parents who want them to play outside	BUT	Other kids have parents who usually want them to play inside	☐	☐
33	☐	☐	Some kids have parents who don't like to do much physical activity	BUT	Other kids have parents who like to do a lot of physical activities	☐	☐
34	☐	☐	Some kids are very happy being the way they are	BUT	Other kids wish they were different	☐	☐

CPAC

	Really true for me	Sort of true for me	A		B	Sort of true for me	Really true for me
35	☐	☐	Some kids don't do well at new games and sports	BUT	Other kids are good at new games and sports right away	☐	☐
36	☐	☐	Some kids have parents who tell them not to watch too much TV	BUT	Other kids have parents who let them watch TV as much as they want	☐	☐
37	☐	☐	Some kids are often unhappy with themselves	BUT	Other kids are usually pleased with themselves	☐	☐
38	☐	☐	Some kids have parents who walk or bike a lot	BUT	Other kids have parents who don't walk or bike very much	☐	☐
39	☐	☐	Some kids are good at most games and sports	BUT	Other kids aren't so good at most games and sports	☐	☐
40	☐	☐	Some kids have parents who remind them to do some physical activity	BUT	Other kids have parents who don't remind them much about physical activity	☐	☐
41	☐	☐	Some kids are not happy with the way they do a lot of things	BUT	Other kids think the way they do things is fine	☐	☐
42	☐	☐	Some kids like the kind of person they are .	BUT	Other kids often wich they were someone else	☐	☐
43	☐	☐	Some kids have parents who would rather walk to a store if possible	BUT	Other kids have parents who always drive the car instead of walking	☐	☐
44	☐	☐	Some kids have parents who encourage them to try hard at games and sports	BUT	Other kids have parents who don't encourage them very much at games and sports	☐	☐

Name: _____ Age: _____ Grade: _____

Sex: M _____ F_____ Height: _____ Weight: _____

APPENDIX B

PHYSICAL ACTIVITY QUESTIONNAIRE (ADOLESCENT)

Physical Activity Questionnaire (A)

Name:_____ Age:_____

Sex: M_____ F_____ Grade:_____

Teacher:_____ Weight:_____ Height:_____

We are trying to find out about your level of physical activity from ***the last 7 days*** (in the last week). This includes sports or dance that make you sweat or make your legs feel tired, or games that make you breathe hard, like tag, skipping, running, climbing, and others.

Remember:

1. There are no right and wrong answers — this is not a test.
2. Please answer all the questions as honestly and accurately as you can — this is very important.

---

1. Physical activity in your spare time: Have you done any of the following activities in the past 7 days (last week)? If yes, how many times? (Mark only one circle per row.)

	No	1-2	3-4	5-6	7 times or more
Skipping	○	○	○	○	○
Rowing/canoeing	○	○	○	○	○
In-line skating	○	○	○	○	○
Golf	○	○	○	○	○
Walking for exercise	○	○	○	○	○
Bicycling	○	○	○	○	○
Jogging or running	○	○	○	○	○
Aerobics	○	○	○	○	○
Swimming	○	○	○	○	○
Baseball, softball	○	○	○	○	○
Dance	○	○	○	○	○
Football	○	○	○	○	○
Badminton	○	○	○	○	○
Skateboarding	○	○	○	○	○
Soccer	○	○	○	○	○
Wrestling	○	○	○	○	○
Volleyball	○	○	○	○	○
Tennis/racquetball	○	○	○	○	○
Basketball	○	○	○	○	○
Ice skating	○	○	○	○	○
Cross-country skiing	○	○	○	○	○
Ice hockey/ice-skating	○	○	○	○	○
Other:					
_____	○	○	○	○	○
_____	○	○	○	○	○

2. In the last 7 days, during your physical education (PE) classes, how often were you very active (playing hard, running, jumping, throwing)? (Check one only.)

I didn't do PE	○
Hardly ever	○
Sometimes	○
Quite often	○
Always	○

3. In the last 7 days, what did you normally do *at lunch* (besides eating lunch)? (Check one only.)

Sat down (talking, reading, doing schoolwork)...	○
Stood around or walked around	○
Ran or played a little bit	○
Ran around and played quite a bit	○
Ran and played hard most of the time	○

4. In the last 7 days, on how many days *right after school*, did you do sports, dance, or play games in which you were very active? (Check one only.)

None	○
1 time last week	○
2 or 3 times last week	○
4 times last week	○
5 times last week	○

5. In the last 7 days, on how many *evenings* did you do sports, dance, or play games in which you were very active? (Check one only.)

None	○
1 time last week	○
2 or 3 times last week	○
4 or 5 last week	○
6 or 7 times last week	○

6. *On the last weekend*, how many times did you do sports, dance, or play games in which you were very active? (Check one only.)

None	○
1 time	○
2 — 3 times	○
4 — 5 times	○
6 or more times	○

7. Which *one* of the following describes you best for the last 7 days? Read *all five* statements before deciding on the *one* answer that describes you.

   a. All or most of my free time was spent doing things that involve little physical effort ..... ❍

   b. I sometimes (1 — 2 times last week) did physical things in my free time (e.g. played sports, went running, swimming, bike riding, did aerobics) ..... ❍

   c. I often (3 — 4 times last week) did physical things in my free time ..... ❍

   d. I quite often (5 — 6 times last week) did physical things in my free time ..... ❍

   e. I very often (7 or more times last week) did physical things in my free time ... ❍

8. Mark how often you did physical activity (like playing sports, games, doing dance, or any other physical activity) for each day last week.

	None	Little bit	Medium	Often	Very often
Monday	❍	❍	❍	❍	❍
Tuesday	❍	❍	❍	❍	❍
Wednesday	❍	❍	❍	❍	❍
Thursday	❍	❍	❍	❍	❍
Friday	❍	❍	❍	❍	❍
Saturday	❍	❍	❍	❍	❍
Sunday	❍	❍	❍	❍	❍

9. Were you sick last week, or did anything prevent you from doing your normal physical activities? (Check one.)

   Yes ..... ❍
   No ..... ❍

   If Yes, what prevented you? _____

10. On a typical school day, how many total hours outside of school do you watch TV, view videos, or work/play on the computer? Circle your answer.

    a. I do not watch TV, view videos or use the computer on a typical school day
    b. Less than 1 hour per day
    c. 1 hour per day
    d. 2 hours per day
    e. 3 hours per day
    f. 4 or more hours per day