

PHYSICAL ACTIVITY OPPORTUNITY IN GEORGIA MIDDLE SCHOOLS:
A CROSS-SECTIONAL SURVEY OF FREQUENCY AND CORRELATES

by

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ABSTRACT

School-based interventions are important to help children improve their activity levels, and to gain health benefits. School physical and social environments are expected to have impact on student physical activity involvement. The purpose of this study was to determine the status of physical activity opportunities afforded to public middle school students, to discover factors that are associated with physical activity opportunities that are made available to the students, and to examine the interactions between those factors and physical activity opportunities in middle schools setting.

This study measures physical education teachers' perceived physical activity opportunities, existing factors, and the relationship between them. The study involved distributing a 96-item questionnaire to 421 public middle school physical education teachers in Georgia. Participants in the study were required to fill out an online survey, which took about 25 minutes. To conduct the research, a questionnaire based on the work of other researchers was modified (Barnett et al., 2006). The majority of the questions were rated on one Likert scales ranging from 1 = strongly disagree to 2 = somewhat disagree, 3 = somewhat agree, to 4 = strongly agree. Items not rated on a Likert scale included questions about the percentage of motor activity involvement, the number of special events, the number of hours engaged in extracurricular physical activity and the time spent on physical education per week. Two

hundred and ninety two physical education teachers responded to the survey with two hundred forty three effective responses from 181 public middle schools in Georgia, and a 37% response rate was reached.

It was found that physical education was available to students more than once a week in 94.2% of schools ($n = 160$). The average length of the physical education class was 186 minutes per week (range 0-450); the median length of the extracurricular physical activity time was 5.78 hours per week (range 0 to 20 hours); the median number of special events was seven times per year per school; and the median time for organized physical opportunity was 39 minutes daily (range 0-90 minutes). When the association between environment factors and students' physical activity opportunity has examined, three key findings were identified: (1) there was a statistically significant association between social climate indicators and students' physical activity opportunities, (2) there was a statistically significant association between physical environment indicators (facilities) and students' physical activity opportunities, and (3) there was statistically significant differences in school location on students' physical activity opportunities. The results indicate that school environment influences student physical activity opportunities and student interest influences their level of activity involvement.

KEY WORDS: Middle school grades, Physical activity opportunities, Physical activity levels

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CHAPTER 1

INTRODUCTION

Overweight and obesity problems, attributed mainly to lifestyle and dietary changes in U.S. populations, have reached epidemic proportions. Mokdad, Ford, and Bowman et al. (2003) provided the most compelling evidence for the prevalence of obesity (approximately 44.3 million obesity) among United States adults in 2001. Moreover, Mokdad, Serdula, Dietz et al. (1999) reported 37 indicated obesity rates to be higher than 15% in 1998, with Georgia having the greatest increases between 1991 and 1998 (101.8%) (Mokdad et al., 1999).

Diseases previously only seen in the adult population are beginning to be observed in children and young people (Sabin, Crowne, & Shield, 2002). Indeed more children and adolescents are overweight in the United States than ever before (Lobstein & Frelut, 2003; Lobstein, Baur, & Uauy, 2004; Otto, 2005). According to a 2003 report based on a study of 4,258 young adolescents, 31% of middle school students aged 11-14 years old were overweight or at risk for overweight (Hedley, Ogden, Johnson, et al., 2004). The rise in childhood obesity has been accompanied by higher rates of the correlates of obesity and the emergence of newly identified health conditions, such as cardiovascular risk factors, type II diabetes (Lobstein et al., 2004; National Center for Health Statistics, 2004; Ogden et al., 2002; Sabin, Crowne, & Shield, 2002). Clinical studies of obese children suggest a range of medical conditions (such as delayed maturation, hypertension, type II diabetes) for which obese children are at greater risk than non-obese children (Must & Strauss, 1999; Scott, Smith, Cradock, & Pihoker, 1997). Now, obesity is one of the most common chronic disorders in childhood and its prevalence continues to increase rapidly. There is a growing awareness of the long-term health complications of obesity in children and adolescents (Jonides, Buschbacher, & Barlow, 2002). Consequently, in terms of

increased testing for associated chronic diseases, such as fatty liver disease, asthma, type II diabetes, menstrual abnormalities, hypertension, etc., “the burden imposed by obesity has become a significant concern in the United States” (Otto, 2005, p. 12).

A number of solutions have been proposed to address the problem of obesity in the United States, with weight management in children and adolescents being the most cost-effective mechanism (Hill & Trowbridge, 1998; Lobstein, Baur, & Uauy, 2004). The best time to overcome the obesity epidemic is to treat obesity during childhood and adolescence, or to prevent obesity from occurring in the first place by developing good physical activity program and excellent eating habits at an early age (Caroli & Lagravinese, 2002; Hill & Trowbridge, 1998; Lobstein, Baur & Uauy, 2004). Research has indicated that physical activity plays a key role in weight maintenance, weight loss, weight maintenance after loss, and the reduction of obesity associated comorbidities (Gortmaker et al., 1996; Berger, 2004; Blazer, Bouchard, & Despres, 1995; Dietz, 2004; Kohl & McKenzie, 1994; Moody, Craft, & Burchett, 2002; Morrow, Jackson, & Payne, 1999; Oja, 1995; Pate, Corbin, & Pangrazi, 1998). Current recommendations are for preadolescent children to be active for at least 60 min/daily of physical activity (National Association for Sport and Physical Education (NASPE) & American Heart Association (AHA), 2006; Strong et al., 2005).

Health benefits can be derived simply from becoming more physically active, but the greatest benefits come from engaging in planned and structured physical education programs in schools (Centers for Disease Control and Prevention, 2000; National Center for Chronic Disease Prevention and Health Promotion, 1997; Summerfield, 1998). Studies have demonstrated significant linkages between school physical education and perceived child and adolescent physical activity levels (Dale, Corbin, & Dale, 2000; McKenzie, Feldman, et al., 1995;

McKenzie, Nader, et al., 1996; McKenzie, 1999; Myers, Strickmiller, Webber, & Berenson, 1996; Sallis, McKenzie, Alcaraz, Kolody, Faucette, & Hovell, 1997). As we know, school is a social and environmental institution that has a large potential on controlling the behavior of children, and therefore has become an ideal setting in which to encourage daily physical activity participation (Wechsler & Devereaux, 2001). Also, many of the lifestyle and behavior choices associated with healthy habits could be developed during school age years. Thus, it is important to promote physical activity at school (Edmunds, Waters, & Elliot, 2001). The middle school years are recognized as an important time in the development of adolescents' knowledge, attitudes, beliefs, and behaviors related to physical activity (Malina, 1996; Mohnsen, 1997; Rowland, 1999; Sallis & Patrick, 1994). This developmental period impacts adolescents far beyond the middle school years into adulthood. In light of this, few would argue that physical education represents an area of the middle school curriculum that has the potential to impact adolescents' developing knowledge, attitudes, beliefs, and behaviors in positive and meaningful ways that may endure across the lifespan.

Indeed, school responses to the physical activity and health needs of society have traditionally been reflected through physical education programs (Fairclough & Stratton, 2005). For example, in order to be physically active, children need to learn fundamental motor skills and develop health related physical fitness (cardiovascular endurance, muscular strength and endurance, flexibility, and body composition) (Allensworth, Lawson, Nicholson, & Wyche, 1997). If children have a strong foundation in fundamental movement skills, they are more likely to enjoy participation in physical activities, and are more willing to attempt new skills and activities (Okley, Booth, & Patterson, 2001). These attributes are required for a lifetime of physical activity. Therefore, physical education provided at school, is an ideal way to encourage

activity involvement and to develop fitness among children for it can influence their beliefs and attitudes regarding nutrition and weight control (Edmunds, Waters, & Elliot, 2001). Eventually, this can lead to preparation for an active lifestyle that could persist into adulthood (Sallis, Conway, Prochaska, et al. 2001; Siedentop, 1994).

Therefore, school physical education programs provide a medium through which middle school students can refine and expand upon their physical repertoire of skills (Mohnsen, 1997) and increase their physical activity levels (Cater, 2002) and also can lead to favorable behaviors and attitudes later in life (Gillander, Gadin, & Hammarstrom, 2002). However, the quality of school based physical education program depends on quantity of students' physical activity opportunities provided in school. Thus, for physical activity promotion to be truly effective and for it to lead to sustainable knowledge and behaviour change, it should be seen as a whole school responsibility and reinforced within the whole school environment (Cale, 2000). In 1996, the CDC recommended that all students in kindergarten through grade 12 receive daily, quality physical education (Department of Health and Human Services, 2006). The National Association for Sport and Physical Education (NASPE) recommends that elementary school children should receive at least 150 minutes of PE per week and that middle and high school students should receive at least 225 minutes a week.

Middle School Physical Education Requirement

Before embarking on a study of the physical activity opportunities in the state of Georgia, one should be familiar with the state laws that govern what is required at the middle school level. Georgia State Board of Education (SBOE) Rule (160-4-2-.12, 2000) states that middle schools shall have health and physical education program available. This rule is open for interpretation by local school boards and districts. Given the breadth of the law, it could mean that all students

are required to take physical education daily or it can mean that only one elective physical education class is offered in the school.

The SBOE law does not stipulate the length of those physical education classes but the Georgia State Department of Education has established minimum content standards for physical education through the Quality Core Curriculum (QCC). These standards cover physical fitness, movement concepts, and self-management.

Professional Requirement for Georgia Physical Educators

Related to physical activity opportunities are the qualifications of those who teach the offerings. PE teachers in public schools in Georgia are required to hold a teaching certificate, which means that middle school students in Georgia receive PE instruction from certified teachers with a PE endorsement. Candidates for teacher certification must complete a state approved program in health and physical education (Rule 505-2-.003, 2004) before they are able to receive an initial certificate from the Professional Standards Commission (PSC). Moreover, certified teachers must earn six semester hours of college course work or ten professional learning units or continuing education units' credits every five years to meet continuing education requirements (Rule 505-2-.024, 2004), but there is no requirement that these credits be from their area of endorsement/specialization.

Statement of the Problems

Physical activity behaviors serve as the cornerstone for the prevention of obesity problems in children and adolescents. Objective data clearly demonstrates the importance and influence of the physical education programs, particularly as related or critical to young children's physical activity levels and patterns of behavior (Fairclough & Stratton, 2005; Gray & Oslin, 2003; McKenzie & Sallis, 1996; Sallis & McKenzie, 1991; Sallis & Patrick, 1994; Summerfield,

1998), which may lead to active lifestyles (Siedentop, 1994). However, the prevalence of overweight and obesity problems raises concerns that need to be addressed with physical activity opportunities. Overweight and obesity problems occur in almost every community in United States, with obesity in Georgia being a significant problem. Nearly 33% of Georgia middle school students are overweight or at risk of becoming overweight (YRBSS, 2003).

It is understood that middle school can be a difficult time for many students because of the tremendous changes taking place in their lives. Students move through developmental changes physically, socially, emotionally, and intellectually. They experience a rapid and uneven growth spurt (Darst, Van der Mars, & Cusimano, 1998). The middle school physical education experience can be one of the most important links to the healthy lifestyle because students make personal decisions about what they like and dislike. Decisions that are made during this stage are often last a lifetime (Darst, Van der Mars, & Cusimano, 1998). The strongest implications show a tendency for those who are more active in middle school age to be more able to lead active lifestyle than their peers in early adulthood (Malina, 1996). However, available documents show erosion of state requirements for daily physical education, with current conditions in states showing limited requirement for daily programming in physical activities (Healthy People, 1995; NASPE & AHA, 2006; Ross & Pate, 1987). Only 6.4% of middle schools provide daily physical education or its equivalent (225 minutes per week for middle schools) (School Health Policies and Programs Study, 2000). The recent School Health Policies and Programs Study, conducted by CDC, determined that just 47% of middle schools require at least 3 years of physical education (Pate et al., 1995). However, limited research data are available on the overall status of physical activity afforded to students in middle school.

Therefore, it is necessary to determine physical activity opportunities made available to middle school students and to discover factors that impact these opportunities. Especially, middle school young adolescents (10-14 age group) are in a time of transition from childhood to young adulthood, which is at a unique stage of development with definite physical, social, emotional difficulties (Mohsen, 1997; Rice, 1996; Wiles & Bondi, 1986), but a paramount stage to examine engagement in physical activities and eating patterns because their engagement may be changing (Wiles & Bondi, 1986). Thus, this period seems to be at a high risk for obesity associated morbidity (Dietz, 1994, 1997). For these reasons, appropriate interventions are needed for youth of middle-school age to prevent overweight and obesity problems (Rice, 1996; Wang, Yang, Lowry, & Wechsler, 2003). Therefore, as Misner and Arbogast (1990) claimed, there is a need to better determine and to understand existing opportunities made available to children/youth in middle school so that the overall quality of physical education can be appraised and or effective strategies can be devoted.

Purpose Statement

The purpose of this study is to determine the status of physical activity opportunities afforded to public middle school students in Georgia, to discover factors that are associated with physical activity opportunities made available to the students, and to examine the interactions between those factors and physical activity opportunities in middle schools setting.

Research Questions and Hypotheses

Research Questions

The following research questions have been used to guide this study.

1. What is the status of physical activity opportunities afforded in public middle schools in Georgia?

2. What are the factors exist in schools will influence the availability of those opportunities?
3. Is there a correlation between school social climate and perceived students' physical activity opportunities?
4. Is there a correlation between school physical environment and perceived students' physical activity opportunities?
5. Is there an association between transportation availability and perceived students' physical activity opportunities?
6. Is there an association between PE teacher personal characteristics and perceived students' physical activity opportunities?
7. Is there a correlation between school location and perceived students' physical activity opportunities?
8. Are there differences in physical activity opportunities between schools have PE Supervisor/coordinator and schools have not?

Hypotheses

The following hypotheses, stated in the null form, are enumerated for testing:

Ho1: There will no significant relationship between school social climate and perceived students' physical activity opportunity in school.

Ho2: There will no significant relationship between school environment and perceived students' physical activity opportunity in school.

Ho3: There will no significant relationship between transportation availability and perceived students' physical activity opportunity in school.

Ho4: There will no significant relationship between PE teacher personal characteristics and perceived students' physical activity opportunity in school.

Ho5: There will no significant relationship between school location and perceived students' physical activity opportunity in school.

Ho6: There will no significant difference in physical activity opportunities between schools have PE supervisor/coordinator and schools have not.

Physical activity opportunity in this study refers to any physical activity (organized physical activity), which happens in school settings, before, during or after school.

Theoretical Framework

This study, designed to determine the status of physical activity opportunities and explore the factors from the knowledge of PE teachers, is grounded in a substantial theoretical basis (Social Ecological Model) for the expectation that multiple facets of the physical and social environments influence the behaviors of individuals. According to Sallis and Owen (1997), social ecological models describe behavior as a dynamic process that is simultaneously influenced by aspects of the social and physical environments, as well as by personal attributes of individuals. Social ecological frameworks are unique in acknowledging multiple levels of influence as fostering the adoption and maintenance of physical activity rather than having a traditional sole focus on intrapersonal factors (Sallis & Owen, 1997). From a social ecological perspective, the potential for behavioral change within population groups, such as middle school age children, is considered within the social context, which can include friends, classmates, classroom and school environment associates, and formal and informal physical activity opportunities. Social ecological models provide an overarching framework, or set of theoretical principles, for understanding the interrelations among diverse personal and environmental factors (Stokols, 1996). Thus, a social ecological approach to understanding correlates of physical activity opportunities among middle school age children allows us to extend traditional

motivational and behavioral theory to provide an analysis of components identified including intrapersonal, interpersonal, community, environmental and organizational resources (Sallis & Owen, 1997).

Significance of the Study

This study can have a significant impact upon the development and delivery of school-based intervention program for middle school students. A review of literature revealed the relationship between physical education, level of physical activity, and obesity. In many schools, the duration and frequency of physical education are restricted. Because of this and other reasons, physical education has a limited potential to significantly contribute to the daily physical activity levels of most adolescent and to combat the increases in physical inactivity and obesity (Fairclough & Stratton, 2005). In order to improve the quality of physical education program, documented evidence of existing problems and factors that may have direct or indirect influence on physical education program need to be determined. Moreover, the evidence of factors associated with limited students' physical activity opportunities and with quality of physical education program are necessary to dispel the doubts of an already skeptical public and also to verify to all that physical education fosters significant student learning and healthy lifestyle habits. This study will produce information about physical activity opportunities afforded to middle school students, with identified factors being related to higher physical activity opportunities, and will determine the quality of physical education programs in Georgia. Not only will the investigation into the impact of students' physical activity opportunity add new knowledge to the field, but will, most importantly, contribute to the interventional programs specific for young adolescent who are overweight/obese or might most likely be overweight/obese because of the available physical activity opportunities.

Delimitation of the Study

This study is delimited to the following:

1. Participants are PE teachers in all 421 public middle schools in Georgia.
2. One self-administered questionnaire (Department of Health and Human Services, 2006; Wisconsin Department of Public Instruction, 2006) is used to assess the school-based physical education program availability, frequency, duration; program features; percentage of time devoted to motor activity during physical education class; and extracurricular physical activity.
3. Categories of the potential factors (Barnett et al. 2006) are used to assess the environmental factors (social climate, physical environment, organizational environment, sociocultural environment), which may influence the availability of students' physical activity opportunities.

Limitation of the Study

There are limitations associated with the study. Representation is limited. The samples in this study are selected from the southeastern region of United States (Georgia) and certain school levels (Middle school) that might decrease the extent to which the results could be generalized to all public schools (K-12). The validity of research design is limited by its nature as a self-report instrument. To minimize the limitations of the study, the focus was on using a cross-sectional study and larger sample size (243).

Assumption of the Study

Certain basic assumptions pertaining to physical activity opportunities related apply to this study:

1. Schools with more support for physical activity (e.g., fewer policy barriers, fewer facilities and equipment barriers) would provide students more chance to engage in physical activity.
2. School location (e.g., urban, suburban, rural) associated with students' physical activity opportunities availability.
3. Larger school districts may have a PE supervisor, thus more opportunities for PE. Smaller school district do not have a PE supervisor, accordingly, they have less PE opportunities.
4. All participants are cooperative and honest in terms of data collection.

Definition of Terms

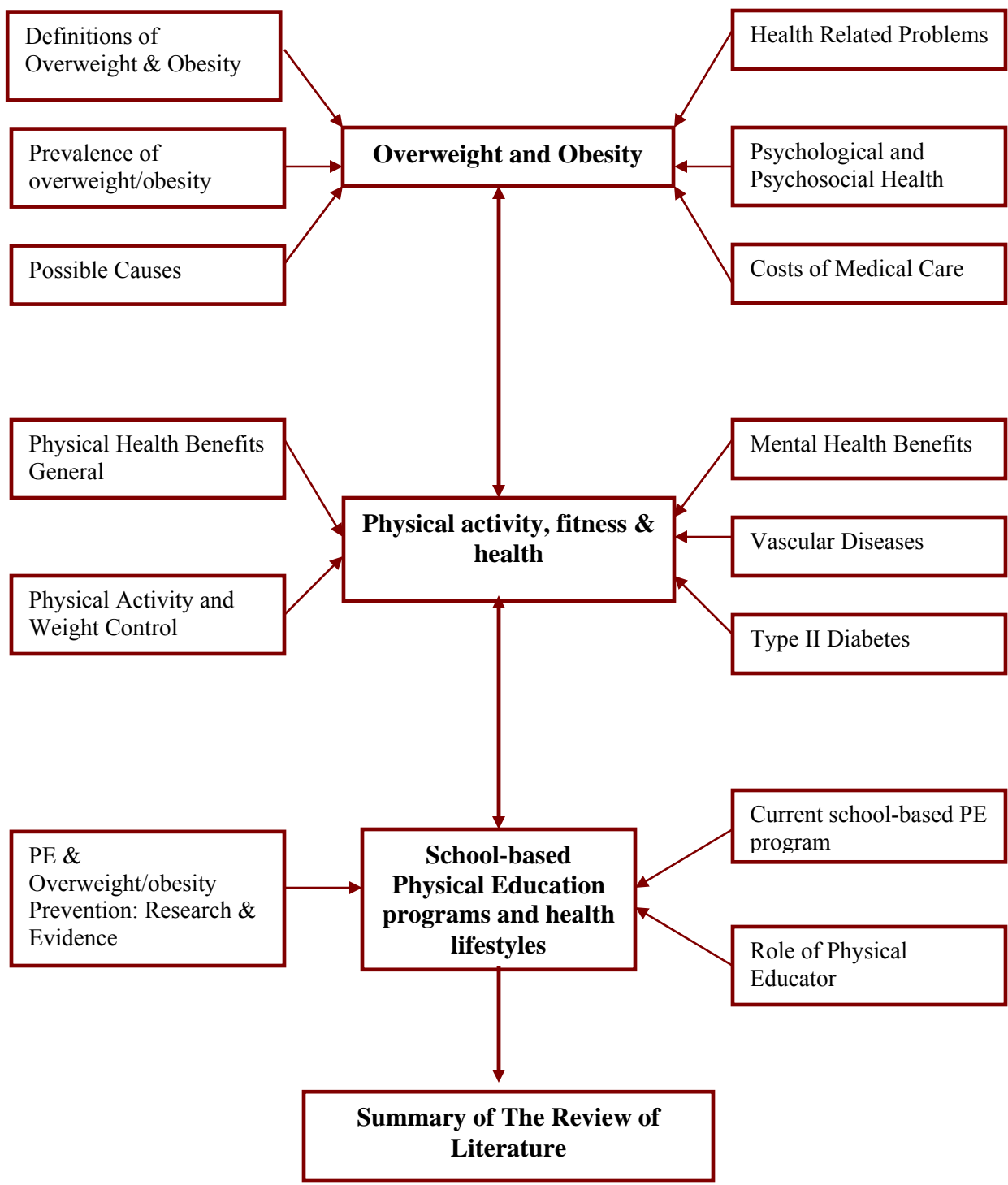
1. Overweight: A person who weights more than his or her desirable weight. A person's desirable weight has been defined as one at which he or she looks good, feels good, and can function efficiently (Hockey, 1996).
2. Obesity: a chronic condition characterized by an excess of body fat. It is most often defined by the body mass index (BMI), a mathematical formula that is highly correlated with body fat. BMI is weight in kilograms divided by height in meters squared (kg per m^2)(Torpy, Lynn, & Glass, 2003). "People with a BMI between 25 and 30 kg per m^2 are categorized as overweight, those with a BMI greater than 30 kg per m^2 are categorized as obese"(Torpy et al., 2003, p. 1880).
3. Physical Education: "is an integral part of the total education of every child from kindergarten through grade 12. Quality physical education program are needed to increase the physical competence, health-related fitness, self-responsibility, and enjoyment of physical activity for all students so that they can be physically active for a

lifetime. Physical education program can provide these benefits only if they are well-planned and well-implemented” (NASPE, 2004, p. 6).

4. Physical activity: Any bodily movement that increases energy expenditure, which includes a broad range of occupational, leisure-time, and routine daily activities. These activities require either light, moderate, or vigorous effort and can lead to improved health if practiced regularly (Brown, Thomas, & Kotecki, 2002).
5. Physical activity opportunities: basically is organized physical activity that happened during and after school, such as frequency and duration of the PE class, percentage of time devoted to motor activity during the PE class, extracurricular physical activity, special physical activity events.
6. Physical Fitness: A set of attributes that allows individuals to carry out daily tasks without undue fatigue. A measure of a person’s ability to perform physical activities that require endurance, strength, or flexibility that is determined by a combination of regular activity and genetically inherited ability (Brown, Thomas, & Kotecki, 2002).
7. Healthy lifestyle: “An enduring pattern of behaviors related to ones’ health”. A healthy lifestyle is a valuable resource for reducing the incidence and impact of health problems, for recovery, for coping with life stressors, and for improving quality of life. A healthy lifestyle is generally characterized as a “balanced life” in which one makes “wise choices” about personal health skills to creating a mutually supportive environment for healthy living (Brown, Thomas, & Kotecki, 2002).

CHAPTER 2

REVIEW OF RELATED LITERATURE



Introduction

As a result of lifestyle and dietary changes, overweight and obesity have reached epidemic proportions in the United States. Physical inactivity is a key factor for this consequence, making physical activity an integral part of daily life to be crucial. Schools showed that physical education more responsibility to make this happen. Accordingly, this chapter focuses on the review of related literature on physical activity, and the chapter is divided into four sections: (1) Overweight and obesity, (2) Physical activity, fitness and health, (3) School-based Physical Education programs and health lifestyles, (4) Summary of the review of literature.

Overweight and Obesity

Overweight and obesity are increasing in both genders and among all population groups. In 1999, the rates of both overweight and obesity in the United States were 61% for adults and 14% for children (USDHHS, 1999). Moreover, Wellman and Friedberg (2002) pointed out that the number of overweight and obese adults and children to be continuously growing. This has caused lots of negative consequences, such as putting a burden on the health care system. This section provides an overview of the current situation on overweight and obesity, its possible causes, and consequences.

Definitions of Overweight and Obesity

Obesity is a chronic disorder that affects tens of millions of Americans (Sabin, Crowne, & Shield, 2002). A number of methods are used to determine if someone is overweight or obese. Some are based on the relation between height and weight; others are based on measurements of body fat (Barlow & Dietz, 1998). However, according to Lobstein, Baur, and Uauy (2004), “The

definitions have usually been based on anthropometry, with body mass index (BMI) being the most widely used both clinically and in population studies” (Lobstein, Baur, & Uauy, 2004, p. 12). According to World Health Organization (WHO), BMI is defined as weight (kg)/ height squared (m^2). A person with a BMI over $25 \text{ kg}/m^2$ is classified overweight, and while one with a BMI of over $30 \text{ kg}/m^2$ is classified obese (WHO, 2000). BMI is the standard obesity assessment in adults, and it is also used in children to provide a consistent measure across age groups (Barlow & Dietz, 1998).

Possible Causes of Overweight and Obesity

According to Wellman and Friedberg (2002), obesity is not a single disorder but a heterogeneous group of conditions with multiple causes and genetic influences. However, the authors also point out that the marked rise in the prevalence of obesity within a relatively stable population during the past 30 years is best explained by behavioral and environmental changes that have resulted from technological advances instead of genetic factors as the primary reason for change (Wellman & Friedberg, 2002).

What behaviors contribute to overweight or obesity, and how does the environment foster these behaviors? According to Hill and Peters (1998), overweight or obesity can arise only when energy intake exceeds energy expenditure. They indicated that our current environment is characterized by an essentially unlimited supply of convenient, relatively inexpensive, highly palatable, energy-dense foods, coupled with a lifestyle requiring only low levels of physical activity for subsistence. Such an environment promotes high energy intake and low energy expenditure, and making people to become overweight or obese (Hill & Peters, 1998).

Accordingly, other researches also provide similar idea, that is sedentary lifestyles together with greater consumption of high-energy foods appear to be the major contributing factors to

overweight and obesity body structures (Hu, Li, Colditz, Willett, & Manson, 2003; Lobstein, Baur, & Uauy, 2004; Staropoli, 2006; Stubbs & Lee, 2004). Sedentary is defined as engaging in less than thirty minutes of moderate physical activity, equivalent to brisk walking, each day (Concannon, 2002).

Evidence continues to support reduced physical activity participation and promotes sedentary behaviors, (Dietz, & Gortmaker, 1985; Eisenmann, Bartee, & Wang, 2002; Gortmaker, Must, Sobol, et al., 1996). According to Staropoli (2006), advances in technology and transportation have reduced the need for physical activity in daily life. The appeal of television, electronic games, and computers has increased the time spent in sedentary pursuits among children and adults alike. A recent media study found youth, ages 2 to 18 years old, to spend an average of 5 hours 29 minutes per day, using various types of media (Roberts, Foehr, Rideout, & Brodie, 1999). According to Hu, Li, Colditz, Willett, and Manson (2003), TV watching is more associated with overweight or obesity, because people are leave hands free for eating, and constant exposure to food advertising serves as a trigger for providing oneself with snacks, and consequently leads to increased food and calorie intake and unhealthy eating habits. Further, other studies have also demonstrated that television viewing is associated with childhood and adolescent obesity (Andersen, Crespo, Bartlett, Cheskin, & Pratt, 1998; Dietz & Gortmaker, 1985; Eisenmann, Bartee, & Wang, 2002; Gortmaker, Must, Sobol, et al., 1996; Hanley, Harris, Gittelsohn, et al., 2000; Kaur, Choi, Mayo, & Harris, 2003).

On the other hand, Wen, Orr, Millett, and Rissel (2006) indicated a relationship between mode of transport used and overweight and obesity. They point out that a increasing sedentary lifestyles is our growing car dependency. Travel by car is the dominant mode of commuting in all developed countries (Wen, Orr, Millett, & Rissel, 2006). These shifts appear to

have had a considerable impact on population levels of walking, cycling and public transport use, which are collectively known as 'active transport'. Frank, Andresen, and Schmid (2004) conducted a study examining urban sprawl and weight status between 2000 and 2002 in Atlanta, Georgia. They found an association between car use and obesity (Frank, Andresen, & Schmid, 2004).

Moreover, facilitating this trend is the fact that most children in the United States do not engage in daily physical activity at school (Hill & Peters, 1998). Cutbacks in mandatory physical education programs have contributed to overall declines in children's physical activity levels (Hill & Peters, 1998). Even when these programs are available, they are often taught by untrained individuals, involve little actual physical activity, and do not focus on the fun aspects of physical activity (U.S. Department of Health and Human Services, 1996).

Overall, because of the lifestyles change, people are less physically active, which serves as a greater inducement of obesity (Lobstein, Baur, & Uauy, 2004). A report of the surgeon general indicates that more than 60% of the United States adults do not engage in the recommended amount of physical activity. Approximately 25% of the United States adults are not active at all (CDC, 1999). Physical activity among children is also decreasing. Youth Risk Behavior Surveillance System (YRBSS) data for 1999 showed that in the United States more than 35% of high school students do not participate regularly in vigorous physical activity. Nearly half are not even enrolled in a physical education class and further enrollment in physical education drops from 79% in 9th grade to 37% in 12th grade (CDC, 2000). National transportation surveys revealed children, aged 5–15, to drop by 40% between 1977 and 1995 in walking and bicycling participation, while the time spent in sedentary activities increased (Nationwide Personal Transportation Survey, 1997).

Prevalence of Overweight and Obesity

The lifestyle change has promoted decreasing physical activity participation, which has mainly led to rapidly increasing obesity epidemic in the United States (Lobstein, Baur, & Uauy, 2004). The prevalence of overweight and obesity in society has increased since the 1980s (Flegal, Carrol, Kuczmarski, & Johnson, 1998; Galuska, Serdula, Pamuk, Siegel, & Byers, 1996). Between 1986 and 2000, the prevalence of severe obesity (BMI ≥ 40 kg/m²) quadrupled from 1 in 200 Americans to 1 in 50 (National Center for Health Statistics, 2004). According to Mokdad, Serdula, Dietz, et al. (1999), the prevalence of obesity increased from 12.0% in 1991 to 17.9% in 1998, with the highest increase among the youngest ages, and the prevalence of obesity increased steadily from 1991 to 1998 in all states (Mokdad, Serdula, Dietz, et al. (1999). Ezzati and his colleagues (2006) report further trends in national and state level obesity in the United States. The authors used data from two nationally representative health surveys and health examination surveys [the Behavioral Risk Factor Surveillance System (BRFSS) and the National Health and Nutrition Examination Survey (NHANES)] for two time periods (1988-1994 and 1999-2002), and they found out that the corrected prevalence of obesity among adult U.S. populations increased (between 1988 and 2002) from 16.0% to 28.7% for men and 21.5% to 34.5% for women, with a nearly linear trend (Ezzati, Martin, Skjold, Hoorn, & Murray, 2006).

Children and adolescents have suffered a similar fate. What is particularly alarming is that the percentage of young people who are overweight has almost doubled in the last 20 years for children aged 6-11 and almost tripled for adolescents aged 12-19 (Inge, Garcia, Daniels et al., 2004). In 2003, a report based on a study of 4,258 children shows 31% of middle school students aged 11-14 years old were overweight or at risk for being overweight (Hedley, Ogden, Johnson, et al., 2004). Further, according to Schwarzenberg (2005), the prevalence of

overweight and obese children increased from 15% in 1971 to more than 30% in 2000. At present, approximately 9 million children over 6 years of age are considered obese (Committee on Prevention of Obesity in Children and Youth, 2004). The rise in childhood obesity has been accompanied by higher rates of the correlates of obesity and the emergence of newly identified health conditions (Lobstein et al., 2004; National Center for Health Statistics, 2004; Ogden et al., 2002; Sabin, Crowne, & Shield, 2002).

Health Problems Related to Overweight and Obesity

Persons who are overweight or obese are much more likely to have health problems than persons who maintain a healthy weight. Clinical observations have long suggested a connection between obesity and a variety of illnesses (National Institutes of Health Consensus Development Conference Statement, 1985). On the other hand, obesity can also create an enormous psychological burden. In fact, in terms of suffering, this burden may be the greatest adverse effect of obesity (Lobstein et al., 2004).

What are the health problems related to being overweight or obese? In Evans, Rich and Davies' (2004, p. 382) view, "this is a narrative of certainty and negativity signaling, as it does, a potential threat to personal, institutional, national health and economic well-being." Further, it is a discourse of risk because all could fall prey to its advances unless appropriate intervention, investment, and action is taken at all appropriate levels (Evan, Rich, & Davies, 2004). For example, Otto (2005) has pointed out obesity to be a risk factor for type II diabetes. The emergence of type II diabetes in youth represents a particularly alarming consequence of the obesity epidemic in children (Scott, Smith, Cradock, & Pihoker, 1997). Moreover, the onset of diabetes in youth will increase the risk for the advanced complications of the disorder – cardiovascular disease, kidney failure, visual impairment and limb amputations in early

adulthood (Scott, Smith, Craddock, & Pihoker, 1997). Meanwhile, obesity is frequently associated with hypertension in adults and the same appears true in children. Up to 30% of obese children suffer from hypertension (Figuroa-Colon, Franklin, Lee, Aldridge, & Alexander, 1997). All of which lead to increases in the overall burden of disease in the population, and consumption of healthcare dollars, reduction of quality of life, and increase mortality (Otto, 2005).

According to Eckel and Krauss (1998), obesity is a major risk factor for coronary heart disease. Other studies have also investigated and described the risk factors of obesity, and they conclude of that diabetes mellitus, hypertension, dyslipidemia, stroke, certain cancers, among other diseases (Calle, Rodriguez, Thurmond, & Thun, 2003; Dyer, Stamler, Garside, & Greenland, 2004; Must, Spadano, Coakley, et al., 1999; Priyanath, Daviglus, Dyer, et al., 2001; Shaper, Wannamethee, & Walker, 1997). It has been estimated that in the US population, more than 45% of the 9.3 million cases of cardiovascular disease (Wang, Zheng, Heath, et al., 2002) and 280 000 deaths annually (13.3% of all deaths)(Allison, Fontaine, Manson, et al., 1999) can be attributed to obesity. The Muscatine study in Iowa has shown that adolescent obesity, especially in males, is associated with higher levels of total and low-density lipoprotein cholesterol in adulthood (Lauer, Lee, & Clarke, 1988). Similarly, The Bogalusa study in Louisiana has provided detailed information on cardiovascular risk factors in childhood and their persistence into adulthood (Freedman, Serdula, & Khan, 2002). Furthermore, obesity has been found to be associated with the early development of coronary atherosclerosis in adolescent and young adult men (McGill, McMahan, & Herderick, 2002)

Yeater (2000) discovered gallstones to be more prevalent in the obese individuals for “their incidence is 9.4% in the lowest quartile of BMI and 25.5% in the highest quartile in women. In men the incidence is less but still increases with BMI” (p. 352). Several cross-sectional studies

have also suggested an association between childhood overweight and asthma (Gennuso, Epstein, Paluch, & Cerny, 1998; Luder, Melnik, & Dimaio, 1998; Chinn & Rona, 2001). In 2002, a representative survey of US children aged 2 months to 18 years indicated BMI to be above the 85th percentile, which was linked to increased asthma prevalence (Rodriguez, Winkleby, Ahn, et al., 2002).

Also, obesity could, according to Flegal, Graubard, Williamson and Gail (2005), be conceived to have relative risks of mortality associated with different levels of BMI. By using the series of National Health and Nutrition Examination Surveys (NHANES) conducted by the National Center for Health Statistics, they first calculated the relative risks from NHANES I, NHANES II, and NHANES III mortality studies and from a data set that combined data from all three surveys. Using relative risks from combined survey data, Flegal et al. estimated that 111,909 excess deaths in 2000 were associated with obesity (BMI ≥ 30), and of the excess deaths associated with obesity, the majority occurred in individuals with BMI 35 or greater (Flegal et al., 2005). Reversing the obesity epidemic is an urgent priority, because of the strong association between overweight and obesity and several well-established risk factors for morbidity and mortality (Mokdad, Ford, Bowman, et al., 2003).

Moreover, psychosocial factors in the development of obesity are widely recognized in the literature (Dietz, 1998; Murray, 2003; Rohrer & Rohland, 2004; Wadden & Stunkard, 1985, 1993; Wadden, 2004). Obesity-related physical impairments and illnesses can significantly reduce a person's quality of life. Schwimmer, Burwinkle and Varnis' (2003) study indicated obese children and adolescents to have significant impairment not only in total scale score, but also in all domains — physical, psychosocial, emotional, social, and school functioning — in comparison with healthy children and adolescents.

However, the most widespread consequences of childhood obesity may be psychosocial, because children will have psychological and social adjustment problems (Dietz, 1998), including lower perceived competencies than normative samples on social, athletic, and appearance domains, as well as overall self-worth (Richard & Strauss, 2000), and the children can experience discrimination in social, school and employment situations (Friedman & Brownell, 1995). The result is often a withdrawal from social interactions and a further reduction of physical activity. Withdrawal and lack of social support also promote unhealthy eating habits, for example binge eating (Spitzer, Devlin, Walsh, et al., 1992; Telch & Agras, 1994).

Strauss, Smith, Frame, et al's (1985) study reveal decreased levels of self-esteem in obese children as a group. However, other studies report normal levels of self-esteem (Wadden, Foster, Brownell, et al., 1984; Mendelson & White, 1982). In order to address the influence of childhood obesity on self-esteem in a large longitudinal sample of U.S. children, Richard and Strauss (2000) analyzed the data from the National Longitudinal Survey of Youth. They found that obese Hispanic and white females demonstrated significantly lower levels of self-esteem by early adolescence. In addition, obese children with decreasing levels of self-esteem demonstrate significantly higher rates of sadness, loneliness, and nervousness and are more likely to engage in high-risk behaviors such as smoking or alcohol consumption (Richard & Strauss, 2000).

On the other hand, body image dissatisfaction is a serious psychosocial consequence of obesity (Friedman & Brownell, 1995). Research on body image dissatisfaction across diverse groups with eating and weight concerns has identified a number of potential predictors, including childhood onset of obesity (Wardle, Waller, & Fox, 2002), and psychological factors, including self-esteem (Foster, Wadden, & Vogt, 1997; Grilo, Wilfley, Brownell, & Rodin, 1994; Matz et

al., 2002) and depression (Wardle, Waller, & Rapoport, 2001). Therefore, there are no doubts that obesity at any age carries a high risk of psychological stress (Otto, 2005).

Roberts, Kaplan, Shema, and Strawbridge (2000) found a strong relationship between obesity and prevalence of depression. Based on a meta-analysis of such studies, Friedman and Brownell (1995) found a moderate effect for obesity and depression. Furthermore, Palinkas, Wingard, and Barrett-Connor (1996) noted that obesity also might be associated with depression through differential consumption of nutrients affecting depression, in particular, carbohydrates. The reason is that consumption of carbohydrates appears to affect the vegetative symptoms of depression via central serotonergic activity while also affecting weight per se (Wurtman, & Wurtman, 1989; Lieberman, Wurtman, & Chew, 1986). Carpenter, Hasin, Allison, and Faily (2000), using data from a large national sample from the United States found obesity to be associated with increased risk of depression and suicidal ideation among women but not men. Obese people also are less likely to exercise, and physical activity reduces the risk of depression by increasing levels of endorphins, improving regulation of norepinephrine, improving fitness, and enhancing self-esteem (Ross & Hayes, 1988; Lobstein, Mosbacher, & Ismail, 1983).

Obesity Related Medical Care Costs

The economic burden of overweight and obesity is enormous. A rising prevalence of obesity in the U.S. population, and the increasing frequency of hospital treatment for obesity linked diagnoses, will lead to a rising burden on a nation's health services (Lobstein et al., 2004). In 1998, Quesenberry, Caan, and Jacobson (1998) examined the relationship between body mass index (BMI) and health care expenditures. They conducted a membership health survey in March 1993 among members of the Kaiser Permanente Medical Care Program in the Northern California Region. Results of analyses of 171 18 respondents through computerized databases of

all hospitalizations, laboratory services, outpatient visits, outpatient pharmacy and radiology services, and the direct costs of providing these services during 1993, indicated a strong association between BMI and total costs (Quesenberry, Caan, & Jacobson, 1998). More specifically, in 2002, US people spent \$92.6 billion (\$78.5 billion in 1998 dollars) in overweight and obesity-related medical costs (Centers for Disease Control and Prevention, 2004). Mokdad et al. (2000) for example, noted alarmingly that more than 9.4% of the US health care budget is spent on the treatment of obesity and related diseases and it is recognised that this is likely to increase. "Obesity has been become widely recognized major health problem of the 20th century. Tens of millions of dollars are spent annually on research, treatment, and prevention" (Johnston, 1985, p. 1068).

Moreover, in the United States, an increase in the prevalence of obesity has been accompanied by a more rapid increase in the extent of the obesity, with more children becoming more severely obese (Jolliffe, 2004), indicating that obesity-related medical conditions will rise at least as rapidly as the overall obesity prevalence rate (Jolliffe, 2004). Wang and Dietz (2002) focused solely on US children with obesity's hospital treatment cost. By using US hospital discharge diagnosis during 1997-1999, they found that the cost for children with an obesity diagnosis was over \$ 120 million (1.7% of annual total US hospital costs) in the late 1990s. Health professionals are aware that the rising trends in excess weight among children and adolescent will put a heavy burden on the health care system, for example, 10% of young people with type II diabetes are likely to develop renal failure by the time they enter adulthood, requiring hospitalization followed by life-long dialysis treatment (Dean & Flett, 2002).

Furthermore, in so far as childhood obesity tracks into adulthood, the rising rates of obesity in childhood will inevitably lead to earlier, and hence more costly referrals into the health care

system for young adults (Lobstein et al., 2004). Consequently, Lobstein et al.(2004) indicated that if childhood obesity is a risk factor for adult diseases, then rising rates of childhood obesity, especially among the heaviest children, can be predicted to lead to earlier onset of adult obesity associated disorder. Earlier onset in adulthood will then lead to a longer subsequent lifetime of disability and treatment, creating a significant extra financial burden on national health services (Lobstein et al., 2004). Thus, it is emphasized that prevention of obesity “should be amongst the highest priorities in public health” (Seidell, 2000, p. 28). And because there is no easy cure for this overweight or obesity disease, prevention is seen to lie in targeting young children, adolescents, and young adults through intervention programs in schools and persuading the wider population to adopt a more physically active lifestyle associated with a low fat diet (Evan, Rich, & Davies, 2004). All in all, a variety of information about this serious health issue remind us that, action is needed to curb the increasing numbers of obesity, especially children who are being negatively effected by obesity.

Physical Activity, Fitness and Health

Over the past few decades, lots of studies identified physical activity as a leading health indicator directly correlated with decrease in certain chronic diseases such as obesity and diabetes in US population (Bouchard & Despres, 1995; Karvonen, 1996; Oja, 1995). As the body of data on this topic has grown considerably over the last few decades, research on physical activity and health has provided a solid base consensus statements on the relations of physical activity and fitness to the physical health and mental health benefits (Berger, 2004; Blair, 1995; Caspersen, 1989; Dishman & Buckworth, 1996; Karvonen, 1996; Kujala, Kaprio, Sarna, & Koskenvuo, 1998; Oja, 1995; Pratt, 1999; Ross & Gilbert, 1985; Sallis et al., 1997; Saxena, Van Ommeren, Tang, & Armstrong, 2005). Stanish, Temple and Frey (2006) emphasized that

physical activity has been operationalized as an attainable health behavior with favorable consequences on commonly recognized health outcomes (Stanish, Temple, & Frey, 2006). Accordingly, Bouchard, Stephens, Sutton, and McPherson (1990) further theorized this health outcome as following:

A human condition with physical, social, and psychological dimensions, each characterized on a continuum with positive and negative poles. Positive health is associated with a capacity to enjoy life and to withstand challenges; it is not merely the absence of disease (pp. 6 -7).

Because the health consequences of activity and fitness are more prominent and potentially most effective among populations, Shephard (1995) points out that “there is now a growing recognition not only among physical educators but also among physicians, that physical activity and fitness influence many aspects of personal health” (p. 288).

General Physical Health Benefits

Physical activity is associated with an impressive physical health benefits. The 1996 Surgeon General’s report proclaimed “physical activity and health”, which was based on compelling body of scientific evidence, that: people of all ages could improve their health and quality of life through lifelong practice of moderate physical activity (United States Department of Health and Human Services, 1996). Accordingly, Bouchard and Despres (1995) pointed out that systematic exercise and physical activity increase the levels of 'organic fitness' by promoting an improved functional capacity, a more efficient cardiovascular system, an increase in mineral content and strength of bones, greater muscular fitness, better control over body weight, and enhanced mental functioning. Researchers further explained that although these elements on their own do not constitute 'health', they can prevent or delay the development of certain forms of

disease (Bouchard & Despres, 1995; Sallis & Owen, 1999), such as coronary heart disease, diabetes, colon cancer, and several other major chronic diseases and conditions (Pratt, 1999).

Physical Activity and Weight Control

According to ACSM (2001), many inactive individuals expend insufficient calories to maintain balance between energy expenditure and intake, and results in overweight or obesity. Therefore, the key to successful weight loss appears to be energy expenditure. Physical activity enable participant to increase their caloric expenditure (Stanish, Temple, & Frey, 2006). Thus, regular physical activity could be a core component of successful weight loss and, more importantly, of long-term weight loss maintenance (Stanish, Temple, & Frey, 2006). Hill, Drougas and Peters (1994) pointed out that there is evidence linking physical inactivity to the development of obesity. Accordingly, Hill, Drougas and Peters (1994) indicated out that exercise alone could be effective in reducing adiposity and likely to be most effective in ameliorating childhood and adolescent mild obesity when it is combined with appropriate dietary changes.

With the current body of available data (Boreham, Wallace, & Nevill, 2000; DeBusk, Senstrand, Sheehan, & Haskell, 1990; Jakicic, Wing, Butler, & Robinson, 1995; Jakicic, Winters, Lang, & Wing, 1999; Murphy & Hardman, 1998; Snyder et al., 1997; Woolf-May, Kearney, Jones, et al., 1998), there appears to be a general agreement that multiple short bouts of exercise per day may be an effective method for weight loss, though the magnitude of these benefits is unclear. Jakicic, Wing, Butler, and Robinson (1995) found that thirty or forty minutes of intermittent aerobic exercise were more effective for improving cardiovascular endurance and weight loss in overweight women. Murphy and Hardman (1998) showed similar fitness improvements and decreased body fat with multiple, short bouts of brisk walking in sedentary middle-aged women. In an 18 months intervention trial by Jakicic, Winters, Lang, and Wing

(1999), subjects exercising in short bouts (home treadmill group) shown long term weight loss maintenance. In addition, in the recent meta-analysis by Anderson, Konz, Frederich, and Wood (2001), subjects that were highly physically active were able to maintain their weight loss better than subjects categorized by low physical activity (54% and 27% average percent weight loss maintained respectively).

There are clear benefits resulting from regular exercise for people trying to lose weight (Murphy & Hardman, 1998; Snyder et al., 1997). It is also possible that exercisers find additional motivation, either through improved body image, self-esteem, or a sense of personal control to better manage their lifestyles (Lohman & Wright, 2004). However, exercise alone is more likely to play a critical role in long-term weight control for overweight and mildly obese individuals rather than the severely obese who often find it difficult to achieve significant levels of weight-bearing movement (Dietz, 2004). However, as weight is lost by other methods, exercise levels can be gradually increased.

Physical Activity and Vascular Diseases

Because high body fatness is closely associated with poor cardiovascular fitness, obesity is, to some degree, an easily measured marker to coronary heart disease and cardiovascular disease (Gutin, Barbeau, & Yin, 2004). Bouchard and Despres (1995) suggested that regular physical activity could have positive influence on blood lipids and lipoproteins that are strong predictors of coronary heart disease. Using randomized controlled trials in adults, Kraus et al. (2002) demonstrated that exercise has a beneficial influence on lipids/lipoproteins. By using similar experimental design, other researchers also identified physical activities to have a positive influence on blood pressure (Fagard & Tipton, 1994; Whelton et al., 2002).

Kohl and McKenzie (1994) pointed out there is some epidemiological evidence suggesting that the risk of cerebrovascular accidents is reduced in active individuals. Powell, Thompson, Caspersen, and Kendrick (1987) conducted a study to calculate relative risk for the occurrence of coronary heart disease at different levels of physical activity by using data from 43 studies review. They found that an inverse association between physical activity and incidence of coronary heart disease was consistently observed, particularly in the better-designed studies (Powell et al., 1987). Some subsequent studies have examined the influence of physical activity and physical fitness in adolescence on cardiovascular disease risk factors later in life (Janz, Dawson, & Mahoney, 2002; Twisk, Kemper, & Van Mechelen, 2002). The findings of these studies suggest that high physical fitness during adolescence and young adulthood is related to a healthy cardiovascular disease risk later in life (Boreham & Riddock, 2001; Janz, Dawson, & Mahoney, 2002; Twisk, Kemper, & Van Mechelen, 2002).

Physical Activity and Type II Diabetes

Type II diabetes is also one of the health risks associated with obesity (Yeater, 2000). The etiology of type II diabetes is not known, but insulin resistance characterizes it. The manifestations of insulin resistance are hyperinsulinemia and impaired glucose homeostasis, which result in impaired fasting glucose and/or impaired glucose tolerance, that precede the development of type II diabetes (Shepard & Kahn, 1999). For these conditions, exercise could be a major component of the lifestyle intervention in diabetes prevention (Tuomilehto et al., 2001). According to Shepard (1995), an increase of physical activity can improve insulin sensitivity, which increases the delivery of glucose to the muscle, thereby improving glucose uptake. Balon and Nadler (1997) reported that nitric oxide might be a potential mediator of exercise-induced glucose transport. In addition, Yeater (2000) indicated that exercise, especially resistance

training increases muscle mass, resulting in more active tissue to clear glucose. Eriksson and Lindgarde (1991) conducted a nonrandomized study. They separated the subjects into two groups, control group served as a standard treatment, experiment group received a diet and exercise program and were followed for 6 years. They found that above 50% of patients in the experiment group had normal glucose at the 6 year follow up (Eriksson & Lindgarde, 1991).

As for exercise intensity, McAuley et al. (2002) suggested that the effects of physical activity were analyzed used high-intensity exercise such as bicycle ergometer or running graded up to 70% to 90% of the VO_2 max. Their study showed that modest levels of exercise recommendations did not improve significantly the insulin sensitivity, but a more intensive program did (McAuley et al., 2002). Therefore, they emphasized that intensive lifestyle changes were necessary to improve insulin sensitivity (McAuley et al., 2002). However, recently, Laaksonen et al. (2002) reported that high-risk men engaging in currently recommended low levels of leisure-time physical activity were also less likely to develop the metabolic syndrome than sedentary men. Researchers further reported that aerobic exercise such as walking was more effective in increasing the insulin sensitivity (Oshida et al., 1991). Also, recent studies suggested that the combination of aerobic and resistance exercise is more efficient in improving insulin sensitivity and responsiveness (Sato, Nagasaki, Nakai, & Fushimi, 2003). It seems that physical activity interventions are most clearly beneficial to those at risk for lifestyle-related diseases. Furthermore, along with benefits in health promotion, moderate-intensity exercise seems to be useful in facilitating treatment of various diseases.

Mental Health Benefits of Physical Activity

Obesity is associated with a variety of undesirable mood states, such as anxiety and depression, as well as with body dissatisfaction (Carpenter, Hasin, Allison, & Faith, 2000).

Those emotional disturbances may be associated with the use of eating as a convenient, habitual way to self-regulate mood states, a higher probability of depressive episodes (Carpenter et al. 2000). Finally, it will create inactivity-obesity cycle. Over the past decade, issues related to emotional eating and body image have been incorporated into physical activity intervention programs. Thayer (2001) suggested that exercise could be a more effective approach to regulating mood states and help people have an appropriate eating pattern. Treasure and Newbery (1998) also point out that physical activity lead to improvement in pleasurable mood states such as energy, vigor, positive engagement. Essentially, as Berger (2004) expressed

By increasing physical activity participation, obese individuals can improve their mood states, feel more positive about themselves, and manage their stress levels while they are increasing caloric expenditure. Meanwhile, exercise also many help in decreasing the influence of psychological factors on their eating patterns (p. 56).

On the other hand, lots of researches also show increased exercise participation and promotion of varied mental health benefits outcomes, such as stress and mood management, competition and enjoyment (Cash, Novy, & Grant, 1994; Flood & Hellstedt, 1991; Frederick & Ryan, 1993; Gill & Overdoff; 1994). Rohrer, Pierce, and Blackburn's (2004) study on relationship between healthy lifestyles and self-rated mental health was a classic work. They concluded that good mental health was independently associated with physical activity (Rohrer, Pierce & Blackburn, 2004). Further, Berger (2004) stated that males and females of all ages can gain the emotional benefits from regular exercise, and that participation in movement activities helps to foster social adjustment. In addition, Mutrie and Parfitt (1998) reviewed literature on young people and mental, social and moral health. They concluded that physical activity could

have positive effects on mental health, most particularly for self-esteem, and also that those who are physically active are less likely to suffer from mental health problems.

Moreover, according to Berger (1996), physical activity also contributes to intellectual development and emotional well-being. Research also indicated that children who lack sensory stimulation and movement opportunities often show developmental delays (Berger, 2004; Blumenthal et al., 1999; Mutrie, 2000). However, Berger, Pargman, and Weinberg (2002) pointed out those benefits of physical activity are not automatic, as “clarification of the complex psychological dynamics associated with exercise is needed to design exercise programs that enhance psychological benefits and possibly adherence” (Berger, 2004, p. 56).

In summary, research evidence shows that regular physical activity can provide us benefits either physically or mentally. Consequently, in the face of increasing physical inactivity and obesity among children, school physical education, after years of relative neglect in favor of other subjects, is gaining new attention to help solve this health problem.

School-based Physical Education Programs and Health Lifestyles

The dramatic increase in the prevalence of obesity among both youth and adults and the evidence that many young people do not engage in sufficient levels of physical activity has generated the support (Tappe & Burgeson, 2004) for the argument that school-based physical education programs should be one of the primary vehicles for addressing health related physical activity goals (McGinnis, Kanner, & DeGraw, 1991; Pate & Hohn, 1994; Sallis & McKenzie, 1991; Tappe & Burgeson, 2004). The main reason for that argument, according to Wechsler and Devereaux (2001), is that school is a social and environmental institution that has a large effect on controlling the behavior of children, and therefore has become an ideal setting in which to encourage daily physical activity participation (Wechsler & Devereaux, 2001). Also, many of the

lifestyle and behavior choices associated with obesity develop during school-age years, and thus a child's physical activity at school is important determinants of body weight (Edmunds, Waters, & Elliot, 2001). There has been a growing recognition that school based physical education programs provide a health benefit. There is now strong consistent epidemiological evidence linking a wide range of important health and social benefits to participation in school-based physical education program (Almond & Harris, 1998; Giebink & McKenzie, 1985; Gray & Oslin, 2003; Martin & Kulinna, 2003; McGinnis, Kanner, & DeGraw, 1991; McKenzie & Sallis, 1996; Miller, Bredemeier, & Shields, 1997; Myers, Strickmiller, Webber, & Berenson, 1996; Pate & Hohn, 1994; Sallis & McKenzie, 1991; Sallis & Patrick, 1994; Shattuck, Banks & Abbot, 1850; Tappe & Burgeson, 2004).

Physical Education and Overweight/Obesity Prevention: Research and Evidence

The rapidly increasing prevalence of obesity in the United States, however, may require a more population-based effort, in contrast to interventions focused only on high-risk (for example, already obese) individuals (Rose, 1985). Researchers have supported the importance of school-based physical education programs in promoting physical activity and health (Almond & Harris, 1998; Martin & Kulinna, 2003; McKenzie et al., 1995; Sallis et al., 1997). Schools are appropriate setting for overweight or obesity prevention, for a number of reasons. According to Edmunds, Waters, and Elliot (2001), children spend many hours in school, making physical education programs in schools a potentially important channel through which physical activity and fitness may be promoted among young children. Summerfield (1998) suggested that “physical education provided at school, is an ideal way to develop, and maintain appropriate physical activity and to develop fitness among children and, for many children, this will be their only preparation for an active lifestyle” (p. 2). Rowland (1999) argued that this especially critical

for those adolescent students who are beginning to establish lifelong physical activity behavior patterns as they cross the threshold to adulthood. According to Fox (1996), school provides one of the few opportunities to address the full range of individuals in a population at no extra cost. Furthermore, any positive impact schools have on young people has the potential to add benefits of have a lifetime, as well as have an immediate effect (Fox, 1996).

Sallis and colleagues (1997) reported that a health-based physical education curriculum implemented by physical education specialists and trained classroom teachers successfully increased children's physical activity levels. Myers, Strickmiller, Webber, and Berenson (1996) demonstrated that children who did not take part in physical education during school were less physically active overall than those who did. In a review of 19 studies, Almond and Harris (1998) also found that the eight intervention-based studies were successful in increasing physical activity levels of children in physical education classes. Giebink and McKenzie (1985) conducted a study in a summer health and fitness program, which was implemented in both physical education and sport setting, found that the instructional strategies utilized for character development (sportsmanship) were more effective in a physical education setting and less effective in a recreational sport setting. A number of researchers have also acknowledged that creating positive fitness experience, coupled with efforts by teachers to hold students accountable during that time, are a means by which health can be promoted and habits can be formed for patterns of lifelong physical activity (Gray & Oslin, 2003; McKenzie & Sallis, 1996; Sallis & Patrick, 1994). Consequently, investigators suggest that public school physical education programs can play a vital role in efforts to socialize youth into engaging in physical activity and motivating them to adopt exercise as a lifestyle habit in a manner more likely to

transfer into adulthood (Blair, Kohl, & Gordon, 1992; Harrell, Davy, Stewart, & King, 2005; Hayward, 1991; Morrow, 1991; Sallis & McKenzie, 1991).

How effective are school physical education programs in preventing obesity and promoting physical activity? Kain and his colleagues (2004) conducted one study to determine the impact of school-based physical education on primary school children through changes in adiposity and physical fitness. In their study, they used a trained nutritionist and physical education teacher to implement the nutrition education and physical activity program and to evaluate the process during a six-month intervention period, and conducted some of the physical activity workshops for children. The results showed a robust effect on physical fitness in both genders and significant decreased adiposity only in boys (Kain, Uauy, Albala, Vio, Cerda, & Leyton, 2004). In a physical education focused study, Sallis and his colleagues (1997) completed a quasi-experimental design study of three conditions in the process of implementing health-related physical education program, which was taught by physical education specialists or trained classroom teachers. Students from these classes were compared with those in control classes. Analyses were conducted on 955 students with complete data. This study acknowledges that the inclusion of a health-related physical education curriculum can provide students with substantially more physical activity during physical education classes. Improved physical education classes can potentially benefit 97% of elementary school students (Sallis, McKenzie, Alcaraz, Kolody, Faucette, & Hovell, 1997). There was also a large-scale, multisite study, testing a school-based health promotion intervention designed to lower percent body fat in American Indian elementary school children (Steckler, Ethelbah, Martin, et al., 2003). The goal for the intervention schools was to teach the pathways physical education curriculum for 30 minutes at least three times per week, or 90 minutes per week. The results showed the school-based

interventions to be implemented successfully with good reach, high extent, and fidelity in individual behavior about physical activity (Steckler, Ethelbah, Martin et al., 2003). Many other studies have documented variable levels of success in school-based physical education program, particularly with elementary and middle school children (Caballero, Clay, Davis, et al. 2003; Flores, 1995; Gortmaker, Peterson, Wiecha et al., 1999; Harrell, Davy, Stewart, & King, 2005; Kien & Chiodo, 2003; McKenzie, Nader, Strikmiller, Yang, Stone, Perry, et al. 1996; Neumark-Sztainer, Story, Hannan, & Rex, 2003; Resnicow, 1993; Robinson, 1999).

Consistent with the above picture of the importance of physical education is the evidence on social value potential. According to McHugh (1996), playing fair, learning to get along and help others, and leading healthy lifestyles were found to be valuable contributions that resulted from physical education. The gym, by nature, is a social place and is qualitatively different from the regular classroom in that children can move freely in larger spaces. Beyond movement skill development and the benefits of physical activity, learning to move in group-oriented environments also provides an appropriate space for teaching social skills (McHugh, 1996). A series of intervention studies were conducted among a group of urban at-risk fourth and fifth grade children (Miller, Bredemeier, & Shields, 1997). Results indicated an improvement in moral reasoning maturity among the children exposed to this instruction design (Miller, Bredemeier, & Shields, 1997). Hellison (1995) also noted that the core of personal-social education is formed by feeling responsible for one's body, rights, and feelings, as well as for the needs of other people. Furthermore, as part of learning in the affective domain, Solomon (1997) provided ideas of how physical education can have a strong influence on character development. By focusing on the social-emotional nature of physical movement, PE teachers can help students become well-adjusted, self-assured members of society (Tomme & Wendt, 1993).

All of the inquiry reviewed here supports the view that with carefully designed instructional strategies, the physical education setting can help children to be active and develop health benefits. Clearly, the evidence to date supports the contention that physical education can provide an excellent opportunity for children to be active and develop health benefits (Martin & Kulinna, 2003; McKenzie et al., 1995).

What's Happening in Current School-Based Physical Education Program

Because of the current trend of inactivity, and “a relationship between habits in early life and physical activity in adults”, NASPE guidelines state that “it is important to provide young people with quality physical education to equip them with the fitness levels, knowledge, motor skills, and personal/social skills they need to be active now and in the future” (NASPE, 2004, p. 8). Therefore, NASPE (2004) recommends that elementary school children should receive at least 150 minutes of physical education per week and that middle and high school students should receive at least 225 minutes a week. Government organizations like the CDC also recommend that all schools require daily physical education for all students from kindergarten through 12th grade. However, in 2001, a survey conducted by NASPE indicated two states (Colorado and South Dakota) still do not have some kind of mandate for physical education; Illinois is the only state that requires daily physical education for all students, K-12 (NASPE, 2001). In Georgia, the situation is that grades K-6 have 90 hours per year required; grades 7-8 might have available classes but they are not mandatory. In high school, two classes are required and are usually done in 9th grade. Currently, at the elementary school level, state mandated requirements for physical education time range from 30 minutes a week to 150 minutes per week (NASPE recommends 150 minutes per week). At the middle school level, physical education time requirements range from 80 minutes a week to 275 minutes per week (NASPE recommends

225 minutes per week). The majority of high school students take physical education for only one year. The time requirements range from no time specified to 225 minutes a week (NASPE recommends 225 minutes per week) (NASPE, 2001). Moreover, according to a survey conducted by CDC, there are only 84.0% of elementary, 77.4% of middle/junior high, and 79.5% of senior high schools follow national or state physical education standards or guidelines (CDC, 2000).

Also, many schools are cutting back on physical education and limiting or eliminating recess (Burgeson, Wechsler, Brener, Young, & Spain, 2001; CDC, 2002; Healthy People, 1995; Ross & Pate, 1987). Enrollment in physical education has dropped from 41 percent of students in 1991 to 25 percent in 1995 (McCracken, 2002). According to Datar and Sturm (2004), in 1998, 16% of kindergartners received daily physical education instruction in school, and approximately 13% received physical education instruction less than once a week or never. School Health Policies and Programs Study (SHPPS) (2000) also indicated that only 6.4% of middle schools provide daily physical education or its equivalent (225 minutes per week for middle schools). Further, the recent SHPPS conducted by CDC, shown that just 47% of middle schools require at least 3 years of physical education (Pate, Small, et al., 1995). Accordingly, McCracken (2002) states that “America’s sedentary lifestyle is a result of the increased use of the automobile and labor saving devices. However, our schools must accept a good portion of the responsibility for childhood inactivity and the obesity crisis” (p. 49).

The cutting back on physical education is problem for children because they need to develop active lifestyle (Edmunds, Waters, & Elliot, 2001, Summerfield, 1998) especially for middle school age children. Researches show that the middle school years may be a critical developmental period to deliver intervention strategies because children are at great risk for

difficulty (Eccles et al., 1996; Eccles, 1994; Baranowski et al., 2000). There is considerable evidence for motivational declines across a wide range of behaviors during this period (Eccles et al., 1996). For example, Sallis has estimated that physical activity declines over the school age years at about 2.7% yearly for males and 7.4% per year for females (Sallis, 1993). To compound this problem, there is some evidence that adolescents' behavioral decisions will impact behaviors and health throughout their life (Telama et al., 1997). Therefore, it is important to provide more physical activity opportunities for middle school children.

Role of Physical Educator

Because a significant portion of population continues to lead a sedentary lifestyle (which is greater inducement of obesity) (United States Department of Health and Human Services, 1996), the promotion of life long physical activity has become an increasingly important responsibility of the physical education teaching profession (Pate & Hohn, 1994). That is, it is the responsibility of physical educators to help students develop the knowledge and skills to select and participate in physical activity in order to become lifetime physically active person (NASPE, 2004). Therefore, if school-based physical education programs are to emphasize curriculum content aimed at socializing youth into regular physical activity, "it seems logical that the success of such efforts will depend, in part, on the effectiveness of instructional strategies chosen by teachers" (van der Mars, Vogler, Darst, & Cusimano, 1998, p. 58). Because what and how students learn from their teachers influences their worldview, which in turn influences their beliefs and decisions about physical activity (Kneer, 1981).

Research conducted within physical education over the last decade (Ajzen, 1991; Bandura, 1997; Ntoumanis & Biddle, 1999; Schuldheisz & van der Mars, 2001; Siedentop & Tannehill, 2000) has demonstrated the potential role that physical educators can play in determining

students' achievement orientation and facilitating an increased perception of competence and enjoyment within an activity area (Treasure & Roberts, 2001). Dale and associates (Dale & Corbin, 2000; Dale, Corbin, & Cuddihy, 1998) have reported this interactive relationship relative to students' conceptual fitness learning and participation in lifetime physical activity.

Schuldheisz and van der Mars (2001) conducted a study to examine the effects of teachers' supervision on student activity levels. They found teacher active supervision is not only help student to engage in the assigned tasks but also to help maintain this engagement at an appropriate level of intensity, duration, and quality (Schuldheisz & van der Mars, 2001). It is also recognized that teacher educator at various levels, deal with different types of students who may have differing professional goals. By Welle and Kittleson's (1994) perspective, when working with students, the teacher educator's main concern is to use different teaching strategies for students, which ensures maximal participation, sequential development, and positive influence in the long run.

Therefore, certified physical education teachers should teach physical education class instead of classroom teachers. Coulon and Reif (1994) pointed out that in some school districts, the physical education specialist's instructional duties are spread across several schools, and in other districts, the instruction of physical education is the sole responsibility of the classroom teacher or no physical education instruction is provided at all. Faucette et al (1990) found that physical education classes conducted by classroom teachers consisted mainly of game play in which a few children were active while the remainder waited for a turn. Only 5% of these classes had fitness activities as the major focus. The problems is that classroom teachers usually are not willing to dedicate the necessary time to plan for effective physical education instruction (Faucette & Hillidge, 1989), because the believe that physical education is of less value to

learners compared to other subject matter areas. As a result, physical education is frequently excluded from the weekly school schedule (Faucette & Hillidge, 1989).

On the other hand, the physical education teacher focuses on teaching and devotes necessary time to plan for effective instruction. However, some schools require physical education teacher to be able to coach and teach physical education (Figone, 1993). Apparently, that will influence the quality of the physical education program. According to Sage (1989), teacher-coach role conflict may cause individuals' cognitive dissonance and physical tension when attempting to effectively fulfill the expressed expectations of both roles. In most cases, the teacher-coach either falls short of these expectancies of both roles or devotes time and energy toward one role, thereby neglecting the other (Figone, 1993), and more importantly, has serious consequences regarding the educational attainment of students (Figone, 1994).

In summary, it seems reasonable to consider that the public school physical education program has the potential to play an important role in our society by teaching and promoting healthy lifestyles. Further, when the main concern of students' attitude formation or modification, that is, how physical education can motivate students to adopt exercise as a lifestyle habit, physical educators are in such unique position to be the vanguard for such an approach. Their regular involvement with young people in physical education settings provides the opportunity to influence youth to have positive lifestyle attitudes. Therefore, qualified physical education teachers and support for physical education teacher is important for a quality physical education program.

Summary of the Review of Literature

Because the prevalence of child and adolescent overweight and obesity, with the resulting negative consequence, such as chronic diseases, increasing in national medical spending, the

United States needs to focus more on health promotion through physical activity interventions than ever before. Thus making school physical education, a primary institution for promoting active lifestyle, appear to have a clear scene for such positive change among children and youth, and by implication the larger society populations. However, there are lots of environmental factors that may influence the quality of school-based physical education program. Little research has been done to systematically study the specific environmental factors, which might influence the quality of school physical education program in the areas of physical activity promotion and health-related physical fitness. It is the purpose of this study to develop and disseminate a survey to examine the school environment in terms of physical activity oriented program offerings. Based on the results of this study, status of students' physical activity opportunity, factors which may influence the quality of physical education program, and specific areas of physical education program deficiencies can be identified so that we can devise strategies to combat these problems, and thus school-based physical education setting can have more efficiently develop programs that serve the needs of individuals with a greater promise in achieving lifestyle learning goals.

CHAPTER 3

RESEARCH METHODOLOGY

The review of literature reveals benefits that accrue from physical activity involvement, indicate chronic diseases that results from obesity, and provides connections between public health and physical education. The purpose of this study was to discover research-based knowledge pertaining to physical activity opportunities afforded to middle school students in Georgia and to identify factors that influence availability of physical activity opportunities in the schools. In this chapter, the methods, including design and specific procedures, data collection methods, and data analysis are delineated as connected to the research questions. The research questions and hypotheses for this study were:

1. What is the status of physical activity opportunities afforded in public middle schools in Georgia?
2. What are the factors exist in schools will influence the availability of those opportunities?
3. Is there a correlation between school social climate and perceived students' physical activity opportunities?
4. Is there a correlation between school physical environment and perceived students' physical activity opportunities?
5. Is there an association between transportation availability and perceived students' physical activity opportunities?
6. Is there an association between PE teacher personal characteristics and perceived students' physical activity opportunities?
7. Is there a correlation between school location and perceived students' physical activity opportunities?

8. Are there differences in physical activity opportunities between schools have PE Supervisor/coordinator and schools have not?

Design of the Study

This study was conducted following a quantitative study design – a cross-sectional on-line survey to provide data regarding physical activity opportunities afforded to students in middle school and to identify factors related to students’ physical activity opportunities. Survey research method allows the researcher to collect data from large group of people and to study the inter-relationships between the variables (Babbie, 1990). Recent studies comparing either email or Web surveys to paper-pencil mail surveys revealed that internet-based surveys are relatively less costly than mail survey (Dillman, 2000). Furthermore, electronic surveys reduce the time of conducting a survey and enables customization, randomization, and real-time changes to the questionnaire (Dillman, 2000). The main concern in Internet surveying was coverage bias. Because the target population may not fully have Internet access, the sampled population may not represent the entire general target population (Couper, 2000). However, when the general target population is a specific population in which respondents have access to the Internet, coverage bias is less of a concern. The potential respondents for this study are public school PE teachers, according to FRSS (Fast Response Survey), nearly 100 percent of public schools in the United States had access to the Internet in fall 2005, and there have been virtually no differences in school access to the Internet by school characteristics (National Center for Education Statistics, 2006). Therefore, the online survey was feasible for this study.

This study used Quantitative correlational research methodology to investigate the possible relationship between the dependent variables – physical activity opportunities, and the independent variables – factors, which might influence physical activity opportunities in schools.

The potential factors that correlate to physical activity at school are based on the descriptions of Barnett and her colleague's research (Barnett et al., 2006). A cross-sectional survey was used to gather data from a sample selected from a predetermined population (Wallen & Fraenkel, 2001). The predetermined population is described in the next section.

Participants

The population for this study consisted of school physical education teachers in all 421 middle schools in Georgia. A list of middle school physical education teachers' email addresses was obtained from individual middle schools' website and through phone calls in April 2006. Many middle school physical education teachers promoted the study using an email, which described the study and provided a link to the web-based survey. There were 750 PE teachers email addresses available and 243 respondents for a response rate of 32%. According to Sheehan (2001), the average response rate of email survey from 1986 to 2000 was 37%, but in 1999 and 2000, the most recent years in the study, the response rates were 28% and 24%. Therefore, the response is reasonable. The number of a 5% sampling error can be tolerant and 95% confident that generalizations from the sample (de Vaus, 2002).

Instrumentation

The survey instrument used in this study was modified from the questionnaire instrument, which was created by Barnett and her colleagues (2006) to determine the physical activity opportunities in elementary schools in Canada. The survey instrument incorporated three techniques. Multiple choice questions and fill in items are used to obtain personal and professional data from the principals and physical education teachers. A Likert type scale is utilized as respondents are asked to rate statements in terms of level of agreement; the last

question of the instrument is open ended in nature to allow the respondents the opportunity to express their views on the issues.

Questionnaire for School Physical Education Teacher

A questionnaire was revised and adapted from Barnett et al.'s (2006) questionnaire on physical activity opportunities designed for elementary school PE teacher. The survey questions were redesigned for middle school physical education. It was conducted as a widely used instrument to collect more comprehensive data that covers all coordinated school health components: (a) health education, (b) physical education, (c) health services, (d) mental health and social services, (e) school policy and environment, (f) faculty/staff health promotion, (g) facility and community involvement et al.

The questionnaire contains school general information; information about physical education; extracurricular physical activities; school policy related to physical activity; support in the municipality, family support; school staff support; physical activity modeling by school principals. Permission was requested to use the questionnaire on physical activity opportunities for this study and to modify certain individual items to be more appropriate for this population.

Demographic Inventory

Additional demographic data proved useful in answering the subsidiary questions concerning availability of physical activity opportunities. A participant demographic inventory was used to collect the participants' information regarding: gender, age, total years of teaching, current assignment, location of school.

Data Collection

The survey was distributed by email linked to a survey webpage, so the recipients were requested to complete the survey online. Data from participants was gathered over a period of

three months beginning August 20th, 2006 and ending November 24th, 2006. The overall process for this study involved two phases. First, in the initial phase, a piloted study was conducted to assure the respondent understood the survey questionnaires and for sufficient variation in responses; how the question was understood, whether all items were necessary, whether scale items scale, was it too long (Converse & Presser, 1986). Second, main survey was conducted based on the modified research plan and questionnaire. In the questionnaire, individually identifiable information was avoided, for example, the respondents were not required to write their names. According to Dornyei (2003), respondents can be reluctant to give honest answers about opinions and perceptions. However, respondent confidentiality encouraged honesty and willingness to disclose. Moreover, the cover page told participants that the data was to be used for research and academic publication purposes only and that all responses would be held confidential.

Survey Pilot

The questionnaire for this study had only been used once before at elementary level in Canada. Thus, a pilot study was conducted to test the appropriateness of the expression adapted and modified from the previous study, and to test the level of reliability of measures in the survey.

A paper version of invitation was mailed in August 20th, 2006 to the 90 public middle school PE teachers in Georgia and an electronic version was emailed five days later with a URL to visit to answer the questionnaire (URL was created by UGA survey research center). The first reminder was sent on ten days later to possible participants. Ten surveys were returned, a response rate of 10%. Since the response is low and the online survey is relatively long, study participants were offered an opportunity to win a prize (two 100 dollars gift cards, six 50 dollars

gift cards, fifteen 20 dollars gift cards, twenty 10 dollars office max gift cards). Then, second reminder with questionnaire link was sent out one week after that to possible participants. The survey webpage was closed on October 6th, 2006. All respondents were asked to complete the online questionnaire and give reactions and monitored the time taken to complete the survey. Fifth-five surveys were returned; a response rate of 61%, and 15 responses were incomplete, which were removed in the data set. Given this response, the full study planned to include prizes. Based on the feedback from the pretest, the online survey was estimated to take 30 minutes to complete. Also, a few questions and statement in the survey were modified based on the feedback to make the questions and statement in the survey clearer and more appropriate for middle school PE teachers in Georgia.

Main survey

The main survey was distributed to the 660 public middle school PE teachers in Georgia. It was sent on October 10th, 2006, and the webpage was closed on November 24th, 2006. There was four follow up email on October 16th, 27th, and November 10th, 20th, 2006. Two hundred and ninety two recipients out of 660 (44%) participated in the survey. Eighty-seven out of two hundred and ninety responses were not complete and were removed from the data set. Eventually, among those 243 effective responses in my study, 195 are complete cases, 48 cases have missing values. Since my sample size is relatively small ($N = 243$), I determined not to drop the rest of the 48 cases, which have less than 5% missing items. All missing values were replaced with the overall sample means or median for that question to replace missing values, except binary variables (de Vaus, 2002). For example, using all the cases with available information by estimating a variable mean (e.g., age and years of teaching experience) for each variable based on the non-missing values of the variable. And computing the median of a

variable with Likert scale (Strongly agree, agree, disagree, and strongly disagree) with all non-missing values and then substituting the median for all missing values of that variable.

Treatment of Data

Data were taken from Internet server and reorganized into an excel spreadsheet for computation and analysis. To recognize and report a statistically significant difference the variance must be at or below the .05 alpha level. According to Best (1981) the .05 alpha level of significance is generally used in the field of education. Using an alpha level of .05, *p*-values are analyzed to determine whether or not to reject the null hypothesis.

Descriptive Statistics

Descriptive statistics were used in this study to describe the characteristics of population. According to Creswell (2002), “descriptive statistics help describe responses to questions, determines overall trends, and the distribution of data” (pp. 230-231). Wallen and Fraenkel defined descriptive statistics as “data analysis techniques enabling the researchers to meaningfully describe data with numerical indices or in graphic form” (p. 475). Descriptive statistics of the responses from participants were generated, including frequency and mean. Frequency tables for the respondents’ gender, race, teacher type, as well as for each variable, were generated using Statistical Package for Social Sciences (SPSS).

Factor Analysis

To develop an understanding of how much environmentally related factors effect students’ physical activity opportunities, indices of predicting variables were created using factor analysis and then regression analysis was performed to find their relative effects on physical activity opportunities. Factor analysis attempts to identify underlying variables, or factors (e.g., social climate, physical environment) that explain the pattern of correlations within a set of observed

variables. Dependent variables retained to be included in the score were included number of special physical activity events, hours of extracurricular physical activity offered per week, and percentage of time devoted to motor activity during physical education class.

Exploratory factor analysis was utilized to study the patterns of relationship among the 40 quality dependent variables. There were two stages involved, including factor analysis and scale reliability testing, which were used on the returned questionnaires to establish construct internal reliability of the adapted instrument. The primary purpose of the first stage was to discover a simple pattern by reducing the number of variables to a much smaller number of inferred independent variables called factors (Darlington, 2002). The goal of the second stage was to statistically manipulate the results to enable the factors to be more interpretable and to make final decisions about the number of underlying factors (Green & Salkind, 2003). Specifically, eigenvalue, percentage of variance explained, were used first as assisting tools to decide how many factors should be retained (de Vaus, 2002). The higher this value, the more variance the factor explains. To be retained, factors must have an eigenvalue greater than 1 (de Vaus, 2002). Finally, variables that did not group with any other variables were removed from the statistical model. After removing the no fitting variables from the model, a final factor analysis was performed, resulting in certain factors or underlying dimensions. This process involved the examination of the covariation between the 40 quality indicator items to determine if there were common, underlying factors present.

However, the initial extraction of factors did not make it clear which variables belong most clearly to which factors. To clarify which variables belong to which factors, and to make the factors more interpretable (de Vaus, 2002), a varimax rotation was used in ten terminal factor solutions ranging from two to six variables. An analysis of each of the solutions was examined

for conceptual meaningfulness. The analysis was guided by the following criteria: (a) ability to interpret meaning, (b) minimization of crossloaders, (c) avoidance of factors containing too few items (George & Mallery, 2001). After the factor solutions were selected, alpha coefficients for each factor determined through the factor analysis were used to establish construct internal reliability, two factors were dropped because alpha was less than .70 (Note that a reliability coefficient of .70 or higher is considered “acceptable” in most social science research situations). After the factors were identified, SPSS procedure was employed to calculate complete estimation factor scores. These concepts defined the students’ physical activity opportunities according to school support and environmental factors that favor them. In this way, the 40 topical variables that I started with was reduced to a more manageable set of five elements (school social climate, physical environment, organizational environment, sociocultural environment, personal characteristics), which were further described how environmental factors influenced students’ physical activity opportunities in school.

Ordinal Logistic Analysis

In addition to factor analysis, univariate and multiple ordinal logistic regression analyses were conducted in order to further observe physical activity opportunities as they related to the studies independent variables. Ordinal logistic regression model is a generalization of logistic regression to outcomes with more than two levels. The most common ordinal logistic model is the proportional odds model. The model is also known as polytomous logistic regression (Hosmer & Lemeshow, 2000). The model is

$$Pr (Y \leq y_i | X_1, \dots, X_m) = 1 / [1 + \exp(-(\alpha_j + \beta^t X))], \text{ for } 1 \leq i \leq k$$

Where $a_1 < a_2 < \dots < a_k$ are k ordinal response level, X_1, \dots, X_m are m explanatory variables, $\beta^t = [\beta_1 \dots \beta_m]$ is the vector of slope parameters, and $X^t = [X_1 \dots X_m]$ is the vector of explanatory variables.

Eventually, independent variables that gave $p < 0.5$ in univariate analysis were applied to multiple logistic regression analysis and odds ratio (OR) and 95% confidence interval were calculated. Multiple ordinal logistic regression analysis regression analysis was run to estimate the likelihood of the correlations between the physical activity opportunities and independent variables, involving all independent variables ($p < 0.5$) (e.g., academic loading) that predicted the value of the dependent variables.

Summary

This chapter includes a description of the research procedures utilized in this study. Included in this chapter are the research design, participants, instrumentation, data collection and treatment of data. The results of the research are presented in Chapter 4. Chapter 5 will focus on discussion in light of the results and in context of the literature, and will include conclusion and recommendations for further study.

CHAPTEHR 4

RESULTS

This chapter presents the results of the study that focused on physical activity opportunities in Georgia's middle school students, and on the factors that influence or predict availability of these opportunities. In particular, demographic variables such as age, sex, college degree, and school location were used to determine possible associations between these variables and physical activity opportunities. The results of the study are presented in three sections: description of the respondent group, explanation of the factor analysis and creation of the outcome scales, and presentation of the research findings. The survey data were analyzed with the SPSS (Statistical Package for Social Sciences for Windows, version 10.0).

Response Rate

The adapted online survey was sent to 750 middle schools physical education teachers in the state of Georgia. Eventually, 243 effective responses, representing a response rate 32% contained usable data.

Demographics

In order to give context to the study, a broader array of demographic information related to middle school PE teachers and their schools than was available from Georgia Department of Education and the McKenzie et al's (2000, 2000b) study was collected from participants. This demographic data provided an understanding of the respondent group that was used to interpret the rest of the data. Basically, this section describes the 243 physical education teachers (36% rural, 15% urban, 49% suburban) from 181 public middle schools in Georgia who completed the survey (Table 1). The median of average school size is 879 (range 157- 2409). It seems like respondents are unevenly distributed among school districts. However, based on Georgia's

geographic database – NCES’s “School District Rural Locale Status” map, and Urban-Centric Locale Code Categories – there are 421 total number of public middle schools in Georgia, with 36% (n = 153) of them being rural schools, 13% (n = 56) are urban and 51% (n =212) being located in suburban schools (U.S. NCES Common Core of Data, 2007). Therefore, the respondents from this study were evenly distributed among schools districts.

Table 1

School District (N =243)

	Frequency	Percent	Cumulative Percent
Rural	88	36.2	36.2
Urban	36	14.8	51.0
Suburban	119	49.0	100.0
Total	243	100.0	

In this study, among middle schools that had physical education, the median of average physical education class size was 30-39, and 74% had maximum allowable teacher to student ratio for required physical education. 9.1% of respondents indicated that their schools had a policy for exempting students from gym class frequently. In terms of the delivery of health related exercise in the curriculum, the study found that 7% respondents didn’t discuss health related topics at all, 28% spent less than 15 minutes, 28% spent 15 to 30 minutes, 10% spent 31 to 45 minutes, 7% spend 46 to 60 minutes, and only 20% spend more than 60 minutes per month discussing. In terms of curriculum materials, there were only 35.9% respondents that indicated National Association for Sport and PE standards to be used in their school physical education class. 54% used Georgia physical education standards, 86.7% used their district’s curriculum and

88.6% used a commercially-developed PE guide. In addition, there were only 22.4% of respondents indicated their school have adaptive physical education material and equipment (Table 2). With respect to health related topics in PE, only 20% of respondents reported that they provide student more than 60 minutes health related topics in their PE class per month (Figure.1). Fifty-six percent of respondents indicated that their schools have physical education supervisor/coordinator.

Table 2

Curriculum Materials Have Been Used in Physical Education

Curriculum Content	Yes	No	Unsure
The National Association for Sport and PE standards	87	28	128
Georgia Physical Education Standards	131	42	70
Your district's curriculum	211	11	21
Fitness test materials	199	16	28
A commercially-developed PE guide	215	17	11
Adaptive Physical Education material and equipment	54	112	77

On average, 1.34 PE teachers per school responded to this survey from 75 different counties. Approximately, there was an equal representation of female and male among respondents (Table 3). 49.8% ($n = 121$) respondents were female and 49.4% ($n = 120$) were male. In addition, the PE teacher's job responsibility was also examined (Table 4). Fourteen percent ($n = 34$) indicated they were teaching physical education only, 61% ($n = 149$) were teaching physical education and health education, 25% ($n = 60$) respondents were teaching physical education and coaching. Table 5 shows the characteristics of the study population. Further

findings reveal the mean ages of respondents to be 39.99 years ($SD = 8.47$, range = 22 - 60), with the mean of the years as physical education teacher being 12.56 ($SD = 8.25$, range = .5 - 35). Most of the respondents had a university degree with specialization in physical education ($n = 185$, 93%)(Table 6). Overall, this was an experienced group of respondents who were able to provide well-informed information on the physical activity opportunities in their school.

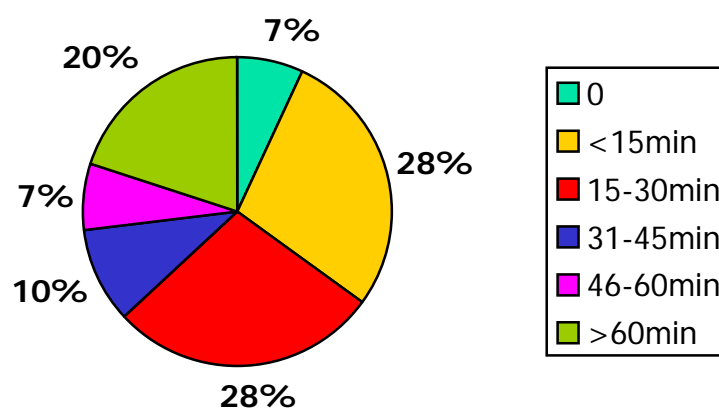


Figure 1: Health Related Topics Covered in PE Per Month ($N = 243$)

Table 3

Sex

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Male	120	49.4	49.8	49.8
	Female	121	49.8	50.2	100.0
	Total	241	99.2	100.0	
Missing	System	2	.8		
Total		243	100.0		

Table 4

Job Responsibility

	Frequency	Percent	Valid percent	Cumulative percent
PE only	34	14.0	14.0	14.0
PE & health education	149	61.3	61.3	75.3
PE & coach	60	24.7	24.7	100.0
Total	243	100.0	100.0	

Table 5

PE Teachers' Age and Years of Experience (N = 243)

	Mean	SD	Minimum	Maximum
Age	39.99	8.47	22	60
Teaching Experience	12.56	8.25	0.5	35

Table 6

Physical Education Related Degree

		Frequency	Percent	Valid percent	Cumulative percent
Valid	0	15	6.2	7.5	7.5
	1	185	76.1	92.5	100.0
	Total	200	82.3	100.0	
Missing	System	43	17.7		
Total		243	100.0		

Factor Analysis

As discussed in Chapter 3, factor analysis was used to “examine the relationship between the content categories and the empirically derived constructs” (Gable & Wolf, 1993, pp. 105-106). These new empirically derived constructs provided direction for the synthesis and data reduction of the 40 items into scales that measured physical education teachers’ perspectives to be used in further analysis (Darlington, 2002). From the 40 originally conceived content categories, this analysis resulted in eleven discrete factors with eigenvalues greater than 1 (Nagpaul, 1999). Analysis of eigenvalues is done by considering a scree-plot. A scree-plot (Fig. 1) presents the factors possibly extracted from the pool of items and associated eigenvalues. The adequacy of the factors can be determined by examining the scree-plot.

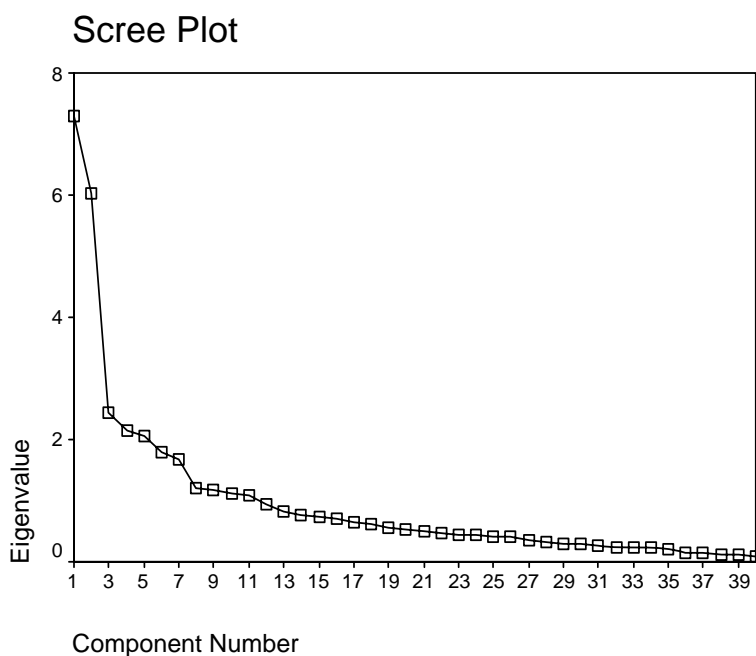


Figure 2. Eigenvalues for Factors Reflecting Variance in Items

After this initial analysis (without rotation) of the eigenvalues, nine factors were retained. Then, a varimax rotation was used in nine terminal factors solutions to get items to be identified more strongly with one or the other factor. Eventually, the factor loadings from the rotated

component matrix greater than .50 and less than -.50 were selected for each factor, and the factor loading was highest on factor one, benefits of PA in general that accounted for 17.1% of the variance. An analysis of each of the solutions was examined for conceptual meaningfulness (Perdue, 1999). Reliability analyses were also run on each of the nine factors. Because of the lower reliability, factor 9 ($n = 2$, $\alpha = -.277$), including two items were deleted to maximize the reliability of the newly designed scales. The eight resulting scales, the number of items per scale, and the resulting Coefficient alpha are displayed in Table 7.

Ultimately, the seven factors solutions were selected. This solution captured 62% of the variance observed in the 40 quality variables. For a greater understanding of the items comprising these scales, the factor loadings from the rotated component matrix greater than .50 and less than -.50 are explained as following. Items that belong together should have relatively higher loading on the same factor. For example, Q27-4, Q27-5 and Q27-11 load .835, .698 and .719 on factor 2 (Table 10), which are high compared to the other variables which load less than on the same factor. Also, a mean-item-mean was calculated for each of the seven quality dimensions for the purpose of gaining a deeper understanding of the relative importance of each of the seven dimensions. This was accomplished by calculating the mean of each of the means with within each factor. In Table 8, the dropped non-qualified items are presented after conducted reliability analyses.

Factor 1: Benefits of PA in general

The seven quality items with primary loading on factor one consisted primarily of physical education teachers' perceptions related to the benefits of participation in physical activity for individuals. Table 9 provides variable loadings and items means for factor 1. Factor 1 includes quality indicators that focus on benefits of physical activity and the interaction that occurs

between physical activity involvement and the learner. The levels of benefits provided by physical activity involvement are depended on quality of interaction, quality of materials, and quality of the instruction used to facilitate school-based physical activity opportunities.

Table 7

Scales Resulting From Exploratory Factor Analysis (n = 40)

Scale	Number of Items	Reliability (Coefficient alpha)
PA Benefits in general	7	.891
Physical environment for PE	3	.802
School policies	4	.808
Benefits of PA to students	3	.894
Family support	4	.790
Physical environment for Extracurricular physical activity	3	.829
Cost and resource	3	.737
Organizational environment	2	.700

Note. Principal component analysis with varimax rotation and Kaiser normalization was used in this exploratory factor analysis. Two items were deleted due to results of reliability analyses.

* A reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations

Table 8

Non-Loading Quality Indicator Items

Item #	Quality indicators	Loading value
Q23-2	Parental permission	.818
Q30-9	Requires too much commitment on the part of parents	-.578

Factor 2: Fewer facilities and equipment barriers for PE

The three quality items with primary loading on factor 2 consisted of perceptions related to limitation factor, which limited the increasing time allocated to school's physical education program. Factor 2 includes quality indicators that focus on equipment, facilities. Table 10 provides variable loadings and item means for factor 2.

Factor 3: Fewer school policies barriers

The four quality items with primary loading on factor 3, focuses on school climate associated limitation. The resulting factor was redefined with the understanding that if physical activity opportunities are limited by budget, and academic load, also as effective as a result of the influence of school council is, board policies.

Factor 4: Perceived benefits of PA to students

The three quality items with primary loading on factor 4, addressed respondent beliefs about the benefits to students as results from physical activity involvement, such as physical fitness improvement, improving capacity to learn and ability to concentrate. Factor 4 includes quality indicators that focus on the physical education teachers' beliefs about regular physical activity, pertaining to the fact that quality physical education programs should have systematic approaches to promote healthy lifestyles in students' learning and development.

Factor 5: Fewer family barriers

The four quality items with primary loading on factor 5 were about the physical activity limited by lack of family interest in school activities, either extracurricular physical activity or the time allocated to school's physical education program (Table 13).

Factor 6: Fewer facilities and equipment barriers for extracurricular

The three quality items with primary loading on factor 6 consisted of perceptions related to

limitation factor regarding students' extracurricular physical activity opportunities. Factor 6 includes quality indicators that focus on lack of school sports equipment and facilities (Table 14). Physical environment is concerned with the qualitative and quantitative factor used in to evaluate the availability of physical activity opportunities in school, since it could influence individual behaviors (Sallis & Owen, 1997). The reason is that when obesity become problematic in the United States, school-based programs are not only challenged to effectively provide quality physical education programs, but also are challenged to find appropriate processes and methods beyond physical education class that could promote physical activity and healthy lifestyle.

Factor 7: Fewer cost and resource barriers

The two quality items with primary loading on factor 7 consisted of perceptions related to cost and human resources, which could limit the physical activity opportunities.

Factor 8: Limited by organizational environment

The two quality items with primary loading on factor 8 included school transportation schedule and need for parents to provide transportation. The interrelationships of these items create a new factor on transport available to students. If school has transportation available or parents are willing to or capable to provide transportation that will favor the development of extracurricular physical activities at school.

In sum, this questionnaire investigated 14 items regarding the respondent characteristic, including gender, age, college degree, PE teachers' physical activity level and two indicators of physical education teachers' beliefs about the physical activity. One is a seven-item indicator (factor 1 general benefits of physical activity 1) and another is a three-item indicator of the physical activity afforded to students (factor 4). In addition, nine items of physical environment

barriers were measured in four indicators, school district, a three-item indicators for sports equipment and facilities for PE (factor 2), a three-item indicator for sports equipment and facilities for extracurricular physical activity (factor 6), and a two-item indicators for organizational barriers (factor 8). School social climate was measured through 16 items, including if school had physical education supervisor/coordinator, how frequent were student exemptions from PE class, PE class size, maximum allowable student to teacher ratio, limitation of transportation and a four-item indicator for school policies barriers (factor 3), a four-item indicator for family barriers (factor 5), and a three-item for cost and human resources barriers (factor 7).

Table 9

Variable Loadings and Items Means for Factor 1

Item #	Quality indicators	Loading value	Item means
Q43-3	Maintaining a healthy body weight	.684	3.71
Q43-4	Stress management	.667	2.94
Q43-5	Participating social activities	.719	3.33
Q43-6	Have fun	.780	3.71
Q43-7	Relax	.842	3.55
Q43-8	Self-confidence	.811	3.65
Q43-9	Spend more time outdoors	.770	3.49

Note. Scale was a four point likert scale, with a scale value of 4 indicating strong agreement and 1 indicating strong disagreement.

Table 10

Variable Loadings and Items Means for Factor 2

Item #	Quality indicators	Loading value	Item means
Q27-4	Inadequate facilities	.835	1.58
Q27-5	Not enough equipment	.698	1.50
Q27-11	Facilities not available	.719	1.45

Note. Scale was a four point likert scale, with a scale value of 4 indicating strong agreement and 1 indicating strong disagreement.

Table 11

Variable Loadings and Items Means for Factor 3

Item #	Quality indicators	Loading value	Item means
Q27-1	Other priorities established by the governing	.862	2.14
Q27-3	Academic load	.722	2.22
Q27-9	School board policies	.755	1.89
Q27-10	MEQ policies (e.g. curriculum content, time allocation)	.740	1.75

Note. Scale was a four point likert scale, with a scale value of 4 indicating strong agreement and 1 indicating strong disagreement.

Table 12

Variable Loadings and Items Means for Factor 4

Item #	Quality indicators	Loading value	Item means
Q30-1	Improves physical fitness	.828	3.71
Q30-2	Improves capacity to learn	.858	3.67
Q30-3	Improves ability to concentrate	.870	3.63

Note. Scale was a four point likert scale, with a scale value of 4 indicating strong agreement and 1 indicating strong disagreement.

Table 13

Variable Loadings and Items Means for Factor 5

Item #	Quality indicators	Loading value	Item means
Q24-8	Lack of student interest for extracurricular PA	.683	1.79
Q24-9	Lack of parental interest for extracurricular PA	.785	1.84
Q27-7	Lack of student interest for PE	.754	1.40
Q27-8	Lack of parental interest for PE	.744	1.42

Note. Scale was a four point likert scale, with a scale value of 4 indicating strong agreement and 1 indicating strong disagreement.

Table 14

Variable Loadings and Items Means for Factor 6

Item #	Quality indicators	Loading value	Item means
Q24-5	Poor quality equipment	.703	1.78
Q24-6	Inadequate facilities	.889	1.84
Q24-7	No enough equipment	.791	1.75

Note. Scale was a four point likert scale, with a scale value of 4 indicating strong agreement and 1 indicating strong disagreement.

Table 15

Variable Loadings and Items Means for Factor 7

Item #	Quality indicators	Loading value	Item means
Q24-3	Costs to school	.752	1.98
Q24-4	Costs to parents	.745	1.98
Q24-10	Lack of human resources	.707	2.13

Note. Principal component analysis with varimax rotation and Kaiser normalization was used in this exploratory factor analysis.

Table 16

Variable Loadings and Items Means for Factor 8

Item #	Quality indicators	Loading value	Item means
Q24-1	School transportation schedule	.736	2.50
Q24-2	Need for parents to provide transportation	.837	2.70

Note. Principal component analysis with varimax rotation and Kaiser normalization was used in this exploratory factor analysis.

Physical Activity Opportunities

There was a marked variation between schools with physical activities opportunities and those that did not (Table 17). The average length of the physical education class was 185.56 minutes per week (range 0-450). Physical education was available more than once a week in 94.2% of schools ($n = 181$). The median for schools was seven special events per year. Among schools that reported having extracurricular physical activity, only 3% made them available during lunchtime, 92% after school.

Table 17

School-Based Opportunities for Student Physical Activity (PA) in Middle School –Georgia, 2006

PA opportunities	Median	Mean	SD	Range
PE class (minutes per week)	195	185.56	98.62	0-450
Extracurricular PA (hours per week)	5.78	5.79	3.74	0-20
Number of Special PA events per year	7	6.29	2.31	0-10
Participation in extracurricular PA per week	40	50.43	49.47	0-200

Note. Mean, standard deviation, and median are computed for schools where physical activity opportunity is offered.

The median length of the extracurricular physical activity time was 5.78 hours per week (range 0 to 20 hours). However, the average participation rate is 50 students per week, compare to average 911 students per school ($n = 181$, range 157 to 2409), it is too low. Therefore, taking reported student participation in extracurricular physical activity into account, the median time for organized physical opportunity was 39 minutes daily (range 0-90 minutes).

Dependent Variables

To categorize schools' PA opportunity, a score was created in following three steps. First, variables retained to be included in the score consisted of a number of special physical activity events, hours of extracurricular physical activity offered per week, and duration of physical education class; the results of those variables on this survey didn't have a regular distribution. Second, responses to each variable were recoded by quartile on a 1 to 4 scale (de Vaus, 2002). It was done by univariate descriptive statistics, which effectively communicates the distribution of a variable that has many possible values (Green & Salkind, 2003). Each of three variables was sorted from the lowest to the highest value. The first quartile is the data value of the variable where 25 % of the cases that have lower values, the second quartile is 25%-50%, the third quartile is 50%-75%, and the fourth quartile is 75%-100% (de Vaus, 2002; Parker, Alford, & Passmore, 2004). Finally, scores were categorized by quartile to designate levels of opportunity in schools. Higher scores indicated greater opportunity for school-based physical activity.

Correlations of Opportunity

Ordinal logistic regression models were used in this data analysis. The model includes nineteen independent variables: school social climate (9 indicators)(Table 18); physical environment (2 indicators); organizational characteristics (1 indicator); sociocultural characteristics (1 indicator)(Table 19) and respondent characteristics (6 indicators). And three

dependent variables: a number of special physical activity events, hours of extracurricular physical activity offered per week, and duration of physical education class were used. The odds ratio (OR) was used as the primary measure of strength and direction of the relationship between each independent variable and the physical activity opportunities. In this analysis, odds ratios are less than one indicating a negative relationship. Tables 18 and 19 present parameter estimates, ORs and 95% CIs, and their corresponding *p*-value for all independent variables.

Cost and human resource (OR=1.40, 95% CI: 1.12-1.74), while keeping all other variables constant, increasing on scale cost and human support significantly increases the physical activity opportunity on average by 40%.

Family barriers (OR = 1.81, 95% CI: 1.22-2.69), decreasing family barriers significantly increase the odds of students' extracurricular physical activity on average by 81% by controlling other variables in the model.

Academic loading (OR = 0.60, 95% CI: 0.41-0.87), while keeping all other variables constant, increasing physical education teacher academic loading decreases students extracurricular physical activity opportunity on average 40%.

Teacher to student ratio (OR= 1.12, 95% CI: 1.03-1.23), while keeping all other variable in control, the odds of students' physical activity opportunity is 1.12 higher in the school who required maximum teacher to student ratio than it didn't.

Facilities (OR =1.97, 95% CI: 1.71-2.32), while keeping all other variable in control, the odds of students' physical activity opportunity is 1.97 higher in the school that have better facilities.

Transportation barrier (OR = 1.40, 95% CI: 1.12-1.74), while keeping all other variable in control, the odds of students' physical activity opportunity is 1.40 higher in the school have fewer transportation barriers.

School location (OR =1.59, 95% CI: 1.20-3.12), with the urban school as reference, the odds of students' physical activity opportunity is 1.59 higher in suburban area, while keeping all other variable in control.

Overall, four of school social climate indicators were statistically significant associated with physical activity opportunity including costs and human resources, family barriers, assignment to physical education teachers, allowable maximum teacher to student ratio with p values less than .05 were accepted as statistically significant. In addition, among the environment indicators, only facilities, transportation were significantly correlated with the physical activity opportunity in school (Table 19). Among these variables, assignment to physical education teachers was negatively associated with physical activity opportunity and all others were protective factors. School physical education supervisor/ coordinator was not associated with student physical activity opportunity. However, school location was significantly associated with opportunity.

Following this analysis, multiple ordinal logistic regression analysis was run among the independent variables and dependent variables. The overall test running a full model including all variables was highly significant with p values less than .05 were accepted as statistically significant, which indicated that based on the observed data, the set of these independent variables significantly helped to predict physical activity opportunities. The conclusion implies that: family interest barriers (Table 21), facilities and school location (Table 22) and teacher to student ratio (Table 23) does have a significant effect on physical activity opportunities. The ORs and 95% CIs adjusted for all other variables were showed in table 24, that there were significant correlations between physical activity opportunities and family interest, facilities, school location and the maximum allowable teacher to student ratio (Table 24). In addition, once other factors were taken into account, no cost and human resources, family barriers, facilities and

equipment, and transportation were retained as independent correlates of physical activity opportunity.

Secondary Analysis

In univariate ordinal logistic analyses, physical education teachers' beliefs on the importance of physical activity, teaching experience and college degree were significantly correlated with higher opportunity (Table 20). However, physical education teachers' sex and age were not related to students' physical activity opportunity, neither physical education teachers' physical activity levels.

Overall, in this chapter the research findings are presented beginning with discussion of the demographic data that explained groups of public school physical education teachers to the various comparisons of mean scores on the outcome scales. Then, with the results that addressed the different factors have been presented, a descriptive statistics that was performed to uncover any predictors of physical activity opportunities are presented. In addition, a multiple ordinal logistic analyses were run to find out the correlation between environment factors and physical activities.

Table 18

School Social Climate – Unadjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) for Potential Correlates of Opportunity

Potential correlate	HEPA			DPEC			NSE		
	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>
FSPB	1.11	0.83-1.48	0.484	0.96	0.72-1.28	0.766	0.78	0.59-1.05	0.104
FCHRB	1.40	1.12-1.74*	0.003	1.08	0.82-1.43	0.591	0.81	0.61-1.07	0.141
FSEFPE	1.09	0.80-1.47	0.588	1.11	0.82-1.50	0.499	0.89	0.66-1.21	0.452
MA	0.60	0.41-0.87*	0.007	0.69	0.48-1.00	0.051	1.24	0.85-1.79	0.263
MHR	0.91	0.79-1.06	0.230	1.08	0.92-1.25	0.320	0.89	0.76-1.03	0.120
FFIB	1.81	1.22-2.69*	0.003	1.33	0.90-1.95	0.152	1.09	0.74-1.60	0.658
PARM	1.02	0.82-1.28	0.842	0.94	0.75-1.17	0.587	0.93	0.74-1.16	0.507
PES	1.33	0.81-2.18	0.264	0.81	0.50-1.33	0.412	0.84	0.51-1.38	0.479
AMTSR	0.97	0.89-1.06	0.458	0.96	0.88-1.04	0.321	1.12	1.03-1.23*	0.010

Note. HEPA = Hours of Extracurricular PA; DPEC=Duration of physical education class; NSE =Number of special events; FSPB =fewer school policies barriers; FCHRB = fewer cost and human resource barriers; FSEFPE = fewer student exemption frequency for PE; MA = More assignment; MHR =(spending) More time spend Health Related topics in physical education; FFIB =fewer family interest barrier; PARM = physical activity Role Modeling by PE teacher; PES = PE supervisor/coordinator; AMTSR = allowable maximum teacher to student ratio.

Table 19

Unadjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) for Potential Correlates of Opportunity

Potential correlate	HEPA			DPEC			NSE		
	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>
PE									
FFEBPE	1.29	0.94-1.78	0.117	0.97	0.71-1.34	0.872	1.00	0.73-1.38	0.981
Facilities	0.78	0.50-1.11	0.436	1.97	1.71-2.32	0.048*	0.92	0.67-1.02	0.300
FFEBE	1.09	0.81-1.48	0.571	1.05	0.77-1.42	0.771	0.96	0.71-1.30	0.785
OC									
FTB	1.40	1.12-1.74*	0.003	1.09	0.88-1.35	0.421	0.85	0.68-1.06	0.140
SC									
Suburban ^a	0.93	0.48-1.81	0.827	1.59	1.20-3.12	0.042*	1.12	0.57-2.19	0.745

Note. HEPA = Hours of Extracurricular PA; DPEC=Duration of physical education class; NSE =Number of special events; PE = Physical environment; OC = organizational characteristics; SC = Sociocultural characteristics; FFEBPE =fewer facilities and equipment barrier for PE; FFEBE = fewer facilities and equipment barrier for extracurricular physical activity; FTB = fewer transportation barrier. a. Suburban (reference: urban)

Table 20

Unadjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) for Potential Correlates of Opportunity & Respondent Characteristics

Potential correlate	HEPA			DPEC			NSE		
	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>
Gender	0.94	0.60-1.48	0.792	0.90	0.57-1.42	0.652	1.10	0.70-1.73	0.681
Age	1.00	0.98-1.03	0.885	1.01	0.98-1.03	0.700	0.99	0.96-1.01	0.258
MTE	1.00	0.98-1.03	0.887	0.99	0.97-1.02	0.672	1.03	1.00-1.06*	0.028
PECD	1.08	0.42-2.78	0.870	0.48	0.19-1.25	0.134	2.70	1.02-7.14*	0.045
BIPEG	1.55	1.03-2.32*	0.034	1.51	1.01-2.25*	0.045	0.90	0.60-1.34	0.605
BPAS	1.24	0.81-1.89	0.318	0.69	0.45-1.06	0.090	0.80	0.53-1.22	0.301

Note. HEPA = Hours of Extracurricular PA; DPEC=Duration of physical education class; NSE =Number of special events; MTE = more teaching experience; PECD =Higher physical education related college degree; BIPEG = PE's belief in importance of physical activity in general; BPAS = PE's beliefs about the health benefits of physical activity to student.

Table 21

Hours of Extracurricular Physical Activity

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept 1	1	-1.2797	0.5629	5.1693	0.0230
Intercept 2	1	0.1161	0.5538	0.0440	0.8339
Intercept 3	1	0.9694	0.5587	3.0107	0.0827
FFIB	1	0.4387	0.2121	4.2784	0.0038

Note. FFIB =fewer family interest barrier.

Table 22

Duration of Physical Education Class

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept 1	1	-1.3881	0.6407	4.6931	0.0303
Intercept 2	1	0.7357	0.6950	1.1204	0.2898
Intercept 3	1	2.3766	0.7151	11.0472	0.0009
Facilities	1	0.3548	0.1696	4.3764	0.0364
Suburban	1	-0.2269	0.0836	7.3636	0.0067

Table 23

Number of Special Events

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept 1	1	-1.5246	0.5161	8.7273	0.0031
Intercept 2	1	0.2159	0.4990	0.1873	0.6652
Intercept 3	1	1.2783	0.5055	6.3940	0.0115
AMTSR	1	0.1481	0.0497	8.9023	0.0028

Note. AMTSR = allowable maximum teacher to student ratio

Table 24

Adjusted Odd Ratios (OR) and 95% Confidence Intervals (CI) for Independent Correlates of Physical Activity Opportunity in Georgia Middle School

Correlate	HEPA			DPEC			NSE		
	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>
FFIB	1.55	1.02-2.35*	0.003						
Facilities				1.43	1.02-1.99*	0.036			
Suburban ^a				0.80	0.68- 0.94*	0.007			
AMTSR							1.16	1.05-1.28*	0.003

Note. HEPA = Hours of Extracurricular PA; DPEC=Duration of physical education class; NSE =Number of special events;

FFIB =fewer family interest barrier; AMTSR = allowable maximum teacher to student ratio.

a. Suburban by using urban as a reference

CHAPTER 5

DISCUSSION

This study measures physical education teachers' perceived physical activity opportunities, environmental factors, and the relationship between them. Accordingly, the results of the study are discussed based on following research questions that concerned: (a) The status of physical activity opportunities afforded to students in public middle schools in Georgia; (b) Correlations between school social and physical environmental factors, and students' perceived physical activity opportunities.

Physical Activity Opportunities in Public Middle School in Georgia

This study assessed the availability of physical education program and other types of physical activity opportunities for students in Georgia middle schools. In this section, two conclusions can be drawn from this study, and comparisons are made with other similar research in terms of PA opportunities status in Georgia.

Physical Education Curriculum

Analyses of the descriptive data indicated that physical education curriculum continues to be an issue in middle schools in Georgia. First, this study found that the time allocated for PE in a week varied considerably from school to school, but the average time of 185.56 minutes per week was below the recommended time of 225 minutes per week (NASPE). However, this can happen in one semester, if the school is on block scheduling. Thus, it is likely that the actual time that middle school students receive weekly is much lower. Therefore, according to Cale (2000), the limited time devoted to PE by schools in this study implies that the PE curriculum might not be taught as effectively or in the depth as it should be, a concern which has been expressed elsewhere. Certainly such limited time makes curriculum developments or additions difficult and

the message it gives to other staff, parents and students is that PE is not a priority area. Other researchers and middle grades advocates (Burgeson, Wechsler, Brener, Young, & Spain, 2001; Cale, 2000; Tompkins, Zizzi, Zedosky, Wright, & Vitullo, 2004; NASPEAHA, 2006; Young et al., 2007) have also concluded that the implementation of middle school physical education class is problematic.

Second, considering other physical education related factors, such as maximum allowable ratio, class size, exemption policy, the 2000 School Health Policies and Programs Study provided limited information on physical education requirements at the state or national levels that could be used to compare to this study. While a study conducted by Burgeson et al. (2001), who examined national data, concluded that nationally, 25% of middle schools exempted students from physical education courses with 42% having a maximum allowable class size of 31. In addition, 81.3% of middle schools allow student to be exempted from required physical education (Burgeson et al., 2001). In contrast, it was discovered in this study that among middle schools that had physical education, 73.8% had maximum allowable teacher to student ratio for required physical education. The average physical education class size ranged from 30 to 39, however, some (9.1%) of the respondents indicated that their schools exempted students from gym class frequently. These results are consistent with those of Young et al. (2007), who found that 8% of 36 middle schools excused students from PE, with 44% of them having a maximal allowable class size of less than 30.

Third, according to McKenzie (1999), having active classes is extremely important because physical education sometimes provides the only opportunity students have to be physically active throughout the entire week. There is little information on the activity levels of middle students during physical education class time. In this study, the result shown that the

percentage of active time in physical education class was approximately 60% in middle schools. While one study found students to engage in motor tasks at an appropriate level, in selected middle schools to be only 16% during the lesson time (Simon-Morton, Taylor, Snider, Huang, & Fulton, 1994), another such study showed average students to be active during 48.4% of class time (McKenzie et al., 2000), and the percentage of active time was close to the Healthy People 2010 standard, which suggested that students should be physically active during 50% of the lesson time (USDHHS, 2000). However, none of these middle schools met the guideline of 50% or more of class time spent on moderate to vigorous physical activity (Power et al., 2002).

Fourth, in terms of the monthly delivery of health related topics in the physical education curriculum, this study found 7% of the respondents failed to discuss health related topics at all, with 73% spending less than 60 minutes, and only 20% spending more than 60 minutes per month on health related topics. Research indicated that an important step in becoming physically fit and promoting positive attitudes toward fitness is learning the concepts and principles of health-related physical fitness (Adams & Brynteson, 1992; Nahas, 1992). Students should be made aware of the importance of learning about physical fitness and be held accountable for their actions (Merkle & Treagust, 1993). In order to achieve that goal, students should be taught about the health benefits and principles of health related physical fitness in physical education programs. Petray (2001) stated that physical education programs should include cognitive objectives that emphasize students' appreciation of health and physical fitness. A major goal of the health-related physical fitness component of the physical education profession is to provide students with knowledge, positive attitudes, and skills that will allow them to develop healthy lifetime habits (Castelli & Williams, 2007).

Extracurricular Physical Activity Opportunities

Extracurricular physical activity is the other physical activity opportunities, which helps to improve students' daily-accumulated physical activity time (CDC, 1997; McKenzie et al., 2000; Powers et al. 2002; U.S. Department of Education, 1996). However, little is known about the nonphysical education activity afforded to middle school students (Powers et al., 2002). The present study found most of the middle schools to provide extracurricular opportunity with an average of 5.79 hours per week. On average, 50 students participated in any given activity. This number is higher than that reported in Powers and her colleagues' (2002) study, where the typical physical activity program offered an average 3.6 hours of extracurricular physical activity per week. However the participation was the same -- 50 students participated in any given activity. Thus, while time and resources are often dedicated to extracurricular activity, it appears that the impact of extracurricular programs on student physical activity is low. Since "extracurricular programs have limited operational cost, because equipment and facilities are typically available on campus and supervision can be provided by physical education teachers, other school staff, and volunteers"(Powers et al., 2002, p. 188), it is concluded that more students would be physically active. According to Powers et al. (2002), it should be possible to improve the contribution of extracurricular school programs to total student physical activity opportunity for students by increasing the number and variety of activities offered within each type of program.

Correlations Between PA Opportunities and Existing Factors

In the present study, three key findings were identified: (1) there were statistically significant association between social climate indicators and students' physical activity opportunities, (2) there were statistically significant association between physical environment

indicators (facilities) and students' physical activity opportunities, and (3) there were statistically significant differences in school location on students' physical activity opportunities.

Social Climate and Students' Physical Activity Opportunities

The results of the present study rejected the first hypothesis that there were no significant relationship between school social climate and perceived students' physical activity opportunity in school. The level of physical activity opportunity in this study was significantly associated with family interest, including parent and student interests. To my knowledge, there are very few studies that associate family interest with physical activity opportunities. Prochaska, Rodgers, and Sallis's (2002) study of middle grades student physical activity found that parent support significantly correlated with adolescent self-reported physical activity, but was not significant after controlling for demographic variables. In terms of student interest, Condon and Collier (2002) indicated interest to be a major influence on students' commitment to become and remain physically active. A student who is interested in an activity is generally motivated to participate, at least initially (Condon & Collier, 2002). Recently, researchers have focused on situational interest: a person's subjective perception of an activity's appealing characteristics (Hidi & Anderson, 1992). Mitchell (1993) tested student interest and found there were specific activities associated with each type of situational interest. Similarly, Chen (1996) conducted a study to examine student interest in physical activities in a secondary physical education, and found participants' perceptions of interest were associated with specific physical activities. This study corroborates those findings (Chen, 1996; Condon & Collier, 2002; Hidi & Anderson, 1992; Mitchell, 1993).

Of the maximum allowable teacher to student ratio has been examined, physical education teachers' perceptions of student physical activity in schools showed the strongest

negative association with class size. This is in line with Sallis et al.'s (1999) study that smaller classes are associated with higher achievement at all grade levels. Similarly, McKenzie et al. (2000) study at middle grades student activity levels, lesson context and teacher behavior, also found that class size was negatively associated with physical activity. Other researchers also found that large class sizes inhibit the amount of moderate to vigorous physical activity for each student, because large classes demand more time for organizational activities thereby reducing the time for physical activity (Darst & Pangrazi, 2006; Hastie & Saunder, 1991). In this manner, the findings appear to be in line with previous research indicating that students can obtain more benefits from smaller class size, and students who attend small classes demonstrated higher achievement and maintained good communication with their teachers (Darst & Pangrazi, 2006; Hastie & Saunder, 1991; Shepard, 1996). It is noteworthy that PE teachers' perceptions of physical activity opportunities were positively correlated with the other school policy as well. Actually, in the present study, cost and human resource was associated univariately with extracurricular physical activity opportunity. However, It was not significant multivariately, after controlling for physical and social environmental variables.

In terms of transportation, McKenzie et al.'s (2000b), study of leisure-time physical activity in middle school found that availability of transportation to school were associated with, and predicted students' opportunity to participate in extracurricular physical activity in school. However, Powers et al. (2002) study showed that there were no correlation between the transportation to school and extracurricular physical activity opportunity involvement. In the present study, transportation availability was associated univariately with extracurricular physical activity opportunity. It was not significant multivariately, after controlling for physical and social environmental variables. Thus, although transportation may have been

underestimated due to data being based on self-reports, the results suggest that overall differences in transportation among different middle schools do not seem to have a strong impact on student physical activity opportunities.

Physical Environment and Students' Physical Activities Opportunities

The present study also rejected the second hypothesis that there were no significant relationship between school physical environment and perceived students' physical activity opportunity in school. There are studies that indicated physical activity among young people has been positively correlated with access to convenient facilities and to sport and exercise equipment (Zakarian, Hovell, Hofstetter, Sallis, Keating, 1994; Stucky-Ropp & DiLorenzo, 1993). However, only two studies were available with respect to facilities and physical activity opportunities in middle school level. Although Tompkins et al. (2004) assessed physical education frequency, facilities and additional physical activity opportunities in West Virginia schools including 146 middle schools the study had no information on combined data providing any association. McKenzie et al.'s (2000b) study of leisure-time physical activity in middle school found that availability of sports equipment was significantly associated with physical activity opportunities. Similarly, Power et al. (2001) found that the more equipment provided in school environment, the higher physical activity level of students. The result of present study was consistent with their conclusion.

Sociocultural Environment and Students' Physical Activities Opportunities

The present study also rejected the fifth hypothesis that there was no significant difference in physical activity opportunities in different school location. However, one major finding is that there was 39% higher physical activity opportunity in suburban compared to urban schools. There are no related studies that associated physical activity opportunity in school

socioeconomic levels with any outcome measures. Barnett et al.'s (2006) study showed the similar results, however, their study focused on elementary schools, not middle schools.

Chapter Summary

In sum, this study found PE teachers' perceptions of students' physical activity opportunities varies among different middle schools in Georgia, and family interest, school facilities, school location, and teacher to student ratio are uniformly associated with student physical activity opportunity. One major finding is that there was higher physical activity opportunity in suburban compared to urban school, and family interest was more strongly associated with student physical activity opportunity. Future studies should consider the strong correlation found between family interest, school facilities and school location, and physical activity opportunities.

Findings of this research study suggest that middle grades student don't have enough opportunities for physical activity involvement in middle schools in Georgia. While this study has added information to the extant literature, there is still a need for more research at middle grades level to examine relations among physical activity opportunities, behavior, beliefs and other potentially influential environmental factors to better understand the broader contexts of physical activity involvement. Results of this study can help educators or researchers assess physical activity opportunities at middle schools, and develop school based intervention program.

Limitations of Study

There are limitations to this study that emerged after completing the data collection and reviewing the results. Researchers wanting to replicate this study should consider the following issues, in addition to those limitations included in chapter one. First, some terms maybe

confusing. Thus it might be wise to give specific definition to make it clear to the respondents, for instance school district, how to define urban, rural, and suburban schools. Second, schools have varying schedules for physical education. Therefore, when gathering information about average weekly intensity of student physical activity involvement, researchers must understand that how weekly physical education time is gathered might not be representative of student involvement throughout the year.

Moreover, the study was conducted in a limited geographic area, and only 74 school districts out of 198 school districts in Georgia were represented, although the 181 schools did represent a broad range of socioeconomic status and diversity that was representative of schools in Georgia. It is possible that schools more favorably disposed to physical activity and its promotion were more likely to involve this study. A national sample would be needed to determine whether the relationships between social and physical environment factors and students' physical activity opportunities apply across student populations. In addition, it is possible that there are other unmeasured confounders that would explain the association between environmental factors and physical activity opportunities. Notably, this study did not include any measure of proportion of student bussed quotient. It is possible that proportion of student bussed would be associated with students' physical activity opportunities. Additional work is needed to clarify directionality, along with the intervening processes between students' physical activity opportunities and their activity levels. A longitudinal study, with data on potential mediators, as well as student activity levels, could be helpful in studying this relationship

Implication for Research and Practice

Given the research questions, this study focused on the investigation or the association between physical activity opportunities and different factors, including the perspectives of

middle school physical education teachers in Georgia. Although this controversy existed in the literature, no research to date had conducted an in-depth study at middle school level on the correlation between different factors and student physical activity opportunities, and the extent to which those factors influence opportunities. Therefore, as an initial study examining the association between physical and social environmental factors with students' physical activity opportunities at middle school level, this investigation provides much fodder information for further research, and could have considerable implications for research and practice. In addition, the perspectives allow us not only to know why great effort is needed to assist student obtain more physical activity opportunity but also to provide direction for how to promote student physical activity.

First of all, the findings indicate that physical activity opportunity was significantly associated with student interest. On the other hand, students who had interests in physical activity tended to be more physically active. This may imply that certain teens are more capable of spending their time on participating in physical activity, or that those who were not physically active chose not to be, regardless of what kinds of physical activity opportunity were made available. As such, increasing physical activity opportunities alone may not be enough with respect to increasing students' physical activity. Physical educators should ascertain students needs and put a great effort into designing a curriculum that could motivate students to get involved in physical activity. Time management skills or motivational strategies may be necessary to encourage participation in physical activity. Future research should address time management skills of students, developing profiles suitable for screening those at risk for poor time management and interventions to improve these skills and student interest in the hope of promoting increased participation in physical activity.

Secondly, the results of this study indicated that student physical activity opportunity also significantly was associated with facilities. Suburban schools have better facilities and could provide 39% more physical activity opportunities than urban schools. The results suggest that increasing the availability of facilities in middle schools may help to increase activity levels and reduce childhood overweight or obesity problems. Enhanced availability of facilities is likely to be particularly important among schools with higher economically disadvantaged students for they are less likely to have optional means of transportation to travel to participate extracurricular physical activity. Thus it is important to understand transportation and location effects on health-related behaviors because of their potential to influence student physical activity opportunities after school.

In addition, this study relied upon the PE teachers perceived school-based students' physical activity opportunities. It would be helpful to use observations of physical education classes and extracurricular physical activity program through either direct observation or videotape reflective of student actual physical activity involvement in different kinds of environments. By extending the research questions to include this type of information, data would be available about how students participate under different circumstances. This information would also provide insights into how various teachers' characteristics influence students' involvement in physical activities when using student interest to explore physical activity opportunities for students.

The findings from this study also suggest policy makers might consider two issues related to how they provide opportunity and support for students to be physically active. First, rather than an afterthought to obesity problems, school policy makers may consider providing more opportunities on campus with a safely and professionally supervised environment. Indeed,

providing more opportunities for student to experience a variety of physical activities will contribute to an active lifestyle and enhance their leisure time is critical. Second, school policy makers should support the physical education program and staff to develop appropriate curricula and strategies to motivate students to participate in physical activities; for instance, providing more PE class, including health related topics in physical education.

Recommendations

The purpose of this study was to examine the relationships between the physical and social environments and students' physical activity opportunities. While one of the goals of this research was to provide information about physical activity opportunities on middle grades populations in school, this research study has only touched the surface in understanding these kinds of association. However, this research study has led to some interesting questions that will require further examination.

As an exploratory study, this research may have raised more questions than it has answered concerning student physical activity opportunities in school. Future research is needed to test the patterns uncovered in this study. For instance, this study indicated the significant association between school facilities and student physical activity opportunities. Research is still needed to assess the effects that increasing the hours in which school facilities are accessible might have an impact on student participation in physical activity. Case studies could help identify the type of facilities that are most likely to increase student participation in physical activity and thereby help schools make efficient use of limited resources.

We cannot effectively promote student physical activity level if we do not specifically understand those physical and social environmental factors that seem to influence student physical activity opportunities in middle school campus. Physical activity opportunities

assessment in different schools ought to be conducted to better understand the kind of physical and social contexts that are most likely to influence students' choices. Only when educators better understand the environmental factors that influence physical activity opportunities that they can work with students to craft policies and procedures that truly prioritize student physical activity levels. Therefore, recommendation for future research might include testing the extent to which physical activity opportunities is directly proportional to the quality and quantity of student physical activity involvement, and by studying whether different physical and social environment factors, when applied to encourage student involvement, actually increase student activity level. Other recommended research might include conducting qualitative research in order to better understand the effect of environment factors on students' personal beliefs and attitude towards physical activity, which will mostly like influence their choices of physical activity involvement eventually.

A future step is also needed to examine student interests in terms of different physical activities, relationships between student characteristics and their active levels, and the functions of these two types of situational issues in school environment. Hopefully, future investigations will address the critical relationship among environmental factors, student involvement and eventual achievement to respond to the need for providing appropriate strategies to improve the efficiency of school-based physical activity promotion program to address obesity issues plaguing children and adolescents population in the United States.

REFERENCE

- Adams II, T. M., & Brynteson, P. (1992). A comparison of attitudes and exercise behaviors of alumni from universities with varying degrees of physical education activity programs. *Research Quarterly for Exercise and Sport*, 63, 148-152.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processing*, 50, 179-211.
- Allensworth, D., Lawson, E., Nicholson, L., & Wyche, J. (Eds.). (1997). *Schools and health: Our nation's investment*. Washington, DC: National Academy Press.
- Allison, D. B., Fontaine, K. R., Manson, J. E., Stevens, J., & VanItallie, T. B. (1999). Annual deaths attributable to obesity in the United States. *The Journal of the American Medical Association*, 282, 1530-1538.
- Almond, L., & Harris, J. (1998). Interventions to promote health-related physical education. In S. Biddle, J. Sallis, & N. Cavill (Eds.), *Young and active? Young people and health enhancing physical activity evidence and implications* (pp. 133-149). A report of the Health Education Authority symposium, London, England.
- American College of Sports Medicine. (2001). American College of Sports Medicine position stand: Appropriate intervention strategies for weight loss and prevention of weight gain for adults. *Medicine and Science in Sports and Exercise*, 33, 2145-2156.
- Andersen, R. E., Crespo, C. J., Bartlett, S. J., Cheskin, L. J., & Pratt, M. (1998). Relationship of physical activity and television watching with body weight and level of fatness among children: results from the Third National Health and Nutrition Examination Survey. *The Journal of the American Medical Association*, 279, 938-942.

- Anderson, J. W., Konz, E. C., Frederich, R. C., & Wood, C. L. (2001). Long-term weight-loss maintenance: A meta-analysis of U.S. studies. *American Journal of Clinical Nutrition*, 74, 579-584.
- Anderssen, N., Wold, B., & Torsheim, T. (2005). Tracking of physical activity in adolescence. *Research Quarterly for Exercise and Sport*, 76, 119-129.
- Babbie, E. (1990). *Survey research methods* (2nd ed.). Belmont, CA: Wadsworth.
- Bailey, R. (2006). Physical Education and Sport in Schools: A Review of Benefits and Outcomes. *Journal of School Health*, 76, 397.
- Balon, T. W., & Nadler, J. L. (1997). Evidence that nitric oxide increases glucose transport in skeletal muscle. *J Appl Physiol*, 82, 359-363.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman and Company.
- Baranowski, T., Mendlein, J., Resnicow, K., Frank, E., Weber, Cullen, K., & Baranowski, J. (2000). Physical activity and nutrition in children and youth: an overview of obesity prevention. *Preventive Medicine*, 31, S1-S10.
- Barlow, S. E., Dietz, W. H. (1998). Obesity evaluation and treatment: expert committee recommendations. The Maternal and Child Health Bureau, Health Resources and Services Administration, and the Department of Health and Human Services. *Pediatrics*, 102, E29.
- Barnett, T. A., O'Loughlin, J., Gauvin, L., Paradis, G., & Hanley, J. (2006). Opportunities for student physical activity in elementary schools: A cross-sectional survey of frequency and correlates. *Health Education Behavior*, 33, 215 - 232.

- Berger, B. G. (1996). Psychological benefits of an active lifestyle: What we know and what we need to know. *Quest, 48*, 330-353.
- Berger, B. G., Pargman, D., & Weinberg, R. (2002). *Foundation of Exercise Psychology*. Morgantown, WV: Fitness Information Technology.
- Berger, B. G. (2004). Subjective well-being in obese individuals: The multiple roles of exercise. *Quest, 56*, 50-76.
- Best, J. (1981). *Research in education*. Englewood Cliffs, NJ: Prentice Hall.
- Biddle, S., Sallis, J., Cavell, N. (1998) *Young and active? young people and health-enhancing physical activity: evidence and implications*. London, England: Health Education Authority.
- Blair, S. N., Kohl, H. W., & Gordon, N. F. (1992). Physical activity and health: A lifestyle approach. *Medicine, Exercise, Nutrition and Health, 1*, 54-57.
- Blair, S. N. (1995). Exercise prescription for health. *Quest, 47*, 338-353.
- Blazer, D. G., Moody, S., Craft, J., & Burchett, B. (2002). Depression in diabetes and obesity: Racial/ethnic/gender issues in older adults. *Journal of Psychosomatic Research, 53*, 913-916.
- Blumenthal, J. A., Babyak, M. A., Moore, K. A., Craighead, W. E., Herman, S., Khatri, P., Waugh, R., Napolitano, M. A., Forman, L. M., Appelbaum, M., Doraiswamy, P. M., & Krishnan, K. R. (1999). Effects of exercise training on older patients with major depression. *Archives of Internal Medicine, 159*, 2349-2356.
- Boreham, C. A. G., Wallace, W. F. M., & Nevill, A. (2000). Training effects of accumulated daily stair-climbing exercise in previously sedentary young women. *Prev Med, 30*, 277-281.

- Boreham, C., & Riddock, C. (2001). The physical activity, fitness, and health of children. *Journal of Sport Sciences, 19*, 915-929.
- Bouchard, C., Shephard, R. J., Stephens, T., Sutton, J., & McPherson, B. (1990). *Exercise, fitness, and health*. Champaign, IL: Human Kinetics.
- Bouchard, C., & Despres, J. (1995). Physical activity and health: Atherosclerotic, metabolic, and hypertensive diseases. *Research Quarterly for Exercise & Sport, 66*, 268-275.
- Braet, C., & Crombez, G. (2003). Cognitive Interference Due to Food Cues in Childhood Obesity. *Journal of Clinical Child & Adolescent Psychology, 32*, 32-39.
- Britz, B., Siegfried, W., Ziegler, A., Lamertz, C., Herpertz, B. M., Remschmidt, H., Wittchen, H., & Hebebrand, J. (2000). Rates of psychiatric disorders in a clinical study group of adolescents with extreme obesity and in obese adolescents ascertained via a population based study. *Internal Journal of Obesity, 24*, 1707-1714.
- Brown, K. M., Thomas, D., & Kotecki, J. E. (2002). *Physical activity and health an interactive approach*. Boston, MA: Jones and Bartlett Publishers.
- Burgeson, C. R., Wechsler, H., Brener, N. D., Young, J. C., & Spain, C. G. (2001) Physical education and activity: Results from the School Health Policies and Programs Study 2000. *Journal of School Health, 71*, 279-293.
- Bydlowski, S., Corcos, M., Jeammet, P., Paterniti, S., Berthoz, S., Laurier, C., Chambry, J., & Consoli, S. M.(2005). Emotion-processing deficits in eating disorders. *International Journal of Eating Disorders, 37*, 321-329.

- Caballero, B., Clay, T., Davis, S. M., Ethelbah, B., Holy, R. B., Lohman, T. G., Norman, J., Story, M., Stone, E. J., Stephenson, L., Stevens, J. (2003). Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian school children. *The American Journal of Clinical Nutrition*, 78, 1030-1038.
- Cale, L. (2000). Physical activity promotion in secondary schools. *European Physical Education Review*, 6, 71-90.
- Calle, E. E., Rodriguez, C., Walker-Thurmond, K., & Thun, M. J.(2003). Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults. *The New England Journal of Medicine*, 348, 1625-1638.
- Carpenter, K. M., Hasin, D. S., Allison, D. B., & Faith, M. S.(2000). Relationships between obesity and DSM-IV major depressive disorder, suicide ideation, and suicide attempts: results from a general population study. *American Journal of Public Health*, 90, 251-257.
- Cash, T. E, Novy, P. L., & Grant, J. R. (1994). Why do women exercise? Factor analysis and further validation of the reasons for exercise inventory. *Perceptual and Motor Skills*, 78, 539-544.
- Caspersen, C. J. (1989). Physical activity epidemiology: Concepts, methods, and applications to exercise science. *Exercise and Sport Sciences Reviews*, 17, 423-473.
- Castelli, D., & Williams, L. (2007). Health-related fitness and physical education teachers' content knowledge. *Journal of Teaching in Physical Education*, 26, 3-19.
- Cater, R. C. (2002). The impact of public schools on childhood obesity. *JAMA*, 288, 2180.

- Centers for Disease Control and Prevention. (1997). *Guidelines for school and community programs to promote lifelong physical activity among young people* (MMWR, 46, No. RR6, 1-36). Atlanta, GA: Author.
- Centers for Diseases Control and Prevention (CDC) (1999). *Physical Activity and Health: A Report to the Surgeon General*. Government Printing Office. May 2, 2006
retrieved from <http://www.cdc.gov/nccdphp/sgr/adults.htm>
- Centers for Disease Control and Prevention (2000). Youth risk behavior surveillance—United States, 1999. *Morbidity & Mortality Weekly Report*, 49, SS-5.
- Centers for Diseases Control and Prevention (CDC) (2000). School health policies and program study 2000. Fact sheet: physical education and activity. May 6, 2006
retrieved from <http://www.cdc.gov/HealthyYouth/SHPPS/factsheets/pdf/pe.pdf>.
- Centers for Disease Control and Prevention (2001). *School Health Index for Physical Activity, Healthy Eating, and a Tobacco-Free Lifestyle: A Self-Assessment and Planning Guide. Middle School/High School Version*. Atlanta, GA: CDC.
- Centers for Disease Control and Prevention (2002). Youth Risk Behavior Surveillance System (YRBSS): United States, 2001. *MMWR Morb Mortal Wkly Rep.* 51, 1–62.
- Centers for Disease Control and Prevention (2004) Centers for disease control and prevention, Trends in intake of energy and macronutrients—United States, *Morbidity and Mortality Weekly Reports*, 53, 80–82.
- Chen, A. (1996). Student interest in activities in a secondary physical education curriculum: An analysis of student subjectivity. *Research Quarterly for Exercise and Sport*, 67, 424-432.

- Chinn, S., & Rona, R. J. (2001). Prevalence and trends in overweight and obesity in three cross sectional studies of British children, 1974-94. *The British Medical Journal*, 322, 24-26.
- Committee on Prevention of Obesity in Children and Youth (2004). Food and Nutrition Board. Board on Health Promotion and Disease Prevention. Institute of Medicine of the National Academies. In: Koplan JP, Liverman CT, Kraak VI, eds. Preventing childhood obesity. Health in the Balance. Washington, DC: Institute of Medicine, The National Academies Press.
- Concannon, M. (2002). Sedentary death syndrome. *Fitness Monthly* February. May 2, 2006 retrieved from <http://www.nvo.com/upandmoving/sedentarydeathsyndrome/>
- Condon, R., & Collier, C. S. (2002). Student choice makes a difference in physical education. *Journal of Physical Education, Recreation & Dance*, 73, 26-30.
- Converse, J. M., & Presser, S. (1986). *Survey questions: Handcrafting the standardized questionnaire*. New Delhi, India: Sage Publications.
- Corbin, C. B., Pangrazi, R. P. (1998). *Physical Activity for Children: A Statement of Guidelines*. Reston, Va: National Association for Sport and Physical Education.
- Coulon, S. C., & Reif, G. (1994). The effect of physical education curriculum development on the instructional... *Physical Educator*, 51, 179-187.
- Couper, M. P. (2000). Web surveys: A review of issues and approaches. *Public Opinion Quarterly*, 64, 464-494.
- Crawford, D., & Ball, K. (2002). Behavioural determinants of the obesity epidemic. *Asia Pacific Journal of Clinical Nutrition (Blackwell)*, Suppl. 8, 11, 718-721.

- Creswell, J. W. (2002). *Educational Research; planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, NJ: Pearson Education.
- Crisp, A. H., & McGuiness, B. (1975). Jolly fat: relation between obesity and psychoneurosis in the general population. *British Medical Journal*, *1*, 7-9.
- Crisp, A. H., Queenan, M., Sittampaln, Y., & Harris, G.(1980). “ Jolly fat” revisited. *Journal of Psychosomatic Research*, *24*, 233-241.
- Dale, D. L., Corbin, C. B., & Cuddihy, T. F. (1998). Can conceptual physical education promote physically active lifestyles? *Pediatric Exercise Science*, *10*, 97-109.
- Dale, D., Corbin, C. B., & Dale, K. S. (2000). Restricting opportunities to be active during school time: Do children compensate by increasing physical activity levels after school? *Research Quarterly for Exercise and Sport*, *71*, 240-248.
- Dale, D., & Corbin, C. (2000). Physical activity participation of high school graduates following exposure to conceptual or traditional physical education. *Research Quarterly for Exercise and Sport*, *77*, 61-68.
- Darlington, R. B. (2002). *Factor analysis*. Retrieved February, 2006 from Cornell University, Department of Psychology Website: <http://comp9.psych.cornell.edu/Darlington/factor.htm>.
- Darst, P. W., Van der Mars, H., & Cusimano, B. E. (1998). Using novel and challenging introductory activities and fitness routines to emphasize regular activity and fitness objectives in middle school physical education. *Physical Educator*, *55*, 199-210.
- Darst, P. W., & Pangrazi, R. (2006). *Dynamic physical education for secondary school students* (5th ed.). San Francisco, CA: Benjamin Cummings.

- Datar A, & Sturm R. (2004). Physical education in elementary school and body mass index: evidence from the early childhood longitudinal study. *American Journal of Public Health, 94*, 1501–1506.
- de Vaus, D. (2002). *Analyzing social science data*. London: SAGE.
- de Vaus, D. (2002). *Surveys in social research* (5th)(p.188-189). Routledge, 11 New Fetter Lane, London EC4P 4EE.
- Dean, H., & Flett, B. (2002). Natural history of type 2 diabetes diagnosed in childhood: long term follow-up in young adult years. *Diabetes, 51*, A24.
- DeBusk, R. F., Senestrland, U., Sheehan, M., & Haskell, W. L. (1990). Training effects of long versus short bouts of exercise in healthy subjects. *The American Journal of Cardiology, 65*, 1010–1013.
- Department of Health and Human Services (2006). Health schools health youths! March 29, 2006, retrieved from <http://www.cdc.gov/healthyyouth>
- Dietz, W. H., & Gortmaker, S. L. (1985). Do we fatten our children at the television set? Obesity and television viewing in children and adolescents. *Pediatrics, 75*, 807–812.
- Dietz, W. H. (1994). Critical periods in childhood for the development of obesity *Am J American Journal of Clinical Nutrition, 59*, 955-959.
- Dietz, W. H. (1997). Periods of risk in childhood for the development of adult obesity- what do we need to learn? *Journal of Nutrition, 127*, 1884s-1886s.
- Dietz, W. H. (1998) *Health consequences of obesity in youth: Childhood predictors of adult disease*. *Pediatrics, 101*, 518-524.
- Dillman, D. A. (2000). *Mail and Internet Survey* (2nd ed.). John Wiley & Sons, Inc.

- Dishman, R. K., & Buckworth, J. (1996). Increasing physical activity: A quantitative synthesis. *Medicine & Science in Sports & Exercise*, *28*, 706-719.
- Dornyei, Z. (2003). *Questionnaires in second language research: Construction, administration and processing*. Mahwah, NJ: Lawrence Erlbaum.
- Dyer, A. R., Stamler, J., Garside, D.B., & Greenland, P.(2004). Long-term consequences of body mass index for cardiovascular mortality: the Chicago Heart Association detection Project in Industry Study. *Annals of Epidemiology*, *14*, 101-108.
- Eccles, J. S. (1994). Understanding women's educational and occupational choices. *Psychology of Women Quarterly*, *18*, 585-609.
- Eccles, J. S., Flanagan, C., Lord, S., Midgley, C., Roeser, R. & Yee, D. (1996). Schools, families, and early adolescents: what are we doing wrong and what can we do instead? *Journal of Developmental and Behavioral Pediatrics*, *17*, 267-276.
- Eckel, R. H., & Krauss, R. M. (1998). American Heart Association call to action: obesity as a major risk factor for coronary heart disease. *Circulation*, *97*, 2099-2100.
- Edmunds, L., Water, E., & Elliott, E. J. (2001). Evidence based management of childhood obesity. *BMJ: British Medical Journal*, *323*, 916-919.
- Eisenmann, J. C., Bartee, R. T., & Wang, M. Q. (2002). Physical activity, TV viewing, and weight in US youth: 1999 Youth Risk Behavior Survey. *Obesity Research*, *10*, 379-385.
- Eriksson, K. F., & Lindgarde, E. (1991). Prevention of type 2 diabetes mellitus by diet and physical activity: The 6 year Malimo feasibility study. *Diabetologia*, *34*, 891-898.

- Evans, J., Rich, E., & Davis, B. (2004). The emperor's new clothes: Fat, thin, and overweight. The social fabrication of risk and ill health. *Journal of Teaching in Physical Education*, 23, 372-391.
- Ezzati, M., Martin, H., Skjold, S., Hoorn, S. V., & Murray, C. J. (2006). Trends in national and state-level obesity in the USA after correction for self-report bias: analysis of health surveys. *Journal of the Royal Society of Medicine*, 99, 250-257.
- Fagard, R. H., & Tipton, C. M. (1994). Physical activity, fitness, and hypertension. In C. Bouchard, R. J. Shephard, & T. Stephens (Eds.), *Physical activity, fitness, and health* (pp. 633-655). Champaign, IL: Human Kinetics.
- Fairclough, S., & Stratton, G. (2005). Physical activity levels in middle and high school physical education: A review. *Pediatric Exercise Science*, 17, 217-236.
- Faucette, N., & Hillidge, S. B. (1989). Research findings: PE specialists and classroom teachers. *Journal of Physical Education, Recreation, and Dance*, 60, 51-54.
- Faucette N, McKenzie T. L, Patterson P. (1990). Descriptive analysis of nonspecialist elementary physical education teachers' curricular choices and class organization. *Journal of Teaching in Physical Education*, 9, 284-293.
- Figone, A. J. (Spring 1993). Origins of the Teacher-Coach Role: Idealism, Convenience, and Unworkability. Paper presented at the Annual Conference of the California Association for Health, Physical Education, Recreation and Dance, Monterey, CA.
- Figone, A. J. (1994). Teacher-coach role conflict: Its impact on students and student-athletes. *Physical Educator*, 51, 29-34.

- Figueroa-Colon, R., Franklin, F. A., Lee, J. Y., Aldridge, R., & Alexander, L. (1997). Prevalence of obesity with increased blood pressure in elementary school-aged children. *Southern Medical Journal, 90*, 806-813.
- Flegal, K. M., Carrol, M. D., Kuczmarski, R. J., & Johnson, C. L. (1998). Overweight and obesity trends in the United States: Prevalence and trends, 1960-1994. *International Journal of Obesity and Related Metabolic Disorders, 22*, 39-47.
- Flood, S. E., & Hellstedt, J. C. (1991). Gender differences in motivation for intercollegiate athletic participation. *Journal of Sport Behavior, 14*, 159-167.
- Flores, R. (1995). Dance for health: improving fitness in African American and Hispanic adolescents. *Public Health Reports, 110*, 189-193.
- Foster, G. D., Wadden, T. A., & Vogt, R. A. (1997). Body image in obese women before, during, and after weight loss treatment. *Health Psychology, 16*, 226-229.
- Fox, K. (1996). Physical activity promotion and the active school, in N. Armstrong (Ed.) *New Directions in Physical Education*, pp. 94-109. London: Cassell Education.
- Fox, K. R., Cooper, A., & McKenna, J. (2004). The school and promotion of children's health-enhancing physical activity: Perspectives from the United Kingdom. *Journal of Teaching in Physical Education, 23*, 338-358.
- Frank, L., Andresen, M., Schmid, T. (2004). Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine, 27*, 87-96.
- Frederick, C. M., & Ryan, R. M. (1993). Differences in motivation for sport and exercise and their relations with participation and mental health. *Journal of Sport Behavior, 16*, 124-146.

- Freedman, D. J., Serdula, M. K., & Khan, L. K. (2002). The adult health consequences of childhood obesity. *Obesity in Childhood and Adolescence*, 49, 63-82.
- Friedman, M. A., & Brwonell, K. D. (1995). Psychological correlates of obesity: Moving to the next generation. *Psychological Bulletin*, 117, 3-20.
- Gable, R. K., & Wolf, M. B. (1993). *Instrument development in the affective domain: Measuring attitudes and values in corporate and school setting* (2nd ed.). Boston, MA: Kluwer.
- Galuska, D. A., Serdula, M., Pamuk, E., Siegel, P., & Byers, T. (1996). Trends in overweight among US adults from 1987 to 1993: A multistate telephone survey. *American Journal of Public Health*, 86, 1729-1735.
- Gennuso, J., Epstein, L. H., Paluch, R. A., & Cerny, F. (1998). The relationship between asthma and obesity in urban minority children and adolescents. *Archives Pediatrics & Adolescent Medicine*, 152, 1197-1200.
- George, D., & Mallery, P. (2001). *SPSS for Windows Step by Step: A simple guide and reference*. (3rd ed.) Boston: Allyn and Bacon.
- Giebink, M., & McKenzie, T. (1985). Teaching sportsmanship in physical education and recreations: An analysis of interventions and generalizations effects. *Journal of Teaching in Physical Education*, 4, 167-177.
- Gill, K., & Overdoff, V. (1994). Incentives for exercise in younger and older women. *Journal of Sport Behavior*, 17, 87-97.
- Gillander Gadin, K., & Hammarstrom, A. (2002). Can school-related factors predict future health behaviour among young adolescents? *Public Health*, 116, 22-29.
- Glanz, K., Lewis, F. M., & Rimer, B. K. (2002). *Health behavior and health education: Theory, research and practice* (3rd ed). San Francisco: Jossey Bass Publishers.

- Gortmaker, S. L., Must, A., Sobol, A. M., Peterson, K., Colditz, G. A., & Dietz, W. H. (1996). Television viewing as a cause of increasing obesity among children in the United States, 1986-1990. *Archives of Pediatric and Adolescent Medicine, 150*, 356-362.
- Gortmaker, S. L., Peterson, K. E., Wiecha, J., Sobol, A. M., Dixit, S., Fox, M. K., & Laird, N. (1999). Reducing obesity via a school-based interdisciplinary intervention among youth (Plant Health). *Archives Pediatrics and Adolescent Medicine, 153*, 409-418.
- Gray, T., & Oslin, J. (2003). Primary school students' choices for a healthy active lifestyle. *Journal of Physical Education, Recreation and Dance, 74*, 52-57.
- Green, S. B., & Salkind, N. J. (2003). *Factor analysis. Using SPSS for windows and macintosh analyzing and understanding data* (3rd ed.). NJ: Upper Saddle River.
- Grilo, C. M., Wilfley, D. E., Brownell, K. D., & Rodin, J. (1994). Teasing, body image, and self-esteem in a clinical sample of obese women. *Addictive Behaviors, 19*, 443- 450.
- Grilo, C. M, Masheb, R. M., Brody, M., Burke, C. H., & Rothschild, B. S. (2005). Binge eating and self-esteem predict body image dissatisfaction among obese men and women seeking bariatric surgery. *International Journal of Eating Disorders, 37*, 347- 351.
- Gutin, B., Barbeau, P., & Yin, Z. (2004). Exercise interventions for prevention of obesity and related disorders in youths. *Quest, 56*, 120-141.
- Hanley, A. J., Harris, S. B., Gittelsohn, J., Wolever, T. M., Saksvig, B., & Zinman, B. (2000). Overweight among children and adolescents in a Native Canadian community: prevalence and associated factors. *The American Journal of Clinical Nutrition, 71*, 693-700.
- Hastie, P. A., & Saunder, J. E. (1991). Effects of class size and equipment availability on student involvement in physical education. *The Journal of Experimental Education, 59*, 212-224.

- Hayward, K. M. (1991). The role of physical education in the development of active lifestyles. *Research Quarterly for Exercise and Sport*, 62, 151-156.
- Harrell, T. K., Davy, B. M., Stewart, J. L., & King, D. S. (2005). Effectiveness of a school-based intervention to increase health knowledge of cardiovascular disease risk factors among rural Mississippi middle school children. *The Southern Medical Journal*, 98, 1161-1162.
- Healthy People 2000 Progress Report For: Physical Activity and Fitness. (April 26, 1995). Washington, DC: U.S. Dept. of Health and Human Services, Public Health Service, Office of Disease Prevention and Health Promotion.
- Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., & Flegal, K. M. (2004). Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *The Journal of the American Medical Association*, 291, 2847-2850.
- Hellison, D. (1995). *Teaching responsibility through physical activity*. Champaign, IL: Human Kinetics.
- Hidi, S., & Anderson, V. (1992). Situational interest and its impact on reading and expository writing. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 215-238). Hillsdale, NJ: LEA.
- Hill, G. M., & Randle, K. (1992). Fitness strategies in high school physical education programs. *Physical Educator*, 49, 195-205.
- Hill, J. O., Drougas, H. J., & Peters, J. C. (1994). Physical activity, fitness, and moderate obesity. In C. Bouchard, R. J. Shephard, & T. Stephens (Eds.), *Physical activity, fitness, and health* (pp. 684-695). Champaign, IL: Human Kinetics.

- Hill, J. O., & Peters, J. C. (1998). Environmental contributions to the obesity epidemic. *Science*, 280, 1371–1374.
- Hockey, R. V. (1996). *Physical fitness the pathway to healthful living* (8th ed.). By Courier Companies, Inc.
- Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York: Wiley.
- Hu, F. B., Li, T. Y., Colditz, G. A., Willett, W. C., & Manson, J. E. (2003). Television Watching and other sedentary behaviors in relation to risk of obesity and type 2 diabetes mellitus in women. *The Journal of the American Medical Association*, 289, 1785-1791.
- Huck, S. W. (2004). *Reading statistics and research* (4th ed). Boston: Person.
- Inge, T. H., Garcia, V., Daniels, S., Langford, L., Kirk, S., Roehrig, H., Amin, R., Zeller, M., & Higa, K. (2004). A multidisciplinary approach to the adolescent bariatric surgical patient. *Journal of Pediatric Surgery*, 39, 442–447.
- Jakicic, J. M., Wing, R. R., Butler, R. A., & Robertson, R. J. (1995). Prescribing exercise in multiple short bouts versus one continuous bout: effects on adherence, cardiorespiratory fitness, and weight loss in overweight women. *Int J Obes*, 19, 893–901.
- Jakicic, J. M., Winters, C., Lang, W., & Wing, R. R. (1999). Effects of intermittent exercise and use of home exercise equipment on adherence, weight loss, and fitness in overweight women. *The Journal of the American Medical Association*, 282, 1554–1560.
- Janz, K. F., Dawson, J. D., & Mahoney, L. T. (2002). Increases in physical fitness during childhood improve cardiovascular health during adolescence: The Muscatine study. *International Journal of Sports Medicine*, 23 (suppl.), S15-S21.

- Johnston, F. E. (1985). Health implications of childhood obesity. *Annals of Internal Medicine*, *103*, 1068-1072.
- Jonides, L., Buschbacher, V., & Barlow, S. E. (2002). Management of child and adolescent obesity: psychological, emotional, and behavioral assessment. *Pediatrics*, *110*, 215-221.
- Jolliffe, D. (2004). Extent of overweight among US children and adolescents from 1971 to 2000. *International Journal of Obesity*, *28*, 4-9.
- Kain, J., Uauy, R., Albala, Vio, F., Cerda, R., & Leyton, B. (2004). School-based obesity prevention in Chilean primary school children: methodology and evaluation of a controlled study. *International Journal of Obesity and Related Metabolic Disorders*, *28*, 483-493.
- Karvonen, M. J. (1996). Physical activity for a healthy life. *Research Quarterly for Exercise and Sport*, *67*, 213-215.
- Kaur, H., Choi, W. S., Mayo, M. S., & Harris, K. J. (2003) Duration of television watching is associated with increased body mass index. *The Journal of Pediatrics*, *143*, 506-511.
- Kien, C. L., & Chiodo, A. R. (2003). Physical activity in middle school-aged children participating in a school based recreation program. *Archives of Pediatrics & Adolescent Medicine*, *157*, 811-815.
- Kneer, M. (1981). *Basic stuff. Series I* (Ed.). Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance.
- Kohl, H. W., & McKenzie, J. D. (1994). *Physical activity, fitness, and health*. Champaign, IL: Human Kinetics.
- Krinsky, N. I. (1989). Antioxidant functions of carotenoids. *Free Radic Biol Med*, *7*, 617-635.

- Kujala, U. M., Kaprio J., Sarna, S., & Koskenvuo, M. (1998). Relationship of leisure-time physical activity and mortality. *Journal of the American Medical Association*, 279, 440-444.
- Laaksonen, D. E., Lakka, H. M., Salonen, J. T., Niskanen, L. K., Rauramaa, R., & Lakka, T. A. (2002). Low levels of leisure-time physical activity and cardiorespiratory fitness predict development of the metabolic syndrome. *Diabetes Care*, 25, 1612–1618.
- Laing, P. (2002). Childhood obesity: a public health threat. *Paediatric Nursing*, 14, 14-16.
- Larsson, B., Bengtsson, C., & Bjorntorp, P. (1992). Is abdominal body fat distribution a major explanation for the sex difference in the incidence of myocardial infarction? *American Journal of Epidemiology*, 135, 266-273.
- Lauer, R. M., Lee, J., & Clarke, W. R. (1988). Factors affecting the relationship between childhood and adult cholesterol levels: the Muscatine study. *Pediatrics*, 82, 309-318.
- Lieberman, H. R., Wurtman, J. J., & Chew, B. (1986). Changes in mood after carbohydrate consumption among obese individuals. *American Journal Clinical Nutrition*, 44, 772-778.
- Leitzmann, M. F., Rimm, E. B., Willett, W. C., Spiegelman, D., Grodstein, F., Stampfer, M. J., Colditz, G. A., & Giovannucci, E. (1999). Recreational physical activity and the risks of cholecystectomy in women. *New England Journal of Medicine*, 341, 777-784.
- Lobstein, D. D., Mosbacher, B. J., & Ismail, A. H. (1983). Depression as a powerful discriminator between physically active and sedentary middle-aged men. *Journal of Psychosomatic Research*, 27, 69-76.

- Lobstein, T., & Frelut, M. L. (2003). Prevalence of overweight among children in Europe, *Obesity Reviews*, 4, 195-200.
- Lobstein, T., Baur L., & Uauy, R. (2004). for the IASO International Obesity Taskforce. Obesity in children and young people: a crisis in public health. *Obesity Reviews (Suppl.1)*, 5, 4-85.
- Lohman, T., & Wright, J. (2004). Maintenance of long-term weight loss: Future directions. *Quest*, 56, 105-119.
- Luder, E., Melnik, T. A., & Dimaio, M. (1998). Association of being overweight with greater asthma symptoms in inner city black and Hispanic children, *Journal of Pediatrics*, 132, 699-703.
- Malina, R. M. (1996). Tracking of physical activity and physical fitness across the lifespan. *Research Quarterly for Exercise and Sport*, 57, 48-57.
- Martin, J. J., & Kulinna, P. H. (2003). The development of a physical education teachers' self-efficacy instrument. *Journal of Teaching in Physical Education*, 22, 219-232.
- Matz, P. E., Foster, G. D., Faith, M. S., & Wadden, T. A. (2002). Correlates of body image dissatisfaction among overweight women seeking weight loss. *Journal of Consulting and Clinical Psychology*, 70, 1040-1044.
- McAuley, K. A., Williams, S. M., Mann, J. I., Goulding, A., Chisholm, A., Wilson, N., Story, G., McLay, R. T., Harper, M. J., & Jones, I. E. (2002). Intensive lifestyle changes are necessary to improve insulin sensitivity: a randomized controlled trial. *Diabetes Care*, 25, 445-452.
- McCracken, B. (2002). Creating an environment for learning. *The State Education Standard*, 3, 46-51.

- McGill, H. J., McMahan, C. A., & Herderik, E. E. (2002). Obesity accelerates the progression of coronary atherosclerosis in young men. *Circulation, 105*, 2712-2718.
- McGinnis, J.M., Kanner, L., & DeGraw, C. (1991). Physical Education's role in achieving national health objectives. *Research Quarterly for Exercise and Sports, 62*, 138-142.
- McHugh, E. (1996). Going beyond the physical: Social skills and physical education. *Runner, 34*, 26-29.
- McKenzie, T. L. (1999). School health-related physical activity programs: What do the data say? *Journal of Physical Education, Recreation and Dance, 70*, 16-19.
- McKenzie, T. L., Feldman, H., Woods, S. E., Romero, K. A., Dahlstrom, V., Stone, E. J., et al. (1995). Children's activity levels and lesson context during third -grade physical education. *Research Quarterly for Exercise and Sport, 66*, 184-193.
- McKenzie, T. L., & Sallis, J. F. (1996). Physical activity, fitness, and health-related physical education. In S.J. Silverman & C.D. Ennis (eds.), *Student learning in physical education: Applying research to enhance instruction* (pp. 223-246). Champaign, IL: Human Kinetics.
- McKenzie, T. L., Nader, P. R., Strikmiller, P. IL, Yang, M., Stone, E. J., Perry, C. L., Taylor, W. C., Epping, J., Feldman, H. A., Luepker, R. V., & Kelder, S. H. (1996). School physical education: Effect of the Child and Adolescent Trial for Cardiovascular Health (CATCH). *Preventive Medicine, 25*, 423-431.
- McKenzie, T. L., Marshall, S. J., Sallis, J. F., & Conway, T. L. (2000). Student activity level, lesson context, and teacher behavior during middle school physical education. *Research Quarterly for Exercise and Sport, 71*, 249-259.

- McKenzie, T. L., Marshall, S. J., Sallis, J. F., & Conway, T. L. (2000b). Leisure-time physical activity in school environment: An observational study using SOPLAY. *Preventive Medicine, 30*, 70-77.
- Mendelson, B. K., & White, D. R. (1982). Relation between body-esteem and self-esteem of obese and normal children. *Perceptual and Motor Skills, 54*, 899-905.
- Merkle, D. G., & Treagust, D. F. (1993). Student knowledge of health and fitness concepts and its relation to locus of control. *School Science and Mathematics, 93*, 355-359.
- Mitchell, M. (1993). Situational interest. *Journal of Educational Psychology, 85*, 424-436.
- Miller, S., Bredemeier, B. J., & Shields, D. (1997). Sociomoral education through physical education with at risk children. *Quest, 49*, 114-129.
- Misner, J. C., & Arbogast, G. W. (1990). Strategies for improving student learning and the status of physical education. *Physical Educator, 47*, 50-54.
- Mohnsen, B. S. (1997). *Teaching middle school physical education: A blueprint for developing an exemplary program*. Champaign, IL: Human Kinetics.
- Mokdad, A. H., Serdula, M. H., Dietz, W. H., Bowman, B. A., Marks, J. S., & Koplan, J. P. (1999). The spread of the obesity epidemic in the United States, 1991-1998. *The Journal of the American Medical Association, 282*, 1519-1522.
- Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., & Marks, J. S. (2003). Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *The Journal of the American Medical Association, 289*, 76-79.
- Mohnsen, B.S. (1997). *Teaching middle school physical education: A blueprint for developing an exemplary program*. Champaign, IL: Human Kinetics.

- Morrow, J. R., Jr. (1991). Physical education's role in the public health: Review and commentary. *Research Quarterly for Exercise and Sport*, 62, 123.
- Morrow, J. R., Jr., Jackson, A. W., & Payne, B. G. (1999). Physical activity promotion and school physical education. *The President's Council on Physical Fitness and Sports Research Digest* (Series 3, No. 7). Washington, DC: The President's Council on Physical Fitness and Sports.
- Murphy, M. H., & Hardman, A. E. (1998). Training effects of short and long bouts of brisk walking in sedentary women. *Med Sci Sports Exerc*, 30, 152–157.
- Mutrie, N., & Parfitt, G. (1998). Physical activity and its link with mental, social and moral health in young people. In Biddle, S, Sallis, J, Cavill, N (Eds.), *Young and active? young people and health-enhancing physical activity – evidence and implications* (pp.49-68), Health Education Authority, London.
- Mutrie, N. (2000). The relationship between physical activity and clinically defined depression. In S. J. H. Biddle, K. R. Fox, & S. H. Boutchner (Eds.), *Physical activity and psychological well-being*. London: Routledge.
- Murray, D. (2003). Morbid obesity – psychosocial aspects and surgical interventions. *AORN Journal*, March 1, 2006, retrieved from <http://www.aorn.org/>
- Must, A., & Strauss, R. S. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal of Obesity*, 23, S2-11.
- Must, A., Spadano, J., Coakley, E. H., Field, A. E., Colditz, G., & Dietz, W. H. (1999). The disease burden associated with overweight and obesity. *The Journal of the American Medical Association*, 282,1523-1529.

- Myers, L., Strickmiller, P. K., Webber, L. S., & Berenson, G. S. (1996). Physical and sedentary activity in school children grades 5-8: The Bogalusa Heart Study. *Medicine and Science in Sport and Exercise*, 28, 852-859.
- Nagpaul, P. S. (1999). *Guide to advanced data analysis using IDAMS software*. New Delhi, India: National Institute of Science Technology and Development Studies.
- Nahas, M. V. (1992). Knowledge and attitudes changes of low-fit college students following a short-term fitness education program. *Physical Educator*, 49, 152-159.
- National Association for Sport and Physical Education. (2001). *Shape of the Nation Report 2001*. Reston, VA: National Association for Sport and Physical Education, 1-7.
- National Association for Sport and Physical Education. (2004). *Moving Into the Future: National Standards for Physical Education, A Guide to Content and Assessment* (2nd Ed.). Reston, VA: Author.
- National Association for Sport and Physical Education & American Heart Association. (2006). *2006 Shape of the nation report: Status of physical education in the USA*. Reston, VA: National Association for Sport and Physical Education.
- National Center for Education Statistics (NCES) (2006). Internet Access in U.S. Public Schools and Classrooms: 1994-2005, February 26, 2007 retrieved from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007020>.
- National Institutes of Health Consensus Development Conference Statement (1985). Health implications of obesity. *Annals of Internal Medicine*, 103, 1073-1077.

- Nationwide Personal Transportation Survey (1997). U.S. Department of Transportation, Federal Highway Administration, Research and Technical Support Center, Lantham, MD: Federal Highway Administration.
- National Center for Chronic Disease Prevention and Health Promotion (1997). Guidelines for school and community programs to promote lifelong physical activity among young people. *Journal of School Health*, 67, 202-219.
- Neumark-Sztainer, D., Story, M., Hannan, P. J., & Rex, J. (2003). New moves: a school-based obesity prevention program for adolescent girls. *Preventive Medicine*, 37, 41-51.
- Ntoumanis, N., & Biddle, S. J. H. (1999). A review of motivational climate in physical activity. *Journal of Sports and Sciences*, 17, 643-665.
- Oja, P. (1995). Descriptive epidemiology of health-related physical activity and fitness. *Research Quarterly for Exercise and Sport*, 66, 303-312.
- Okely, A. D., Booth, M. L., & Patterson, J. W. (2001). Relationship of physical activity to fundamental movement skills among adolescents. *Medicine & Science in Sports & Exercise*, 33, 1899-1904.
- Oshida, Y., Ohsawa, I., Sato, J., Kimura, Y., Higuchi, M., Kobayashi, S., & Sato, Y. (1991) Effects of different types of physical training on insulin action in human peripheral tissues -use of the euglycemic clamp technic. *Jap J Physical Fit Sports Med*, 40, 315-320.
- Otto, C. N. (2005). Understanding the obesity epidemic: What does the lab need to know? (cover story). *MLO: Medical Laboratory Observer*, 37, 12-19.

- Palinkas, L. A., Wingard, D. L., & Barrett-Connor, E. (1996). Depressive symptoms in overweight and obese older adults: A test of the “jolly fat” hypothesis. *Journal of Psychosomatic Research, 40*, 59-66.
- Parcel, G. S., Simons-Morton, B. G., O'Hara, N. M., Baranowski, T., Kolbe, L. J., & Bee, D. E. (1987) School promotion of healthful diet and exercise behavior: an integration of organizational change and social learning theory interventions. *Journal of School Health, 57*, 150-156.
- Parker, R. W., Alford, C., & Passmore, C. (2004). Can Family Medicine Residents Predict Their Performance on the In-Training Examination? *Family Medicine Journal, 36 (10)*, 705-709.
- Pate, R. R., & Hohn, R. C. (1994). A contemporary mission for physical education. In R. R. Pate & R. C. Hohn (Eds.), *Health and fitness through physical education* (pp. 1-8). Champaign, IL: Human Kinetics.
- Pate, R. R., Small, M. L., Ross, J. G., Young, J. C., Flint, K. H., & Warren, C. W. (1995). School physical education. *Journal of School Health, 65*, 339-343.
- Pate, R., Corbin, C., & Pangrazi, B. (1998). Physical activity for young people. *The President's Council on Physical Fitness and Sports Research Digest* (Series 3, No. 3). Washington, DC: The President's Council on Physical Fitness and Sports.
- Perdue, K. J. (1999). *Deterrents to participation in web-based continuing professional education for certified public accountant in Georgia*. Unpublished doctoral dissertation, University of Georgia, Athens.
- Petray-Rowcliffe, C. (2001). *Active children! Promoting physically active lifestyles in physical education*. Boston, MA: Pearson Custom Publishing.

- Pierce, J. W., & Wardle, J. (1997). Cause and effect beliefs and self-esteem in overweight children. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 38, 645-650.
- Powell, K. E., Thompson, P. D., Caspersen, C. J., & Kendrick, J. S. (1987). Physical activity and the incidence of coronary heart disease. *Annual Review of Public Health*, 8, 253-287.
- Powers, H. S., Conway, T. L., McKenzie, T. L., Sallis, J. F., & Marshall, S. J. (2002). Participation in extracurricular physical activity programs at middle schools. *Research Quarterly for Exercise and Sport*, 73, 187-192.
- Prather, R. C., & Williamson, D. A. (1988). Psychopathology Associated with Bulimia, Binge Eating, and Obesity. *International Journal of Eating Disorders*, 7, 177-184.
- Pratt, M. (1999). Benefits of lifestyle activity vs structured exercise. *Journal of the American Medical Association*, 28, 375-376.
- Priyanath, A., Daviglius, M. L., Dyer, A. R., Liu, K., Greenland, P., & Stamler, J. (2001). Relationship of body mass index and coronary heart disease mortality in young adults: the Chicago Heart Association Detection Project in Industry Study. *Jpn J Cardiovasc Dis Prev.(Suppl.)*, 36, 131.
- Prochaska, J. J., Rodgers, M. W., & Sallis, J. F. (2002). Association of parent and peer support with adolescent physical activity. *Research Quarterly for Exercise and Sport*, 73, 206-210.
- Quesenberry, C. P., Caan, B., & Jacobson, A. (1998). Obesity, health services use, and health care costs among members of a health maintenance organization. *Archives of Internal Medicine*, 158, 466-472.

- Resnicow, K. (1993). School-based obesity prevention: population versus high-risk interventions. *Annals of the New York Academy of Sciences*, 699, 154-166.
- Richard, S., & Strauss, M. D. (2000). Childhood obesity and self-esteem. *Pediatrics*, 105, 1-5.
- Rice, F. P. (1996). *The adolescent: Development, relationships, and culture* (8th ed.). Boston: Allyn and Bacon.
- Roberts, D. F., Foehr, U. G., Rideout, V. J., & Brodie, M. (1999). *Kids and media at the new millennium: a comprehensive national analysis of children's media use*. Menlo Park, CA: The Henry J Kaiser Family Foundation Report
- Robert, R. E., Strawbridge, W. J., Deleger, S., & Kaplan, G. A. (2002). Are the fat more jolly? *Annals of Behavioral Medicine*, 24, 169-180.
- Roberts, R. E., Kaplan, G. A., Shema, S. J., & Strawbridge, W. J. (2000). Are the obese at greater risk of depression? *American Journal of Epidemiology*, 152, 163-170.
- Robinson, T. N. (1999). Reducing children's television viewing to prevent obesity: a randomized controlled trial. *The Journal of The American Medical Association*, 282, 1561-1567.
- Rodriguez, M. A., Winkleby, M. A., Ahn, D., Sundquist J., & Kraemer, H. C. (2002). Identification of population subgroups of children and adolescents with high asthma prevalence: findings from the Third National Health and Nutrition Examination Survey. *Archives Pediatrics & Adolescent Medicine*, 156, 269-275.
- Rohrer, J. E. & Rohland, B. M. (2004). Psychosocial risk factors for obesity among women in a family planning clinic. *BMC Family Practice*, 5, 1-6. March 1, 2006 retrieved from <http://www.biomedcentral.com/1471-2296/5/20>.

- Rohrer, J. E., Pierce, J. R., & Blackburn, C. (2004). Lifestyle and mental health. *Preventive Medicine, 40*, 438-443.
- Rose, G. (1985). Sick individuals and sick populations. *International Journal of Epidemiology, 14*, 32-38.
- Ross, J. G., & Gilbert, G. G. (1985). The National Children and Youth Fitness Study: A summary of findings. *Journal of Physical Education, Recreation, and Dance, 56*, 45-50.
- Ross, J. G., & Pate, R. R. (1987). The National Children and Youth Fitness Study II: A summary of findings. *Journal of Physical Education, Recreation and Dance, 58*, 51-56.
- Ross, C. E., & Hayes, D. (1988). Exercise and psychologic well-being in the community. *American Journal of Epidemiology, 127*, 762-771.
- Rowland, T. W. (1999). Adolescence: A "risk factor" for physical inactivity. *President's Council on Physical Fitness and Sports, 3*, 1-8.
- Rule 160-4-2-.12 (2000). Internet Access in Curriculum and Instruction, April 18, 2007 retrieved from <http://nasbe.org/HealthySchools/States/states.asp? Name=Georgia>
- Rule 505-2-.003 (2004). Internet Access in Curriculum and Instruction, April 18, 2007 retrieved from <http://nasbe.org/HealthySchools/States/states.asp? Name=Georgia>
- Rule 505-2-.024 (2004). Internet Access in Curriculum and Instruction, April 18, 2007 retrieved from <http://nasbe.org/HealthySchools/States/states.asp? Name=Georgia>
- Ryden, A., Karlsson, J., Persson, L., Sjostrom, L., Taft, C., & Sullivan, M. (2001). Obesity-related coping and distress and relationship to treatment preference. *British Journal of Clinical Psychology, 40*, 177-188.

- Sabin M., Crowne, E., & Shield, J. (2002) *Childhood obesity and type 2 diabetes*.
Nursing Times. 98, 49-50.
- Sage, G. H. (1989). Becoming a High School Coach: From Playing Sports to Coaching.
Research Quarterly, 60, 81-92.
- Sallis, J. F., & McKenzie, T. L. (1991). Physical Education's role in public health.
Research Quarterly for Exercise and Sports, 62, 124-137.
- Sallis, J. F. (1993). Epidemiology of physical activity and fitness in children and
adolescents. *Critical Reviews in Food Science and Nutrition*, 33, 403-408.
- Sallis, J. F., & Patrick, K. (1994). Physical activity guidelines for adolescents. Consensus
statement. *Pediatric Exercise Science*, 6, 302-314.
- Sallis, J. F., & Owen, N. (1997). Ecological models (Eds.), *Health Behavior and Health
Education*, pp. 403-424. San Francisco: Jossey-Bass.
- Sallis, J. F., McKenzie, T. L., Alcaraz, J. E., Kolody, B., Faucette, N., & Hovell, M. F.
(1997). The effects of a 2-year physical education program (SPARK) on physical
activity and fitness in elementary school students. *American Journal of Public
Health*, 87, 1328-1334.
- Sallis, J., McKenzie, T., Lolody, B., Lewis, M., Marshall, S., & Roesngard, P. (1999). Effects of
health-related physical education on academic achievement: Project SPARK. *Research
Quarterly for Exercise and Sport*, 70(2), 127-134.
- Sallis, J. F., & Owen, N. (1999). *Physical Activity and Behavioral Medicine*. Thousand
Oaks, CA: Sage Publications.

- Sallis, J. F., Conway, T. L., Prochaska, J. J., McKenzie, T. L., Marshall, S. J., & Brown, M. (2001). The association of school environments with youth physical activity. *American Journal of Public Health, 91*, 618-620.
- Sarkin, J. A., McKenzie, T. L., & Sallis, J. F. (1997) Gender differences in physical activity during fifth-grade physical education and recess periods. *Journal of Teaching in Physical Education, 17*, 99-106.
- Sato, Y., Nagasaki, M., Nakai, N., & Fushimi, T. (2003). Physical Exercise Improves Glucose Metabolism in Lifestyle-Related Diseases. *Experimental Biology and Medicine, 228*, 1208-1212.
- Saxena, S., Van Ommeren, M., Tang, K. C., & Armstrong, T. P. (2005). Mental health benefits of physical activity. *Journal of Mental Health, 14*, 445-451.
- Schwarzenberg, S. J. (2005). Obesity in children: epidemic and opportunity. *Minnesota Medicine, 88*, 62-66.
- Scott, C. R., Smith, J. M., Cradock, M. M., & Pihoker, C. (1997). Characteristics of youth-onset non-insulin-dependent diabetes mellitus and insulin-dependent diabetes mellitus at diagnosis. *Pediatrics, 100*, 84-91.
- School Health Policies and Programs Study (SHPPS) (2000). Fact sheet physical education and activity. *Journal of School Health, 71*. April 12, 2006 retrieved from <http://www.cdc.gov/HealthyYouth/shpps>
- Schuldheisz, J. M., & van der Mars, H. (2001). Active supervision and students' physical activity in middle school physical education. *Journal of Teaching in Physical Education, 21*, 75-90.

- Schwimmer, J. B., Burwinkle, T. M., & Varni, J. W. (2003). Health-related quality of life of severely obese children and adolescents. *The Journal of the American Medical Association*, 289, 1813-1819.
- Seidell, J. C. (2000). Obesity, insulin resistance and diabetes – a worldwide epidemic. *British Journal of Nutrition* (Suppl. 1), 83, S5-S8.
- Shattuck, L., Banks, N. P., & Abbott, J. (1850). Report of a general plan for the promotion of public and personal health, devised, prepared and recommend by the commissioners appointed under the resolve of the legislature of Massachusetts, relating to a sanitary survey of the state. Retrieved June 20, 2004, From <http://biotech.law.lsu.edu/cphl/history/books/sr/index/htm>.
- Shaper, A. G., Wannamethee, S.G., & Walker, M. (1997). Body weight: implications for the prevention of coronary heart disease, stroke, and diabetes mellitus in a cohort study of middle-aged men. *The British Medical Journal*, 314, 1311-1317.
- Sheehan, K. (2001). E-mail survey response rates: A review. *Journal of Computer-Mediated Communication* 6(2). Access online: <http://www.ascusc.org/jcmc/vol6/issue2/sheehan.html>
- Shephard, R. J. (1995). Physical activity, fitness, and health: the current consensus. *Quest*, 47, 288-303.
- Shepard, R. J. (1996). Habitual physical activity and academic performance. *Nutrition Reviews*, 54(4 supplement), S32-36.
- Shephard, R. J., & Kahn, B. B. (1999). Glucose transporters and insulin action glucose transporters and insulin action. *New England Journal of Medicine*, 341, 248-257.
- Siedentop, D. (1994). *Introduction to physical education, fitness, and sport* (2nd ed.) Mountain View, CA: Mayfield Publishing Co.

- Siedentop, D., & Tannehill, D. (2000). *Developing teaching skills in physical education* (4th ed.). Mountain View, CA: Mayfield.
- Simons-Morton, B. G., Parcel, G. S., & O'Hara, N. M. (1988). Implementing organizational changes to promote healthful diet and physical activity at school. *Health Education Quarterly*, *15*, 115-130.
- Simon-Morton, B., Taylor, W. C., Snider, S. A., Huang, I. W., & Fulton, J. E. (1994). Observed levels of elementary and middle school children's physical activity during physical education classes. *Preventive Medicine*, *23*, 437-441.
- Snyder, K. A., Donnelly, J. E., Jacobsen, D. J., Hertner, G., & Jakicic, J. M. (1997). The effects of long term, moderate intensity, intermittent exercise on aerobic capacity, body composition, blood lipids, insulin, and glucose in overweight females. *International Journal of Obesity*, *21*, 1180-1189.
- Solomon, G. (1997). Fair play in the gymnasium: Improving social skills among elementary school students. *Journal of Physical Education, Recreation and Dance*, *68*, 22-25.
- Spitzer, R. L., Devlin, M., Walsh, B. T., Hasin, D., Wing, R., Marcus, M., Stunkard, A., Wadden, T., Yanovski, S., Agras, S., Mitchell, M. & Nonas, C. (1992). Binge eating disorder: A multisite field trial of the diagnostic criteria. *International Journal of Eating Disorders*, *11*, 191-203.
- Staffo, D. F. (1990). Guest editorial: A national K-12 health and physical education mandate is needed: But changes... *Physical Educator*, *47*, 2-6.

- Stanish, H. I., Temple, V. A., & Frey, G. C. (2006). Health-promoting physical activity of adults with mental retardation. *Mental Retardation and Developmental Disabilities Research Reviews, 12*, 13-21.
- Steckler, A., Ethelbah, B., Martin, C. J., Stewart, D., Pardilla, M., Gittelsohn, J., Stone, E., Fenn, D., Smyth, M., & Vu, M. (2003). Pathways process evaluation results: a school-based prevention trial to promote healthful diet and physical activity in American Indian third, fourth, and fifth grade students. *Preventive Medicine, 37*, S80-90.
- Stewart, A., & Brook, R. H. (1983). Effects of being overweight. *American Journal of Public Health, 73*, 171-178.
- Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion, 10*, 282-298.
- Stokols, D. (1992). Establishing and maintaining healthy environments: Toward a social ecology of health promotion. *American Psychologist, 47*, 6-22.
- Strand, B. N., Scantling, E., & Johnson, M. (1997). *Fitness education: Teaching concepts based fitness in the schools*. Scottsdale, AZ: Gorsuch Scarisbrick.
- Strauss, C. C., Smith, K., Frame, C., & Forehand, R. (1985). Personal and interpersonal characteristics associated with childhood obesity. *Journal of Pediatric Psychiatry, 10*, 337-343.
- Strong, W. B., Malina, R. M., Bumkic, C. J. R., Daniels, S. R., Dishman, R. K., Gutin, B., Hergenroeder, A. C., Must, A., Nixon, P. A., Pivarnik, J. M., Rowland, T., Trost, S., & Trudeau, F. (2005). Evidence based physical activity for school-age youth. *Journal of Pediatrics, 146*, 732-737.

- Stubbs, C., & Lee, A. (2004). The obesity epidemic: both energy intake and physical activity contribute. *The Medical Journal of Australia*, *181*, 489–491.
- Stucky-Ropp, R. C., & DiLorenzo, T. M. (1993). Determinants of exercise in children. *Preventive Medicine*, *22*, 880–889.
- Summerfield, L. M. (1998). *Promoting physical activity and exercise among children*. Washington, DC: American Association of Colleges for Teacher Education.
- Suominen, H. (1991). Osteoporosis. In P. Oja & R. Telama (eds.), *Sport for all* (pp. 325-332). Amsterdam: Elsevier.
- Tappe, M. K., & Burgeson, C. R. (2004). Physical education: A cornerstone for physically active lifestyles. *Journal of Teaching in Physical Education*, *23*, 281-299.
- Telama, R., Yang, X., Laakso, L., & Viikari, J. (1997). Physical activity in childhood and adolescence as predictor of physical activity in young adulthood. *American Journal of Preventive Medicine*, *13*, 317-322.
- Telch, C. F., & Agras, W. S. (1994). Obesity, binge eating and psychopathology: are they related? *International Journal of Eating Disorders*, *15*, 53-61.
- Thayer, R. E. (2001). *Calm energy: How people regulate mood with food and exercise*. New York: Oxford University Press.
- The National Institute for Health Care Management Foundation (NIHCM Foundation). *New Research Shows More Physical Education Time Sharply Reduces Overweight in Children*. March 12, 2006 retrieved from <http://www.nihcm.org/OYCpress.html>.
- Tompkins, N., Zizzi, S., Zedovsky, L., Wright, J., & Vitullo, E. (2004). School-based opportunities for physical activity in West Virginia public schools. *Preventive Medicine*, *39*, 834-840.

- Tomme, P., & Wendt, J. (1993). Affective teaching: Psycho-social aspects of physical education. *Journal of Physical Education, Recreation and Dance, 64*, 66-69.
- Torpy, J. M., Lym, C., & Glass, R. M. (2003). Obesity, *The Journal of the American Medical Association, 289*, 1880.
- Treasure, D. C., & Newbery, D. M. (1998). Relationship between self-efficacy, exercise intensity, and feeling states in a sedentary population during and following an acute bout of exercise. *Journal of Sport and Exercise Psychology, 20*, 1-11.
- Treasure, D. C., & Roberts, G. C. (2001). Students' perceptions of the motivational climate, achievement beliefs, and satisfaction in physical education. *Research Quarterly for Exercise and Sport, 72*, 165-175.
- Twisk, J. W. R., Kemper, H. C. G., & Van Mechelen, W. (2002). The relationship between physical fitness and physical activity during adolescence and cardiovascular disease risk factors at adult age: the Amsterdam Growth and Health Longitudinal Study. *International Journal of Sport Medicine, 23* (supplement), S8-S14.
- U.S. Department of Education. (1996). Digest of educational statistics. *Washington: National Center for Educational Statistics.*
- United States Department of Health and Human Services. (1996). *Physical activity and health: A report of the surgeon general.* Rockville, MD: Author.
- U.S. Department of Health and Human Services. (2000). *Healthy People 2010* (Conference Edition, in Two Volumes). Washington, DC: U.S. Government Printing Office.

- United States Department of Health and Human Services, National Center for Health Statistics (1999). Centers for Disease Control and Prevention. *Prevalence of Overweight and Obesity among Adults*. Hyattsville, MD. May 2, 2006 Retrieved from <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/obese.obse99.htm>.
- U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD) (2007). *Public Elementary/Secondary School Locale Code File, 2003-04*. February 26, 2007 retrieved from http://nces.ed.gov/ccd/rural_locales.asp.
- Van der Mars, H., Vogler, B., Darst, P., & Cusimano, B. (1998). Students' physical activity levels and teachers' active supervision during fitness instruction. *Journal of Teaching in Physical Education, 18*, 57-75.
- Viner, R. M., & Cole, T. J. (2005). Adult socioeconomic, educational, social, and psychological outcomes of childhood obesity: a national birth cohort study. *BMJ: British Medical Journal, 330*, 1354-1357.
- Wadden, T. A., Foster, G. D., Brownell, K. D., & Finley, E. (1984). Self-concept in obese and normal-weight children. *Journal of Consulting and Clinical Psychology, 52*, 1104-1105.
- Wadden, T. A., & Stunkard, A. J. (1985). Social and Psychological consequences of obesity. *Annals of Internal Medicine, 103*, 1062-1067.
- Wadden, T. A., & Stunkard, A. J. (1993). Psychosocial aspects of obesity and dieting: Research and clinical findings. In A. J. Stunkard & T. A. Wadden (eds.), *Obesity: Theory and Therapy* (2nd ed., pp. 163-177). New York: Raven Press.
- Wadden, T. A. (2004). Psychosocial aspects of obesity and obesity surgery. *Surgical Clinics of North America, 81*, 1001-1024.

- Wallen, N. E., & Fraenkel, J. R. (2001). *Educational research: A guide to the process* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Wang, G., Zheng, Z. J., Heath, G., Macera, C., Pratt, M., & Buchner, D. (2002). Economic burden of cardiovascular disease associated with excess body weight in U.S. adults. *American Journal of Preventive Medicine*, *23*, 1-6.
- Wang, G., & Dietz, W. H. (2002). Economic burden of obesity in youths aged 6-17 years: 1979-1999. *Pediatrics*, *109*, E 81-1.
- Wang, L., Yang, Q., Lowry, R., & Wechsler, H. (2003). Economic Analysis of a School-Based Obesity Prevention Program. *Obesity Research*, *11*, 1313-1324.
- Wankel, L. M. (1993). The importance of enjoyment to adherence and psychological benefits from physical activity. *International Journal of Sport Psychology*, *24*, 151-169.
- Wardle, J., Waller, J., & Fox, E. (2002). Age of onset and body dissatisfaction in obesity. *Addictive Behaviors*, *27*, 561-573.
- Wardle, J., Waller, J., & Rapoport, L. (2001). Body dissatisfaction and binge eating in obese women: the role of restraint and depression. *Obesity Research*, *9*, 778-787.
- Wechsler, H., & Devereaux, R. (2001). Using the school environment to promote healthy eating and physical activity. *Preventive Medicine*, *31* (Suppl.), S121-S137.
- Welle, H. M. & Kittleson, M. J. (1994). Impact of college health education and physical education courses on personal wellness. *Wellness Perspectives*, *10*, 3-12.
- Wellman, N. S., & Friedberg, B. (2002). Causes and consequences of adult obesity: health, social and economic impacts in the United States. *Asia Pacific Journal of Clinic Nutrition* (Suppl.), *11*, 705-709.

- Wen, L. M., Orr, N., Millett, C., & Rissel, C. (2006). Driving to work and overweight and obesity: findings from the 2003 New South Wales Health Survey, Australia. *International Journal of Obesity, 30*, 782–786.
- Wiles, J. W., & Bondi, J. W. (1986). *Making middle schools work*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Woolf-May, K., Kearney, E. M., Jones, D. W., Davison, R. C. R., Coleman, D., & Bird, S. R. (1998). The effect of two different 18-week walking programmes on aerobic fitness, selected blood lipids and factor XIIa. *Journal of Sports Science, 16*, 701–710.
- World Health Organization. (2000). *Obesity: Preventing and managing the global epidemic*. Report of a WHO Consultation. WHO Technical Report Series no. 894. WHO: Geneva.
- Wurtman, R. J., & Wurtman, J. J. (1989). Carbohydrates and depression. *Scientific American, 260*, 68-75.
- Yeater, R. (2000). Obesity, metabolic syndrome, and physical activity. *Quest, 52*, 351-357.
- Young, D. R., Felton, G. M., Grieser, M., Elder, J. P., Johnson, C., Lee, J., et al. (2007). Policies and opportunities for physical activity in middle school environments. *Journal of School Health, 77*, 41-47.
- Youth Risk Behavior Surveillance System (YRBSS). (2003). Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. April 11, 2006 retrieved from <http://health.state.ga.us/epi/cdiee/student>
- Zakarian, J. M., Hovell, M. F., Hofstetter, C. R., Sallis, J. F., & Keating, K. J. (1994). Correlates of vigorous exercise in a predominantly low SES and minority high school population. *Preventive Medicine, 23*, 314-321.

APPENDIX A

**QUESTIONNAIRE ON PHYSICAL ACTIVITY OPPORTUNITIES FOR MIDDLE
SCHOOLS IN GEORGIA**

1. Today's date: _____
(Month/day/year)

2. Your school district is: Rural Urban Suburban

3. What is your school's name: _____

4. Your gender is: Female Male

5. How many days are there in your scheduling cycle?
(Please mark only one answer)

Days/cycle ▶ Go to Question 6

OR

Our school functions on a
regular 5 day/week schedule ▶ Go to Question 7

6. For each grade, indicate the number of physical education periods per cycle, and the duration of each period. **(Please indicate grades that you do not teach with an "X")**

	Number of periods Per cycle	Duration (minutes) of Each period
Grade 6	<input type="text"/> Period(s)	<input type="text"/> Minutes
Grade 7	<input type="text"/> Period(s)	<input type="text"/> Minutes
Grade 8	<input type="text"/> Period(s)	<input type="text"/> Minutes

Go to Question 8

7. For each grade, indicate the number of physical education periods per week, and the duration of each period. **(Please indicate grades that you do not teach with an "X")**

	Number of periods Per week	Duration (minutes) of Each period
Grade 6	<input type="text"/> Period(s)	<input type="text"/> Minutes
Grade 7	<input type="text"/> Period(s)	<input type="text"/> Minutes
Grade 8	<input type="text"/> Period(s)	<input type="text"/> Minutes

8. Which percentage best reflects the amount of time students engage in motor activity during their physical education period? (Please check one answer per level)

	Less than 25%	26 - 45%	46 - 60%	61 - 75 %	More than 75%
Grade 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grade 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grade 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. How large is the average physical education class size in your school?

- 0-19 20 - 29 30 - 39 40 or more students

10. Is there a maximum allowable student to teacher ratio allowed for required PE class in your school?

- Yes No Unsure

11. Since September 2005, did your physical activity program include any of the following activities? (**Please check all that apply**)

	<u>Grades</u>		
	6	7	8
Outdoor activities (in the playground, park, school yard, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Circus-type activities (juggling, acrobatics, trampoline, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Track and field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calisthenics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aerobics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Square/Folk/Free dance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gymnastics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Running games (tag, hide-and-see, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ball games (dodge ball, kick-ball, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Team sports (soccer, basketball, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Martial arts/boxing/wrestling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Racket sports (badminton, tennis, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(s), specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. On average, how many minutes per month do you spend discussing health related topics in your physical education program?

	None	Less than 15 min.	15 –30 min.	31-45 min.	46 - 60 min.	More than 61 min.
Grade 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grade 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grade 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Would you be interested in professional development activities to help you teach the new health education program?

Not at all interested A bit interested Quite interested Very interested

14. To what extent do each of the following influence the quality of your school's physical education program?

	Not at all	A bit	Quite a bit	A lot
Budget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competence of staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Student behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities (space, rooms, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teacher motivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MEQ policy (regarding curriculum content, time allocation, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Equipment quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time allotted to the program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(s), specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Do you believe that co-ed gym classes limit student participation among...

Boys

- Not at all
 A bit
 Quite a bit
 A lot

Girls

- Not at all
 A bit
 Quite a bit
 A lot

16. How frequently does your school exempt students from gym class?

- Rarely Occasionally Often Very often

17. How frequently are each of the following used as reasons for exemption from gym class?


	Never	Rarely	Occasionally	Frequently
Medical reason from physician	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minor injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical disability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conflict with another program (music, art, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic disease (diabetes, asthma, arthritis, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural or religious reasons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Learning disability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Acute or temporary health problem (headache, stomach ache, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emotional problems (sadness, depression, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conflict with remedial courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Behaviour disorders (violence, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(s), specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. In a usual school year, does your school organize any of the following physical activities for students in Grades 6-8?

	Grades			
	6	7	8	<u>Don't know</u>
Field trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Track and field days, "Olympics"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outing to promote physical activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sports tournaments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical activities or events to reward students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fund-raising activities (Jump Rope for heart, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sports week/Sports month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(s), specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. In a usual school year, does your school organize extracurricular physical activities for students in...?

	YES	NO
Grade 6	<input type="checkbox"/>	<input type="checkbox"/>
Grade 7	<input type="checkbox"/>	<input type="checkbox"/>
Grade 8	<input type="checkbox"/>	<input type="checkbox"/>



If all are "No", Please go to Question 24

20. Approximately how many hours of extracurricular physical activities are organized each week for students in...?

Grade 6	Grade 7	Grade 8
Hrs/week	Hrs/week	Hrs/week

21. Are extracurricular physical activities organized...?

	YES	NO
During lunch break	<input type="checkbox"/>	<input type="checkbox"/>
After school	<input type="checkbox"/>	<input type="checkbox"/>

22. Approximately how many students participate in extracurricular physical activities each week?

Grade 6	Grade 7	Grade 8
students/wk	students/wk	students/wk

23. How important are each of the following at your school in choosing which students participate in extracurricular physical activities?

	Not at all important	Somewhat important	Quite important	Very important
Attitude and behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parental permission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Familiarity with game or activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical fitness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Athletic ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(s), specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. Do any of the following limits the development of extracurricular physical activities at your school?

	Not at all	A bit	Quite a bit	A lot	Not applicable
School transportation schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Need for parents to provide transportation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost to school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost to parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor quality equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inadequate facilities (no gymnasium, lack of space, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not enough equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of student interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of parental interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of human resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lunch period too short	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities used by day care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(s), specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. In a usual school year, are you involved in organizing physical activities at your school outside the regular physical education classes?

- Never
- Occasionally
- Often
- Always
- Not applicable

26. Your school is one which offers many opportunities for physical activity for...

Boys

- Strongly disagree
- Disagree somewhat
- Agree somewhat
- Strongly agree

Girls

- Strongly disagree
- Disagree somewhat
- Agree somewhat
- Strongly agree

27. Do the following limit increasing the time allocated to your school's physical education program?

	Not at all	Somewhat	Quite a bit	A lot
Other priorities established by the Governing Board (e.g. time allotted to specialists)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Budget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Academic load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inadequate facilities (no gymnasium, lack of space, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not enough equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of student interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of parental interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School board policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MEQ policies (curriculum content, time allocation, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities used by school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other(s), specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

28. Are you a member of the Governing Board of your school?

- Yes
 No

29. Is your Governing Board in favor of increasing the time available for physical activity at your school?

- Not at all in favor
 Somewhat in favor
 Quite in favor
 Very much in favor
 Don't know

30. Do you think that student participation in physical activity...?

	Not at all	Somewhat	Quite a bit	A lot
Improves physical fitness (muscular strength, endurance, flexibility)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves capacity to learn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves ability to concentrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Causes too many injuries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduces behavioural problems such as hyperactivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Takes too much time away from academic work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promotes violent behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves socialization skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Requires too much commitment on the part of parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fosters co-operation/team spirit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Encourages students to be overly competitive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

31. Are you in favor of increasing the amount of time allocated to physical activity at your school?

- Not at all in favor
- Somewhat in favor
- Quite in favor
- Very much in favor

32. Would parents in your school be interested in having more time made available for students to participate in physical activity?

- Not at all interested
- A bit interested
- Quite interested
- Very interested
- Don't know

33. Would the local municipality be interested in working with your school to organize physical activity opportunities for students?

- Not at all interested
- A bit interested
- Quite interested
- Very interested
- Don't know

34. Would you be interested in working with the local municipality to increase physical activity for students in your school?

- Not at all interested
- A bit interested
- Quite interested
- Very interested
- Don't know

35. In your school, which grades require physical education and how many times a week do the classes meet?

	Once	Twice	Three days	Fours days	Everyday	Not required
6 th grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 th grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 th grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

36. What type of schedule does your school follow?

	YES	NO
Semester on, semester off physical education courses?	<input type="checkbox"/>	<input type="checkbox"/>
Block scheduling?	<input type="checkbox"/>	<input type="checkbox"/>

37. For approximately how many minutes per week does the average required physical education class meet?

- 0-60 minutes
- 61-90 minutes
- 91-120 minutes
- greater than 120 minutes
- physical education is not required

38. Has the amount of times per week of required physical education classes increased, decreased, or stayed the same over the last five years?

- Increased **(if you choose this one, go to question 41)**
- Decreased
- Stayed the same
- Physical education is not required

39. Has the number of required physical education minutes per week...

- Increased **(if you choose this one, go to question 41)**
 Decreased
 Stayed the same
 Physical education is not required

40. Will you propose that your school allocate some of the free time available in the new curriculum for the physical education program in (e.g. in Grades 6 and 7) next year?

- Yes
 No
 Don't know

41. Have physical education teachers in your school used any of the following curricular materials in a required physical education course?

	Yes	No	Unsure
The National Association for Sport and PE standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Georgia Physical Education Standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your district's curriculum, set of guidelines, or framework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fitness test materials such as fitness-gram or presidential fitness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A commercially-developed PE guide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adaptive Physical Education material and equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

42. How important are each of the following in maintaining good health?

	Not at all important	Somewhat important	Quite important	Very important
Healthy eating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controlling stress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adequate sleep/rest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintaining a healthy body weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participating in social activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regular physical activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

43. Does participation in physical activity help...?

	Not at all	Somewhat	Quite a bit	A lot
People deal with difficult situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve appearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Control or lose weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forget problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meet people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have fun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feel better about oneself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spend more time outdoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

44. In the past year, how often did you engage in moderate physical activity in your spare time?
(Moderate physical activity is exercise engaged in for at least 30 minutes that causes you to breathe heavily and perspire)

- Rarely/ never
- Once a month
- Every 2 weeks
- Once or twice a week
- At least 3 times a week
- Almost daily

45. What is your year of birth?

19 _____

46. How many years have you been a physical education teacher?
(if less than one year, write "LT1")

year(s)

47. How many years have been a physical education teacher at this school?
(if less than one year, write "LT1")

year(s)

48. At this school, do you work...?

- Full time
- Part time

49. Your present assignment is primarily...

- PE only
- PE and health education
- PE and Athletics

50. Do you have a degree to teach physical education?

- Yes
- No

51. Which University degree(s) do you have?

Bachelor's degree in: _____

Master's degree in: _____

Other, specify: _____

52. Is your school has PE Supervisor/coordinator?

- Yes
- No (please skip question 55)

53. Does a PE Supervisor/coordinator in your school need

- Generalist - physical education
- Specialist - physical education

Thank you very much for your help!

APPENDIX B:
IMPLIED CONSENT

Dear PE Teacher,

You are invited to participate a research study which I am conducting entitled “Physical Activity Opportunity in Georgia Middle Schools: A Cross-sectional Survey of Frequency and Correlates”. The purpose of this study is to discover information about physical activity opportunities afforded to students in the middle school level and to identify factors related to physical activity opportunities.

Your participation will involve completion of an online questionnaire covering your background information and the status of students’ physical activity opportunity in school and should only take about 20 minutes. Your involvement in the study is voluntary. No risk is expected from your participation in this study. No information about you, or provided by you during the research will be shared with others. The results of the research study may be published, but your name will not be used. In fact, the published results will be presented in summary form only. Your identity will not be associated with your responses in any published format.

The findings from this project provide information on physical activity opportunities afforded to middle school students, identify factors related to higher physical activity opportunities, and identify possible directions for interventions for increased school-based physical activity. Not only will the investigation into the impact of students’ physical activity opportunity add new knowledge to the field, but will, most importantly, contribute to the interventional programs specific for young adolescents who are overweight/obese or might most likely be overweight/obese because of the available physical activity opportunities. There are no known risks or discomforts associated with this research.

If you have any questions about this research project, please feel free to call me at 706-389-6333(h), 706-542-2902(o) or by e-mail at sue6@uga.edu. Questions or concerns about your rights as a research participant should be directed to the University of Georgia Institutional Review Board, 612 Boyd GSRC, Athens, Georgia 30602-7411; telephone (706) 542-3199; email address irb@uga.edu.

To begin the survey please enter your password and click on the ‘START SURVEY’ button below.

Thank you in advance for your participation.

Furong Xu
Doctoral Student University of Georgia
706-389-6333 (Home)
706-542-2902 (Office)
sue6@uga.edu

APPENDIX C:
URBAN-CENTRIC LOCALE CODES

Urban-Centric Locale Codes

Corresponding Categories	Urban-Centric
Urban	11, 12, 13
Suburban	21, 22, 23
Rural	31, 32, 33, 41, 42, 43

Urban-Centric Locale Codes

11 - City, Large:

Territory inside an urbanized area and inside a principal city with population of 250,000 or more.

12 - City, Midsize:

Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.

13 - City, Small:

Territory inside an urbanized area and inside a principal city with population less than 100,000.

21 - Suburb, Large:

Territory outside a principal city and inside an urbanized area with population of 250,000 or more.

22 - Suburb, Midsize:

Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000.

23 - Suburb, Small:

Territory outside a principal city and inside an urbanized area with population less than 100,000.

31 - Town, Fringe:

Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.

32 - Town, Distant:

Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.

33 - Town, Remote:

Territory inside an urban cluster that is more than 35 miles from an urbanized area.

41 - Rural, Fringe:

Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.

42 - Rural, Distant:

Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.

43 - Rural, Remote:

Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), *Public Elementary/Secondary School Locale Code File, 2003-04*.