INDIVIDUAL, SOCIAL AND PHYSICAL ENVIRONMENT DETERMINANTS OF PHYSICAL ACTIVITY AMONG ADOLESCENTS GRADES 10-12 IN A SUBURBAN REGION

By

JOAN FURMAN

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

2005

INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

Approval Page

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

04/25/05
Date

Chair of Examining Committee

04/26/05
Date

Executive Office

David Chapin

John Seley, Ph.D.

Roscoe C. Brown, Ph.D.

Tracey Revenson, Ph.D.

Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK

Abstract

INDIVIDUAL, SOCIAL AND PHYSICAL ENVIRONMENT DETERMINANTS OF PHYSICAL ACTIVITY AMONG ADOLESCENTS GRADES 10-12 IN A SUBURBAN REGION

By

Joan Furman

Advisor: Gary Winkel

This quantitative cross-sectional study identified the determinants of physical activity in a sample (N=264) of African American and Hispanic, lower-income adolescents in a suburban community in Nassau County, New York. High school students grades 10 through 12 completed questionnaires on physical activity and its determinants from the demographic, biological, individual, social and physical environment domains of the ecological health model framework. Unique features of this study are that it measured several variables not previously studied among adolescents including the actual settings used by participants for physical activity, the characteristics associated with these settings, and the distances traveled between home and these settings. In addition, the study examined the role of transportation and spending time outdoors on physical activity level. The overall results showed that several factors directly predicted greater physical activity including having a body mass index (BMI) less than the 95th percentile for gender and age, having higher self-efficacy beliefs, spending one's usual recreational time in active rather than sedentary pursuits, having transportation provided to physical activity settings by

family, friends and oneself, and the number of hour spent outdoors. In addition, the number of hours spent outdoors mediated several factors in predicting higher amounts of physical activity: a BMI at or above the 95th percentile level, higher self-efficacy beliefs, and spending ones usual recreational time in active rather than sedentary pursuits. As for places used for physical activity, participants' used presumably non-fee and low-fee settings including their own and friends' private homes and public settings (e.g., community parks) more often than private, fee-based health club settings. Using one's home as a setting for physical activity was predictive of less physical activity than was using settings outside of the home. Measures of gender, ethnic and income group differences among physical activity determinants revealed some significant within-group differences. However, these differences did not account for differences in physical activity levels within gender, ethnic or income groups. These findings should be confirmed in future studies with an emphasis on the role of being outdoors, transportation, proximity to settings, and setting characteristics on adolescent physical activity among diverse ethnic and income groups.

TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER I

Introduction

Physical Activity Levels among Adolescents

Regular participation in physical activity early in life is recognized as beneficial for childhood and adolescent development and health (U.S. Department of Health and Human Services [USDHHS], 1996; USDHHS, 2000). Furthermore, because research suggests that the benefits of physical activity habits in early life may continue into adulthood, early participation in physical activities is crucial to life-long health and disease prevention (Taylor, Blair, Cummings, et al., 1999; Telama, Yang, Laakso, & Viikari, 1997; Malina, 1996). Given these benefits, experts recommend that adolescents engage in regular vigorous and moderate physical activity.[1]

Despite the health benefits of regular physical activity in youth, national surveys of child and adolescent physical activity levels indicate that a large percentage of American children and adolescents participate in less physical activity then recommended (Grunbaum et al., 2004; Grunbaum et al., 2002; Pate, Long, & Heath, 1994). Equally troubling is that physical activity levels decline during adolescence (Grunbaum et al., 2004; Grunbaum et al., 2002; USDHHS 1996).

---

[1]There is variation among experts as to recommended levels of physical activity in adolescents for health benefits. However, generally recommended minimum physical activity levels are: 1) daily moderate intensity activity for at least 30 minutes that involves a variety of muscle groups and 2) three or more sessions per week of vigorous physical activities that last 20 minutes or more per occasion (U.S. Department of Health and Human Services, 1996).

A heightened interest in adolescent physical activity patterns arose during the last decades with the awareness that physical activity among adolescents was declining (Grunbaum et al., 2004; Grunbaum et al., 2002; Kann et al., 2000; Kann et al., 1998). Adolescent inactivity trends follow similar patterns seen in Americans of all ages (USDHHS, 1996). Adoption of physical activity depends on multiple intrapersonal, interpersonal and environmental factors, which are discussed throughout this study. Public health officials and social scientists speculate that the causes of inactivity may be the result, in part, of contemporary American lifestyles (Sallis, Kraft, & Linton, 2002, King et al., 1995).

Inactivity as an Ecological Problem

Contemporary lifestyles shaped by technological advancements, lifestyle demands and physical activity attitudes, and sociopolitical environments are likely causes of inactivity trends. Technological advancements have increased the amount of automated, labor-saving and electronic devices used in everyday activities and consequently increased sedentariness. This shift is seen in all spheres of ordinary American life including the workplace (e.g., robots, transport devices), transportation (e.g., automobiles, escalators, elevators), home maintenance (e.g., electric lawnmowers and household appliances), and leisure-time activity (e.g., television, movies, videogames, computer-related activities). For instance, some studies have found time spent watching television predicts physical activity levels among adolescents (Bungum & Vincent, 1997; Eisenmann, Bartee, & Wang, 2002; Page, Hammermeister, & Scanlan, 1996); however, other studies have not

found this association (Marshall, Biddle, Sallis, McKenzie, & Conway, 2002; McGuire, Neumark-Sztainer, & Story, 2002; Sallis, Zakarian, Hovell, & Hofstetter, 1996).

Lifestyle demands and physical activity attitudes also may shape current activity levels. Even though the benefits of physical activity are well known (Pate et al., 1995; USDHHS, 1996), barriers to activity, such as "lack of time" and lack of "access to facilities," take precedence over physical activity (Sallis & Owen, 1999). A possible deterrent to physical activity may be Americans' aspirations. According to the popular media, American modern lifestyles are filled with multi-tasking, priority juggling and other achievement-directed or economic-driven goals that may limit time for physical activity. Lastly, lifestyles situated in impoverishment or low-income status may impose seemingly insurmountable barriers to physical activity, such as, lack of time due to extensive work obligations, lack of access to affordable facilities and equipment and lack of or inadequate transportation.

Sociopolitical environments may also contribute to inactivity. Shifts in population distribution from cities to suburbs and changes in urban designs create physical environments that encourage inactivity. Built environments in the suburbs often lack mixed-purpose land use or the relative proximity of different land uses within a given area, such as homes, stores, offices, parks , schools and other land uses, sufficient public transportation systems, and sidewalks abundantly found in cities. Research on land use found that people walk and cycle more for transportation in mixed land use communities (Frank & Engelke, 2001). Therefore, poorly designed land use creates auto-dependent communities and discourages physical activity for transportation and leisure activities

(Sallis, Kraft, & Linton, 2002). An example of this may be the fact that walking is steadily losing ground to automobile travel in general. Although walking is a very popular form of physical activity in the United States, the number of walking trips as a percentage of all trips taken (of any distance) has declined over the years for adults. Walking has declined even more sharply for children (U.S. Department of Transportation, 1994).

Given that contemporary lifestyles facilitate inactivity, efforts to promote physical activity must take into account two considerations: 1) engaging in physical activity has become, for most Americans, a voluntary, deliberate action requiring personal agency and 2) efforts to overcome American lifestyle deterrents to physical activity will require broad, systematic interventions at the intrapersonal, interpersonal, social and sociopolitical levels.

Ecological Health Models and Physical Activity

Ecological Health Models provide a conceptual framework for understanding physical activity. Ecological health model theorists postulate that health behaviors occur within an ecological context; wherein, intrapersonal, interpersonal, sociocultural, policy, and physical environmental factors influence behavior and these respective domains of influence are interactive (McLeroy, Bibeau, Streckler, & Glanz, 1988; Sallis & Owens, 2002).

Two prominent ecological models, social cognitive theory (Bandura, 1986) and behavior setting theory (Barker, 1968, 1987), demonstrate the multi-causative and interactive nature of behavior, such as physical activity. Social cognitive theory addresses the roles of the individual, social and physical environments respectively. The theory

purports that personal attributes (e.g., preferences, competencies, motivation), cognition, behavior itself and the environment interact as determinants of each other. The mutual action among determinants results in a three-entity exchange: person, environment and their interaction, or the "triadic model." Three constructs in the social cognitive model that are heavily supported in the physical activity literature are self-efficacy, or confidence in performing a behavior; behavioral capacity, or skill sets to perform a behavior; and outcome expectancies, or the beliefs about the outcomes of a behavior (Sallis & Owen, 1999). Each of these constructs is measured in physical activity literature; however, these are often treated as individual predictors of behavior, independent of the social and physical environments in the triadic model. An example of the consequences of this unilateral focus is seen in the insufficient literature explaining the differences in perceived physical activity capacity or competency between females and males (Lirgg, 1991; USDHHS, 1996). Social cognitive theory and gender differences in physical activity predictors are covered more extensively later.

Barker's (1968, 1987) behavior setting theory contributes an ecological view with a different emphasis. Behavior setting theory recognizes the influence of psychological and environmental constructs on behavior and the interactive nature of these. An emphasis in the model is how environments structure behavior. According to Barker, behavior settings maintain the equilibrium of human behavior. Barker asserts "much of the order, stability, and predictability of human behavior comes from the ecological environment; from the structured, homeostatic, coercive behavior settings that people inhabit." Furthermore, "the ecological environment initiates, organizes, terminates, and

gives stability to much human behavior" (Barker, 1987). In essence, the setting prescribes place-specific behaviors. Furthermore, because of the structured nature of settings, they facilitate or restrict behavior. Two simplistic examples are a basketball court and a community bicycle trail, in which, the physical structure and social rules surrounding the place define the behaviors within. Behavior settings and ecological models are discussed in depth later.

Physical activity literature, discussed throughout, demonstrates that various individual, social, and physical environment factors are predictors of physical activity. However, within this literature, ecological modeling is rare and consequently there are gaps in our understanding of the multi-causative effects explained by ecological models. Fortunately, the multi-causative nature of physical activity is gaining attention among public health officials and social scientists in their recommendations for physical activity interventions, particularly among youth.

Efforts to Increase Physical Activity among Youth

Promoting participation in physical activity and sports among young people is a critical national priority. Physical activity, including among youth, is one of the leading health indicators in Healthy People 2010, the national health objectives for the decade (USDHHS, 2000). Furthermore, health advocates have published national strategies for enhancing physical activity interventions among youth (Centers for Disease Control and Prevention [CDC], 1997; CDC, 2000). Not surprisingly, national health promotion priorities now embrace ecological health model principles either directly (Pate et al., 2000; Richter et al., 2000; Sallis, Bauman, & Pratt, 1998) or indirectly through promoting

community-based research and interventions that emphasize social, cultural and physical environmental determinants of physical activity (Task Force on Community Preventive Services, 2002) including physical activity promotion among youth (USDHHS, 2000; CDC, 1997; Pate et al., 2000; Richter et al., 2000). For example, Healthy People 2010 (USDHHS, 2000) physical activity objectives specify access to physical environments and individual activity level objectives among their health goals. Likewise, the CDC (2000) recommends the development of enjoyable, accessible, safe, and affordable opportunities for youth to be active through after-school care programs, youth sports and recreation programs, and a community structural environment that "makes it easy and safe for young people to walk, ride bicycles, and use close-to-home physical activity facilities." Furthermore, the report also embraces the familial and social aspects of physical activity including the need for family modeling and support, and institutional programs that help develop in youth the knowledge, attitudes, skills, behaviors, and confidence to adopt and maintain physically active lifestyles. Despite these far reaching recommendations, there are still gaps in the literature on the individual, social and environmental influences of adolescent physical activity (Sallis, Prochaska, & Taylor, 2000), particularly in the sphere of environmental determinants of physical activity (Brownson, Baker, Housemann, Brennan, & Bacak, 2001; Sallis, Johnson, Calfas, Caparosa, & Nichols, 1997).

Conceptual Model for Present Study

The overall aim of this study is to integrate multiple ecological domains of recognized physical activity determinants of planned physical activity including individual, social, and physical environmental factors within one study and to examine the relative

influence of and the interaction of these factors on physical activity levels among adolescents in one suburban community with a predominantly Black and Hispanic ethnic, lower income composition. A specific objective is to better understand the relationship between the accessibility of physical activity settings and participants' physical activity levels.

Accessibility, for the purpose of this study, includes the desirability of and ease of use of physical activity environments. Desirability characteristics within settings that may affect participation in physical activity include venue features or behavior setting characteristics specific to an activity type, such as whether the setting has the requisite equipment to complete the activity (e.g., a basketball hoop, a swimming pool, exercise equipment, an unobstructed path) and characteristics unrelated to an activity type (e.g., aesthetics, safety, amenities at the setting, built vs. natural setting). Accessibility to settings is influenced by ease of use factors including mode of transportation available and/or used for access, geo-spatial qualities, such as whether settings are proximal, visible, or have passageways for access; and geopolitical characteristics, such as public transportation availability, municipality or politically defined boundaries (e.g., town boundaries or school district perimeters), and municipality requirements (e.g., residency requirements, admission fees). Social and economic factors also may affect the desirability of and ease of use of a physical setting. For instance, admissions criteria based on affiliation status in a private organization (e.g., private country clubs) or excessive non-residency fees that favor affluent socioeconomic status (SES) groups may affect attendance and participation in setting activities. The desirability of and ease of use

properties of settings may be particularly relevant for low-income individuals who may have restricted access to adequate proximal physical activity settings due to the lack of personal and community resources. Furthermore, transportation barriers may be more burdensome in low-SES suburban communities in which ownership of private automobiles may be limited and where public transportation systems may be insufficient to address the great distances between places associated with suburban land use.

CHAPTER II

Literature Review

Determinants of Physical Activity in Youth

Health researchers, over the last few decades, have measured potential determinants of physical activity in adolescents, which are commonly conceptualized within spheres of influence or categories of factors affecting behavior. One schema developed by Sallis, Prochaska & Taylor (2000) includes six categories: 1) demographics/biological, 2) psychological/ cognitive/emotional, 3) behavioral attributes/skills, 4) social/cultural factors, 5) the physical environment, and 6) physical activity characteristics, such as perceived effort and intensity. The first five of the six are discussed in depth here, as they are most relevant to this proposed study. Although the emphasis is on adolescent physical activity, factors related to childhood and adult physical activity are included when they provide insight into important similarities and differences with adolescents.

Demographic and Biological Factors

As mentioned earlier, three demographic and biological factors consistently predict physical activity in adolescents in America. These are age (inverse), gender (male) and ethnicity (White) (Grunbaum et al., 2004; Grunbaum et al., 2002; Kann et al., 2000; Kann et al., 1998, USDHHS 1996). Physical activity declines with age in adolescence. In a national sample, vigorous physical activity among high school age youth in 2003 progressively decreased from the 9th grade rate of 68.5% to the 12th grade rate of 55.5% (Grunbaum et al., 2004). Among adolescents, females are much less likely than males to

participate regularly in vigorous physical activity (Grunbaum et al., 2004; Grunbaum et al., 2002; USDHHS 1996) or to participate on sports teams (Grunbaum et al., 2004; Grunbaum et al., 2002). Likewise, females join organized sports programs at later ages and drop out at younger ages than males (Seefeldt & Ewing, 1997). Similarly, discrepancies in physical activity levels occur between Whites and other ethnic groups. Among high school students in 2003, Whites participated in physical activity more than Blacks and Hispanics and Whites were more likely than Blacks and Hispanics to play on sports teams in and out of school (Grunbaum et al., 2004). Such trends were consistent with earlier findings in national surveys (Grunbaum et al.; 2002; Kann et al., 2000; Kann et al., 1998). However, research comparing ethnic group differences among Black and Hispanic youth did not find significant differences in physical activity between these groups (Gordon-Larsen, Adair, & Popkin, 2002; Gordon-Larsen, McMurray, & Popkin, 2000). Another demographic factor, SES, is infrequently studied. However, the limited data available suggests that adolescents from low and middle SES families are less active overall than more affluent adolescents (Gordon-Larsen, McMurray, & Popkin, 2000; Sallis, Zakarian, Hovell, & Hofstetter, 1996) and adolescents from low-SES are less active than middle-SES adolescents (Molner, Gortmaker, Bull, & Buka, 2004). In addition, low and middle SES adolescents may be less likely to participate in organized sports teams and school physical education classes and they may have less frequent physical education classes available to them than high-SES group adolescents (Sallis, Zakarian, Hovell, & Hofstetter, 1996). These findings suggest that it is important to study determinants of physical activity in youth among various SES groups. Lastly, the biological factor of body mass index has been inconsistently found to predict activity level. Some studies show an

association between increased body mass index and reduced physical activity (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Wolf et al., 1993) while others do not (Sallis, Taylor, Dowda, Freedson, & Pate, 2002).

Psychological, Cognitive and Emotional Factors

Many psychological, cognitive, and emotional factors have been studied as potential predictors of physical activity in adolescents, including among others, self-efficacy, outcome expectations, barriers, general self-esteem, exercise self-schema, body image, self-motivation, and knowledge of exercise (Sallis, Prochaska & Taylor, 2000, USDHHS, 1996). Only a few factors are consistently or strongly indicated determinants of physical activity in adolescents. These include self-efficacy (Bungum, Dowda, Weston, Trost, & Pate, 2000; Reynolds et al., 1990; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994) perceived physical activity capacity, skill, or competence (Biddle, Sallis, & Cavill, 1998; Lirgg, 1991); intention to be active (Godin, & Shepard, 1986; Reynolds et al., 1990; USDHHS, 1996); outcome expectations or perceived benefits (Gentle, Caves, Armstrong, Balding, & Kirby, 1994; Garcia et al., 1995; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994), barriers, such as lack of time and lack of energy, (Garcia et al., 1995; Gentle, Caves, Armstrong, Balding, & Kirby, 1994; Sallis, Prochaska, Taylor, Hill, & Geraci, 1999) and enjoyment of physical activity (Bungum, Dowda, Weston, Trost, & Pate, 2000; Dilorenzo, Stucky-Ropp, Van Der Wal, & Gotham, 1998). Although these factors are associated with physical activity in females and males, there are some gender differences. Males generally have higher perceptions of exercise self-schema and general self-esteem than females (Garcia et al., 1995) and physical activity capacity or competency

(Lirgg, 1991; USDHHS, 1996). Males and females also perceive different benefits for physical activity. For example, males often cite competition and females often cite weight management as the reasons for engaging in physical activity (Kelder, Perry, Peters, Lytle, & Klepp, 1995). Males and females differ in their preferences or interests for activities. Males are more likely to participate in team sports, while females are more likely to participant in aerobics and dance (USDHHS, 1996).

Behavioral Attributes and Skills

Several behavioral attributes and skills are associated with physical activity in adolescents across gender and ethic groups studied. These factors are previous physical activity (Dilorenzo, Stucky-Ropp, Van Der Wal, & Gotham, 1998; Godin, & Shepard, 1986; Reynolds et al., 1990; USDHHS, 1996), participation in organized or community sports (Bungum & Vincent, 1997; Terre, Drabman, & Meydrechm, 1990) and use of afternoon time for sports and physical activity (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Sallis, Taylor, Dowda, Freedson, & Pate, 2002) and, conversely, being sedentary after school and on weekends (Terre, Drabman, & Meydrechm, 1990). Other behavioral factors, including among others things, alcohol use (inverse), tobacco use (inverse), attitude, and knowledge of exercise and health, are inconsistently associated with physical activity in adolescents (Sallis et al., 1992; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994).

Social and Cultural Factors

Numerous social and cultural factors determine physical activity among adolescents. Family support, social support from others, and parental indirect assistance

(e.g. transportation and fees) are associated with adolescent physical activity. Family support variables, which generally measure encouragement and joint participation in physical activities, frequently showed parental and sibling support predicts physical activity (Bungum & Vincent, 1997; Dilorenzo, Stucky-Ropp, Van Der Wal, & Gotham, 1998; Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Sallis, Taylor, Dowda, Freedson, & Pate, 2002). However, there is some evidence that parental support may be more influential among African American and Caucasian ethnic groups than among Asian and Hispanic groups (Mcguire, Hannan, Neumark-Sztainer, Falkner Cossrow & Story, 2002). Moreover, some studies suggest that the effect of family support may be stronger for females than males (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). Peer support has also been found to be a determinant of physical activity in adolescents (Garcia et al., 1995; Gentle, Caves, Armstrong, Balding, & Kirby, 1994; Sallis, Taylor, Dowda, Freedson, & Pate, 2002). Indirect parental assistance in the form of provision of transportation (Hoefer, Mckenzie, Sallis, Marshall, & Conway, 2001) and in paying activity fees (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999) predicts physical activity. Two other physical activity determinants are commonly measured: parental physical activity or modeling and peer, teacher or coach modeling. Parental modeling has shown inconsistent results and peer, teacher or coach modeling were not predictive in any studies (Sallis, Prochaska & Taylor, 2000).

Physical Environment Factors

Research measuring potential physical environment determinants of adolescent physical activity is scarce and has shown mixed results. Research in this area is based

entirely on participant perceived environmental variables. Availability of opportunities to exercise (Gentle, Caves, Armstrong, Balding, & Kirby, 1994) is significantly associated with physical activity in males and females. Similarly, Garcia et al. (1995) found access to exercise facilities and programs predictive of physical activity with no differences between gender or ethnic subgroups. In contrast, other studies did not find associations between physical environment variables and physical activity. These latter research studies measured access to facilities, locations or play spaces for physical activity (Bungum & Vincent, 1997; Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994) and safety (Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994).

Research on environmental factors affecting childhood and adult physical activity is also scarce. However, some studies show associations between physical environment factors and physical activity level. Research on physical activity in children ages 4-12 showed that access to programs and facilities (Sallis et al., 1993; Stucky-Ropp & Dilorenzo, 1993) and time spent outdoors (Baranowski, Thompson, Durant, Baranowski, & Puhl, 1993; Klesges, Eck, Hanson, Haddock, & Klesges, 1990; Sallis et al., 1993) are determinants of physical activity. Additionally, amenities within recreation facilities including safety, availability of toilets, drinking fountains, lighting, and shade are associated with parents deciding whether to take their children to outside play environments (Sallis, McKenzie, Elder, Broyles, & Nader, 1997). Two other variables measured in studies, safety and season, showed mixed results in predicting children's

physical activity levels (Baranowski, Thompson, Durant, Baranowski, & Puhl, 1993; Sallis, Prochaska & Taylor, 2000).

Several studies measured the physical environment as a potential predictor of physical activity in adults using both perceived and objective measures of the physical environment. Research using perceived environment measures found numerous variables significantly associated with physical activity in adults. These are: spatial access (proximity) to physical activity settings (Booth, Owen, Bauman, Clavisi, & Leslie, 2003; Sternfeld, Ainsworth, & Quesenberry, 1999; Troped et al., 2001), convenience of exercise environments (Ball, Bauman, Leslie, & Owen, 2001; Howell et al., 1989), opportunities for activity, such as equipment at home, (Jakicic, Wing, Butler, & Jeffery, 1997; Sallis, Johnson, Calfas, Caparosa, & Nichols, 1997) and awareness of facilities (Leslie et al., 1999). In contrast, other studies measuring perceived environments did not find spatial access associated with physical activity use in adults (Shaw, Bonen, & McCabe, 1991; Sallis et al., 1989). Additional environmental factors were associated with physical activity in studies that measured perceived environments including safety from crime (Booth, Owen, Bauman, Clavisi, & Leslie, 2003; CDC, 1999; Wilson, Kirtland, Ainsworth, & Addy, 2004) and aesthetics (Ball, Bauman, Leslie, & Owen, 2001; King et al., 2000). However, these were not significant in another perception-based study (Sallis, Johnson, Calfas, Caparosa, & Nichols, 1997). Finally, a study of one American city found SES neighborhood type associated with the perceived availability of resources. In this study, residents of low-SES areas reported less access to public recreational facilities than residents from high-SES areas reported. However, an analysis of actual recreational

facilities available in the low-SES and high-SES areas respectively did not find significant differences in available resources between low-SES and high-SES geographic areas other than the number of walking trails where high-SES areas had more walking trails available than low-SES areas had (Wilson, Kirtland, Ainsworth, & Addy, 2004).

Five studies on physical environment determinates of physical activity in adults included objective measures of physical environment settings. Four of these studies utilized geographic information systems (GIS) to plot their settings and to measure physical distance between home and physical activity settings as a factor of interest. Sallis et al. (1990) measured proximity of pay-for-use and free facilities to the participants' homes and found a positive association between density of pay-for-use facilities and activity level, but not for free facilities, regardless of SES status. Another study found close distances and the lack of structural barriers including a busy street and a steep slope hill were associated with bicycle trail use in a White professional sample, with females being more sensitive to distance and structural barriers (Troped et al., 2001). However, a related study assessing the use of the same bicycle trail found distance was not a significant predictor of trail use (Troped, Saunders, Pate, Reininger, & Addy, 2003). The next study, conducted in an affluent region, measured spatial access to and the appeal of (based on interviewer perceptions) recreational settings. The findings showed that distance between subjects' homes and formal (e.g., health club, fitness center) and informal (e.g., streets, public open spaces, beaches) physical activity settings was a significant predictor of setting use (Giles-Corti & Donovan, 2002). The last study, of one American city, measured the number of natural and built physical activity resources (e.g.,

facilities, parks) within each census track for low, middle and high socioeconomic status regions and found SES neighborhood type associated with the availability of resources. In this study, there were significantly fewer total resources in low-SES and medium-SES neighborhoods compared to high-SES neighborhoods. No differences were found in the number of pay-for-use facilities between neighborhood types. However, low-SES and medium-SES neighborhoods had fewer free-for-use facilities compared to high-SES neighborhoods (Estabrooks, Lee, & Gyurcsik, 2003).

Conceptual and Methodological Limitations in Published Research: Psychosocial Factors

Psychosocial variables dominate investigations in the field of physical activity research. Within these studies there are common weaknesses including inconsistent inclusion of, definition and measurement of variables, lack of replication of studies and a bias toward cross-sectional studies. Furthermore, studies often lack inclusion of diverse ethnic and low-income participants or fail to adequately compare gender, ethnic and SES differences among variables. A major deficiency in the current body of research is the lack of conceptual and methodological attention to mediator and moderator variable effects. This problem is illustrated in the treatment of gender effects, ethnic effects and SES effects in the literature.

The causes of gender differences in physical activity remains unclear and further assessment of variables that mediate and/or moderate physical activity could shed light on the challenge to increase physical activity in females. Although some gender effects of physical activity might arguably be attributed to biological causes, evidence suggests that

physical activity is socially constructed. Several interrelated factors favor males' participation in physical activity and the possible cumulative effects of these advantages, starting at a young age, could potentially account for the discrepancies in physical activity levels between females and males at all ages. Males have higher levels of several socially constructed predictors of physical activity including that of exercise self-schema and general self-esteem (Garcia et al., 1995) and perceived physical activity capacity or competency (Lirgg, 1991; USDHHS, 1996) than females. In addition, parental support is predictive of physical activity, with parental support apparently having greater effects in females than males (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). Research also shows that parental gender stereotype beliefs influence parental physical activity beliefs and achievement goals for their children (Xiang, 2003) and may result in parental discouragement of females in physical activity because of the belief that physical activity is a masculine pastime. Furthermore, several additional factors may benefit males over females in physical activity participation over time. For example, consistent factors predictive of physical activity in childhood are gender (male), physical activity preferences, intention, perceived barriers (inverse), previous activity, program/facility access, and time spent outdoors (Sallis, Prochaska, & Taylor, 2000). Early introduction to physical activity and physical activity settings, as well as, early encouragement to be physically active could reasonably be expected to shape physical activity beliefs, acquisition of skills, self-efficacy and perceived competency, intention, perceived barriers and enjoyment of physical activity over time. Therefore, disparities in access to physical activity settings between males and females and differences

between males and females in the extent to which physical activity is encouraged in early childhood and adolescence could account for differences in activity levels throughout life.

Research on adolescent physical activity has repeatedly measured and identified differences in activity levels between White and non-White ethnic groups (Sallis, Prochaska, & Taylor, 2000). However, research samples are generally homogenous and predominantly White (Sallis & Owen, 1999). Studies examining ethnic differences in activity levels between minority ethnic groups are less frequent and studies examining differences in physical activity determinants between ethnic groups are rare (Sallis, Zakarian, Hovell, & Hofstetter, 1996). As mentioned earlier, among the limited studies measuring minority ethnic group differences in physical activity, most have not found significant differences in activity level (Garcia et al., 1995; Gordon-Larsen, Adair, & Popkin, 2002; Gordon-Larsen, McMurray, & Popkin, 2000). Among studies comparing ethnic group differences in determinants of physical activity, one study, mentioned earlier, showed significant differences in parental support effects between African American, Caucasian, Asian and Hispanic ethnic groups (Mcguire, Hannan, Neumark-Sztainer, Falkner Cossrow & Story, 2002). A second study found several significant differences in determinants of physical activity between minority ethnic groups. These included differences in types of preferred activities, such as African Americans favoring dance while Asians favored tennis, African Americans and Latinos reporting fewer convenient facilities than other groups and Latinos reporting lower levels of neighborhood safety than comparison groups (Sallis, Zakarian, Hovell, & Hofstetter, 1996). These two studies demonstrating ethnic differences in physical activity provide a glimpse of the potential

information that could be available if more research compared determinants of physical activity by ethnic group. Another understudied factor in adolescent physical activity is SES.

Few studies have reported SES as a potential determinant of adolescent physical activity (Gordon-Larsen, McMurray, & Popkin, 2000; Molner, Gortmaker, Bull, & Buka, 2004; Sallis, Prochaska, & Taylor, 2000; Sallis, Zakarian, Hovell, & Hofstetter, 1996) despite findings that SES has explained differences in adult physical activity levels in numerous studies (Sallis & Owens, 1999). However, research findings among adolescents that measured SES effects of physical activity showed differences in activity levels between SES groups such that low and middle SES adolescents are less active overall than more affluent adolescents (Gordon-Larsen, McMurray, & Popkin, 2000; Sallis, Zakarian, Hovell, & Hofstetter, 1996) and that low-SES adolescents are less active than middle-SES adolescents (Molner, Gortmaker, Bull, & Buka, 2004). As noted earlier, one study's findings showed that adolescents from low and middle SES families were less active overall than more affluent adolescents and that there were significant differences between SES groups where low-SES and middle-SES adolescents had less frequency of physical education classes and participated less in organized sports and physical education than high-SES adolescents (Sallis, Zakarian, Hovell, & Hofstetter, 1996). In any event, when studying or interpreting the effects of SES and/or ethnicity on physical activity, Sallis and Owen (1999) advise using caution "as it is difficult or impossible to separate the effects of ethnicity and SES."

The lack of measurement of the role of gender, ethnicity and SES group differences among the potential determinants of physical activity and the role of mediator and moderator effects on adolescent physical activity are limitations in the published research. Another limitation in the published research is the lack of studies addressing the physical environment segment of the ecological model among adolescents.

Conceptual and Methodological Limitations in Published Research: Physical Environment Factors

The scarcity of research assessing the environmental sphere of physical activity is a large gap in the literature, particularly among research involving youth (Richter et al., 2000). Moreover, research on physical environment factors and physical activity has several design limitations that may affect findings. First, the over reliance on perceived environments is misguided as there is a poor association between perceived physical environment factors and actual physical environment factors, as evidenced in research comparing perceived and objective proximity to physical activity facilities (Kirtland et al., 2003; Sallis et al., 1990; Wilson, Kirtland, Ainsworth, & Addy, 2004). Second, questionnaire items sometimes inadequately specify terms of interest. The term "convenience" was used in several physical activity studies. Although it appears to loosely describe the distance or number of facilities in an area, convenience is analogous to the terms ease and expediency, which reflect characteristics other than distance. The third design limitation in studies is the reliance on a person's local neighborhood characteristics as the unit of measure for determining correlations between physical environment attributes and physical activity. People whose neighborhoods are not conducive to activity

or lack features desirable for activity (e.g., aesthetics, safety, passageways) may participate in physical activity outside of their neighborhood, thereby distorting the importance of neighborhood characteristics on physical activity. Each of these design features may influence the results of studies on physical environment factors in physical activity. Another critical design flaw of previous research is rooted in the broad conceptual models underlying the research.

Although several physical environment studies reference prominent ecological models, such as social cognitive theory (Bandura, 1986) and, less so, behavior setting theory (Barker, 1968), the absence of key domain variables within these studies, such as individual and social factors, may result in models insufficient to test ecological theories. One physical environmental and physical activity study that included multiple individual, social and physical environment factors found individual and social determinants of activity more strongly associated with physical activity than the physical environments. The researcher concluded that having access to physical activity facilities was a necessary, but insufficient factor in assuring physical activity (Giles-Corti & Donovan, 2002). Moreover, research examining the relationship between the physical environments and physical activity is often myopic in that it focuses on one or two variables, such as proximity or numbers of facilities, and ignores other potentially important variables, such as transportation or the availability of physical activity settings with specific utility and importance for participants. A vital example of this is seen in the measurement of accessibility.

Researchers may be underestimating the scope of accessibility and its impact on physical activity. Hansen (1959), a geographer, considers accessibility as a measure of the spatial distribution of facilities adjusted for the desire and the ability of people to overcome the distance or travel time to access a facility or activity. Therefore, to fully understand accessibility, researchers must measure both the desirability of the location and transportation. For instance, the sheer number of facilities near ones home may be irrelevant based on the personal exercise preferences of the participant. A proximal football field may be irrelevant to a tennis player. Likewise, lack of private or public transportation may constrain access to otherwise desirable settings.

Theoretical Perspective

Ecological Models: an Overview

Ecological models of health behavior provide a broad theoretical framework in which to study physical activity. The ecological perspective recognizes behaviors that occur within a multiple-domain context. Sallis and Owens (2002) succinctly describe the paradigm as "models proposing that behaviors are influenced by interpersonal, sociocultural, policy, and physical environmental factors; these variables are likely to interact, and multiple levels of environmental variables are described that are relevant for understanding and changing health behaviors." Ecological models are generally high-level models, frameworks or perspectives rather than specific constructs or variables.

Ecological approaches to health behavior have evolved from many theoretical frameworks including health policy, geography, psychology and other social science disciplines. Several ecological health models have grown from existing ecological models.

For instance, an early model proposed by McLeroy, Bibeau, Streckler, and Glanz (1988) referenced and adapted psychologist Urie Bronfenbrenner's bioecological model (1979) as the groundwork for health research. The model incorporated some of Bronfenbrenner's human development theories. In Bronfenbrenner's theory, behaviors are seen as being affected by and effecting multiple levels of influence. According to Bronfenbrenner, "in the bioecological model, the characteristics of the person are both a producer and a product of development" (Bronfenbrenner, 1979). This notion is central to all ecological health models. Likewise, Bronfenbrenner's concept of nested environments was incorporated into the McLeroy, Bibeau, Streckler, and Glanz model (1988). The multiple levels of influence on behavior are specified by Bronfenbrenner as "the conceptualization of the ecological environmental as a set of nested systems ranging from the "micro" to the "macro" (Bronfenbrenner, 1999). Bronfenbrenner divides environmental influences into micro, meso, exo, and macrosystem levels of influence; wherein, each level of influence is nested in the next level. Three examples highlight these levels. The microsystem refers to the face-to face influences in specific settings, such as interactions with family, friends, coworkers. The mesosystem, refers to the interrelations among the various settings in which the individual is involved, such as family, peer, school and religious groups. The exosystem refers to the larger social system that can influence individuals and settings through economic forces, cultural beliefs and values and political settings. Bronfenbrenner's ecological theories are reviewed briefly here because they have heavily influenced general ecological health model theory. However, the theories of social cognitive theory (Bandura, 1986) and behavior settings (Barker, 1968) are the theoretical foundations for this study, as they have advantages in modeling physical activity research.

Social Cognitive Theory

Albert Bandura's social cognitive theory (1986) combines personal and environmental factors as interactive determinants of health behavior. As summarized earlier, the theory purports that personal attributes, cognition, behavior itself, and the environment interact as determinants of each other. The person-environment interaction, referred to as "reciprocal determinism" is bi-directional, continuous and simultaneous. The mutual action among determinants results in a three-entity exchange: person, environment and their interaction, or the "triadic model."

Each component in the triadic model plays a role that contributes to the collective action between determinants. The person in social cognitive theory (Bandura, 1986) has unique characteristics including human agency to affect change. The environment consists of objective factors external to the person, such as the social environment (e.g., family, friends, co-workers) and the physical environment features (e.g., a room's light, temperature, size) that influence the person. Bandura (1997) emphasizes that social structures impose constraints and provide resources for personal development and human functioning, but that human adaptation and change are rooted in social structures and the system is circular in nature. Social structures which "are devised to organize, guide and regulate human affairs in given domains by authorized rules and sanctions" are created by human activities. People therefore are both producers and products of social systems. An essential component of the theory is that of situation. According to Baranowski, Perry, and Parcel (2002), "the term situation refers to cognitive or mental representation of the environment (including real, distorted or imagined factors) that may affect a person's

behavior. "The situation is a person's perception of the environment, such as place, time, physical features, activity, participants, and his or her own role in the situation." The interface of person, environment and situation provides the ecological framework for behavior.

A simplified example using physical activity research conveys the utility of social cognitive theory in research of this kind. Research of Mexican-American and Anglo-American children (Sallis et al., 1993) found child personal behaviors, parental encouragement, and the physical environment significantly affect physical activity in children. A child's request for physical activity (e.g., personal agency) affects parent action (e.g., personal agency). Additionally, parental prompts for a child to perform physical activity involves the child (e.g., personal agency), the environment (e.g., parental prompts) and the interaction between them (e.g., parent-child interaction) forming the triadic model. Furthermore, access by the child (e.g., personal agency) to outdoor environments (e.g., expanded play space, aesthetic and sensual stimulators) and the interaction between them are a triadic interchange. These simple examples demonstrate how the triadic model explains multiple domains of influence, their interaction and their affect on health behaviors.

Social cognitive theory includes several constructs related to personal action which are measured extensively in health research: self-efficacy, behavioral capacity, and outcome expectancies. "Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997). Behavioral capacity refers to requirements needed to effectively

perform a particular behavior, such as knowledge of the behavior and how to perform it (skills). Outcome expectations refer to a judgment of the likely consequences of the behaviors. These are often based on previous learning and experiences that enable the behaviors. According to Bandura (1997), an outcome is the consequence of a performance, not the performance itself. In keeping, outcome expectations take three forms, positive and negative physical effects (e.g., pleasant sensations, pain), positive and negative social effects (e.g., approval, recognition, monetary compensation, social rejection) and positive and negative self-evaluation (e.g., self-satisfaction, self-devaluation). Although all three of these constructs are important in understanding physical activity, self-efficacy has received much attention, as it is a chief factor in predicting physical activity.

Self-efficacy, which is often categorized as an individual trait in physical activity research, is individually and environmentally constructed. Self-efficacy is a construct that is a key facet of social cognitive theory. A very brief summary of some basic tenets of this construct are provided to situate physical activity self-efficacy beliefs in the context of this larger theory. The term self-efficacy in the context of physical activity is a "persons confidence in his or her ability to do specific physical activities in specific circumstances" or, more generally, it represents the perception of personal efficacy regarding one's ability to be active on a regular basis (Sallis & Owens, 1999). Self-efficacy in the context of social cognitive theory includes three elements: the person, the person's behavior and the environment, all of which function as part of a reciprocal relationship. The environmental aspects, which include the social environment, are best understood within the sources of

self-efficacy. Self-efficacy beliefs or perceptions are constructed from five major sources: "enactive mastery or learning through personal experience; vicarious experiences, which includes learning through observation of events and/or people; verbal persuasion; psychological state and affective state" (DeVellis & DeVellis, 2001). A review of how vicarious experiences and verbal persuasion, the largely socially constructed sources of self-efficacy, promote individual physical activity self-efficacy under the right circumstances is documented in Self-efficacy- Exercise of Control (Bandura, 1997). In this book, Bandura describes how non-athletic individuals exhibit higher efficacy beliefs after observing other non-athletics model successful athletic performances and how appropriate and realistic verbal persuasion is an effective means of mobilizing greater effort and bolstering personal efficacy in many contexts including physical activity. The importance of self-efficacy beliefs as a catalyst to enhancing physical activity has been repeatedly shown in self-efficacy literature (Bandura, 1997; DeVellis & DeVellis, 2001; Schwarzer, 1992).

The social cognitive model postulates a global framework and specific variables for measuring and understanding personal behaviors in the context of the environment. Another theory, "behavior settings" (Barker, 1968) complements social cognitive theory by offering an extensive model and measurement techniques for explaining how physical environment structures behavior and the interaction between individuals and their environments.

Behavior Setting Theory

Roger Barker (1968) investigated ecological psychology, or the study of molecular and molar behavior, psychological environments and ecological environments, by focusing on "methods and concepts for dealing with the ecological environment of human molar behavior." Barker proposed that the behavior setting is "the central unit of ecological psychology," as behavior settings constitute the "relevant environment" of human molar behavior. Although the methods of inquiry are not a focus here, Baker's methods of investigation involved extensive observation and narrative description of minute parts of human behavior within "environmental units." This field research led to the discovery of behavior settings and a new paradigm to explain ecological psychology. The term ecological psychology within this section refers to Barker's use of the expression, not the science as a whole. The key concepts of behavior setting theory are presented here in general and as relevant to the physical activity settings and behaviors.

In his writings, Barker (1968, 1987) uses the concept of behavior settings to explain the relationship between the ecological environment and psychological environment in ecological psychology. The ecological environment is defined by Barker as the "parts of the surround that are independent of a person's psychological system but that, nevertheless, affect the system and, therefore, affect behavior." The psychological environment is defined by Barker as "the surround that is part of a person's psychological system with direct effects on behavior." Principal to the ecological theory is that the ecological environment, generally in the form of behavior settings, maintains the equilibrium of human behavior through structures that give stability to much human

behavior (Barker, 1987). In addition to behavior settings, this ecological psychology model includes many constructs, such as behavioral episodes, behavior objects, place, and place-specific behavior that elucidate the dynamics of ecological environments, psychological environments and behavior settings.

Behavior settings are complex environmental entities with defined attributes and varying properties where interaction between person and environment occur. According to Barker (1968), a behavior setting has both structural and dynamic attributes. In the structural part, the behavior setting consists of one or more standing patterns of "behavior-and-milieu." A structural characteristic of the behavior-and-milieu phenomena is that it is "circumjacent", or the milieu or environment surrounds the behavior with spatial and temporal boundaries. Similarly, a structural characteristic is that the behavior-and-milieu is "synomorphic" to the behavior; wherein, the features of the environment portray the essential features of the relationship between the behavior and the milieu of the behavior setting. For example, these structural characteristics can be seen in a behavioral setting called a basketball game. The spatial boundaries of a basketball court (e.g., size, shape) are specified, as are the temporal boundaries with start and end times to the games. The fixtures or features of the basketball court, combined with the spatial and temporal definitions of the event define the relationship between the behaviors and settings. The second behavior setting attribute is its dynamic quality. The dynamic side of the behavior-and-milieu parts of a behavior setting, called synomorphs, have a specific degree of interdependence among themselves that is greater than their interdependence with parts of other behavior settings. For example, two behavior-and-milieu synomorphs that share a

common space (e.g., a church choir, a girls club) and must arrange times to use a community room during the same evening, are more interdependent than two church girls clubs held in different buildings on the same night.

Place-specific behavior is the distinctive pattern of behavior prescribed by a setting. Behavior that occurs in one place would be out of place elsewhere. For example, ball throwing is appropriate in a physical education class, but not in a diner, movie theater, or house of worship. The ecological environment restricts the range of personal attributes and opportunities for behavior across persons inhabiting places. Social processes are part of the environmental structure that defines behaviors in settings. Social structures construct the environment by selecting particular persons to inhabit places and by regulating behaviors in places. According to Barker (1987), inhabitants are selected through many ways, such as through mandate (e.g., teachers, principal, children in school), rules of governance (e.g., municipalities, social clubs), and even admission fees that help define the appropriate attributes for inclusion. It is important to recognize that personal behaviors do account for an individual's presence and participation in a setting, such as pupils choosing to attend and participate in class.

The behavior-and-milieu concept recognizes that the person and environment contribute to the interaction between person and environment. Place-specific behavior or the distinctive pattern of behavior prescribed by the setting is dictated predominantly by behavior settings, but this does not suggest that individual human behavior does not have a role in the interaction. A person's psychological system is central to his/her immediate perceptions, cognitions, motivations and motor processes; to his/her psychological

environment (Barker, 1987). A person's psychological system accounts for his/her own goal-directed behaviors, such as throwing a ball to a peer, moving hair from his/her face, watching an interchange between teacher and peer, listening to instruction from a teacher. These are psychological environment episodes that are autonomous to the person and his/her psychological environment. According to Barker (1987), these distinctive periods of behaviors in ecological psychology are defined as "behavior episodes", or "goal-directed actions that are identified independent of their content." Some goal-directed behavior is self-initiated, separate from the ecological environment (e.g., moving hair), while other behaviors are initiated, monitored and terminated by the environment. For instance, students responding to a teacher's instructing them when to start and stop play constitutes externally initiated behavior. Another factor affects the person-environment interaction: behavioral objects. These objects are the observable points of intersections between a person's ecological environment and psychological environment, both human and non-human. The person may hit a ball with a racket, catch a ball thrown by another person, and observe the teacher, all examples of behavior objects. The importance of behavior objects is that they are the routes to the relationship between the psychological system and ecological environment. Despite the apparent uniqueness of these personal behaviors, the ecological environment is the source of the specificity of behaviors much of the time.

Another essential property of behavior settings is the "extraindividual behavior" of behavior settings. Extraindividual behavior refers to an environmental entity's having a life of its own, independent of particular persons. The setting is "superordinate" to

individual behavior and itself generates behavior (Barker, 1987). The essence of a school gymnasium is that it has an ongoing program of actions that are time-place specific. The program components include non-human fixtures (e.g., physical education equipment) and human inhabitants (e.g., teachers, students) that pertain to physical education. The time-place specific actions, physical education, are imposed by the components of the program. The components of the program, fixtures and inhabitants are essential to the setting en mass, but any given person or fixture is not essential. In Barker's (1987) words, "Human behavior occurs in an extraindividual as well as an individual form; environmental units, such as grocery stores, generate a characteristic pattern of behaviors independent of the particular persons involved, and the characteristics and amount of the behaviors can be determined, en bloc, without reference to particular persons." This does not suggest that individuals do not deviate from the program, such a class troublemakers, or that individual traits, such as teacher style, do not contribute to the setting atmosphere and program. However, these individual behaviors are not responsible for the overriding prescribed behavior within the setting. An example of how powerful extraindividual behavior is seen in gymnasium behavior on the first day of a new school semester. Regardless of the year, school location, teacher, or students involved, a set of behaviors similar to reviewing rosters, establishing lockers, and reviewing rules will occur independent of the individual inhabitants in attendance.

The spatial and temporal characteristics of a place may have varying flexibility depending on the structure and dynamics of the setting. Place is not a static state. It may be a unit of the defining physical properties or it may be identified in space-time terms.

Some settings have firm, clear-cut spatial structures that define place-specific behavior, such as swimming pools, which are only for swimming activities and religious chapels that are restricted to religious activities. Other settings have flexible structures, which may afford different behaviors at difference times. A church community room may be a place for a congregation planning meeting or alternately for choir practice. Such spaces are time defined. For instance, the community room may be a congregation planning meeting place on Sunday afternoon from 1:00-2:30 PM, while the community room is a place for choir practice on Wednesday evening from 7:30-to 8:30 PM. Likewise, a specific behavior is not exclusively performed in a particular type of place. The same behaviors may occur in different places, such as dancing occurring in dance halls, health clubs, church meeting rooms, and school auditoriums. Large-scale geographically defined environments, called habitats, also have spatial-temporal boundaries.

In the ecological psychology model, habitats refer to places within the border of towns and outside of people's homes where they engage in individual actions that satisfy personal needs (Barker, 1987). Habitats cover public areas of the local and encompass behavior settings of many purposes. Per Barker (1987) habitats have spatial qualities of "near in time or "at hand" and "conveniently located" or "handy." These spatial features are in addition to the actual physical size and shape of the setting. Habitats also have temporal boundaries, such as days and hours of operations that affect people's behavior. The importance of these spatial and temporal features is that their structures (proximal or distal) define the relationship between people and their habitat. A tenet of behavior setting theory is that behavior can be encouraged or facilitated in some environments, while

discouraged or restricted in others. The actual physical location of place can also facilitate or restrict behavior. Accessibility of a setting encourages its use, facilitating behavior, while inaccessibility discourages its use, restricting behavior.

Social cognitive theory and behavior settings models are well suited for examining the physical activity. Both models address ecological model premises; such as the reciprocal nature of the person-environment interaction, while each model augments the other with specific constructs to measure specific aspects of behavior in context. Social cognitive theory provides highly relevant concepts, including self-efficacy, capabilities, and outcome expectancies that are all predictive of physical activity. Behavior setting theory augments these constructs by stressing the specific role settings play in supporting behaviors. This study collectively incorporates concepts from each theory to explain adolescent physical activity within the project scope.

CHAPTER III

Methods

Sample Selection

The primary goal of the study was to understand the determinants of adolescent physical activity among suburban youth in ethnic and socioeconomic groups that are under-represented in many studies of adolescent physical activity. In addition, the study sought to determine the relationship between three main demographic characteristics, gender, ethnicity, and income, with adolescent physical activity. Accordingly, the high school setting selected for the study represented the gender, ethnic and income characteristics of interest for the study. Three other school districts with large student populations of Black and Hispanic, lower SES students were requested to participate in the study, but all declined to join the study.

Sample Characteristics

Data were collected from 280 students in the 10^{th} through 12^{th} grades, a total of 41.9% of the school's 668 students in the 10^{th}, 11^{th} and 12^{th} grades or 28.5% of the overall 984 school student population during the study time frame in Spring 2004. The grade range for the study is consistent with the grade range groupings in other published research on adolescent physical activity. The final study sample size was 264 as 16 participant's surveys were deleted due to incomplete data. Table 1 compares the percentages of students for the data collection group, the study sample, and the total school population. The gender, ethnic and income composition in the final sample was: 122 males (46.2%) and 142 females (53.8%), 137 African Americans (51.9%) and 127

Hispanics (48.1%), and 93 lower middle-income income participants (35.2%) and 171 low-income participants (64.8%). Pearson chi-square tests showed there were no significant overall sample differences among gender, ethnic and income groups. However, there were significant differences in income among ethnic groups. Hispanics were significantly more likely to be low-income than African Americans within the sample ($X^2 = 3.982$, $p = .046$). Pearson chi-square tests also showed the study sample had lower levels of African American students and higher levels of Hispanic students than the school population ($X^2 = 5.43$, $p = .020$) and also had a greater proportion of low-income students than the school population ($X^2 = 3.59$, $p = .058$). There were no gender differences between the study sample and the school population ($X^2 = .688$, $p = .407$). The school administration's published demographic statistics did not include gender, ethnic, and income between group statistics; therefore, there was no baseline for comparison of school between group characteristics with the study sample.

Sample Comparisons

The ethnic and income group compositions of the present study sample differ from samples found in published research on adolescent physical activity. The present study's ethnic composition had higher percentages of Blacks and Hispanics than many other studies of its kind. The two studies that most resembled the present study did not include large percentages of non-White ethnic group participants. The first study reported including "76.9% non-Hispanic white" participants (Sallis, Talor, Dowda, Freedson, & Pate, 2002) and the second study reported an ethnic composition of 74% Caucasian, 8.5% Hispanic, 14% African American and 3.5% "other" for 10th through 12th grades (Sallis,

Prochaska, Taylor, Hill, & Geraci, 1999). Other studies that included more diverse ethnic groupings did not measure equivalent numbers of Hispanics and African Americans simultaneously. For example, one such study's ethnic composition was 62.6% "European American," 30.4% African American, and 7% "other racial heritage" (Garcia et al., 1995). Another large study of a "low SES and minority high school population" included a large percentage of "Latino" students (60.2%), but smaller numbers of African Americans, 3.7%, Asians, 12.0%, and other non-Causation students, 2.7%. Within this latter study, 21.4% of students were "Anglo" (Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). Another study focusing on gender, ethnic and SES group differences included 56.6% Latino, 11.2% Asian/Pacific Islander, 3.4% African American, and 19.8% low-SES Anglo and 8.9% High-SES Anglo participants (Sallis, Zakarian, Hovell, & Hofstetter, 1996). SES is infrequently measured in physical activity studies comparable to the present study. When specifically measured, low-SES participants were often the primary SES groups studied (Sallis, Zakarian, Hovell, & Hofstetter, 1996; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). In contrast, the present study included both lower middle-SES and low-SES groups across ethnic groups. Gender composition of the current study was comparable to published research. Studies of this type typically have a slight majority of female participants as was seen in most of the research cited above.

Table 1
Demographic Characteristics of Data Collection, Sample and Participating School Roster

Variable	Questionnaires Collected	Study Sample	Spring 2004 School Roster
	N=280	N=264	N=984
Gender			
Male	47.9%	46.2%	49.1%
Female	52.1%	53.8%	50.9%
Ethnicity			
African American/Black	51.4%	51.9%	59.9%
Hispanic	48.6%	48.1%	36.7%
Asian Pacific	N/A	N/A	1.6%
White	N/A	N/A	1.8%
Income[1]			
Low-income	61.1%	64.8%	58.3%
Lower middle-income	33.2%	35.2%	41.7%
Missing data	5.7%	N/A	0

[1] Low income is based on eligiblity to receive a free or reduced lunch.

Procedures

Study procedures were reviewed and approved by The Graduate Center of the City University of New York Institutional Review Board. Consistent with standard research protocols, permission to conduct the study was obtained from the principal of the school where the research was conducted. In addition, only students who returned consent forms signed by a parent or guardian were allowed to participate in the study. Participating students also gave their verbal assent to participate in the study. For agreeing to participate in the study, participants received gifts of nominal value including discount coupons for purchases at a national sportswear chain and water bottles.

Data were collected during a five-week period beginning the last week of April through the last week of May 2004. The study was conducted during a time period when

school was in session and when there were no scheduled holidays or vacations. Measuring physical activity during this period (no holidays nor vacations) was done to ensure that the amounts and types of physical activity reported by participants would reflect what might occur during a usual school spring session.

Paper and pencil questionnaires were administered in mandatory physical education and health classes to 10th though 12th grade classes. Students were allowed approximately 35 minutes to complete the questionnaire. Surveys were available to participants in English and Spanish versions because of the ethnic and language composition of the school where the study was conducted. One percent of the respondents (3 respondents) took the Spanish version of the questionnaire. See Appendix A for a copy of the survey tools and consent forms.

Survey Design and Data Preparation

The questionnaire used in Section I of the survey tool included previously published items and a few additional items of interest. The majority of items measuring demographic, biological, individual, social, and physical environment variables were obtained from the Amherst Health and Activity Survey ("Amherst Survey"), a questionnaire validated in and used in large-scale adolescent physical activity research projects (Sallis, Taylor, Dowda, Freedson, & Pate, 2002). The benefits of this tool were its inclusion of the demographic, biological, individual, social, and physical environment areas of interest in the current study and its use of a 7-day self-report of physical activity. The validity of adolescent 7-day recall self-reported physical activity has been documented for other questionnaires of this nature (Sallis, Buono, Roby, Micale, & Nelson, 1993). Of

particular importance was the presence of physical environment items validated in earlier studies including home environments, neighborhood features, and environmental barriers (Sallis, Johnson, Calfas, Caparosa, & Nichols, 1997). Three additional items were developed specifically for this study. Two were transportation-related items including transportation by oneself and transportation by friends respectively. Lastly, to measure SES, one SES-related question was included in the survey tool: whether the participant was eligible for a free or reduce-priced school lunch. Eligibility for a free or reduced-price lunch is an indication that a student is from a family with an income less than 130% or 185% of the prevailing poverty rate respectively (United States, Department of Agriculture, 2003).

Two sections of the overall survey tool used in the study were designed specifically for this study. Section II, "describe your environment," was developed to gather information about the impact of accessibility to, desirability of, and ease of use of physical activity environments. This section was exploratory in nature and the items were intended to obtain information about the attributes of physical activity settings that might facilitate or restrict their use for physical activity. To gather the desirability of and ease of use factors, each participant was asked to list up to five settings he or she currently used for physical activity. For each place listed, participants were asked to indicate whether 18 different characteristics were present or absent at the settings listed. Another area of interest in the study was the affect of distance, a measure of accessibility, on physical activity. The specific objective was to calculate distance information about actual settings used by respondents for physical activity. Two survey items were included to collect data

to measure distance to settings: residential street address and the exact physical locations where participant's physical activity occurred. Lastly, Section III, "places you might want to go for physical activity," was an exploratory section developed to gather information about physical activity settings participants did not attend, but which were of interest to them. For this section, each participant was asked to list up to five settings he or she might want to use for physical activity, but did not use and to indicate the presence or absence of 18 characteristic items for each setting listed.

Comparisons of Included and Excluded Participant Surveys

The survey completion rate for the previously published survey section was higher than the new sections developed specifically for this study. This section preceded the two new sections in the survey and was most likely completed by participants first. The differences in completion rates between sections may be attributable to several factors including participant overall interest, time constraints and personal relevancy of survey items. The completion rate for previously published items was 264/280 (94%) overall. Sixteen of the original 280 (6%) surveys collected were excluded due to a missing response for the income item, a chief factor of interest in the study. Males, (12/16 surveys, 75%) were more likely than females (4/16, 25%) to have missing income item responses ($X^2 = 5.010$, $p = .025$) in their surveys. There were no differences in missing income responses within ethnic groups ($X^2 = .401$, $p = .527$). An important individual question, the number of hours spent outdoors, had 15 missing responses. To adjust for the missing hours spent outdoors responses, the missing responses were replaced with the grand mean for the item. Although there were other sporadic missing items among

surveys, the missing items were primarily elements of composite index scores and the inclusion of the surveys with these missing items in the analyses did not influence study outcomes.

In contrast to previously published items used in the survey tool, the sections developed specifically for this study had many missing responses. Section II, "describe your environment," collected information on the specific places participants attended for physical activity including the location and characteristics associated with each place listed. Of the designated sample (N=264), a total of 263 (99%) participants answered items in Section II and there were no differences in demographic group completion rates within gender ($X^2 = 1.168$, $p = .280$), ethnicity ($X^2 = .931$, $p = .335$), or income ($X^2 = 1.846$, $p = .174$) groups. However, 32 participants (12.2%) did not list any places that they attended for physical activity. The absence of places listed for physical activity appears to be due to genuine lack of attendance at such settings. A review of surveys showed a few participants indicated that they did not go anywhere for physical activity. Furthermore, as seen in the results section later, an analysis of surveys with and without places listed found an association between listing places for physical activity and greater activity levels. Therefore, not listing any places attended most likely reflected that physical activity settings were not used rather than the participant merely failed to answer the question. There were no differences in the completion rate for listing at least one place attended for physical activity between gender ($X^2 = .210$, $p = .647$) or income ($X^2 = .465$, $p = .555$) groups. There was a marginal difference for ethnicity ($X^2 = .275$, $p = .097$), but this difference was not present in later tests using bivariate logistic regression.

In addition, another 19/264 (7.2%) of the participants did not provide sufficient information about their home address location or the location they listed as a place they engaged in physical activity to compute a distance measurement between residential address and the place attended. No gender ($X^2 = .578$, $p = .447$), ethnicity ($X^2 = .625$, $p = .429$) or income ($X^2 = 1.733$, $p = .188$) differences were found in providing sufficient information to calculate distance measurements.

Finally, Section III, the "places you might want to go for physical activity" section was sparsely completed. Only 79 (29.9%) of participants answered Section III. Females were more likely than males to list at least one place they wanted to go ($X^2 = 16.572$, $p = .000$). There were no differences in completion rates in ethnic ($X^2 = 1.491$, $p = .222$) and income ($X^2 = .964$, $p = .326$) group response rates for Section III. Due to the absence of complete Section III data, these data were only included in descriptive analyses for examining the categories or types of settings participants wished to attend.

Dependent Variables

Adolescent physical activity outside of school ("physical activity level", "physical activity", or "activity") was the dependent variable in the study. A 4-item index was created based on the physical activity items collected which measured physical activity exclusively "outside of school." The reason for this was that an emphasis of the current study was on understanding the impact of community environments outside of school on physical activity. The current survey items measured activity outside of school including the number of days of vigorous physical activity in the last 7 days, the number of days walked or bicycled in the last 7 days, the number of sports teams played on in the last 12

months that were run by community organizations, and the approximate number of hours of weekly physical activity. In order to adjust for scale differences in these variables, each item in the physical activity index needed to be standardized as a Z-score, with a mean of 0 and a standard deviation of 1. This is consistent with the scoring adjustments used by the authors of the original study. Cronbach's alpha reliability coefficient for the physical activity index items was .62 indicating an acceptable level of internal consistency among the items. Another item, the number of school sports teams played on in the last 12 months excluding physical education classes was also collected for use in comparing study activity levels with published benchmarks of adolescent physical activity. However, the item was not included in the index of physical activity as the primary purpose of the present study was activity outside of school. Table 2 contains the items and the possible ranges of answers for these items.

Table 2

Description of Physical Activity Items and Summary Index

Items in Physical Activity Index Score	Range of possible answers
Outside of school, on how many of the past 7 days did you exercise or participate in sports activities for at least 20 minutes that made you sweat and breath hard, such as basketball, jogging, swimming laps, tennis, fast bicycling, or similar aerobic activities?	[0,7]
On how many of the past 7 days did you walk or bicycle for exercise for at least 30 minutes at a time? Include walking to or bicycling to school?	[0,7]
During the past 12 months, on how many sports teams run by organizations outside of your school, did you play?	[0, 3+]
Outside of school, approximately how many hours weekly are you physically active?	[0, 168]
Items excluded from Index Score	
During the past 12 months, on how many sports teams run by your school, did you play? Do NOT include Physical Education classes.	[0, 3+]

Explanatory Variables

The study was designed to integrate multiple ecological domains of recognized physical activity determinants to examine the relative influence of and the interaction of these factors on adolescent physical activity. Based on the physical activity literature, variables were classified into one of four domains. In the first domain, five demographic and biological variables were hypothesized as predictors of physical activity among the study sample: gender, ethnicity, income, age, and body mass index (BMI) level at or above the 85th percentile (BMI85) and 95th percentile (BMI95) for gender and age group respectively. Height and weight variables were used to calculate body mass index according to the Centers for Disease Control and Prevention formulas (CDC, 2003). Subsequently, BMI values were used to determine which participants met the criteria for

the 85th percentile and 95th percentile BMI values based on published CDC tables (CDC, Center for Health Statistics, 2000).

Many individual, social, and physical environment domain variables were included in the study. In many instances, single-item explanatory variables were combined into multi-item index measures. Index measures were used if they represented theoretical constructs of interest and had a Cronbach's alpha reliability coefficient of .60 or greater. A few individual variables were reverse-coded so that higher response values consistently reflected a positive response before creating indexes. For instance, an item, "It is difficult to walk/jog in my neighborhood because of things like traffic, ...and so on" was converted to mean not difficult to walk/jog in neighborhood. Unless otherwise specified in survey section overviews presented next, variables are continuous. A full description of explanatory variables and indexes and their coding is found for explanatory variables in Appendix B.

Survey Section I

Section I included single-item variables and multi-item index variables. In the demographic and biological domains, variables were all single-item including gender (female = 0, male = 1), ethnicity (Hispanic = 0, African American = 1), income (lower middle-income = 0, low-income = 1), BMI85 (no = 0, yes = 1), BMI95 (no = 0, yes = 1) and age. Individual domain single-item variables included the number of hours worked weekly variable, how much one enjoys physical activity, how one's recreational time is usually spent (e.g., watching TV, active sports), and three time-related barrier variables that prevented one's physical activity including "lack of time," "my job," and "my

homework." Within the physical environment domain, single-item variables included access to sports equipment at home, the number of hours spent outdoors weekly, three neighborhood environment characteristics including close recreational areas or facilities, neighborhood safety during the day, and neighborhood characteristics such as traffic, sidewalks, and three environmental barriers, including lack of equipment, inclement weather, and lack of a convenient place for physical activity. Multi-item index variables were also included within several domains. Individual domain indexes included a self-efficacy index (alpha = .84), an athletic capacity or skill level index (alpha = .75), and a general barriers index (alpha = .86). The social domain was exclusively multi-item index variables including a family support index (alpha = .88), an index of transportation provided by family members to settings for physical activity (alpha = .80), an index of transportation provided by friends or oneself to settings for physical activity (alpha = .70), a peer support index (alpha = .80), and a social barriers index (alpha = .62). When index variables were used in the present study, they were similar to indexes used in the Amherst Survey with the major exception of the family support index and transportation by family member index. In the Amherst Survey, transportation by family members was included in the family support index. Since transportation was a primary focus of the present study, the transportation by family members items were separated into a unique index: transportation by family. In addition, two other unique variables, transportation by friends and transportation by oneself were created for the present study based on the same scaling as the transportation by family members items in the Amherst Survey. In the present study, transportation by friends and oneself was converted to a multi-item index.

Survey Section II

Section II, "describe your environment," included one single–item variable: the most frequent form of transportation to and from school (walking or biking = 1, all others = 0). The remainder of the section consisted of variables related to the places each participant attended for physical activity, the characteristics of those places, and the distance between the address of each place listed and participant's home address. To capture the characteristics of the places attended, participants were asked to indicate the presence of or absence of 18 features of physical activity settings they used. The items were dichotomous variables and an item response of 1 indicated the setting had the characteristic, while a response of 0 indicated the setting did not possess the characteristic. One computation was to create mean values for each of the 18 characteristics across places attended. These were then treated as single-item variables in analyses. In addition, multi-item indexes were created to capture place characteristics theorized as important to physical activity. Indexes of mean values were created for a desirability features index, an ease of use features index, a safety features index, and a social features index.

In addition, a measure was developed to capture accessibility to physical activity settings, operationalized as travel distance (median distance). This measure was the median central tendency of all individual distances between the participant's home and each of the places the participant listed attending for physical activity. When physical activity occurred at home, the distance value was zero. In some instances, participants indicated that they were physically active in their neighborhood, for which no specific address was indicated. A distance of one tenth of a mile was used as the neighborhood

place distance in all cases to account for the neighborhood as a place outside of the realm of home. In addition, single-item dichotomous variables were created to measure whether home was a place where physical activity occurred (no = 0, yes = 1) and whether home was the only place the participant used for physical activity (no = 0, yes = 1).

Other areas of interest in the study were the types of places attended and whether there were any patterns to the types of places attended and physical activity. Data from section II was used for these analyses. Based on the names of the places listed, the overwhelming majority of the places attended by participants were well-known settings in the region. Therefore, the places were readily classified into eight nominal groupings that described the types of settings used for physical activity. These groupings were home, public parks, public clubs, such as the Police Activity League, and school grounds, the neighborhood, a relative or friend's home, the mall, religious settings, and private health clubs. In addition, a dichotomous variable was created to re-classify the eight place type groupings into two major category types: a personal-related (e.g., familial or friend) and public setting category that included presumably non-fee or low-fee settings and a private, fee-based facility category (e.g., health club). These aggregate items were used in descriptive analyses to understand what place types were important to participants.

Survey Section III

Section III, the items for listing "places you might want to go for physical activity" was designed to collect information similar to Section II. However, given the scarcity of responses to this section, data preparation was limited to classifying places listed into eight

nominal groupings that described the types of settings desired for use for physical activity. These eight groups were the same as those used for section II.

Research Hypotheses

1) There is a positive association between physical activity level and proximity of physical activity setting used. However, this association is moderated by the frequency in which participants are driven to physical activity settings by family, friends or themselves.

2) Individual and social factors are stronger predictors of physical activity than physical environment factors. However, individual and social factors are moderated by physical setting accessibility. This finding will support the hypotheses that having access to physical activity settings is a necessary, but insufficient factor in assuring physical activity.

Research Questions

1. Is there an association between the physical environment factors and physical activity when individual and social factors are not considered?

2. What individual and social factors are predictive of physical activity?

3. If individual and/or social factors predict physical activity among this sample, is this association moderated by physical environment factors?

4. Are there differences in the individual, social and environmental factors between gender groups? If so, do any differences in individual, social and environmental factors affect differences in activity level between these gender groups?

5. Are there differences in the individual, social and environmental factors between ethnic groups? If so, do any differences in individual, social and environmental factors affect differences in activity level between these ethnic groups?

6. Are there differences in the individual, social and environmental factors between income groups? If so, do any differences in individual, social and environmental factors affect differences in activity level between these income groups?

7. Are there differences in accessibility to physical activity settings between different SES groups?

Data Analysis

Statistical Data Analysis

Statistical analyses were conducted using SPSS (version 11.0.1). In brief, statistical analyses included descriptive statistics, Pearson bivariate correlations, binary logistic regression, multivariate analysis of variance (MANOVA), independent samples t-tests, multiple linear regression, and univariate analysis of variance (ANOVA). Analyses are discussed briefly as applicable within each sub-heading. In some instances, additional details for analytical procedures are found in the results section.

Preliminary descriptive statistics and variable transformations were calculated as the first statistical step in the data analysis process. Means and standard divisions were computed for gender, ethnic, and income groups and for the total sample. Adjustments were made to two variables with extreme outliers: number of hours of physical activity weekly and number of hours spent outdoors weekly. To adjust skewness, a square root transformation was made to the variable number of hours of weekly activity, an item in the composite index of physical activity. In addition, the variable number of hours spent outdoors was corrected for extreme positive skewness by Winsorizing. This process corrects large outliers by eliminating the highest values and replacing them with a lower value based on a given percentile level for the variable. In this case, the highest responses for number of hours spent outdoors were replaced with the values at the 95^{th} percentile value. Finally, descriptive procedures were used to analyze the types of places attended by participants and the distances traveled by participants to activity settings.

The next step in the statistical analysis process was to perform Pearson bivariate correlations. Variables entered into the correlation analyses included the dependent variable, physical activity index, and its subcomponent variables, and explanatory variables and indexes.

Since distance is a primary focus of the study, the next analysis was performed to determine the impact of proximity of physical activity settings on physical activity. An ANCOVA model was completed that included only covariate terms. The model included the main effect terms median distance, transportation by family, and transportation by

friends and oneself, as well as, interaction terms for median distance by family transportation and for median distance by transportation provided by friends and oneself.

The next set of distinct analyses involved using MANOVA procedures and bivariate logistic regressions to calculate differences within gender, ethnicity and income groups. For ease of use, MANOVA procedures were used in lieu of independent samples t-tests to find mean differences between groups.

Several multiple regression analyses were performed to identity variables that best predicted adolescent physical activity outside of school. Continuous variables were mean-centered for use in this regression modeling. In keeping with the ecological health model, the variables for each physical activity domain including demographic and biological, individual, social, and physical environment domains were first run as separate step-wise backward regressions using a ≤ 0.05 significance level entry criteria and an ≤ 0.10 significance level removal criteria. Several model iterations were completed to evaluate variables for inclusion in the final model. The final preliminary model included all significant variables from domain specific regression analyses and interaction terms derived from significant variables from earlier MANOVA procedures. Finally, an overall predictive model was developed using three successive multiple regressions that tested the impact of all ecological domain variables and, specifically, the effects of the variable number of hours spent outdoors as a mediator variable on physical activity. The outcomes of these analyses are reviewed throughout the results section.

Geographic Information System Analysis and Distance Measures

An important purpose of this study was to explore the influence of accessibility, in terms of travel distance, to physical activity settings on adolescent physical activity. Distance was chosen as the measure of accessibility instead using travel time between locations to be consistent with the published research used for comparison in the study. Much of the published physical activity research addressing actual locations used by participants measured the actual distance between home and the activity setting location used (Humpel, Owen, & Leslie, 2002). The measure of accessibility in the study was distance between the participant's residential address and the locations of favorite places used by the participant. The distance in miles between these locations was calculated using MapQuest.com, a web-based geographic information system (GIS) application which measures the shortest possible road distance between origins and destinations. Distances were measured as driving directions. Subsequently, Microsoft Office Excel was used to calculate a median distance variable for each participant based on the individual place distances for each participant.

CHAPTER IV

Results

Descriptive Statistics

Means and standard deviations for all variables and indexes for total, gender, ethnic and income categories are in Appendix C. Number of days of vigorous physical activity 3 or more times weekly and the number of sports teams played on in the last 12 months are reported as measures of physical activity among youth for approximate comparisons with national and local benchmarks. Rates of vigorous activity outside of school are reported here as a broad estimate of the national benchmark standard, the, Youth Risk Behaviors Surveillance Survey ([YRBSS], CDC, 2004b), which includes all weekly physical activity[1]. The current study results showed that 57.6% of participants met the vigorous activity standard. Furthermore, 63.6% of the sample played on one or more sports teams in the past year. These findings were comparable with national rates for vigorous exercise and playing on one or more sports team in the past year in 2003 which were 62.6% and 57.6% respectively (Grunbaum et al., 2004). New York State rates, excluding New York City, for vigorous exercise and playing on one or more sports team in the past year in 2003 were 64.5% and 57.7% respectively (CDC, 2004c).

Table 3 contains descriptive analyses of the categories or types of settings used by participants for physical activity and the places participants indicated they might want to

[1] The YRBSS research is conducted throughout the United States biannually, including in New York State. Results from the current study cannot be used for exact comparisons with YRBSS findings due to differences in vigorous activity measures where the present study measures activity outside of school while the YBRSS measures all weekly activity, as well as, differences in other factors, such as study time period and grade range (e.g., the YBRSS age group includes 9th graders).

go for physical activity. These included places listed even when a distance measure could not be calculated. Participants in the study overwhelmingly attended personal-related (e.g., a family or friend's home) or public settings, which were presumably non-fee or low-fee, rather than private, fee-based settings. Public parks (56.2%), home (13.9%), public clubs and school grounds (12.9%), the neighborhood (5.42%), a relative or friend's home (3.8%), the mall (1.9%) and religious settings (0.9%) account for 301 (95%) of the 317 total places attended. Private health clubs accounted for the remaining (5.0%) of total places attended. In contrast, the types of settings listed as "places you might want to go," were predominantly private health clubs (71%). Personal and public settings (28.9%) made up the rest. One influential factor in the preference for personal and public settings could be proximity. Using an independent samples t-test, the mean distance differences for personal/public and private fee-based setting types were calculated. As seen in Table 4, the results show private clubs were farther away from participants' homes than places attended which are either personal or public in nature ($t = 3.125$, $p = .002$). However, of the farthest distances to places in the study (5 miles or greater), 6 of the 7 places were public settings. Therefore, distance alone does not explain why participants attended personal and public settings over private health clubs. The findings suggest that place attendance is based on other factors, such as cost and/or social group membership. Lastly, in reviewing the types of places attended and/or desired, many are behavioral settings, such as public parks, public clubs, school grounds and health clubs, where individuals would be expected to engage in physical activities.

Table 3

Categories of Places for Physical Activity

Place Type Attended	#	%	Place Type Want to Go	#	%
Public park	178	56.2%	Public park	12	14.5%
Home	44	13.9%	Home	1	1.2%
Public club/school	41	12.9%	Public club/school	11	13.3%
Neighborhood	17	5.4%	Neighborhood	0	0.0%
Health club -fee	16	5.0%	Health club -fee	59	71.1%
Family/friend	12	3.8%	Family/friend	0	0.0%
Mall	6	1.9%	Mall	0	0.0%
Religious	3	0.9%	Religious	0	0.0%
Total	317	100%	Total	83	100%
Personal or public	301	95.0%	Personal or public	24	28.9%
Health club/fee based	16	5.0%	Health club/fee based	59	71.1%

Table 4

Mean Differences - Private Health Club and Personal/Public Place Types[1]

Place	N	Min	Max	Range	Mean	Std	t	Sig.*
Private Club	16	1.20	7.36	6.16	2.72	1.59	3.125	0.002
Personal/Public	222	0.01	10.93	10.92	1.57	1.42	n/a	n/a
	238							

[1]Place activity setting distances exclude home settings which are set to zero.

* 2-tailed, equal variances.

Bivariate Correlations

Bivariate correlations are in Appendix D. Significant correlations are briefly reviewed here. Overall, there were positive associations between physical activity level and self-efficacy, perceived physical activity capacity or skill level, use of recreational time for active rather than sedentary pursuits, enjoyment of physical activity, family support for activity, transportation provided by family, transportation provided by friends and oneself, peer support for activity, having sports equipment at home, the number of hours spent outdoors, the most frequent form of transportation to and from school being bicycling or

walking and, finally, listing one or more settings for physical activity. There were also inverse associations between physical activity and general barriers, lack of time for physical activity, social barriers, and using home as a place for physical activity. In addition, when gender was taken into consideration, there was an association between physical activity level and gender indicating males reported higher levels of physical activity than females. Likewise, males also reported higher scores for self-efficacy, perceived physical activity capacity, peer support, transportation provided by family, transportation provided by friends and oneself, the number of hours spent outdoors, and transportation to and from school being bicycling and walking. For ethnicity and income, there were few within group specific associations. African Americans reported higher scores on neighborhood environment characteristics, an indication of a positive environment for activity, than Hispanics. However, Hispanics reported greater levels of enjoyment of physical activity than African Americans. Hispanic respondents were also more likely to be low-income, based on eligibility to receive a free or reduced price lunch.

While the correlations were low to moderate in magnitude, these results are consistent with those found in research using the original Amherst Survey tool (Sallis, Talor, Dowda, Freedson, & Pate, 2002) and by other adolescent physical activity researchers (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). The next analytical steps provided additional definitive information about what factors predicted physical activity in the study.

Hypotheses Testing

The research hypotheses and questions posed in this study sought to uncover many unanswered questions in the area of adolescent physical activity. Research hypotheses and questions were combined as appropriate to address commonalities in findings.

Hypothesis 1:

The Relationship between Proximity of Physical Activity Settings and Physical Activity

The first research hypothesis stated that physical activity level would be positively associated with the proximity of physical activity settings[2]. However, this association would be moderated by the frequency of transportation to these settings by family, friends, and oneself. Two primary sets of analyses were run to test the influence of distance and transportation on physical activity. One set of analyses included all participants' median distance values. The second set of analyses excluded participants who engaged in physical activity only at home since distance and transportation factors would not affect their ability to access the setting used for activity. Proximity was not predictive of physical activity in either set of analyses. The latter analyses are shown in Table 5. In the model for median distance, the main effect for median distance with physical activity was not significant and the transportation interaction terms for median distance also were not significant. However, the availability of motorized transportation, independent from distance traveled, was a significant predictor of physical activity whether transportation was provided by family ($b = .331$, $p = .000$), or by friends and oneself ($b = .363$, $p = .000$) as shown in the model. Having a ride to physical activity settings may serve as a proxy for

[2] Home requires no travel for access. Therefore, unless otherwise noted, distance specific analyses were run without the home distance values included.

nearness to settings across a range of distances. Furthermore, the relationship between setting proximity and activity level may be more complex than initially hypothesized.

Table 5

Analyses of Covariance, Physical Activity Explained by Median Distance:

Median Main Effect Model	**b**	**S.E.**	**t**	**Sig.**
Median distance	-0.149	0.195	-0.763	0.446
N= 184, R2 = .003 , Adj. R2 = -.002, F(1,183) =15.262, p= .446				

Main Effect and Interaction Model	**b**	**S.E.**	**t**	**Sig.**
Median distance	-0.283	0.169	-1.676	0.095
Transportation - Family	0.331	0.060	5.506	0.000
Transportation - Friends/Self	0.363	0.089	4.072	0.000
Family transport by Median distance	-0.005	0.049	-0.098	0.922
Friend/Self transport by Median distance	0.122	0.080	1.533	0.127
N= 184, R2 = .299 , Adj. R2 = .279, F(5,179) =15.262, p= .000				

Distance factors appear to play a role in physical activity location selection. Participants who listed settings in the study listed between 1 and 3 places attended for activity. Descriptive measures for these three settings are shown in Table 6. Consistent with the overall median results (M = 1.55, SD = 1.08), on average, individual places attended were within 1.55 miles to 1.95 miles from home. In addition, participants' ranges of travel were between 0.010 and 10.93 miles from home. Overall, participants did not venture tremendous distances for physical activity. Moreover, only 7 (2.9%) of the respondents attended within-region[3] settings for physical activity that exceeded 5 miles. This finding suggests that there is a maximum limit to the distance adolescents will travel on a regular basis for physical activity. Another consideration for understanding distance

[3] Results do not include a distance value for 13 participant's place locations that were 20 miles or more from the participant's home as the participants did not indicate a locatable addresses (e.g, "Brooklyn").

in this study is the proximity of settings within a short, perhaps walkable distance from participants' homes. In the current study, 27 (11%) of the participants attended settings outside of the home but within a quarter of a mile of home. Hence, many participants may have needed to rely on motorized transportation to access physical activity settings. Therefore, although the findings do not support a linear relationship between distance and activity settings, distance is important to physical activity setting attendance.

Table 6

Range of Travel Distances in Miles[1]

Descriptives for place settings

Place	N	Min	Max	Mean	Std Dev
Activity Setting 1	160	0.02	10.93	1.55	1.458
Activity Setting 2	60	0.01	6.94	1.80	1.397
Activity Setting 3	18	0.10	6.10	1.95	1.588
Total	238				

Less than 1/4 mile and greater than 5 miles for each place setting

Place	N	# Places ≤ .25 mile	% Places ≤ .25 mile	# Places ≥ 5 miles	% Places ≥ 5 miles
Activity Setting 1	160	22	13.8%	4	2.5%
Activity Setting 2	60	3	5.0%	2	3.3%
Activity Setting 3	18	2	11.1%	1	5.6%
Total	238	27	11.3%	7	2.9%

[1]Place activity setting distances exclude home settings which are set to zero.

Hypothesis 2:

The Relationship between Physical Environment and Other Factors and Physical Activity

Study hypotheses sought to assess the role of the physical environment on physical activity including question 1 and question 3 and the role of physical environments on other study determinants as in hypothesis 2. Question 2, in turn, focused on what individual and

social factors predicted physical activity. Each of these questions is addressed in this section. In totality, the hypotheses assumed that individual and social factors were stronger predictors of physical activity than the physical environment, but that physical environment factors would supplement and moderate these individual and social variables. An important conceptual premise was that having access to physical activity settings is a necessary but insufficient factor in assuring physical activity.

As seen in the domain specific analyses in Appendix E, many individual and social variables predicted physical activity. Individual domain specific predictors of greater physical activity were reporting higher levels of self-efficacy, physical activity capacity or skill level, or belief that one has greater athletic abilities than one's peers, and using recreational time for active rather than sedentary interests. An individual variable predictive of less activity was reporting a lack of time for physical activity. Social domain-related predictors of physical activity included greater amounts of family support, transportation by family members, transportation by friends and oneself, peer support, and having fewer social barriers to physical activity. Likewise, physical environment domain specific variables predicted greater physical activity including having sports equipment at home to use for physical activity and the number of hours spent outdoors, while using home as a place for physical activity, an environment-related variable, predicted less physical activity.

A final model containing variables from all domains was used to predict physical activity. The final model appears in the last panel of Table 7. There it can be seen that only one physical environmental variable, the number of hours spent outdoors, was a

significant predictor of physical activity. To compare the predictive ability of physical environment variables to variables in other domains, the results reported in Appendix F were used. In the first step, all significant predictors of physical activity other than number of hours spent outdoors were entered in a multiple regression procedure yielding an R-square of .370. In step 2, number of hours outdoors was included yielding an R-square of .484. The difference between the R-square of step 1 and step 2 was .114 so the physical environment variable only accounted for 11.4% of the variation in the final model compared to 37.0% for the non-physical environment variables.

A more liberal test of hypothesis 2 involves a regression model in which number of hours spent outdoors was entered first yielding an R-square of .212. In the second step, all other significant predictors of physical activity were entered yielding an R-square of .370. The difference between the R-square of step 1 and step 2 was .158, so the biological, individual and social variables accounted for 15.8% of variation in physical activity in the final model compared to 21.1% for the physical environment variable.

Since the number of hours spent outdoors was a significant predictor of physical activity, an effort was made to understand its role in the final model. In the first model, number of hours spent outdoors was regressed on all domain specific variables. The results of this analysis are in Table 7, the mediation effects panel. There it can be seen that more time was spent outdoors by those with BMI at or above the 95th percentile level, those with higher self-efficacy scores and those who use their recreational time for active rather than sedentary interests. Less time was spent outdoors by those who reported barriers to physical activity including lack of time, homework barriers, and social barriers,

and those with neighborhood environment characteristic scores that indicated the neighborhood was not conducive for physical activity.

As hypothesized, physical environment factors predicted adolescent physical activity alone and in models including individual and social factors. Furthermore, using a conservative test, individual and social factors were stronger predictors of activity than the physical environment. The hypothesis that accessibility to physical environments would moderate individual and social determinates was not supported. However, as will be discussed later, an initial regression analysis of individual and social variables on the number of hours spent outdoors, shown above, is the first step in supporting the role of time spent outdoors as a mediator of individual and social variables in predicting physical activity.

Differences in Individual, Social and Physical Environment Factors within Groups

Questions 4, 5, and 6 focused on differences in the individual, social and physical environmental factors within gender, ethnic and income demographic groups respectively. Part 2 of these questions asked which differences in these demographic groups, if any, predicted differences in physical activity within groups. Question 7 also addressed within income group differences, but in this instance, it only addressed whether there were differences in accessibility to physical activity settings between SES groups. Unless otherwise stated, the results in this section are MANOVA analyses found in Appendix H.

Binary logistic regression was used to determine gender, ethnic and income within group differences among dichotomous variables in the study. As seen in the results in

Appendix G, there was only one noteworthy significant within group difference: a significant gender odds ratio: males were 4.135 times more likely to report that they bicycle or walk to and from school than females (β= 1.420 p= .000).

Many significant gender differences were found among continuous variables presumed to be predictors of physical activity in the study. As seen in the MANOVA procedures, males' mean responses were significantly higher than females for self-efficacy (t = -3.879, p = .000), physical activity skill level (t = -2.015, p = .045), transportation provided by family members (t = -2.751, p = .006), transportation provided by friends and oneself (t = -3.774, p = .000), peer support (t = -3.137, p = .002), and the number of hours spent outdoors (t = -2.627, p = .009). On the other hand, females' mean response for the variable neighborhood environment, an indicator that an environment is suitable for physical activity, was higher than the mean response for males (t = 1.880, p = .061).

Few factor differences were found within ethnic and within income (SES) groups. In the MANOVA results, Hispanics were more likely to report that they enjoyed physical activity than African Americans (t = 2.392, p = .017), but were less likely than African Americans to rate their neighborhood environment as suitable for physical activity (t = -2.452, p = .015). As for income differences, low-income participants' mean scores for general barriers to physical activity (t= -1.692, p= 0.092) and barriers to physical activity due to inclement weather (t = -3.496, p = .001) and lack of convenient places for activity (t = -1.694, p = .092) were higher than their lower middle-income income counterparts.

The answer to the research question whether there were SES differences in accessibility to physical activity settings, ANOVA procedures were run for income groups.

The first procedure tested differences between income groups for the median distance variable. Findings showed no significant mean differences between income groups ($t = -1.516$, $p = .131$). Further tests included the median variable as the dependent measure and the variables of family transportation and transportation by friends and oneself respectively as covariates. The results showed no mean differences between lower middle-income and low-income groups for median distance ($t = -1.616$, $p = .108$) when controlling for the effects of family transportation and transportation by friends and oneself. Based on these analyses, there were no differences within SES groups for accessibility.

The second parts of questions 4, 5, and 6 asked which differences within gender, ethnic and income groups, if any, predicted differences in physical activity within the group respectively. To analyze this, several interaction terms were created based on the variables with gender, ethnic or income mean differences identified during MANOVA analyses. These variables were then added to the preliminary final analysis regression model along with other significant within domain variables to determine their effects on physical activity. Variables entered into the regression model and model results are found in Appendix F and are described in more detail in the next section. There were no significant interaction effects in the analyses. Therefore, within group differences found for gender, ethnic and income groups in the MANOVA analyses did not predict physical activity.

Demographic, Biological, Individual, Social and Physical Environment Determinants of Physical Activity

The overall goal of the study was to identify what factors predicted physical activity among the adolescents studied. Numerous sets of analyses were performed to identify possible main, moderator, and mediator effects of variables in predicting physical activity within the context of the ecological health model. To identify the variables predictive of physical activity within each ecological health model domain multiple regression analyses were performed independently for each ecological model domain. Preliminary analyses included interaction terms within domain specific analyses as appropriate, such as measuring the interaction effects between gender, ethnicity and income. Outcomes for each domain, as seen in Appendix E, show all main effects variables entered into the model regardless of their significance in predicting physical activity. Interaction terms are not reported as they were not significant in these analyses. Demographic and biological domain specific variables are shown in the first panel of the table. Males reported more physical activity than females (b = 1.418, p = .000), while those whose BMI was at or above the 95th percentile level (b = -1.259, p = .032) reported less physical activity. Individual domain specific predictors of physical activity were reporting higher levels of self-efficacy (b = 0.159, p = .000) and physical activity capability or skill level (b = 0.183, p = .041), and using recreational time for active rather than sedentary interests (b = 0.524, p = .000). Having a lack of time was inversely predictive of physical activity (b = -0.335, p = .020). Social domain related predictors of greater physical activity included greater amounts of family support (b = 0.052, p = .008), transportation by family members (b = 0.116, p = .060), transportation by friends and

oneself (b = 0.251, p = .001), and peer support (b = 0.141, p = .014). Having a higher social barriers score was inversely predictive of physical activity (b = -124, p = .010). Physical environment domain specific predictors of greater physical activity were having sports equipment at home to use for physical activity (b = 0.285, p = .018) and the number of hours spent outdoors (b = 0.090, p = .000). In the realm of "describe your environment" variables, using home as a place for physical activity (b = -1.062, p = .039) was predictive of less activity and greater frequency of walking or biking as transportation to and from school (b= 1.244, p = .007) was predictive of more physical activity.

To determine what, if any, interaction terms were predictive of physical activity; an analysis was run that included all significant variables from domain specific regressions and interaction terms speculated to be predictive based on earlier analyses. Interaction terms entered into the model were derived from variables that had significant mean differences within gender, ethnic and income groups respectively. The interaction terms included were: gender by self-efficacy, gender by physical activity capacity, gender by family transportation, gender by transportation by friends and oneself, gender by peer support, gender by number of hours outdoors, gender by neighborhood environment, ethnicity by enjoyment of physical activity, ethnicity by neighborhood environment, income by general barriers, income by inclement weather and income by lack of a convenient place for physical activity. As seen in Appendix F, the Final Preliminary Analyses, there were several significant main effects, but no significant interaction terms. After identifying the significant main effect variables from domain specific analyses and ruling out several non-significant interaction terms, the final regression analysis was completed.

The final regression analyses were run as steps to determine the final predictive model in the study including the overall effect of variables from each ecological domain in the study and the affect of number of hours spent outdoors as a potential mediator in the final model. To test the mediator effects of the variable number of hours spent outdoors, three models were estimated as discussed by Barron and Kenny (1986). Results for this three-step analysis are found in Table 7. The first step in the analysis used a model to determine the direct effects of the independent variables on physical activity. This model, seen in the Direct Effects panel, included all main effect variables excluding the number of hours spent outdoors. Findings from this model showed several variables had a direct predictive effect on higher physical activity. Participants with a BMI below the 95th percentile level, those with higher self-efficacy, those whose usual recreational time was spent in active rather than sedentary pursuits, and those who were transported to physical activity settings by friends or oneself had higher activity levels. Those who had higher social barrier scores had lower activity levels. The second step in the process was to regress the number of hours spent outdoors, the presumed mediator variable, on the independent variables. Findings from this analysis, in the Mediation Effects panel, were that those with a BMI equal to or greater than the 95th percentile level, those with higher self-efficacy scores, and those whose usual recreational time was spent in active rather than sedentary pursuits all spent more time outdoors. In contrast, those with barriers including lack of time, homework, and social barriers all spent less time outdoors. Lastly, those whose neighborhood environment was not suitable for physical activity spent less time outdoors.

The final step was to identify the final model predictive of physical activity including the effects of number of hours spent outdoors, the presumed mediator, and the independent variables on physical activity. The findings from this model, seen in the Final Analysis panel, were that those participants with a BMI below the 95th percentile level, those with higher self-efficacy scores, those whose usual recreational time was spent in active rather than sedentary pursuits, those who were transported to physical activity settings by family members and friends or oneself, and those who spent greater amounts of time outdoors all had higher levels of physical activity. Within the direct effects model, gender and family support were also significant variables, but they were not significant in the final model when the number of hours spent outdoors was considered. The diminished importance of gender, in this case males had a higher level of physical activity, and having greater family support in predicting higher physical activity level is due to the strength of the number of hours outdoors in determining activity, and not because these two variables were no longer conceptually important factors in adolescent physical activity. The final path model, comprised of the outcomes of each of these steps, is shown in Figure 1.

Table 7

Multiple Regression Analyses for Final Overall Path Model

Step 1:

Direct Effects

Dependent Variable = Physical Activity Index without Hours Outdoors

	B	S.E.	Std	t	Sig.
		Adj R^2 = .391, p < .000			
Gender	0.822	0.280	0.150	2.934	0.004
BMI ≥ 95 percentile	-0.766	0.376	-0.098	-2.034	0.043
Self-efficacy	0.124	0.030	0.219	4.064	0.000
Uses recreation time for active pursuits	0.380	0.109	0.197	3.496	0.001
Family support	0.059	0.015	0.220	3.890	0.000
Transportation–Friends/Self	0.241	0.066	0.192	3.642	0.000
Social barriers	-0.096	0.044	-0.107	-2.174	0.031

Step 2:

Mediation Effects

Dependent Variable = Hours Outdoors

	B	S.E.	Std	t	Sig.
		Adj R^2 = ..220, p < .000			
BMI ≥ 95 percentile	4.898	1.942	0.140	2.522	0.012
Self-efficacy	0.443	0.154	0.173	2.876	0.004
Uses recreation time for active pursuits	1.491	0.521	0.171	2.864	0.005
Lack of time barrier	-1.184	0.629	-0.112	-1.882	0.061
Homework barrier	-1.105	0.567	-0.117	-1.950	0.052
Social barriers	-0.742	0.251	-0.182	-2.962	0.003
Neighborhood environment	-2.066	0.520	-0.221	-3.970	0.000

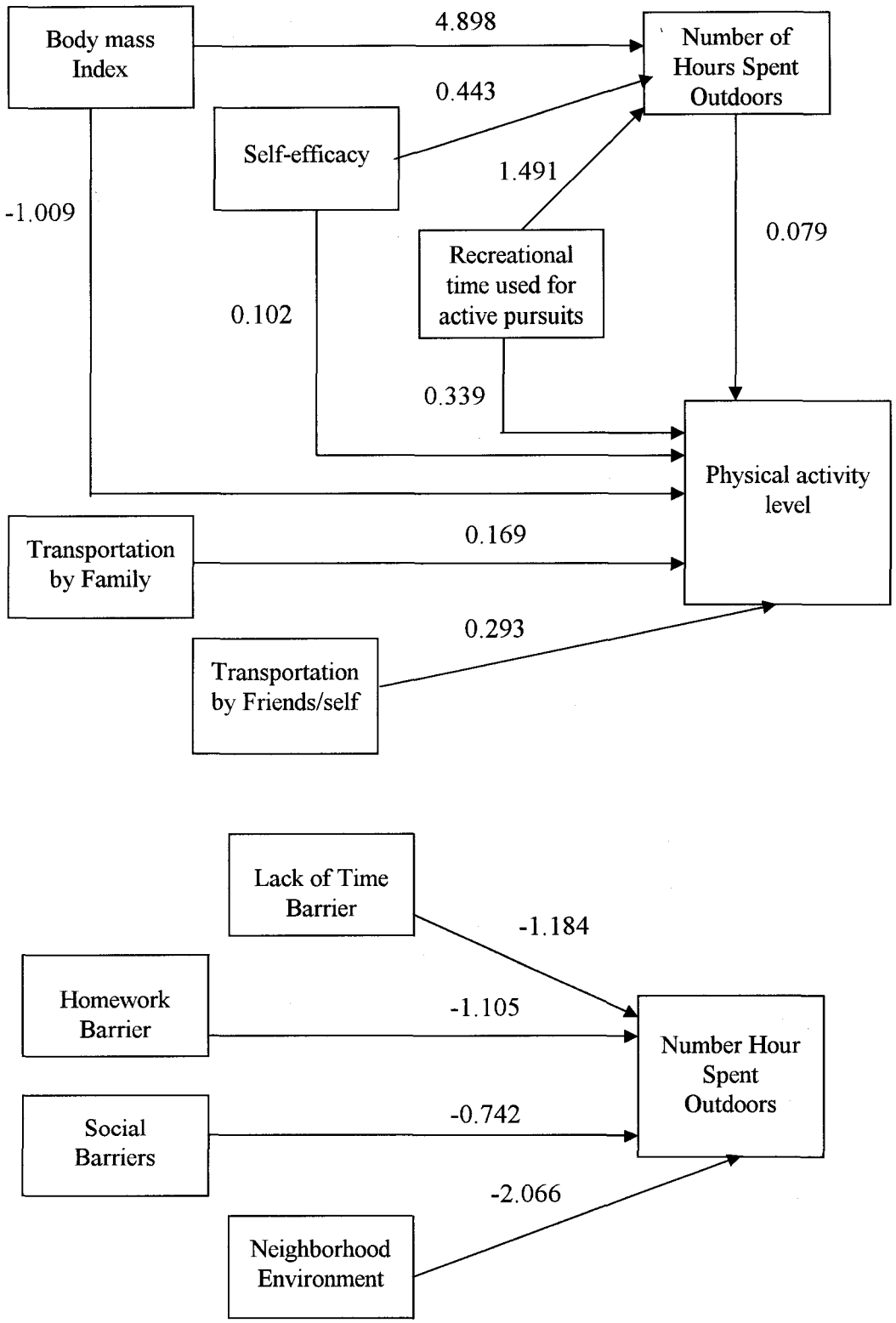
Step 3:

Final Analysis

Dependent Variable = Physical Activity Index with Hours Outdoors

	B	S.E.	Std	t	Sig.
		Adj R^2 = .494, p < .000			
BMI ≥ 95 percentile	-1.009	0.353	-0.130	-2.854	0.005
Self-efficacy	0.102	0.028	0.180	3.589	0.000
Uses recreation time for active pursuits	0.339	0.099	0.176	3.440	0.001
Transportation - Family	0.169	0.044	0.194	3.804	0.000
Transportation–Friends/Self	0.293	0.061	0.234	4.834	0.000
Number hours spent outdoors	0.079	0.011	0.355	7.396	0.000

Figure 1: Exploratory Path Model of Physical Activity



CHAPTER V

Discussion

The present study underscores the importance of the ecological health model in understanding physical activity patterns among adolescents and for developing effective strategies for promoting the adoption and maintenance of physical activity among adolescents and perhaps individuals of all ages. Furthermore, the study demonstrates that a host of factors within the demographic, biological, individual, social and physical environment domains of the ecological health model influence adolescent physical activity including some unique physical environment factors not previously studied. The discussion will emphasize findings unique to this study, the overall determinants of physical activity, and those factors addressed in the study for which health and community interventions might reasonably influence physical activity beliefs and behavior among adolescents over time.

Behavioral Settings, Distance, and Transportation and Physical Activity

The present study is unique in that it measured several variables not previously studied among adolescents including the actual settings used by participants for physical activity, the characteristics associated with these settings, and the distances traveled between home and these settings. Additional distinctive measures were the effects of time spent outdoors and the role of transportation on physical activity, particularly the contribution of motorized transportation by friends and oneself on physical activity. Each of these areas of interest provides insight into the role of physical environments and transportation in adolescent physical activity.

Hours Spent Outdoors

In the overall model, the number of hours spent outdoors directly predicted greater physical activity level and mediated the effects of several other factors in subsequently determining activity levels. A commonsense finding was that higher levels of self-efficacy and one's use of recreational time for active pursuits predicted greater time spent outdoors and consequently greater physical activity. Similarly, higher self-efficacy and use of recreational time for active pursuits directly predicted physical activity. On the other hand, the findings for a body mass index at first glance appeared contradictory. Having a body mass index equal to or greater than the 95th percentile for gender and age (being overweight) predicted greater time spent outdoors which, in turn, predicted greater physical activity. However, the direct effects of being overweight on physical activity were that being overweight predicted less physical activity. Although at first it might seem puzzling that being overweight would predict greater time spent outdoors and thus greater activity. However, some but not all overweight participants spent many hours outdoors and were very active, resulting in this finding. Nonetheless, having a body mass index of less than the 95th percentile was more common among physically active participants and was a direct predictor of greater physical activity levels. Additional findings were that factors that intuitively would be associated with less time spent outdoors, including lack of time, homework, social barriers, and perceiving one's neighborhood environment as unsuitable for physical activity due to characteristics, such as traffic, sidewalks and gangs, were found to predict fewer hours spent outdoors but these barriers did not have a direct or indirect effect on level of physical activity itself. Overall, these findings provide information as to what factors influence spending time outdoors and suggest areas for

intervention to increase time spent outdoors which may also increase physical activity among adolescents.

The effect of time spent outdoors on physical activity has been shown for young children (Baranowski, Thompson, Durant, Baranowski, & Puhl, 1993; Sallis et al., 1993). However, this finding is new for adolescents. Ecological researchers have demonstrated the positive impact of the outdoors on health and behavior in general and on youth specifically so the relationship between being outdoors and greater physical activity is a logical extension of previously established ecological research findings.

The benefits of natural outdoor spaces, which are typically found in suburban parks, recreational areas, and common landscapes, are well documented in the ecological literature. Natural environments have been shown to contribute to one's sense of well-being and to have restorative effects (Hartig, Mang, & Evans, 1991) including short-term recovery from psychological stress (Ulrich et al., 1991). Natural settings have been identified as desired places among children and adolescents (Korpela & Hartig, 1996), and, in children, have been associated with increased creative play and activity (Korpela, 2002). Furthermore, both natural and built outdoor spaces are associated with adolescent development. Some specific developmental goals supported by attending outdoor settings include the need for environmental exploration, social interaction, and restorative retreat (Clark & Uzzell, 2002). Therefore, it would be anticipated that being outdoors promotes physical activity in adolescents as seen in the present study. The value of the outdoors in shaping physical activity appears to be aided by behavior setting characteristics.

Behavior Setting Types and Attributes

Behavior setting attributes appeared to shape the choice of places attended for physical activity by participants. Setting types predominantly used by study participants included personal-related places, such as home and the domiciles of friends and relatives, and public access places, such as public parks, recreational centers, and school grounds. Private fee-based health clubs were utilized less, but, based on where participants indicated they wanted to go, these clubs were a highly desired setting type for activity. The importance of public settings may be based, in part, on cost factors as study participants were largely lower income and costs associated with private clubs may restrict access. Cost as a deterrent was supported by participant use of public settings over private clubs despite their desire to attend private clubs. Social group membership, or one's circle of friends, peer support, and specific structural behavior setting features conducive to physical activity may also have influenced settings used. Peer support was associated with physical activity within the social domain analysis in this study and in findings from other studies on adolescent physical activity (Sallis, Taylor, Dowda, Freedson, & Pate, 2002). Conversely, in this study, a high level of social barriers, including not having anyone to be active with, predicted lower levels of physical activity directly. It seems reasonable to believe that peer support occurred within the settings used for activities and that social group membership and peer support drove selection of places attended.

The structure of places attended also influenced setting selection. The predominance of public settings used, such as parks, public clubs, and school grounds,

supported structured and unstructured physical activity pursuits engaged in by participants. For instance, many frequently listed activities, such as soccer, basketball, baseball, and swimming are dependent on behavior setting features, such as playing fields, large athletic apparatus (e.g., swimming pools, basketball hoops), and, at a minimum, expansive open spaces for movement. Many public settings used offer a variety of activity options (e.g., large playing fields) not typically found at the private health clubs named by participants. The health clubs, for participants who used them, offered other types of athletic opportunities such as weight lifting and structured physical fitness exercises. Furthermore, attendance at settings that facilitate activity would reasonably encourage physical activity in that the physical structure of the behavior setting and the behavior of the inhabitants, such as interaction between peers, would promote activity among attendees. Overall, the effects found here regarding setting contexts shaping behavior are consistent with Barker's theory of behavior settings in which the structure and milieu of settings shapes physical activity behavior (Barker, 1968; 1987).

An inquiry in the study was whether place characteristics, such as the desirability of or the ease of use of a setting, would predict physical activity level. The results of this inquiry were mixed or undetermined. As noted above, the desirability of place type was important to setting use. Furthermore, outdoor settings appeared to be a preferred space for activity as seen in the direct effects of time spent outdoors on increased activity. In contrast, neighborhood environment characteristics including neighborhood safety during the day, having "playgrounds, parks and gyms close to my home or that "I can get to easily," and neighborhood characteristics such as traffic, sidewalks and gangs were not

significant predictors of activity level. However, neighborhood characteristics such as traffic, sidewalks and gangs did predict fewer hours spent outdoors and, therefore, indirectly predicted physical activity. One planned investigation of place characteristics in the study was to measure neighborhood characteristics separately from the characteristics of specific places used for activity since individuals might use settings outside of their neighborhood for activity that have characteristics different than those in their neighborhood. The outcome of this inquiry remains unanswered as variables developed to measure setting-specific characteristics of places used for activity were not included in the results due to poor internal consistency within the multi-item variables meant to capture these place characteristics. In general, some findings regarding place characteristics in the study support the role of place characteristics in setting selection and activity levels but these results did not close many of the gaps in the literature regarding the nature and scope of this role. An area with important findings was the effect of using the home for exercise on physical activity level.

Home as a Place for Activity

Home played a unique role in physical activity among this group in that those who used home for physical activity were less active than those who did not. This difference in activity level may be due to less active individuals preferring home environments and home-based activities rather than community-based environments and activities. The findings from a published study of inactive adolescent girls may, to some extent, support this notion; wherein, the subjects were more aware of and more likely to use the equipment (e.g., treadmill, weights) in their homes for physical activity than the physical

activity resources (e.g., gyms, parks, basketball courts) in their communities (Dunton, Jamner, & Cooper, 2003) suggesting that less active individuals may not seek out settings outside the home that facilitate greater physical activity. However, the results of this study may not reflect other factors that might have affected the subjects' decision to favor home resources over community resources as the study did not measure barriers to using community resources, such as lack of transportation and/or lack of parental support. Although home provides a highly convenient setting for activity, it may not afford the user features that promote activity for adolescents who are more active. As discussed earlier, community settings may provide physical surroundings and an atmosphere of social influences, such as peer encouragement and teammates, that facilitate and re-enforce physical activity in ways that being active at home do not. The importance of social support specific to the home environment is seen in the contrast between using one's own home for physical activity and being active at a relative or friend's home. Both are home settings, but in the latter case, setting use predicted greater physical activity in the same manner that other activity settings outside the home did. Home as the ultimate proximal setting, yet the antithesis of promoting activity in this study, underscores the complexity of proximity and accessibility as determinants of physical activity.

Accessibility to Physical Activity Settings

Accessibility or distance to activity settings affected places used. One measure of accessibility was the proximity of the home to settings used outside the home. Study findings did not show that proximity to setting, based on linear regression analysis, predicted physical activity. This study's proximity effect is inconsistent with the results of

two of three studies involving adults, where as in the current study, researchers measured distance between home and activity settings used and found that physical activity was associated with setting proximity. Research on adults is provided for broad comparison purposes due to the lack of such research involving adolescents. Two related studies that considered the relationship between distance from home and use of a community bicycle trail had different outcomes. The first study found a significant inverse relationship between distance to the bicycle trail location and use of the trail for bicycling (Troped et al., 2001), while the companion study found a non-significant inverse relationship between subjects' homes and the trail (Troped, Saunders, Pate, Reininger, & Addy, 2003). Another study of adult physical activity and distance between subjects' homes and formal (e.g., health club, exercise center) and informal (e.g., streets, public open spaces, beaches) recreational facilities used by the subjects showed a significant reduction in facility use with an increase in distance (Giles-Corti & Donovan, 2002). In the present study, although distance traveled, even when transportation was considered, did not have a gradient effect on physical activity, travel range appeared important. The distance traveled to physical activity locations by participants tended to be within a couple of miles from home and there appeared to be a maximum distance participants would regularly travel to activity settings. General distance may be one factor influencing setting selection, but as hypothesized, travel distance in conjunction with other factors, including desirability of setting type, appear to dictate setting choice. For instance, in the present study, some participants used private fee-based settings and/or public settings that were very far from home. Use of these settings despite their far distance suggests that features other than distance, such as activities offered at the setting or the presence of peers at the setting,

influenced attendance. Similar findings were seen in adult physical activity setting research, in which type of setting influenced how far individuals would travel to attend the setting. The results of one study showed use of public open spaces such as parks was lower as travel distance increased than use of built facilities, such as sporting and recreational centers and golf courses (Giles-Corti & Donovan, 2002). The overall importance of travel distance and place settings among youth is documented in literature regarding ecological factors influencing youth travel behavior. Territorial range, or "the distance from home base to which a given child travels," has been a recognized phenomenon in child and adolescent development and behavior for years (Wohlwill & Heft, 1987) including that the distance a child or adolescent will travel is affected by the meaningfulness of the destination to that individual (Van Vliet, 1983). However, physical activity has not been a large focus of territorial range research. Although schemes for investigating youth physical activity in the context of youth travel behavior and community design have been proposed, information about youth travel patterns in the context of physical activity and physical activity environments is unavailable (Krizek, Birnbaun, & Levinson, 2004). The present study provides empirical support for further investigation of the effects of accessibility on physical activity in youth.

Transportation

Transportation may be a very important factor in adolescent physical activity as it had a sizable role in the accessibility of physical activity settings in the present study. Transportation by family members, friends, and oneself were strong predictors of physical activity among participants. In addition, although not predictive of physical activity, males

reported having more transportation provided by family, friends, and oneself than females. Study findings of the role of motorized transportation are unique in that transportation has not been independently measured among older adolescents by researchers. In comparison, among young adolescents 8th graders transportation by parents was predictive of various forms of physical activity for gender and all ethnic groups measured. However, there were gender and ethnic differences in the frequency of transportation within the study, with males, Whites, and "multi-ethnic" groups transported to activity settings more than females and Asian/Pacific Islanders and Latinos' respectively (Hoefer, Mckenzie, Sallis, Marshall, & Conway, 2001). As for SES effects on transportation in the present study, there were no differences in the amount of motorized transportation between income groups dispelling the notion that activity settings were less accessible to low-income participants due to lack of transportation. The use of walking or bicycling as a travel method was also significant in certain circumstances.

Walking and bicycling to and from school was positively associated with physical activity level when other key explanatory variables were not considered. In addition, although not predictive of physical activity, males reported they walked and bicycled to school more frequently than females. Although there are many proponents of walking to school as a means to increase physical activity among youth (CDC, 2004a), little is known about the actual effects of walking and bicycling among this age group on overall activity levels. One recent study of children, whose mean age was 11 years, found that boys who walked to school engaged in significantly more moderate-to-vigorous physical activity after school and throughout the evening than those who traveled by car. The effect was

not significant for girls (Cooper, Page, Foster, & Qahwaji, 2003). Another form of non-motorized transportation preliminarily considered in the current study was the relative prevalence of walking as transportation to recreational settings. Community design experts suggest that a feasible "walkable" distance between home and community settings is approximately one quarter of a mile (Atash, 1994). Therefore, based on the current definition of "walkable," very few participants attended settings within a walkable distance from their home which might account for the significance of transportation in the study.

Overall, behavioral settings, distance and transportation all are important to physical activity. However, these are only some of the ecological model factors affecting adolescent physical activity.

Demographic, Biological, Individual, Social, and Physical Environmental Factors and Physical Activity

Gender, Ethnicity and Income

A primary goal of the study was to understand the influence of three main demographic factors gender, ethnicity, and income in predicting adolescent physical activity among African American and Hispanic, less advantaged adolescents as a whole and within each demographic grouping. Analyses showed that in the final overall model, gender, ethnic, and income factors did not predict physical activity level. However, a trend that emerged in the analyses, including in the final analysis when number of hours spent outdoors was not considered, was that males reported significantly greater levels of physical activity outside of school as well as levels of factors typically associated with

increased activity, such as self-efficacy and perceived physical activity skill level, than their female counterparts. The finding that males' physical activity exceeds that of females' is consistently found in published research (Grunbaum et al., 2004; Grunbaum et al., 2002; Kann et al., 2000; Kann et al., 1998, USDHHS 1996). Therefore, the present study's findings showing no gender effects when the number of hours spent outdoors is considered is unique.

Based on males' known higher levels of physical activity than females' in past research, it was believed that males might have higher levels of activity in the current study and that higher activity levels among males would be related to their possessing higher levels of other factors predictive of physical activity. Although males reported higher levels of several predictors of activity, including self efficacy, physical activity skills, peer support, frequency of walking and bicycling to school, family transportation, transportation by friends and oneself, and hours spent outdoors, gender interaction effects were not significant in predicting physical activity level in either preliminary regression analyses or in final path analyses when interaction terms were entered into the models. In the former preliminary models, males reported significantly higher levels of activity than girls but interaction terms were not significant. In the latter path models, neither gender nor interaction effects were significant predictors of activity. In brief, in the present study, the role of gender in physical activity became insignificant when time spent outdoors was taken into account. Additional research is needed to substantiate this unique finding. Furthermore, additional research is needed to measure potential gender differences in

factors that predict physical activity as many published studies do not make direct gender comparisons of determinants of physical activity in their data analyses.

In contrast to gender's inconsistent effect in the study, one's ethnicity and income status repeatedly had no bearing on overall physical activity levels. The current study's ethnicity findings were consistent with previous research where most available studies found no significant differences in physical activity levels among minority ethnic groups (Garcia et al., 1995; Gordon-Larsen, Adair, & Popkin, 2002; Gordon-Larsen, McMurray, & Popkin, 2000). In addition, the present study's SES findings provide further information regarding adolescent physical activity as published studies do not generally include SES stratum group comparisons of physical activity levels or determinants (Sallis, Prochaska, & Taylor, 2000), particularly comparisons between low-SES and middle-SES groups. As mentioned earlier, results from research comparing high-SES with a grouping combining both low-SES and middle-SES groups showed that high-SES adolescents' participate in more physical activity than the comparison grouping (Gordon-Larsen, McMurray, & Popkin, 2000; Sallis, Zakarian, Hovell, & Hofstetter, 1996). For instance, in one of these studies, the results showed that high-SES Anglo adolescents had higher levels of total weekly activity that included school-based and community-based activity than low-SES and middle-SES Anglo, African American, Latino, and Asian/Pacific Islander adolescents. However, these differences did not exist for activity that occurred exclusively outside of school (Sallis, Zakarian, Hovell, & Hofstetter, 1996). Similar to the current study, this published study did not find significant differences among minority group activity levels. A distinct feature of the current study is that it compared low-SES

and lower-middle SES groups and found no differences in adolescent physical activity between these groups. In contrast, another unique study that compared low-SES and middle-SES groups found significant activity differences in children and young adolescents between groups (Molner, Gortmaker, Bull, & Buka (2004). A review of some of the differences between these two studies sheds light on some things to consider when investigating and interpreting the effect of SES on physical activity.

In addition to age-range differences among participants between these two studies, there could potentially be many reasons for the differing outcomes between the current study and this published study including differences in the urban form of the areas where participants resided; wherein, the current study measured suburban youth while the contrasting study measured urban youth. Another notable difference in study features was that the current study participants resided in the same general geographic area, while the published study included multiple geographic neighborhoods. Furthermore, the current study showed the participants had the availability of and used physical activity resources in areas adjacent to or within travel distance of their residence, while such resources were not measured in the published study. These differences in urban form, the range of geographic area under study, and availability of resources outside of the immediate community may have impacted the respective study outcomes. More importantly, these influences highlight the complexity of identifying socioeconomic and physical environment characteristics that affect physical activity. As pointed out by Sallis and Owen (1999) with regard to SES and Ethnicity, one must use caution when studying or interpreting the effects of SES and/or ethnicity on physical activity, "as it is difficult or impossible to

separate the effects of ethnicity and SES." Similar problems exist when studying and interpreting socioeconomic factors and environmental characteristics across land use types, neighborhoods, and general geographic regions, because although SES levels may be the same, economic and environmental conditions may differ. Confounding factors, such as cost of living, including physical activity costs, social disorder, and the availability of transportation, between geographic regions may impact study outcomes. For instance, the comparison study used here by Molner, Gortmaker, Bull, & Buka (2004) studied social disorder features and lack of safety in urban neighborhoods. Social disorder features were measured by social scientists observing and systematically coding neighborhood features into social order categories within 343 urban census tracks for use in analyses. Examples of social disorder features measured were broken windows, abandoned buildings, graffiti, illegal drug sales, and prostitution. Safety levels of neighborhoods were obtained from participants' questionnaire responses. The study findings showed there was significantly less physical activity among children and young adolescents residing in urban neighborhood clusters with more social disorder features, as well as, in neighborhood clusters characterized by residents as unsafe. In contrast, although in the current study suburban neighborhoods may have social disorder and poor safety, these levels may be less dramatic and have less effect on physical activity than the social disorder and lack of safety found in impoverished inner-city regions. That may, in part, account for the lack of significant findings for all neighborhood characteristics questions in the current study despite the study of lower-income neighborhoods. Notwithstanding the need to consider overlapping dynamics and confounding issues among ethnic, SES, urban form, neighborhood characteristics, and regional economic

factors when studying these factors, there were noteworthy differences within ethnic and SES groups in the current study.

Although activity levels did not differ between ethnic and income groups respectively, there was a noteworthy ethnic difference in a factor predicting physical activity: neighborhood environment, where African Americans rated their neighborhood's characteristics as more suitable for physical activity than Hispanics did. Furthermore, although not significant in predicting physical activity, low-income participants were more likely than lower middle-income participants to report environmental barriers to physical activity including inclement weather and lack of convenient places for activity. These findings suggest that real and/or perceived environmental characteristics, including geographic features, may facilitate or restrict physical activity. The full impact of differences in neighborhood and regional environmental characteristics among ethnic and SES groups may not be seen in the present study as residents live in the same general geographic area.

The environmental findings in the present study support the importance of conducting further research examining the relationship between environmental variables and physical activity in diverse ethnic and income groups. For instance, a study of older adolescents from multiple SES groups that did not compare income group differences, found environmental barriers had a significant inverse association with physical activity (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999). Similarly, a study of diverse SES adolescents found that low-SES African American and Latino subjects reported a greater lack of convenient facilities than low-income Asian/Pacific Islander, high-SES Anglo and

low-SES Anglo adolescents (Sallis, Zakarian, Hovell, & Hofstetter, 1996). Furthermore, the study by Molner, Gortmaker, Bull, & Buka (2004) discussed extensively above showed the effect of SES status and physical environments on physical activity. Lastly, within a study of environmental barriers and resources related to physical activity among low-SES adults, subjects reported less access to public recreational facilities and greater neighborhood barriers than high-SES adults had (Wilson, Kirtland, Ainsworth, & Addy, 2004). The present study's findings that neighborhood environment characteristics predicted the number of hours spent outdoors and that there are ethnic and income differences in survey scores for environmental factors further supports the need for additional research on actual and perceived environmental barriers to physical activity among diverse ethnic and income groups.

A unique contribution of the study is in its comparisons of similar numbers of African American and Hispanic adolescents. This is important because many of the research findings presented for comparison included few African Americans in relation to their overall ethnic composition. Furthermore, most previous adolescent research has not made ethnic and income group comparisons among factors presumed to be predictive of activity levels including environmental characteristics. Therefore, many of the ethnic and income findings in the present study are unique. In contrast, many overall study findings were consistent with previously published adolescent research.

Similarities with Published Research Findings

Physical activity levels in the current study reflected the insufficient levels of vigorous activity outside of school found within published research (Zakarian, Hovell,

Hofstetter, Sallis, & Keating, 1994), as well as, the generally insufficient physical activity levels found nationally among adolescents (Grunbaum et al., 2004). In addition, in the final statistical model, greater physical activity was determined by demographic, biological, individual and social factors similar to those found in previous research. Having a body mass index less than the 95th percentile for gender and age, having higher levels of self-efficacy, and spending ones usual recreational time in active pastimes rather than sedentary ones were predictive of increased physical activity level in the final model. In addition, in the individual domain model, two factors found to be predictive of physical activity in adolescent activity research were significant in the current study: physical activity capacity or skill and having adequate time for physical activity. Furthermore, three factors found to be significant in previous studies were also significant in the social domain model in the present study: higher levels of family support and peer support predicted higher physical activity levels, while greater social barriers predicted less activity. Factors not directly measured in research among older adolescents, but significant in this study were transportation provided by family, friends, oneself, and a physical environment factor, the number of hours spent outdoors.

Body Mass Index

The weight characteristic of body mass index (BMI) has been frequently assessed in adolescent physical activity research. BMI has been inconsistently found to predict activity level. Some studies show an association between increased body mass index and reduced physical activity (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Wolf et al., 1993) while others do not (Sallis, Taylor, Dowda, Freedson, & Pate, 2002). Some of the

discrepancy in findings may be attributable to the continuous measure of BMI used in these studies. BMI would naturally be expected to vary in youths up to a certain threshold. The CDC published tables of BMI by gender and age (CDC, Center for Health Statistics, 2000) distinguishes between normal BMI levels among adolescents and BMI indexes indicating an overweight status. Therefore, the use of a dichotomous BMI variable with cutoffs at the 85% percentile rate, the threshold for being at risk for overweight, and the 95th percentile rate, the threshold for being overweight, may account for the significant findings for the 95th percentile BMI rate in the present study. Similarly, the 95th percentile was a significant inverse predictor of activity in a study of Hispanic youth using this technique (Mirza et al., 2004). Confirming the negative impact of being overweight on activity level among adolescents is important because programs combining healthy diets and physical activity interventions among children have been effective in increasing behaviors associated with improved diets and increased physical activity (Stone, McKenzie, Welk, & Booth, 1998).

Use of Recreational Time

The effect of spending one's usual recreational time in active pursuits rather than sedentary ones was predictive of activity level in the present study and in other studies (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Sallis, Taylor, Dowda, Freedson, & Pate, 2002). The nature of this variable is somewhat circular as measuring engagement in active pursuits may be an alternative or latent measure of activity itself. However, the need to determine the effect of active versus sedentary behaviors on physical activity is crucial as laboratory-based research of obese children has found that reducing access to sedentary

behaviors and increasing reinforcement of physical activity behaviors increases the amount of time spent in physical activity (Epstein, 1998). A specific sedentary activity, the amount of time spent watching television, has also been shown to be inversely related to adolescent physical activity level (Eisenmann, Bartee, & Wang, 2002; Page, Hammermeister, & Scanlan, 1996), but this finding is not consistent across studies (Sallis, Prochaska, & Taylor, 2000). This trend is of great concern in the context of the present study sample in that research shows African American adolescents spend more time watching television than other adolescents do (Marshall, Biddle, Sallis, McKenzie, & Conway, 2002; McGuire, Neumark-Sztainer, & Story, 2002; Sallis, Zakarian, Hovell, & Hofstetter, 1996).

Activity Types

In the current study, how participants usually spent their recreational time was informative in establishing that those who did more energetic types of activities engaged in greater amounts of overall physical activity. Another consideration in understanding physical activity involves the specific type of activity one does. Although the current study did not conduct statistical analyses of activity types, a brief review of what activities participants engaged in at the settings they used is noteworthy. Descriptive tables showing total activity types and gender, ethnic and income within-group activity type comparisons are located in Appendix I. In general, the types of activities listed by participants fell into the realm of traditional athletic behaviors (e.g. basketball, running, soccer) rather than non-traditional activities, such as dancing and movement. This may be the result of the questionnaire instructions and items that did not specifically highlight to

participants the importance of reporting time spent in non-traditional activities within physical activity level item responses or considering non-traditional activities when they listed the settings they attended. The lack of inclusion of these alternative activities may have resulted in the under-reporting of physical activity, as well as, the under-reporting of places attended by some participants. For instance, in the current study, only 3% of females reported they either danced or did aerobic or aerobic dancing activities. These numbers seem low when we consider that published research has shown that females prefer aerobics and dance over other physical activities (USDHHS, 1996). Similarly, in the current study, only 2% of African American participants reported dancing as an activity, a percentage that seems low given that previous research has found that dance is a preferred activity among African American adolescents (Sallis, Zakarian, Hovell, & Hofstetter, 1996). Researching differences in activity types and activity type preferences among adolescents seems essential to addressing gaps in activity levels between demographic groups and promoting physical activity among adolescents. Activity types may also be important in community resource development.

As discussed above, published studies of adolescents have found differences in preferred activity types between males and females, including that males prefer team sports while females prefer aerobics and dance (USDHHS, 1996) and differences between ethnic groups, wherein, African Americans prefer dance and Asians prefer tennis (Sallis, Zakarian, Hovell, & Hofstetter, 1996). Differences in activity preferences could account for variations in activity levels due to the availability of community resources for given activities. The availability of facilities and programs which meet the individual and cultural

preferences of participants is important for promoting physical activity. For instance, in the current study, participants reported a desire to attend health clubs. These types of settings typically offer activities, such as aerobic exercises, aerobic dancing, and weight lifting which might be preferred activities among participants. However, these settings may not be accessible to participants due to cost barriers. Furthermore, the community settings available to participants, such as parks and public recreation centers, may not provide equipment or instruction for these noted activities. Therefore, interventions that make desired activities available within free or low-cost community recreation centers might be one means of increasing physical activity. Notwithstanding the possibility that participants have an actual preference for health club-related activities, their overwhelming desire to attend private health clubs may, in part, be attributable to the media's glamorization of health clubs venues and not as much due to an actual interest in the activities provided at health club settings. In addition, this discussion on preferred activities does not address the issue that gender and ethnic activity preferences are the product of gender and ethnic socialization and physical environment influences over time that reinforce preferences for certain activities over other activities. Given the opportunity and encouragement to learn and enjoy a variety of physical activities as children and throughout adolescence, activity preferences among select demographic groups of adolescents might be different. Additional research is needed to explore the activity type interests of adolescents, particularly those who are most inactive.

Self-efficacy and Social Support

Two significant factors in predicting physical activity in the present study's final model were self-efficacy and having few social barriers to activity. Furthermore, family and peer support were significant in preliminary models. The significance of these factors is that they reaffirm the role of both self-efficacy and social supports as predictive of physical activity among multiple ethnic groups including African Americans and Hispanic adolescents (Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). In addition, they are consistent with general adolescent physical activity research where self-efficacy (Bungum, Dowda, Weston, Trost, & Pate, 2000; Sallis, Prochaska, & Taylor, 2000) and family support or influence (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Sallis, Taylor, Dowda, Freedson, & Pate, 2002) and peer support (Sallis, Prochaska, & Taylor, 2000; Sallis, Taylor, Dowda, Freedson, & Pate, 2002) are positively associated with or predictive of physical activity in adolescents. Social barriers are not as commonly measured but have been found to be inversely predictive of physical activity in adolescents (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999). The benefits of family support in predicting physical activity is seen throughout the age spectrum (Sallis & Owen, 1999) and family support as well as school and community support are frequently seen as a means of increasing physical activity levels among youth (CDC, 2000). A review of social support variables found that parent and significant other encouragement and direct parental help in physical activity were the most consistent social predictors of physical activity among adolescents (Sallis, Prochaska, & Taylor, 2000). The current study further underscores the importance of social environments in shaping and influencing physical activity behaviors among African American and Hispanic lower SES youth. A factor with

social implementations, which has received much attention from physical activity researchers, is self-efficacy.

The importance of self-efficacy in promoting physical activity cannot be overemphasized. Self-efficacy, in addition to predicting physical activity in adolescents, predicts physical activity levels in children (Sallis, Prochaska, & Taylor, 2000), young adults (Ronviak, Anderson, & Winett, 2002), and adults (Sallis, & Owen, 1999). Moreover, interventions to increase self-efficacy have been shown to increase physical activity. For example, research involving African American and White 9th grade girls, using a randomized trial, showed that enhancing self-efficacy beliefs through intervention increased physical activity directly and moderated baseline self-efficacy levels (Dishman et al., 2004). Similar physical activity gains were found in numerous studies of youth who received social cognitive theory based interventions, including self-efficacy interventions. Furthermore, of these studies, many with post-intervention follow-up showed, significant increases in physical activity in the intervention groups versus the control groups (Stone, McKenzie, Welk, & Booth, 1998). In addition, prospective studies of 10th graders (Reynolds et al., 1990) and 5th graders (Trost, Pate, Saunders, Ward, Dowda, & Felton, 1997) respectively showed physical activity self-efficacy beliefs strongly predicted future physical activity. The value of current self-efficacy in predicting future activity was also found in a randomized control trial among older adults (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003) showing the benefits of self-efficacy even in later years. These studies showing self-efficacy as a predictor of present and future physical activity further support the cumulative effects of self-efficacy and its strength as an intervention

method. What is more, the effects of self-efficacy would presumably reinforce the benefits of previous physical activity in predicting future physical activity in youth (Dilorenzo, Stucky-Ropp, Van Der Wal, & Gotham, 1998; Godin, & Shepard, 1986) and young adults (Wallace, Buckworth, Kirby, & Sherman, 2000). Self-efficacy has immense potential in intervention programs for shaping positive physical activity behaviors among youth. Accordingly, instilling physical activity self-efficacy beliefs at a young age and reinforcing those beliefs through social support and self-efficacy enhancing situations would increase the likelihood of maintaining such beliefs later in life and in bolstering previously acquired physical activity skills and habits.

Limitations

Limitations of this study were the use of a single school district's high school and associated geographic locations which did not allow for comparisons with other districts and locations where student ethnic and socioeconomic statuses and community resources differed from the current sample. In addition, had the sample size been larger, marginal findings, such as the effects found in domain specific analyses, may have been more significant in the overall model.

Another limitation was the exclusive reliance on self-reported measures of physical activity where participants may have overestimated their activity levels, such as was seen in some presumably excessive reports of hours of time spent weekly in any physical activity. Another limitation was not specifying a time frame for which participants used the physical activity settings they attended, such as a 7-day time frame, that could be compared to the same time frame with which participants reported their physical activity.

The discrepancy in time frames may have made measures, such as median distance, unreliable for predicting physical activity level. Other limitations were the use of unvalidated survey tool questions in the "describe your environment" and "places you might want to go to be physically active" sections of the study. The shortcomings of the "describe your environment" section were that measures of place characteristics, such as desirability of and ease of use, may not reflect the types of features important to adolescents or that the multi-item index measures comprising these variables might not accurately measure the given construct of interest. Similar weaknesses are present in the measure "places you might want to go to be physically active." In addition, participants may not be able to readily envision places of potential interest within the context of these survey questions. For instance, participants may not easily imagine venues outside of their general range of travel or behavior settings that offer activities not generally found in the realm of their current activities. The poor response rate for the "places you might want to go to be physically active" questions may reflect these survey limitations. Lastly, it was not possible to use previously published multi-item physical environment indexes developed and used in the previous research, as the internal consistency of these items was poor. These indexes' component items, such as neighborhood safety and availability of facilities close to home, were used instead. However, these single item variables may not have fully captured the intended constructs of the original multi-items variables and by using single-items, exact outcome comparisons could not be made with the original published survey results.

Future Research

Findings from the present work support future research in numerous ecological areas where an emphasis is placed on including a diverse representation of ethnic and SES participants, particularly those groups who are underrepresented in the literature. Future research should measure differences in physical activity levels and its determinants among and between sample gender, ethnic, and income groups. In addition, greater understanding is needed regarding the effects of the physical environment on adolescent physical activity. Further investigation is needed regarding the role of behavior settings including private or public setting types, natural versus built spaces, home versus spaces outside the home, and behavior setting attributes on setting use and physical activity. Such research would better inform individual, social, and community based physical activity interventions including community planning and development of activity spaces. Other important research issues involve the impact of facility availability, cost, and neighborhood characteristics on setting use and physical activity levels among different SES groups. A major area of study needed is how proximity of settings and territorial range affects adolescent setting use and physical activity. Lastly, the role of spending time outdoors in increasing activity bears investigation given its significance in predicting physical activity in the current study and its role, in general, in promoting health and in promoting essential adolescent developmental goals.

The significant effect of transportation on physical activity in the present study and in previous research on children points to the importance of understanding the role of transportation availability on setting use through empirical research. Furthermore, such

studies should include an assessment of all forms of transportation including private motorized transport, pedestrian travel including walking and bicycling, general public transportation, and lastly, setting-specific carpools, buses and shuttles.

The impact of many individual and social domain determinants on physical activity is well established. Additional studies in the individual and social domain areas would be valuable with an emphasis on less known determinants such as the role of sedentary activities and body mass index on activity. In addition, in light of the existing literature showing the role of self-efficacy, perceived physical activity competency, and family and peer emotional support in increasing physical activity, substantial benefit might be achieved through implementing longitudinal interventions to increase activity and promote those determinants among youth that best sustain physical activity behaviors over time.

Conclusions

Throughout the data results, a prevalent finding was the importance of the ecological health model in investigating and explaining physical activity among this adolescent group. Great value was derived from measuring factors not previously measured among older adolescents including the number of hours spent outdoors and transportation by family, friends, and oneself as they provide insight into what influences adolescent physical activity. The examination of physical environments also brought to light factors of importance to the adolescents studied including the impact of relative distance, neighborhood environments, and behavior settings on physical activity. In addition, the data collection and analyses methods used in the study for physical environment variables offer potential tools for future research in this area. Additional

research is needed to examine the relationship of ecological model factors further, particularly social and physical environmental variables, among understudied ethnic groups, as well as, the need for targeted intervention programs and outcomes studies to establish long-range strategies that promote life-long physical activity.

studies should include an assessment of all forms of transportation including private motorized transport, pedestrian travel including walking and bicycling, general public transportation, and lastly, setting-specific carpools, buses and shuttles.

The impact of many individual and social domain determinants on physical activity is well established. Additional studies in the individual and social domain areas would be valuable with an emphasis on less known determinants such as the role of sedentary activities and body mass index on activity. In addition, in light of the existing literature showing the role of self-efficacy, perceived physical activity competency, and family and peer emotional support in increasing physical activity, substantial benefit might be achieved through implementing longitudinal interventions to increase activity and promote those determinants among youth that best sustain physical activity behaviors over time.

Conclusions

Throughout the data results, a prevalent finding was the importance of the ecological health model in investigating and explaining physical activity among this adolescent group. Great value was derived from measuring factors not previously measured among older adolescents including the number of hours spent outdoors and transportation by family, friends, and oneself as they provide insight into what influences adolescent physical activity. The examination of physical environments also brought to light factors of importance to the adolescents studied including the impact of relative distance, neighborhood environments, and behavior settings on physical activity. In addition, the data collection and analyses methods used in the study for physical environment variables offer potential tools for future research in this area. Additional

Appendix A continued…

Q3. Outside of School, approximately how many **hours weekly** are you physically active?

_____ Hours Per Week

Q4. Approximately how many **hours per week** do you spend outdoors? _____ Hours Per Week

How much do you agree with the following statements? (CIRCLE ONE NUMBER FOR EACH ITEM)

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
Q5. At home, there are enough supplies and pieces of sports equipment (like balls, bicycles, skates) to use for physical activity.	1	2	3	4	5
Q6. There are playgrounds, parks, or gyms close to my home or that I can get to easily.	1	2	3	4	5
Q7. It is safe to walk or jog alone in my neighborhood during the day.	1	2	3	4	5
Q8. It is difficult to walk or jog in my neighborhood because of things like traffic, no sidewalks, dogs, gangs, and so on.	1	2	3	4	5

Answer each of the following questions: (CIRCLE ONE NUMBER FOR EACH TYPE OF PERSON)

	None	Once	Sometimes	Almost daily	Daily
Q9. During a typical week, how often has a member of your household **encouraged you to do physical activities or play sports**? *Answer A, B, &C*					
A. Male adults?	0	1	2	3	4
B. Female adults?	0	1	2	3	4
C. Other children?	0	1	2	3	4

	None	Once	Sometimes	Almost daily	Daily
Q10. During a typical week, how often has a member of your household **done a physical activity or played sports with you?** *Answer A, B, & C*					
A. Male adults?	0	1	2	3	4
B. Female adults?	0	1	2	3	4
C. Other children?	0	1	2	3	4

Appendix A continued…

	None	Once	Sometimes	Almost daily	Daily
Q11. During a typical week, how often has a member of your household **provided transportation to a place where you can do physical activities or play sports?** *Answer A, B, & C*					
A. Male adults?	0	1	2	3	4
B. Female adults?	0	1	2	3	4
C. Other children?	0	1	2	3	4

	None	Once	Sometimes	Almost daily	Daily
Q 12. During a typical week, how often has a member of your household **watched you participate in physical activities or sports?** *Answer A, B, & C*					
A. Male adults?	0	1	2	3	4
B. Female adults?	0	1	2	3	4
C. Other children?	0	1	2	3	4

	None	Once	Sometimes	Almost daily	Daily
Q13. During a typical week, how often has a member of your household **told you that physical activity is good for health?** *Answer A, B, & C*					
A. Male adults?	0	1	2	3	4
B. Female adults?	0	1	2	3	4
C. Other children?	0	1	2	3	4

During a typical week, how often: (CIRCLE ONE NUMBER)

	None	Once	Sometimes	Almost daily	Daily
Q14. Do you encourage your friends to do physical activities or organize games or sports?	0	1	2	3	4
Q15. Do your friends encourage you to do sports or physical activities?	0	1	2	3	4
Q16. Do your friends do physical activities or play sports with you?	0	1	2	3	4
Q17. Do your friends or classmates tease you about not being good at physical activities or sports?	0	1	2	3	4
Q18. During a typical week, how often do you **drive yourself** to a place where you can do physical activities or play sports?	0	1	2	3	4
Q19. During a typical week, how often do **your friends drive you** to a place where you can do physical activities or play sports?	0	1	2	3	4

Appendix A continued…

Q20. How often do the following **prevent you** from getting exercise?
(CIRCLE ONE NUMBER FOR EACH ITEM)

	Never	Rarely	Sometimes	Often	Very Often
A. Self conscious about my looks when I do activities	0	1	2	3	4
B. Lack of interest in physical activity	0	1	2	3	4
C. Lack of self-discipline (will power)	0	1	2	3	4
D. Lack of time	0	1	2	3	4
E. Lack of energy	0	1	2	3	4
F. I do not have anyone to do physical activities with me	0	1	2	3	4
G. I do not enjoy physical activity	0	1	2	3	4
H. Lack of equipment	0	1	2	3	4
I. The weather is too bad	0	1	2	3	4
J. Lack of skills	0	1	2	3	4
K. I am too tired to exercise	0	1	2	3	4
L. Lack of knowledge on how to do physical activities	0	1	2	3	4
M. Lack of a convenient place to do physical activity	0	1	2	3	4
N. I am too overweight	0	1	2	3	4
O. Physical activity is boring	0	1	2	3	4
P. My friends don't like to exercise	0	1	2	3	4
Q. My friends tease me during exercise or sports	0	1	2	3	4
R. I'm chosen last for teams	0	1	2	3	4
S. I don't like to sweat,	0	1	2	3	4
T. Physical activity messes up my appearance (hair, clothes, or makeup)	0	1	2	3	4
U. My job	0	1	2	3	4
V. I don't want to get too strong or muscular	0	1	2	3	4
W. Homework	0	1	2	3	4

Q21. How sure are you that you can do the following things on your own time outside of school?
(CIRCLE ONE NUMBER FOR EACH ITEM)

	I'm sure I can't	I Probably can't	Neutral	I Probably can	I 'm Sure I can
A. Get up early, even on weekends, to exercise.	1	2	3	4	5
B. Exercise even though you are feeling sad or highly stressed.	1	2	3	4	5
C. Stick to regular exercise even when your family or friends demand more time from you.	1	2	3	4	5
D. Stick to regular exercise even when you have a lot of school work to do.	1	2	3	4	5
E. Set aside time for regular exercise.	1	2	3	4	5

Appendix A continued...

022. How do you usually spend **your recreational time**? (CIRCLE ONE NUMBER ONLY)

1. Almost always choose activities like TV, reading, listening to music, or computers
2. Usually choose activities like TV, reading, listening to music, or computers
3. Just as likely to choose active as inactive recreation
4. Usually choose activities like bicycling, dancing, outdoor games, or active sports
5. Almost always choose activities like bicycling, dancing, outdoor games, or active sports

Q23. How do you rate **your athletic coordination**, compared to others of the same age and sex? (CIRCLE ONE NUMBER ONLY)

1. Much less coordinated
2. Somewhat less coordinated
3. About the same
4. Somewhat more coordinated
5. Much more coordinated

Q24. How do you **rate your physical activity**, compared to others of the same age and sex? (CIRCLE ONE NUMBER ONLY)

1. Much less than others
2. Somewhat less than others
3. About the same
4. Somewhat more than others
5. Much more than others

Q25. How much do you **enjoy** physical activity? (CIRCLE ONE NUMBER ONLY)

1. Activity is very un-enjoyable
2. Activity is somewhat un-enjoyable
3. Neutral
4. Activity is somewhat enjoyable
5. Activity is very enjoyable

Q26. At your school, are there supervised physical activity programs for all interested students? (CIRCLE ONE NUMBER FOR EACH ITEM)

1. After School	No	Yes	Don't Know
2. On weekends	No	Yes	Don't Know
3. During the Summer	No	Yes	Don't Know

DEMOGRAPHICS

Q27. What is your sex? ☐ Male ☐ Female

Q28. What is you age? _____ Years old

Q29. Would you best describe your ethnicity as

1. African-American
2. Asian, Pacific Islander
3. Caucasian, white, nonhispanic
4. Latino, Hispanic, Chicano
5. Native American
6. Unknown
7. Other_____

Appendix A continued…

Q30. Are you eligible for a free or reduced lunch program offered at school? ☐ No ☐ Yes

Q31. What is your height? _____ Feet _____Inches

Q32. What is your weight? _____ Pounds

Q33. How many hours per week do you usually work for pay? _____ Hours per week

PLEASE GO TO NEXT SECTION……

Appendix A continued...

PART II

Describe Your Environment

Q1E. What is your home address (include town)?

My home address is: _____

Q2E. What is your **most frequent** form of transportation to and from school?

☐ Walking, biking ☐ All others

List up to 5 of your favorite places you go to be physically active.

Think about the following types of places you may go:

- At home (inside)
- At home, in yard
- Parks, playgrounds, beaches
- School grounds
- Around the neighborhood
- Gymnasiums, dance studios, athletic clubs
- Community recreation centers
- Church buildings/grounds

# 0. a) Name of place where you go: Example Eisenhower Park		
b) Address or location description (include street and town): Merrick Road, East Meadow		
d) List activities you personally do here: Examples Basketball, swimming		
e) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☒ Yes	☐ No
Close to home	☐ Yes	☒ No
Equipment for my activity is available	☒ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☒ Yes	☐ No
Convenient hours	☐ Yes	☒ No
Easy to walk or bicycle to	☒ Yes	☐ No
Friends/family exercise here	☐ Yes	☒ No
Transportation available	☒ Yes	☐ No
Enjoyable scenery or atmosphere	☒ Yes	☐ No
Lighted at night	☐ Yes	☒ No
Someone is there to prevent trouble.	☐ Yes	☒ No
Free or low fees ($$)	☒ Yes	☐ No
Place is maintained nicely	☒ Yes	☐ No
Heavy traffic getting to place	☒ Yes	☐ No
Place is too crowded	☐ Yes	☒ No
Has a reputation for being unsafe	☒ Yes	☐ No
Indoor space	☒ Yes	☐ No
Outdoor space	☐ Yes	☒ No

Appendix A continued...

# 1. a) Name of place where you go:		
b) Address or location description (include street and town):		
c) List activities you personally do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

# 2. a) Name of place where you go:		
b) Address or location description (include street and town):		
c) List activities you personally do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

Appendix A continued...

# 3. a) Name of place where you go:		
b) Address or location description (include street and town):		
c) List activities you personally do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

# 4. a) Name of place where you go:		
b) Address or location description (include street and town):		
c) List activities you personally do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

Appendix A continued...

# 5. a) Name of place where you go:		
b) Address or location description (include street and town):		
c) List activities you personally do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

PLEASE GO TO NEXT SECTION.....

Appendix A continued...

PART III

List up to 5 of the places **you might want to go** to be physically active, where **you do not go.**

# 1.a) Name of place where you might want to go:		
b) Address or location description (include street and town):		
c) List activities you would want to do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

Appendix A continued...

# 2. a) Name of place where you might want to go:		
b) Address or location description (include street and town):		
c) List activities you would want to do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

# 3. a) Name of place where you might want to go:		
b) Address or location description (include street and town):		
c) List activities you would want to do here:		
d) This place has the following features: (Check all features as either yes or no).		
Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

Appendix A continued…

 # 4. a) Name of place where you might want to go:

b) Address or location description (include street and town):

c) List activities you would want to do here:

d) This place has the following features: (Check all features as either yes or no).

Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

 # 5. a) Name of place where you might want to go:

b) Address or location description (include street and town):

c) List activities you would want to do here:

d) This place has the following features: (Check all features as either yes or no).

Offers an activity I like	☐ Yes	☐ No
Close to home	☐ Yes	☐ No
Equipment for my activity is available	☐ Yes	☐ No
Has facilities (e.g., bathrooms, Lockers)	☐ Yes	☐ No
Convenient hours	☐ Yes	☐ No
Easy to walk or bicycle to	☐ Yes	☐ No
Friends/family exercise here	☐ Yes	☐ No
Transportation available	☐ Yes	☐ No
Enjoyable scenery or atmosphere	☐ Yes	☐ No
Lighted at night	☐ Yes	☐ No
Someone is there to prevent trouble.	☐ Yes	☐ No
Free or low fees ($$)	☐ Yes	☐ No
Place is maintained nicely	☐ Yes	☐ No
Heavy traffic getting to place	☐ Yes	☐ No
Place is too crowded	☐ Yes	☐ No
Has a reputation for being unsafe	☐ Yes	☐ No
Indoor space	☐ Yes	☐ No
Outdoor space	☐ Yes	☐ No

Thank you for completing this survey

Appendix A continued...

ENCUESTA DE ACTIVIDAD FÍSICA

Esta es una encuesta sobre tu actividad física.

La mayoría de las preguntas tratan de tus actividades físicas **en los últimos siete días**, realizadas **después de la escuela, en la casa, o en los fines de semana**.

Las preguntas siguientes podrían ayudarte a responder:
- ¿El año pasado, cuáles fueron tus actividades recreativas?
- ¿En qué deportes, ejercicios, equipos, o lecciones de educación física, participaste?
- ¿En qué actividades participaste con tus amigos?

No hay respuestas buenas o malas, por favor trata de ser lo más preciso y honesto que puedas.

PARTE PRIMERA

Q1a. ¿**Fuera de la escuela,** en los últimos siete días, hiciste ejercicio o participaste en actividades deportivas por más de 20 minutos, actividades que producen sudor, respiración acelerada, tales como básquetbol, carrera, natación, tenis, bicicleta veloz, u otra actividad aeróbica similar?
☐ 0 días
☐ 1 día
☐ 2 días
☐ 3 días
☐ 4 días
☐ 5 días
☐ 6 días
☐ 7 días

Q1b. ¿En cuántos días de los últimos siete, caminaste o manejaste bicicleta para hacer ejercicio, por lo menos 30 minutos cada vez? Incluye caminar o ir en bicicleta a la casa.
☐ 0 días
☐ 1 día
☐ 2 días
☐ 3 días
☐ 4 días
☐ 5 días
☐ 6 días
☐ 7 días

Q2a. En los últimos doce meses, ¿en cuántos equipos auspiciados por la escuela, participaste? No incluyas clases de educación física.
☐ en ningún equipo escolar
☐ en un equipo escolar
☐ en dos equipos de la escuela
☐ en tres o más equipos de la escuela?

Q2b. Durante los últimos doce meses, ¿en cuántos equipos auspiciados por organizaciones fuera de la escuela, participaste?
☐ ningún equipo fuera de la escuela
☐ en un equipo fuera de la escuela
☐ en dos equipos fuera de la escuela
☐ en tres o más equipos fuera de la escuela

Appendix A continued...

Q3. **Fuera de la escuela**, aproximadamente, ¿cuántas horas estás activo físicamente.

_____horas por semana

Q4. Aproximadamente, ¿cuántas horas permaneces afuera? _____ horas por semana.

¿En qué medida estás de acuerdo con las siguientes declaraciones? (traza un círculo en el número correspondiente)

	Muy en desacuerdo	Algo en desacuerdo	Neutral	Algo de acuerdo	Muy de acuerdo
Q5. Hay en mi casa suficiente equipo y material para las actividades físicas (pelotas, patines, bicicleta, etc.).	1	2	3	4	5
Q6. Cerca de mi casa hay sitios de juego, canchas, parques, o gimnasios a los que se puede llegar fácilmente.	1	2	3	4	5
Q7. Es seguro caminar o correr en mi vecindario durante el día.	1	2	3	4	5
Q8. Es difícil caminar o correr en mi vecindario por el tráfico, los perros, las pandillas y la falta de andenes.	1	2	3	4	5

Durante una semana corriente, qué tan a menudo un miembro de tu familia:
(Traza un círculo en el número correspondiente a cada tipo de persona. **Contesta A, B, y C**. en cada pregunta)

	Ninguno	Una Vez	Algunas veces	Casi a diario	A diario
Q9. ¿te anima a tener actividades físicas o deportivas? **Contesta A, B y C**					
A. Hombres adultos	0	1	2	3	4
B. Mujeres adultas	0	1	2	3	4
C. Jóvenes	0	1	2	3	4
	Ninguno	**Una Vez**	**Algunas veces**	**Casi a diario**	**A diario**
Q10. ¿tiene una actividad física o practica un deporte? **Contesta A, B y C**					
A. Hombres adultos	0	1	2	3	4
B. Mujeres adultas	0	1	2	3	4
C. Jóvenes	0	1	2	3	4

Appendix A continued...

Durante una semana corriente, qué tan a menudo un miembro de tu familia:					
	Nin-guno	**Una Vez**	**Alguna s veces**	**Casi a diario**	**A diario**
Q11. ¿te ofrece transporte para ir a un sitio de actividad física o deporte? **Contesta A, B y C**					
A. Hombres adultos	0	1	2	3	4
B. Mujeres adultas	0	1	2	3	4
C. Jóvenes	0	1	2	3	4

	Nin-guno	**Una Vez**	**Algunas veces**	**Casi a diario**	**A diario**
Q12. ¿te ve participando en actividades físicas o deportivas? **Contesta A, B y C.**					
A. Hombres adultos	0	1	2	3	4
B. Mujeres adultas	0	1	2	3	4
C. Jóvenes	0	1	2	3	4
	Nin-guno	**Una Vez**	**Algunas veces**	**Casi a diario**	**A diario**
Q13. ¿te ha dicho que la actividad física es buena para la salud? **Contesta A, B y C.**					
A. Hombres adultos	0	1	2	3	4
B. Mujeres adultas	0	1	2	3	4
C. Jóvenes	0	1	2	3	4

Durante una semana corriente, que tan a menudo:
(Traza un círculo en el número)

	Ninguna vez	**Una vez**	**Algunas veces**	**Casi a diario**	**A diario**
Q14. ¿animas a tus amigos a participar en actividades físicas u organizar juegos y deportes?	0	1	2	3	4
Q15. ¿tus amigos te animan a hacer deporte y actividades físicas?	0	1	2	3	4
Q16. ¿tienen tus amigos actividades físicas o juegan deportes contigo?	0	1	2	3	4
Q17. ¿tus amigos o compañeros de clase te molestan por no ser muy hábil en las actividades físicas o deportivas?	0	1	2	3	4
Q18. ¿vas en carro al sitio donde tienes actividades físicas o deportivas?	0	1	2	3	4
Q19. tus amigos te llevan en carro al sitio de las actividades físicas o deportivas?	0	1	2	3	4

Appendix A continued...

Q20. ¿Qué tan frecuentes son los siguientes puntos un obstáculo para hacer ejercicio?

	Nunca	Raramente	Algunas veces	A menudo	Muy a menudo
A. Eres muy conciente de tu apariencia	0	1	2	3	4
B. Falta de interés	0	1	2	3	4
C. Falta de disciplina (fuerza de voluntad)	0	1	2	3	4
D. Falta de tiempo	0	1	2	3	4
E. Falta de energía	0	1	2	3	4
F. Quién me acompañe en las actividades	0	1	2	3	4
G. No disfruto de las actividades físicas	0	1	2	3	4
H. Falta de equipo	0	1	2	3	4
I. Que el tiempo esté muy malo	0	1	2	3	4
J. Falta de habilidad	0	1	2	3	4
K. Siento demasiado cansancio	0	1	2	3	4
L. No se cómo hacer las actividades físicas	0	1	2	3	4

	Nunca	Raramente	Algunas veces	A menudo	Muy a menudo
M. Falta de un sitio conveniente	0	1	2	3	4
N. Tengo mucho peso	0	1	2	3	4
O. Las actividades físicas son aburridas	0	1	2	3	4
P. A mis amigos no les gusta el ejercicio	0	1	2	3	4
Q. Mis amigos me molestan durante el ejercicio o el deporte	0	1	2	3	4
R. Me escogen a lo último en los equipos	0	1	2	3	4
S. No me gusta sudar	0	1	2	3	4
T. La actividad física daña mi apariencia (el pelo, los vestidos, el maquillaje)	0	1	2	3	4
U. Mi trabajo	0	1	2	3	4
V. No deseo ser muy fuerte o musculoso	0	1	2	3	4
W. Las tareas	0	1	2	3	4

Q21. ¿Tienes la seguridad de que puedes hacer lo siguiente después de la escuela?
(Traza un círculo en el número correspondiente)

	Es seguro que no pueda	Es probable que no pueda	Neutral	Es probable que pueda	Es seguro que si pueda
A. Levantarte temprano, aún en fines de semana para hacer ejercicio	1	2	3	4	5
B. Hacer el ejercicio aunque estés triste o muy estresado	1	2	3	4	5
C. Hacer el ejercicio con regularidad aunque tenga otras demandas de tiempo	1	2	3	4	5
D. Hacer el ejercicio aunque tengas muchas tareas por hacer	1	2	3	4	5
E. Dedicar tiempo al ejercicio	1	2	3	4	5

Appendix A continued...

Q22. ¿Qué actividades tienes generalmente en tu tiempo de recreación?
(Traza un círculo en el número correspondiente)

1. Casi siempre escojo algo como mirar TV, leer, escuchar música, o en el computador
2. Usualmente escojo algo como mirar TV, leer, escuchar música, o en el computador
3. Podría escoger entre actividades de recreación activas o no activas
4. Usualmente escojo algo como manejar bicicleta, bailar, jugar al aire libre, o deportes activos
5. Casi siempre escojo algo como manejar bicicleta, bailar, jugar al aire libre o deportes activos

Q23. ¿Cómo calificas **tu coordinación atlética** comparándola a otras personas de la misma edad y sexo. (Marca sólo un número)

1. Mucho menos coordinada que la de otras personas
2. Algo menos coordinada que la de otras personas
3. Más o menos igual que la de otras personas
4. Algo más coordinada que la de otras personas
5. Mucho más coordinada que la de otras personas

Q24. ¿Cómo calificas tu actividad física comparada a otras personas de la misma edad y sexo?
(Marca sólo un número)

1. Mucho menos que la de otras personas
2. Algo menos que la de otras personas
3. Igual que la de otras personas
4. Algo más que la de otras personas
5. Mucho más que la de otras personas.

Q25 ¿Qué tanto disfrutas de la actividad física (Traza un círculo en un número nada más)

1. La actividad no es muy agradable
2. La actividad es algo desagradable
3. Neutral
4. La actividad es algo agradable
5. La actividad es muy agradable

Q26 ¿En tu escuela, hay programas de actividades físicas supervisadas para todos los estudiantes interesados?

1. Después de las clases	No	Si	No lo se
2. Los fines de semana	No	Si	No lo se
3. En el verano	No	Si	No lo se

DEMOGRAFÍA

Q27. ¿Cuál es tu sexo? ☐ Masculino ☐ Femenino

Q28. ¿Cuál es tu edad? _____ años

Appendix A continued...

Q29. ¿Cómo describes tu grupo étnico?

1. Afro-americano
2. Asiático o de las islas del Pacífico
3. Caucásico, blanco, no hispano
4. Latino, hispano, chicano
5. Nativo de América
6. Desconocido
7. Otro _____

Q30. ¿Tienes derecho al almuerzo gratis o de precio reducido que se ofrece en tu escuela?
No,_____ Si,_____

Q31. ¿Cuánto mides de alto?_____pies _____pulgadas

Q32 ¿Cuál es tu peso? _____ libras

Q33. ¿Cuántas horas remuneradas trabajas por semana? _____horas por semana

Appendix A continued...

PARTE SEGUNDA

Q1E. ¿Cuál es la dirección de tu casa? (Incluye la ciudad)

Mi dirección es: _____

Q2E. ¿Cómo te trasportas de casa a la escuela y de la escuela a la casa?
☐ Caminando, en bicicleta ☐ De otra forma

Enumera cinco sitios favoritos para tu actividad física

Piensa en los siguientes sitios:
- Dentro de su casa
- En el patio de su casa
- En el parque, canchas, en la playa
- En los predios de la escuela
- Alrededor del vecindario
- Gimnasio, salón de baile, club atlético
- Centro comunal de recreación
- Edificio o predios de la iglesia

#0. a) Nombre del sitio que frecuentas: Ejemplo			
b) Dirección o localización (incluye la calle y la ciudad)			
c) Indica las actividades que tienes aquí personalmente: Ejemplo			
d) Este sitio tiene lo siguiente; (conteste en todos si o no)			
Ofrece una actividad que me gusta	☐ Si	☐ No	
Esta cerca de mi casa	☐ Si	☐ No	
Hay equipo disponible para mi actividad	☐ Si	☐ No	
Tiene otras facilidades, baños, gabinetes, etc.	☐ Si	☐ No	
Tiene horas convenientes	☐ Si	☐ No	
Fácil llegar caminando o en bicicleta	☐ Si	☐ No	
Amigos y familiares también vienen aquí	☐ Si	☐ No	
Hay facilidad de transporte	☐ Si	☐ No	
Tiene escenas y atmósfera agradables	☐ Si	☐ No	
De noche está iluminado	☐ Si	☐ No	
Alguien está presente para prevenir problemas	☐ Si	☐ No	
Es gratis o barato	☐ Si	☐ No	
Mantienen bien el sitio	☐ Si	☐ No	
Mucho tráfico para llegar al sitio	☐ Si	☐ No	
El sitio está demasiado lleno	☐ Si	☐ No	
Tiene reputación de inseguridad	☐ Si	☐ No	
Espacio de interior	☐ Si	☐ No	
Espacio al aire libre	☐ Si	☐ No	

Appendix A continued...

#1. a) Nombre del sitio que frecuentas:			
b) Dirección o localización (incluye la calle y la ciudad)			
c) Indica las actividades que tienes aquí personalmente:			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

#2. a) Nombre del sitio que frecuentas:			
b) Dirección o localización (incluye la calle y la ciudad)			
c) Indica las actividades que tienes aquí personalmente:			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

Appendix A continued...

#3. a) Nombre del sitio que frecuentas:			
b) Dirección o localización (incluye la calle y la ciudad)			
c) Indica las actividades que tienes aquí personalmente:			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

#4. a) Nombre del sitio que frecuentas:			
b) Dirección o localización (incluye la calle y la ciudad)			
c) Indica las actividades que tienes aquí personalmente:			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

Appendix A continued...

#5. a) Nombre del sitio que frecuentas:			
b) Dirección o localización (incluye la calle y la ciudad)			
c) Indica las actividades que tienes aquí personalmente:			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	☐ Si	☐ No	
Esta cerca de mi casa	☐ Si	☐ No	
Hay equipo disponible para mi actividad	☐ Si	☐ No	
Tiene otras facilidades, baños, gabinetes, etc.	☐ Si	☐ No	
Tiene horas convenientes	☐ Si	☐ No	
Fácil llegar caminando o en bicicleta	☐ Si	☐ No	
Amigos y familiares también vienen aquí	☐ Si	☐ No	
Hay facilidad de transporte	☐ Si	☐ No	
Tiene escenas y atmósfera agradables	☐ Si	☐ No	
De noche está iluminado	☐ Si	☐ No	
Alguien está presente para prevenir problemas	☐ Si	☐ No	
Es gratis o barato	☐ Si	☐ No	
Mantienen bien el sitio	☐ Si	☐ No	
Mucho tráfico para llegar al sitio	☐ Si	☐ No	
El sitio está demasiado lleno	☐ Si	☐ No	
Tiene reputación de inseguridad	☐ Si	☐ No	
Espacio de interior	☐ Si	☐ No	
Espacio al aire libre	☐ Si	☐ No	

Appendix A continued…

Pieza Tercero

Enumera cinco sitios que te gustaría ir para tu actividad física, pero que ahora no vas

(Indica en cada caso, si o no)

#1a) NOMBRE DEL SITIO QUE FRECUENTAS			
b) Dirección o localización (incluye la calle y la ciudad)			
c) INDICA LAS ACTIVIDADES QUE AQUÍ TIENES			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

Appendix A continued...

#2a) NOMBRE DEL SITIO QUE FRECUENTAS			
b) Dirección o localización (incluye la calle y la ciudad)			
c) INDICA LAS ACTIVIDADES QUE AQUÍ TIENES			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

#3a) NOMBRE DEL SITIO QUE FRECUENTAS			
b) Dirección o localización (incluye la calle y la ciudad)			
c) INDICA LAS ACTIVIDADES QUE AQUÍ TIENES			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

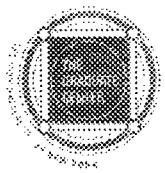
Appendix A continued…

#4a) NOMBRE DEL SITIO QUE FRECUENTAS			
b) Dirección o localización (incluye la calle y la ciudad)			
c) INDICA LAS ACTIVIDADES QUE AQUÍ TIENES			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

#5a) NOMBRE DEL SITIO QUE FRECUENTAS			
b) Dirección o localización (incluye la calle y la ciudad)			
c) INDICA LAS ACTIVIDADES QUE AQUÍ TIENES			
d) Este sitio tiene lo siguiente: (conteste en todos si o no)			
Ofrece una actividad que me gusta	_ Si	_ No	
Esta cerca de mi casa	_ Si	_ No	
Hay equipo disponible para mi actividad	_ Si	_ No	
Tiene otras facilidades, baños, gabinetes, etc.	_ Si	_ No	
Tiene horas convenientes	_ Si	_ No	
Fácil llegar caminando o en bicicleta	_ Si	_ No	
Amigos y familiares también vienen aquí	_ Si	_ No	
Hay facilidad de transporte	_ Si	_ No	
Tiene escenas y atmósfera agradables	_ Si	_ No	
De noche está iluminado	_ Si	_ No	
Alguien está presente para prevenir problemas	_ Si	_ No	
Es gratis o barato	_ Si	_ No	
Mantienen bien el sitio	_ Si	_ No	
Mucho tráfico para llegar al sitio	_ Si	_ No	
El sitio está demasiado lleno	_ Si	_ No	
Tiene reputación de inseguridad	_ Si	_ No	
Espacio de interior	_ Si	_ No	
Espacio al aire libre	_ Si	_ No	

Mucho Gracias

Appendix A continued…



Ph.D. Program in Psychology
Subprogram in Environmental Psychology

The Graduate School and University Center
The City University of New York
365 Fifth Avenue
New York, NY 10016-4309
tel 212.817.8710 fax 212.817.1538

Consent Form

March 15, 2004

My name is Joan Furman. I am a student in the Environmental Psychology Program at the Graduate School and University Center at the City University of New York (CUNY). **I am writing to ask your permission to allow your son or daughter to participate in a research project I am conducting.**

The purpose of this study is to learn what things help teenagers be physically active. A main focus is what is important to teenagers about the places they go or would like to go for physical activity. There are no likely risks from participating in this study. If your child is uncomfortable after taking this study, he or she may seek counseling at the school. The benefits of your child's participation are that he or she will receive a gift of nominal value. He or she may also become more aware about physical activity. I am expecting that the study will be of benefit in helping us think about ways to help students become more physically active.

The study involves your child completing a 13-page questionnaire. The questionnaire takes about 30 to 35 minutes to complete. The questionnaire will be given out by teachers during physical education class. About 350 students will take part in this study. Your child's name will not be on the questionnaire. I will ask your child to put his or her home address on the questionnaire. I will use this for measuring the distance between your home and places where your child exercises.

Your child does not have to participate in this study. He or she will not be penalized in any way if not allowed to participate. Your child will also be given the choice to participate or not. If your child does participate, he or she may withdraw at any time or refuse to answer any question without penalty. Non-participation will in no way affect your child's grades or academic standing.

All information gathered in this project will be kept strictly confidential. Any information that I give the school from this study will not identify your child.

I may publish results of the study. I will not include your child's name or other information that could be used to identify him or her in any publication. If you would like a copy of the study, please give me your name and address. I will send you a copy in the future.

If you have any questions about this research, you can call me at (718) 312-4130 or at jfurman@gc.cuny.edu. You may also call Professor Gary Winkel, Ph.D. He can be reached at (212) 817-8724 or at gwinkel@gc.cuny.edu. If you have questions about your rights as a participant in this study, you can contact Hilry Fisher. She is at the Office of Sponsored Research, Graduate Center/City University of New York. She can be reached at (212) 817-7523 or at hfisher@gc.cuny.edu.

Thank you for your child's participation. A second copy of this form is provided for you.

I give my child, _____ (Child's Name) permission to participate in the study.

_____ _____ _____ _____
Parent or Guardian signature Date Investigator's signature Date

Appendix A continued…

Ph.D. Program in Psychology
Subprogram in Environmental Psychology

The Graduate School and University Center
The City University of New York
365 Fifth Avenue
New York, NY 10016-4309

Student Permission Form

March 15, 2004

My name is Joan Furman. I am a student in the Environmental Psychology Program at the Graduate School and University Center at the City University of New York (CUNY).

The purpose of this study is to learn what things help teenagers be physically active. A main focus is what is important to teenagers about the places they go or would like to go for physical activity. There are no likely risks from participating in this study. If you are uncomfortable after taking this study, you may seek counseling at the school. The benefits of your participation are that you will receive a gift of nominal value. You may also become more aware about physical activity. I am expecting that the study will be of benefit in helping us think about ways to help students become more physically active.

Your parent or guardian signed the consent form for you to participate in this study. I also ask your permission to participate in this study. The study involves completing a 13-page questionnaire. The questionnaire takes about 30 to 35 minutes to complete. The questionnaire will be given out by teachers during physical education class. About 350 students will take part in this study. I would like you to fill out the 13-page questionnaire. Your name will not be on the questionnaire. I will ask for your home address on the questionnaire. I will use this for measuring the distance between your home and places where you exercise.

You do not have to participate in this study. You will not be penalized in any way if you do not participate. If you do participate, you may withdraw at any time or refuse to answer any question without penalty. Non-participation will in no way affect your grades or academic standing.

All information gathered in this project will be kept strictly confidential. Any information that I give the school from this study will not identify you.

I may publish results of the study. I will not include your name or other information that could be used to identify you in any publication. If you would like a copy of the study, please give me your name and address. I will send you a copy in the future.

If you have any questions about this research, you can call me at (718) 312-4130 or at jfurman@gc.cuny.edu. You may also call Professor Gary Winkel, Ph.D or at gwinkel@gc.cuny.edu. He can be reached at (212) 817-8724. If you have questions about your rights as a participant in this study, you can contact Hilry Fisher. She is at the Office of Sponsored Research, Graduate Center/City University of New York. She can be reached at (212) 817-7523 or at hfisher@gc.cuny.edu.

Thank you for your participation. A copy of this form is provided for you.

Graduate School & University Center / CUNY
IRB
Approved
04-02-0506
Approved: Expires:

……………………………… ………………………
Investigator's signature Date

Appendix A continued...

Formulario para obtener permiso

Marzo 15, 2004

Mi nombre es Joan Furman, soy estudiante del programa de Sicología del Medio Ambiente de la escuela de graduados de la Universidad de Nueva York (CUNY). **Por medio de ésta quiero pedirle permiso para que su hijo participe en un proyecto de investigación que estoy conduciendo.**

El propósito de este estudio es conocer aquellas cosas que puedan ayudar a los jóvenes a mantenerse más activos físicamente. El foco principal es conocer lo que los jóvenes consideran importante de los sitios adonde les gustaría ir para practicar sus actividades físicas. No existen probables riesgos al participar en este estudio. Si su hijo se siente incómodo después de haber participado en este estudio, puede buscar consejo en la clínica de salud de la escuela. Su hijo recibirá como beneficio un regalo de valor nominal por participar en este estudio. También, podría adquirir más conciencia sobre la actividad física. Espero que este estudio nos lleve a pensar en qué forma podríamos ayudar a los estudiantes para que sean más activos físicamente.

El estudio requiere que su hijo complete un cuestionario de 13 páginas. El cuestionario se puede contestar en 30 o 35 minutos. Será distribuido por los profesores durante la clase de educación física. Aproximadamente unos 350 estudiantes tomarán parte en el estudio. El nombre de su niño no aparecerá en el cuestionario. Le pediré a su niño que escriba la dirección de su casa en el cuestionario. Esta información servirá solamente para medir la distancia entre la casa y los sitios donde su niño hace ejercicio.

Su niño no tiene que participar en el estudio. No será penalizado de ninguna forma por no permitírsele participar. A su niño también se le dará la opción de participar o no. Si su niño participa, puede salirse en cualquier momento o rehusar contestar cualquier pregunta sin ninguna penalidad. No participar no afectará en ninguna manera las calificaciones o el nivel académico de su niño.

Toda la información que se adquiera en este estudio se mantendrá estrictamente confidencial. Cualquier información que se le entregue a la escuela referente a este estudio no identificará a su niño.

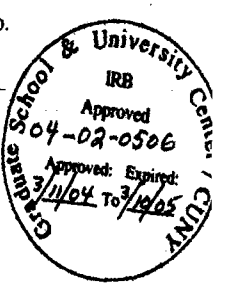
Quizá se publiquen los resultados del estudio. No incluiré el nombre de su niño o cualquier otra información que pueda identificarlo en cualquier publicación. Si quiere una copia del estudio, por favor dé su nombre y dirección para enviársela en el futuro.

Si tiene cualquier otra pregunta acerca de esta investigación, puede llamarme al (718) 312-4130. o a jfurman@gc.cuny.edu. Usted puede también llamar a mi profesor Gary Winkel, Ph.D. Él se encuentra en el número (212) 817-8724, o en gwinkel@gc.cuny.edu. Si tiene preguntas sobre sus derechos como participante del estudio, puede llamar a Hilry Fisher. Ella se encuentra en la oficina de Investigaciones Auspiciadas, Centro de Graduados de la Universidad de la Ciudad de Nueva York. Puede llamársele también al número de teléfono (212) 817-7523 o en hfisher@gc.cuny.edu.

Gracias por la participación de su niño. Una segunda copia de este formato es para usted.

Doy permiso a mi hijo(a) _____ para participar en el estudio.

_____	_____	_____	_____
Padre o Apoderado	Fecha	Firma del Investigador	Fecha



Appendix A continued...

Formulario para obtener permiso del estudiante

Marzo 15, 2004

Mi nombre es Joan Furman, soy estudiante del programa de Sicología del Medio Ambiente de la escuela de graduados de la Universidad de Nueva York (CUNY).

El propósito de este estudio es conocer aquellas cosas que puedan ayudar a los jóvenes a mantenerse más activos físicamente. El foco principal es conocer lo que los jóvenes consideran importante de los sitios adonde les gustaría ir para practicar sus actividades físicas. No existen probables riesgos al participar en este estudio. Si se siente incómodo después de haber participado en este estudio, puede buscar consejo en la clínica de salud de la escuela. Usted recibirá como beneficio un regalo de valor nominal por participar en este estudio. También, podría adquirir más conciencia sobre la actividad física. Espero que este estudio nos lleve a pensar en qué forma podríamos ayudar a los estudiantes para que sean más activos físicamente.

Sus padres o apoderados dieron consentimiento para que participe en el estudio. A su vez, pedimos el permiso suyo para participar. El estudio requiere que complete un cuestionario de 13 páginas. El cuestionario se puede contestar en 30 o 35 minutos. Será distribuido por los profesores durante la clase de educación física. Aproximadamente unos 350 estudiantes tomarán parte en el estudio. Me gustaría que llenara las trece páginas del cuestionario. Su nombre no aparecerá en el cuestionario. Le pediré que escriba la dirección de su casa en el cuestionario. Esta información servirá solamente para medir la distancia entre la casa y los sitios donde usted hace ejercicio.

Usted no tiene que participar en el estudio. No será penalizado de ninguna forma por no participar. Si participa, usted puede salirse en cualquier momento o rehusar contestar cualquier pregunta sin ninguna penalidad. La no participación de ninguna manera afectará sus calificaciones o su nivel académico.

Toda la información que se adquiera en este estudio se mantendrá estrictamente confidencial. Cualquier información que se le entregue a la escuela referente a este estudio, a usted no lo identificará.

Quizá se publiquen los resultados del estudio. No incluiré su nombre o cualquier otra información que pueda identificarlo en cualquier publicación. Si quiere una copia del estudio, por favor dé su nombre y dirección para enviársela en el futuro.

Si tiene cualquier otra pregunta acerca de esta investigación, puede llamarme al (718) 312-4130, o en jfurman@gc.cuny.edu. Usted puede también llamar a mi profesor Gary Winkel, Ph.D o en gwinkel@gc.cuny.edu. Él se encuentra en el número (212) 817-8724. Si tiene preguntas sobre sus derechos como participante del estudio, puede llamar a Hilry Fisher. Ella se encuentra en la oficina de Investigaciones Auspiciadas, Centro de Graduados de la Universidad de la Ciudad de Nueva York. Puede llamársele también al número de teléfono (212) 817-7523 o en hfisher@gc.cuny.edu.

Gracias por la participación. Una segunda copia de este formato es para usted.

Firma del Investigador _____ Fecha _____

Appendix B

Description of Explanatory Variables and Indexes[1]	
Variable Name	**Descriptions of items, paraphrased**
Demographic/Biological Variables	
Gender	Male =1, Female =0
Ethnicity	Recoded: African American =1, Latino = 0
Income	Eligible for free/reduced-price lunch: Yes =1/No =0
Age	What is your age?
Height	What is your height?
Weight	What is your weight?
BMI85	Body mass index is > to the 85th percentile for gender/age group (Yes =1/No =0)
BMI95	Body mass index is > to the 85th percentile for gender/age group (Yes =1/No =0).
Individual Variables	
Self-efficacy Index (5 items)	Get up early to exercise, Exercise even when sad or stressed, Stick to regular exercise even with family/friend demands, Stick to regular exercise even with school work Set aside time for exercise
General barriers Index (12 items)	Self conscious about my looks when I do activities, Lack of interest, Lack of self-discipline, Lack of energy, I do not enjoy physical activity, Lack of skills, Too tired to exercise, Lack of knowledge on how to do physical activities, I am too overweight, Physical activity is boring, I don't like to sweat, Physical activity messes up my appearance, I don't want to get too strong or muscular
Time Barrier	Lack of time prevents exercise
Time Barrier	My job prevents exercise
Time Barrier	Homework prevents exercise
Use of recreational time	How do you usually spend your recreational time?
Enjoyment of physical activity	How much do you enjoy physical activity?
Behavioral Capacity Index (athletic skill) (2 items)	Rate your athletic coordination compared to others same age/geder, Rate your physical activity compared to others same age/gender
Hours worked weekly	How many hrs weekly do you usually work?

[1] Variables comprised of more than 1 item have the number of items noted.

Appendix B continued...

Variable Name	Descriptions of items, paraphrased
Social Variables	
Family Support Index (15 items) (male, female, child)	Encouraged you to do physical activities/play sports, Done a physical activity/played sports with you, Watched you participate in physical activities/sports, Told you that physical activity is good for health
Provide Transportation - Family Index (3 items) (male, female, child)	Provided transportation to a place where you can do physical activities or play sports.
Provide Transportation – Friend/Self Index (2 items)	Drive yourself to a place where you can do physical activities, Your friends drive you to a place where you can do physical activities.
Peer Support Index (3 items)	Do you encourage your friends to do physical activities, Do your friends encourage you to do sports or physical activities, Do your friends do physical activities or play sports with you
Social Barriers Index (4 items)	I do not have anyone to do physical activities with, My friends don't like exercise, My friends tease me during exercise, sports, I'm chosen last for teams.
Environment Variables	
Number of hrs spent outdoors	How many hours weekly spend outdoors?
Equipment at home	At home, the is enough sports equipment to use for physical activity
Neighborhood Environment	Parks, gyms close to my home or that I can get to easily
Neighborhood Environment	Safe to walk/ jog alone in my neighborhood during the day
Neighborhood Environment	Difficult to walk/jog in my neighborhood because of things like traffic, no sidewalks, dogs, gangs, and so on (reverse coded)
Environment Barrier	Lack of equipment prevent exercise
Environment Barrier	The weather is too bad prevents exercise
Environment Barrier	Lack of a convenient place to do physical activity prevent exercise
Median Distance	Median distance of all settings from home

Appendix B continued...

Variable Name	Descriptions of items, paraphrased
Section II: Describe Your Environment-	
Transportation to/from school	Most frequent form of transport to/from school? (Walking/Biking =1 , All others = 0)
Home is place for physical activity	Yes =1/No =0
Desirability features (8 items)	Offers an activity I like, Equipment for my activity is available, Has facilities (e.g., bathrooms, Lockers), Enjoyable scenery or atmosphere, Free or low fees ($$), Place is maintained nicely, Place is too crowded, Convenient hours.
Ease of Use features (3 items)	Easy to walk or bicycle to, Transportation available, Heavy traffic getting to place
Safety features (3 items)	Lighted at night, Someone is there to prevent trouble, Has a reputation for being unsafe
Social features	Friends/family exercise here

Descriptive Statistics for Variables by Total, Gender, Ethnicity and Income Subgroups

	All Subjects	Female Total	Male Total	Ethnicity Hispanic	Ethnicity African American	Lower Middle Regular	Income Low
	N=264	N=264		N=264		N=264	
		N=142	N=122	N=127	N=137	N= 93	N=171
	100%	53.8%	47.9%	48.1%	51.9%	35.2%	64.8%
Dependent Variables for Physical Activity[1]							
Physical Activity Index	0.00	-0.64	0.74	-0.05	0.05	0.32	-0.17
(SD)	(2.73)	(2.62)	(2.68)	(2.79)	(2.68)	(2.76)	(2.71)
Days Weekly of Vigorous PA	2.83	2.52	3.19	2.59	3.05	3.11	2.68
(SD)	(2.07)	(2.05)	(2.04)	(2.00)	(2.11)	(2.13)	(2.02)
Days Weekly Walk/Bike	2.59	2.31	2.93	2.43	2.75	2.84	2.46
(SD)	(2.20)	(2.21)	(2.16)	(2.12)	(2.27)	(2.13)	(2.24)
Number of School Teams	0.92	0.83	1.02	0.87	0.96	0.98	0.89
(SD)	(2.20)	(1.00)	(1.02)	(1.01)	(1.01)	(1.02)	(1.01)
Number of Community Teams	0.52	0.38	0.67	0.54	0.49	0.52	0.51
(SD)	(0.81)	(0.73)	(0.87)	(0.82)	(0.80)	(0.77)	(0.83)
Hours of Weekly Activity (N=256)	11.53	9.62	13.80	12.66	10.47	13.06	10.69
(SD)	(15.86)	(17.07)	(14.02)	(14.93)	(16.67)	(20.42)	(12.66)
Vigorous activity > 3 day weekly	57.6%	49.3%	67.2%	55.9%	59.1%	62.4%	55.0%
One or more sports team in 12 months[2]	63.6%	57.7%	70.5%	63.5%	63.8%	65.6%	62.6%

[1] Physical activity variables are for activity outside of school with the exception of "number of school teams"

[2] Includes school teams and community teams

Appendix C continued…

	All Subjects	Female Total	Male Total	Ethnicity Hispanic	Ethnicity African American	Lower Middle Regular	Income Low
Demographic/Biological							
Body Mass Index (BMI)	24.21	23.88	24.58	24.15	24.26	24.89	23.83
(SD)	(4.75)	(4.62)	(4.89)	(4.40)	(5.07)	(4.35)	(4.92)
BMI >= 85 percentile	29.2%	26.8%	32.0%	31.5%	27.0%	33.3%	26.9%
BMI >= 95 percentile	14.4%	12.0%	17.2%	11.8%	16.8%	15.1%	14.0%
Age	16.22	16.12	16.35	16.24	16.21	16.34	16.16
(SD)	(1.14)	(1.13)	(1.15)	(1.15)	(1.15)	(1.19)	(1.12)

	All Subjects	Female Total	Male Total	Ethnicity Hispanic	Ethnicity African American	Lower Middle Regular	Income Low
Individual Variables							
Self-efficacy	14.94	13.92	16.12	14.88	15.00	14.55	15.19
(SD)	(4.83)	(4.75)	(4.68)	(4.74)	(4.94)	(4.71)	(4.90)
Physical activity capacity/skill	6.11	5.88	6.37	5.98	6.23	6.34	5.98
(SD)	(1.98)	(1.97)	(1.96)	(1.92)	(2.03)	(2.05)	(1.93)
Usual recreational activity	2.74	2.61	2.89	2.77	2.71	2.79	2.71
(SD)	(1.41)	(1.43)	(1.39)	(1.40)	(1.42)	(1.44)	(1.40)
Enjoyment of physical activity	3.66	3.67	3.65	3.85	3.49	3.55	3.74
(SD)	(1.23)	(1.12)	(1.34)	(1.16)	(1.26)	(1.33)	(1.16)
General barriers	15.27	15.44	15.07	14.69	15.80	14.01	16.01
(SD)	(9.20)	(8.76)	(9.72)	(9.13)	(9.27)	(9.32)	(9.10)
Lack of time	1.71	1.81	1.60	1.81	1.62	1.60	1.77
(SD)	(1.17)	(1.27)	(1.04)	(1.24)	(1.10)	(1.10)	(1.21)
My Job	1.20	1.09	1.33	1.22	1.19	1.08	1.27
(SD)	(1.35)	(1.38)	(1.30)	(1.37)	(1.33)	(1.32)	(1.36)
Homework	1.54	1.55	1.52	1.48	1.60	1.43	1.60
(SD)	(1.31)	(1.36)	(1.25)	(1.33)	(1.29)	(1.30)	(1.31)
Number hour work - weekly	9.34	9.02	9.70	9.85	8.85	9.11	9.46
(SD)	(11.67)	(11.76)	(11.60)	(12.08)	(11.30)	(11.69)	(11.69)

	All Subjects	Female Total	Male Total	Ethnicity Hispanic	Ethnicity African American	Lower Middle Regular	Income Low
Social Variables							
Family support	16.80	16.71	16.89	17.82	15.84	16.97	16.70
(SD)	(10.26)	(9.75)	(10.86)	(10.07)	(10.38)	(10.28)	(10.28)
Transportation - Family	3.31	2.82	3.88	3.34	3.28	3.62	3.14
(SD)	(3.14)	(2.95)	(3.25)	(3.06)	(3.22)	(3.15)	(3.12)
Transportation–Friends/Self	2.20	1.74	2.73	2.20	2.20	2.44	2.06
(SD)	(2.17)	(2.08)	(2.17)	(2.12)	(2.23)	(2.09)	(2.21)
Peer support	6.22	5.70	6.84	6.48	5.99	6.17	6.25
(SD)	(2.99)	(3.02)	(2.84)	(2.82)	(3.13)	(2.96)	(3.01)
Social barriers	4.25	4.08	4.43	4.03	4.45	4.19	4.27
(SD)	(3.05)	(3.00)	(3.11)	(2.96)	(3.14)	(3.04)	(3.07)

	All Subjects	Female Total	Male Total	Ethnicity Hispanic	Ethnicity African American	Lower Middle Regular	Income Low
Physical Environment							
Equipment at home	3.23	3.30	3.16	3.31	3.16	3.30	3.19
(SD)	(1.36)	(1.46)	(1.24)	(1.30)	(1.42)	(1.44)	(1.32)
Access -Close to home	3.74	3.77	3.71	3.76	3.72	3.76	3.73
(SD)	(1.32)	(1.34)	(1.31)	(1.30)	(1.35)	(1.33)	(1.32)
Neighborhood is safe to walk/jog	3.40	3.46	3.34	3.45	3.36	3.26	3.48
(SD)	(1.31)	(1.29)	(1.35)	(1.38)	(1.25)	(1.39)	(1.27)
Neighborhood environment	3.40	3.55	3.24	3.20	3.60	3.47	3.36
(SD)	(1.32)	(1.25)	(1.38)	(1.40)	(1.21)	(1.27)	(1.35)
Lack of Equipment barrier	1.48	1.55	1.39	1.39	1.56	1.38	1.53
(SD)	(1.22)	(1.37)	(1.01)	(1.20)	(1.23)	(1.15)	(1.25)
Weather is too bad barrier	1.47	1.45	1.50	1.45	1.50	1.18	1.63
(SD)	(1.01)	(1.01)	(1.01)	(1.03)	(0.99)	(0.97)	(1.00)
Lack of convenient place barrier	1.24	1.21	1.27	1.35	1.13	1.08	1.33
(SD)	(1.15)	(1.22)	(1.06)	(1.21)	(1.08)	(1.12)	(1.16)
Number hrs spent outdoors (Winsorized)	12.69	10.86	14.82	13.40	12.03	12.29	12.90
(SD)	(12.34)	(11.08)	(13.40)	(12.17)	(12.50)	(11.34)	(12.88)
Number hrs spent outdoors	14.42	12.50	16.73	14.92	13.94	12.98	15.19
(SD)	(20.38)	(19.83)	(20.89)	(19.09)	(21.61)	(14.68)	(22.87)

	All Subjects	Female Total	Male Total	Ethnicity Hispanic	Ethnicity African American	Lower Middle Regular	Income Low
Describe Your Environment							
Home is a physical activity location	20.8%	24.1%	16.7%	24.8%	16.8%	19.7%	21.3%
Home is only place listed	12.7%	15.5%	9.4%	16.2%	9.3%	12.7%	12.8%
Count of physical activity places	1.23	1.30	1.16	1.27	1.20	1.14	1.29
(SD)	(0.76)	(0.82)	(0.69)	(0.72)	(0.80)	(0.73)	(0.78)
Median distance (N= 213)	1.35	1.28	1.43	1.40	1.30	1.19	1.42
(SD)	(1.33)	(1.06)	(1.20)	(1.13)	(1.13)	(0.99)	(1.19)
Median distance excluding home only	1.55	1.52	1.43	1.67	1.44	1.37	1.64
(SD)	(1.08)	(1.00)	(1.20)	(1.03)	(1.11)	(0.95)	(1.13)
Transportation - school (walk/bike) (N=244)	25.3%	13.4%	39.1%	27.2%	23.1%	25.9%	24.5%
Completed describe your environment	99.6%	100.0%	99.2%	100.0%	99.3%	98.9%	100.0%
Listed 1 or more setting: physical activity	87.9%	88.7%	86.9%	91.3%	84.7%	86.0%	88.9%

Appendix D

Bivariate Correlations: Demographic, Individual, Social and Physical Enviornment Variables with Physical Activity Index

	All Subjects	Gender	Ethnicity	Income
Physical Activity Items				
Physical Activity Index	N/A	.251**	.019	-.086
Days Weekly of Vigorous PA	.736**	.161**	.111	-.099
Days weekly Walk/Bike	.711**	.139*	.074	-.082
Number of School Teams	.306**	.095	.044	-.042
Number of Community Teams	.650**	.179**	-.033	-.001
Hours of Weekly Activity	.567**	.132*	-.069	-.072
Demographic/ Biological				
Gender	.251**	N/A	.010	-.048
Ethnicity	.019	.010	N/A	-.123*
Income	-.086	-.048	-.123*	N/A
Body Mass Index (BMI)	.017	.074	.011	-.107
BMI $\geq$ 85 percentile	.004	.057	-.049	-.068
BMI $\geq$ 95 percentile	-.091	.074	.071	-.014
Age	.029	.099	-.010	-.077
Individual				
Self-efficacy	.425**	.227**	.013	.060
Physical activity capacity/skill	.334**	.124*	.063	-.089
Use of recreational time	.436**	.098	-.019	-.028
Enjoyment of physical activity	.284**	-.007	-.146*	.081
General barriers	-.172**	-.020	.061	.101
Lack of time	-.151*	-.090	-.082	.067
My Job	-.029	.089	-.013	.070
Homework	-.034	-.011	.044	.059
Number hour work - weekly	-.001	.029	-.043	.014

Appendix D continued...

	All Subjects	Gender	Ethnicity	Income
Social Support				
Family support	.427**	.008	-.097	-.013
Transportation - Family	.399**	.168**	-.009	-.074
Transportation–Friends/Self	.358**	.227**	.000	-.083
Peer support	.388**	.190**	-.083	.013
Social barriers	-.167**	.057	.068	.013
Physical Environment				
Equipment at home	.220**	-.051	-.054	-.038
Access -Close to home	.120	-.021	-.016	-.012
Neighborhood is safe to walk/jog	.049	-.046	-.035	.080
Neighborhood environment	-.105	-.116	.151*	-.039
Lack of Equipment barrier	-.199	-.068	.073	.059
Weather is too bad barrier	-.044	.024	.024	.211
Lack of convenient place barrier	-.088	.028	-.092	.104
Number hours spent outdoors Winsorized	.440**	.160**	-.055	.024
Describe Your Environment				
Home is a physical activity location	-.162*	-.078	-.076	.035
Home is only place listed	-.108	-.040	.000	-.095
Median distance	.025	.065	-.045	.097
Transportation - school (walk/bike)	.177**	.295**	-.047	-.015
Completed describe your environment	-.048	.067	.059	-.084
Listed 1 or more setting: physical activity	.163*	-.028	-.102	.042

Appendix E

Multiple Linear Regressions, Domain Specific Factors with Dependent Variable= Physical Activity Index

	B	S.E.	Std	t	Sig.
Demographic/Biological		Adj. R2 = .065, p= .001			
Gender	1.418	0.331	0.259	4.284	0.000
Ethnicity	0.143	0.333	0.026	0.429	0.668
Income	-0.380	0.347	-0.066	-1.094	0.275
BMI >= 85 percentile	0.472	0.454	0.079	1.039	0.300
BMI >= 95 percentile	-1.259	0.582	-0.162	-2.162	0.032
Age	-0.023	0.147	-0.010	-0.158	0.875
Individual		Adj R^2 = .281, p = .000			
Self-efficacy	0.159	0.036	0.283	4.485	0.000
Physical activity capacity/skill	0.183	0.089	0.132	2.059	0.041
Uses recreation time for activity	0.524	0.116	0.273	4.519	0.000
Enjoyment of physical activity	0.067	0.149	0.030	0.453	0.651
General barriers	0.022	0.020	0.072	1.057	0.291
Lack of time barrier	-0.335	0.143	-0.144	-2.336	0.020
My Job barrier	0.018	0.144	0.009	0.123	0.902
Homework barrier	-0.091	0.126	-0.043	-0.723	0.470
Number hour work - weekly	-0.001	0.015	-0.005	-0.073	0.942
Social		Adj R^2 = .277, p = .000			
Family support	0.052	0.019	0.194	2.686	0.008
Transportation - Family	0.116	0.061	0.134	1.893	0.060
Transportation–Friends/Self	0.251	0.073	0.200	3.428	0.001
Peer support	0.141	0.057	0.154	2.482	0.014
Social barriers	-0.124	0.048	-0.139	-2.597	0.010
Physical Environment		Adj R^2 = .210, p = .000			
Equipment available at home	0.285	0.120	0.143	2.384	0.018
Access -Close to home	0.050	0.124	0.024	0.401	0.689
Neighborhood is safe to walk/jog	0.056	0.124	0.027	0.451	0.652
Neighborhood environment	-0.025	0.124	-0.012	-0.199	0.842
Lack of equipment barrier	-0.221	0.141	-0.099	-1.568	0.118
Weather is too bad barrier	0.021	0.161	0.008	0.133	0.894
Lack of convenient place barrier	0.077	0.151	0.033	0.511	0.610
Number hours spent outdoors	0.090	0.013	0.409	6.922	0.000
	B	**S.E.**	**Std**	**t**	**Sig.**
Describe Your Environment, N=213		Adj R2 = .046, p= .007			
Home is a place for physical activity	-1.062	0.511	-0.156	-2.077	0.039
Median distance	-0.052	0.190	-0.021	-0.275	0.784
Transportation to /from school	1.244	0.457	0.192	2.724	0.007

Appendix F

Multiple Linear Regressions, Final Domain Specific Analyses Dependent Variable= Physical Activity Index

	B	S.E.	Std	t	Sig.
Final Preliminary Model		Adj R^2 = .468, p < .000			
Gender	0.370	0.393	0.065	0.940	0.349
Ethnicity	0.431	0.354	0.076	1.217	0.226
Income	-0.277	0.416	-0.046	-0.667	0.506
BMI $\geq$ 95 percentile	-1.171	0.479	-0.146	-2.442	0.016
Self-efficacy	0.160	0.059	0.260	2.706	0.008
Physical activity capacity/skill	0.064	0.137	0.045	0.471	0.639
Uses recreation time for activity	0.183	0.156	0.092	1.173	0.243
Enjoy physical activity	0.019	0.253	0.007	0.075	0.941
Lack of time barrier	-0.069	0.185	-0.028	-0.372	0.711
General barriers	0.002	0.054	0.007	0.038	0.970
Family support	0.023	0.026	0.084	0.873	0.384
Transportation - Family	0.176	0.102	0.198	1.725	0.087
Transportation–Friends/Self	0.342	0.130	0.257	2.637	0.009
Peer support	-0.013	0.100	-0.014	-0.132	0.895
Social barriers	-0.057	0.087	-0.061	-0.654	0.514
Equipment available at home	-0.057	0.146	-0.026	-0.389	0.698
Neighbothood environment	-0.001	0.235	-0.001	-0.005	0.996
Weather too bad	-0.126	0.364	-0.046	-0.348	0.728
Lack of convenient place	0.045	0.455	0.017	0.098	0.922
Number hours spent outdoors	0.067	0.020	0.302	3.416	0.001
Gender X self-efficacy	-0.148	0.091	-0.168	-1.625	0.106
Ethnicity X enjoy physical activity	-0.407	0.306	-0.116	-1.331	0.185
Income X general barriers	0.004	0.054	0.011	0.081	0.935
Gender X physical activity skill	-0.069	0.204	-0.033	-0.338	0.736
Gender X family transport	0.017	0.128	0.013	0.129	0.897
Gender X friend/self transport	-0.118	0.188	-0.062	-0.627	0.532
Gender X peer support	0.206	0.157	0.142	1.312	0.192
Gender X hours outdoors	-0.007	0.030	-0.024	-0.237	0.813
Gender X neighbothood environment	-0.371	0.290	-0.124	-1.282	0.202
Ethnicity X neighbothood environment	0.185	0.269	0.055	0.686	0.494
Income X weather too bad	0.042	0.424	0.012	0.100	0.920
Income X lack of convenient place	0.003	0.510	0.001	0.006	0.995

Appendix G

Binary Regression Analysis within Group Gender, Ethnicity and Income Groups Comparisons for Dichotomous Variables

	B	S.E.	Sig.	Exp(B)
GENDER				
Ethnicity	0.042	0.247	0.865	1.043
Income	-0.202	0.258	0.435	0.817
BMI $\geq$ 85 percentile for gender/age	0.252	0.252	0.354	1.286
BMI $\geq$ 95 percentile for gender/age	0.425	0.353	0.229	1.529
Transportation to/from school	1.420	0.320	0.000	4.136
Home is a physical activity location	-0.403	0.341	0.237	0.669
Home is only place listed	-0.302	0.503	0.548	0.739
Listed 1 or more setting for activity	-0.173	0.377	0.647	0.841
ETHNICITY				
Income	-0.520	0.261	0.047	0.595
BMI $\geq$ 85 percentile for gender/age	-0.217	0.271	0.423	0.805
BMI $\geq$ 95 percentile for gender/age	0.410	0.358	0.252	1.506
Transportation to/from school	-0.219	0.296	0.459	0.803
Home is a physical activity location	-0.389	0.335	0.247	0.678
Home is only place listed	0.000	0.491	1.000	1.000
Listed 1 or more setting for activity	-0.647	0.395	0.101	0.524
INCOME				
BMI $\geq$ 85 percentile for gender/age	-0.306	0.280	0.273	0.736
BMI $\geq$ 95 percentile for gender/age	-0.082	0.364	0.822	0.921
Transportation to/from school	-0.072	0.309	0.816	0.931
Home is a physical activity location	0.189	0.356	0.597	1.208
Home is only place listed	-0.700	0.493	0.156	0.497
Listed 1 or more setting for activity	0.262	0.386	0.496	1.300

Appendix H

Multivariate Analysis of Variance Analysis within Group Gender, Ethnicity and Income Groups Comparisons

Gender Group Means

	Female	Male	t	Sig.
Demographic/Biological Variables				
Age	16.12	16.35	-1.605	0.110
Individual Variables				
Self-efficacy	13.92	16.18	-3.879	0.000
Physical activity capacity/skill	5.88	6.37	-2.015	0.045
Uses recreation time for activity	2.61	2.89	-1.596	0.112
Enjoyment of physical activity	3.67	3.67	0.000	1.000
General barriers	15.44	15.15	0.252	0.801
Lack of time	1.81	1.60	1.488	0.138
My Job	1.09	1.33	-1.454	0.147
Homework	1.55	1.52	0.177	0.859
Number hour work - weekly	9.02	9.70	-0.470	0.639
Social Variables				
Family support	16.71	16.89	-0.137	0.891
Transportation - Family	2.82	3.88	-2.751	0.006
Transportation - Friends/Self	1.74	2.73	-3.774	0.000
Peer support	5.70	6.84	-3.137	0.002
Social barriers	4.08	4.43	-0.927	0.355
Physical Environment Variables				
Equipment available at home	3.30	3.16	0.840	0.402
Access - Close to home	3.77	3.71	0.333	0.740
Neighborhood is safe to walk/jog	3.46	3.34	0.744	0.457
Neighborhood environment	3.55	3.24	1.880	0.061
Lack of Equiptment barrier	1.55	1.39	1.123	0.263
Weather is too bad barrier	1.45	1.50	-0.389	0.698
Lack of convenient place barrier	1.21	1.27	-0.463	0.644
Number hours spent outdoors	10.86	14.82	-2.627	0.009
Describe Your Environment Variables				
N=213				
Count of favorite places	1.48	1.35	1.305	0.193
Median distance	1.28	1.43	-0.094	0.347

Appendix H continued...

Ethnic Group Means				
	Hispanic	African American	t	Sig.
Demographic/Biological Variables				
Age	16.24	16.21	0.162	0.872
Individual Variables				
Self-efficacy	14.92	15.00	-0.131	0.896
Physical activity capacity/skill	5.98	6.23	-1.021	0.308
Uses recreation time for activity	2.77	2.71	0.310	0.757
Enjoyment of physical activity	3.85	3.49	2.392	0.017
General barriers	14.76	15.80	-0.916	0.360
Lack of time	1.81	1.62	1.314	0.190
My Job	1.22	1.19	0.211	0.833
Homework	1.48	1.60	-0.712	0.477
Number hours work - weekly	9.85	8.85	0.696	0.487
Social Variables				
Family support	17.82	15.84	1.570	0.118
Transportation - Family	3.34	3.28	0.139	0.889
Transportation - Friends/Self	2.20	2.20	-0.001	0.999
Peer support	6.48	5.99	1.346	0.180
Social barriers	4.03	4.45	-1.099	0.273
Physical Environment Variables				
Equipment available at home	3.31	3.16	0.873	0.384
Access - Close to home	3.76	3.72	0.252	0.801
Neighborhood is safe to walk/jog	3.45	3.36	0.558	0.577
Neighborhood environment	3.20	3.60	-2.452	0.015
Lack of Equiptment barrier	1.39	1.56	-1.176	0.241
Weather is too bad barrier	1.45	1.50	-0.382	0.703
Lack of convenient place barrier	1.35	1.13	1.486	0.139
Number hours spent outdoors	13.40	12.03	0.899	0.369
Describe Your Environment Variables				
N=213				
Count of favorite places	1.43	1.42	0.125	0.901
Median distance	1.40	1.30	0.648	0.518

Appendix H continued...

Income Group Means				
	Lower Middle Income	**Low Income**	**t**	**Sig.**
Demographic/Biological Variables				
Age	16.34	16.16	1.252	0.212
Individual Variables				
Self-efficacy	14.55	15.19	-1.027	0.305
Physical activity capacity/skill	6.34	5.98	1.440	0.151
Uses recreation time for activity	2.79	2.71	0.451	0.652
Enjoyment of physical activity	3.54	3.73	-1.194	0.234
General barriers	14.01	16.01	-1.692	0.092
Lack of time	1.60	1.77	-1.120	0.264
My Job	1.08	1.27	-1.141	0.255
Homework	1.43	1.60	-0.957	0.340
Number hours work - weekly	9.11	9.46	-0.228	0.820
Social Variables				
Family support	16.97	16.70	0.205	0.838
Transportation - Family	3.62	3.14	1.196	0.233
Transportation - Friends/Self	2.44	2.06	1.344	0.180
Peer support	6.17	6.25	-0.206	0.837
Social barriers	4.19	4.27	-0.206	0.837
Physical Environment Variables				
Equipment available at home	3.30	3.19	0.598	0.551
Access - Close to home	3.76	3.73	0.189	0.850
Neighborhood is safe to walk/jog	3.26	3.48	-1.272	0.205
Neighborhood environment	3.47	3.36	0.646	0.519
Lack of Equiptment barrier	1.38	1.53	-0.976	0.330
Weather is too bad barrier	1.18	1.63	-3.496	0.001
Lack of convenient place barrier	1.08	1.33	-1.694	0.092
Number hours spent outdoors	12.29	12.90	-0.384	0.701
Describe Your Environment Variables				
N=213				
Count of Places	1.35	1.46	-1.048	0.296
Median distance	1.19	1.42	-1.409	0.160

Appendix I

Activity Types - Total

All Participants		
Activity	#	%
Unspecified	66	15%
Basketball	66	15%
Running, jogging, treadmill	53	12%
Soccer	45	10%
Walking for exercise	43	9%
Swimming	25	6%
Exercise	20	4%
Baseball/softball	17	4%
Bicycling or exercise cycling	14	3%
Racquet sport	12	3%
Everything	10	2%
Weight lifting	9	2%
Plays	9	2%
Football	9	2%
Works Out	8	2%
Other	8	2%
Dancing	7	2%
Skating	6	1%
Volleyball	6	1%
Jumping rope	4	1%
Walking for transportation	3	1%
Aerobics/aerobic dancing	3	1%
Frisbee	2	0%
Golfing	2	0%
Boxing	2	0%
Kickboxing	2	0%
Scuba diving	1	0%
Handball	1	0%
Lacrosse	1	0%
Total	454	100%

Appendix I continued...

Activity Types by Gender

Female		
Activity	#	%
Running, jogging, treadmill	46	15%
Walking for exercise	41	14%
Basketball	32	11%
Soccer	21	7%
Swimming	21	7%
Unspecified	21	7%
Bicycling or exercise cycling	13	4%
Racquet sport	12	4%
Exercise	11	4%
Baseball/softball	9	3%
Everything	8	3%
Other	8	3%
Plays	8	3%
Dancing	7	2%
Volleyball	6	2%
Weight lifting	6	2%
Skating	5	2%
Jumping rope	4	1%
Aerobics/aerobic dancing	3	1%
Walking for transportation	3	1%
Works Out	3	1%
Football	2	1%
Frisbee	2	1%
Golfing	2	1%
Kickboxing	2	1%
Handball	1	0%
Lacrosse	1	0%
Scuba diving	1	0%
Total	299	100%

Male		
Activity	#	%
Unspecified	45.0	.29%
Basketball	34.0	22%
Soccer	24.0	15%
Exercise	9.0	6%
Baseball/softball	8.0	5%
Football	7.0	5%
Running, jogging, treadmill	7.0	5%
Works Out	5.0	3%
Swimming	4.0	3%
Weight lifting	3.0	2%
Boxing	2.0	1%
Everything	2.0	1%
Walking for exercise	2.0	1%
Bicycling or exercise cycling	1.0	1%
Plays	1.0	1%
Skating	1.0	1%
Total	155	100%

Appendix I continued...

Activity Types by Ethnicity

Hispanic		
Activity	#	%
Soccer	39	16%
Running, jogging, treadmill	32	13%
Unspecified	31	13%
Basketball	29	12%
Walking for exercise	20	8%
Baseball/softball	11	5%
Bicycling or exercise cycling	10	4%
Exercise	10	4%
Plays	7	3%
Swimming	7	3%
Everything	5	2%
Other	5	2%
Racquet sport	5	2%
Volleyball	5	2%
Football	4	2%
Weight lifting	4	2%
Works Out	4	2%
Skating	3	1%
Boxing	2	1%
Dancing	2	1%
Frisbee	2	1%
Jumping rope	2	1%
Aerobics/aerobic dancing	1	0%
Golfing	1	0%
Kickboxing	1	0%
Lacrosse	1	0%
Scuba diving	1	0%
Total	244	100%

African American		
Activity	#	%
Basketball	37	18%
Unspecified	35	17%
Walking for exercise	23	11%
Running, jogging, treadmill	21	10%
Swimming	18	9%
Exercise	10	5%
Racquet sport	7	3%
Baseball/softball	6	3%
Soccer	6	3%
Dancing	5	2%
Everything	5	2%
Football	5	2%
Weight lifting	5	2%
Bicycling or exercise cycling	4	2%
Works Out	4	2%
Other	3	1%
Skating	3	1%
Walking for transportation	3	1%
Aerobics/aerobic dancing	2	1%
Jumping rope	2	1%
Plays	2	1%
Golfing	1	0%
Handball	1	0%
Kickboxing	1	0%
Volleyball	1	0%
Total	210	100%

Appendix I continued...

Activity Types by Income

Low-middle income		
Activity	**#**	**%**
Unspecified	29	21%
Basketball	16	12%
Running, jogging, treadmill	16	12%
Walking for exercise	13	9%
Soccer	12	9%
Swimming	8	6%
Baseball/softball	7	5%
Exercise	6	4%
Everything	4	3%
Plays	4	3%
Skating	3	2%
Works Out	3	2%
Bicycling or exercise cycling	2	1%
Dancing	2	1%
Football	2	1%
Racquet sport	2	1%
Weight lifting	2	1%
Aerobics/aerobic dancing	1	1%
Golfing	1	1%
Handball	1	1%
Kickboxing	1	1%
Lacrosse	1	1%
Other	1	1%
Volleyball	1	1%
Walking for transportation	1	1%
Total	139	100%

Low-income		
Activity	**#**	**%**
Basketball	50	16%
Running, jogging, treadmill	37	12%
Unspecified	37	12%
Soccer	33	10%
Walking for exercise	30	10%
Swimming	17	5%
Exercise	14	4%
Bicycling or exercise cycling	12	4%
Baseball/softball	10	3%
Racquet sport	10	3%
Football	7	2%
Other	7	2%
Weight lifting	7	2%
Everything	6	2%
Dancing	5	2%
Plays	5	2%
Volleyball	5	2%
Works Out	5	2%
Jumping rope	4	1%
Skating	3	1%
Aerobics/aerobic dancing	2	1%
Boxing	2	1%
Frisbee	2	1%
Walking for transportation	2	1%
Golfing	1	0%
Kickboxing	1	0%
Scuba diving	1	0%
Total	315	100%

References

Atash F. (1994). Redesigning suburbia for walking and transit: emerging concepts, *Journal of Urban Planning and Development*, 120, 48-57.

Ball, K., Bauman, A., Leslie, E., & Owen, N. (2001). Perceived environmental and social influences on walking for exercise in Australian adults, *Preventive Medicine,* 33, 434–40.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice–Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: W.H. Freeman

Baranowski, T, Thompson, W.O., Durant, R.H., Baranowski, J, & Puhl, J. (1993). Observations on physical activity in physical locations: age, gender, ethnicity, and month effects, *Research Quarterly for Exercise and Sport,* 64, 127-133.

Baranowski, T., Perry, C.L., & Parcel, G.S. (2002). How individuals, environment and health behaviors interact: social cognitive theory. In K. Glanz, B.K. Rimer, & F.M. Lewis (Eds.), *Health Behavior and Health Education: Theory, Research, and Practice*, (3rd ed., pp.165–184). San Francisco, CA: Jossey–Bass.

Barker, R.G. (1968). *Ecological Psychology*. Stanford, CA: Stanford University Press.

Barker, R.G. (1987). Prospecting in environmental psychology: Oskaloosa revisited. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology*, (pp. 1413-1432). New York: J. Wiley & Sons.

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations, *Journal of Personality and Social Psychology,* 51(6), 1173-1182.

Biddle, S., Sallis, J.F., & Cavill, N.A. (Eds). (1998). *Young and Active? Young People and Health-Enhancing Physical Activity*: Evidence and Implications. London: Health Education Authority, 1998.

Booth, M.L., Owen, N., Bauman, A., Clavisi, O., & Leslie, E. (2003). Social-cognitive and perceived environmental influences associated with physical activity in older Australians. *Preventive Medicine*, 31, 15–22.

Bronfenbrenner, U. (1979). *Ecology of human development: experiments by nature and design*, Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (1999). Environments in developmental perspective: Theoretical and operational models, In Sarah L. Friedman & Theodore D. Wachs (Eds.), *Measuring environment across the life span: Emerging methods and concepts*, (pp. 3–28). Washington, DC: American Psychological Association.

Brownson, R.C., Baker, E.A., Housemann, R. A., Brennan, L.K., & Bacak, S.J. (2001). Environment and Policy Determinants of Physical Activity in the United States, *American Journal of Public Health,* 91(12), 1995-2003.

Bungum, T., Dowda, M., Weston, A., Trost, S.G., & Pate, R.R. (2000). Correlates of physical activity in male and female youth, *Pediatric Exercise Science,* 12, 71-79.

Bungum, T. & Vincent, M. (1997). Determinents of Physical Activity among female adolescences, *American Journal of Preventive Medicine*, 12(2), 115-122.

Clark, C., & Uzzell, D. (2002). The affordances of the home, neighborhood, school and town center for adolescents, *Journal of Environmental Psychology,* 22, 95-108.

Centers for Disease Control and Prevention. (1997). Guidelines for school and community programs to promote lifelong physical activity among young people. *Morbidity and Mortality Weekly Report*, 46-(RR-6), 1-36.

Centers for Disease Control and Prevention. (1999). Neighborhood safety and the prevalence of physical activity - selected states, *Morbidity and Mortality Weekly Report*, 47,143–6.

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. (2000). *Promoting Better Health for Young People Through Physical Activity and Sports: A Report to the President.*

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion, (2003). *BMI for Children and Teens*, [Webpage article], (Last updated April 08, 2003), Atlanta, GA. http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm.

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. (2004a). *Kidswalk-To- School- A Guide to Promote Walking to School*, [Webpage article], (Last updated December 01, 2004), Atlanta, GA. http://www.cdc.gov/nccdphp/dnpa/kidswalk.

Centers for Disease Control and Prevention. (2004b). National Center for Chronic Disease Prevention and Health Promotion. Methodology of the Youth Risk Behavior Surveillance System, Morbidity and Mortality Weekly Report, 53, RR-12, 1-16.

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion, (2004c) *YRBSS - Youth Online: Comprehensive Results – Physical activity, States/Territories Surveys, New York (Excluding New York City) 2003.* [Webpage], (Last updated December 01, 2004), Atlanta, GA. http://apps.nccd.cdc.gov/yrbss.

Centers for Disease Control and Prevention. National Center for Health Statistics. (2000). *CDC Growth Charts: United States - BMIAGE: BMI-for-age charts, 2 to 20 years,* (May 30, 2000), [WebPages charts], Hyattsville, MD. http://www.cdc.gov/nchs/about/major/nhanes/growthcharts/datafiles.htm.

Cooper, A.R., Page, A.S., Foster, L.J., & Qahwaji, D. (2003). Commuting to school- are children who walk more physically active?, *American Journal of Preventive Medicine,* 25(4), 273-276.

DeVellis, B.D., & DeVellis, R.F. (2001). Self-efficacy and health. In A. Baum, T.A. Revenson, & J.E. Singer (Eds.), *Handbook of Health Psychology* (pp. 235-247). Mahwah, NJ: Lawrence Erlbaum Associates.

Dilorenzo, T.M., Stucky-Ropp, R.C., Van Der Wal, J.S., & Gotham, H.J. (1998). Determinants of exercise among children II: A longitudinal analysis, *Preventive Medicine,* 27, 470–477.

Dishman, R.K., Motl, R.W., Saunders, R., Felton, G., Ward, D.S., Dowda, M., & Pate, R. R. (2004). Self-efficacy partially mediates the effect of a school-based physical-activity intervention among adolescent girls, *Preventive Medicine,* 38 (5), 628-636.

Dunton, G.F., Jamner, M.S., & Cooper, D.M. (2003). Assessing the perceived environment among minimally active adolescent girls: validity and relations to physical activity outcomes, *American Journal of Health Promotion,* 18(1), 70-73.

Eisenmann, J.C., Bartee, R.T., & Wang, M.Q. (2002). Physical activity, TV viewing, and weight in U.S. youth: 1999 Youth Risk Behavior Survey, *Obesity Research,* 10(5), 379-385.

Epstein, L.H. (1998). Integrating theoretical approaches to promote physical activity, *American Journal of Preventive Medicine*, 15, 257-265.

Estabrooks, P.A., Lee, R.E., & Gyurcsik, N.C. (2003). Resources for physical activity participation: does availability and accessibility differ by neighborhood socioeconomic status?, *Annals of Behavioral Medicine*, 25(2), 100-104.

Frank, L.D. & Engelke, P.O. (2001). The built environment and human activity patterns: Exploring the impacts of urban form on public health, *Journal of Planning Literature*, 16(2), 202–18.

Garcia, A.W., Norton, M.A., Frenn, M., Coviak, C., Pender, N.J., & Ronis, D.L. (1995). Gender and developmental differences in beliefs among youth and prediction of their exercise behavior, *Journal of School Health*, 65(6), 213-219.

Gentle. P.R., Caves, R., Armstrong, N., Balding, J. & Kirby, B. (1994). High and low exercisers among 14 and 15 year old children, *Journal of Public Health Medicine*, 16: 186-94.

Giles-Corti, B., & Donovan, R.J. (2002). The relative influence of individual, social and physical environment determinants of physical activity, *Social Science and Medicine*, 54, 1793-1812.

Godin, G, & Shepard, R.J. (1986). Psychosocial factors influencing intention to exercise among young adults grades 7 to 9, *Research Quarterly for Exercise & Sport*, 57,41-52.

Gordon-Larsen, P., Adair, L.S., & Popkin, B.M. (2002). Ethnic Differences in Physical Activity and Inactivity Patterns and Overweight Status, *Obesity Research*, 10(3), 141-149.

Gordon-Larsen, P., McMurray, R.G., & Popkin, B.M. (2000). Determinants of Adolescent Physical Activity and Inactivity Patterns, Pediatrics, 105(6), 1-8.

Grunbaum, J.A., Kann, L., Kinchen, S., Ross, J., Hawkins, J., Lowry, R., Harris, W.A., McManus, T., Chyen, D., Collins, J. (2004). Youth Risk Behavior Surveillance-United States, 2003, *Morbidity & Mortality Weekly Report*, 53(SS-2), 1–95.

Grunbaum, J.A., Kann, L., Kinchen, S., Williams, B., Ross, J.G., Lowry, R., & Kolbe, L. (2002). Youth Risk Behavior Surveillance-United States, 2001, *Morbidity and Mortality Weekly Report*, 51(SS-4), 1-64.

Hansen, W.G. (1959). How accessibility shapes land use, *Journal of the American Institute of Planners*, 15, 73-76.

Hartig, T., Mang, M., & Evans, G. (1991). Restorative effects of natural environment experiences, *Environment and Behavior*, 23, 3-26.

Hoefer, W.R., Mckenzie, T.L., Sallis, J.F., Marshall, S.J., & Conway, T.L. (2001). Parental provision of transportation for adolescent physical activity, *American Journal of Preventive Medicine*, Jul; 21 (1), Pp. 48-51.

Hovell, M.F., Sallis, J.F., Hofstetter, C.R., Spry, V.M., Faucher, P., & Caspersen, C.J. (1989). Identifying correlates of walking for exercise: an epidemiologic prerequisite for physical activity promotion, *Preventive Medicine*, 18, 856–66.

Humpel, N., Owen, N., & Leslie, E. (2002). Environmental Factors Associated with Adults' Participation in Physical Activity – A Review, American Journal of Preventive Medicine, 22(3), 188-199.

Jakicic, J.M., Wing, R.R., Butler, B.A., & Jeffery, R.W. (1997). The relationship between presence of exercise equipment in the home and physical activity level, *American Journal of Health Promotion*, 11, 363–5.

Kann, L., Kinchen, S.A., Williams, B.I., Ross, J.G., Lowry R., Grunbaum J.A., & Kolbe, L.J. (2000). Youth Risk Behavior Surveillance-United States, 1999, *Morbidity and Mortality Weekly Report*, 49(SS-5), 1-96.

Kann, L., Kinchen, S.A., Williams, B.I., Ross, J.G., Lowry, R., Hill, C.V., Grunbaum, J.A., Blumson, P.S., Collins, J.L., & Kolbe, L.J. (1998) Youth Risk Behavior Surveillance-United States, 1997, *Morbidity and Mortality Weekly Report*, 47(SS-3), 1-92.

Kelder, S.H., Perry, C.L., Peters, R.J., Jr., Lytle L.L., & Klepp, K. (1995). Gender differences in the class of 1989 study: the school component of the Minnesota Heart Health Program, *Journal of Health Education*, 26(2), Suppl: S3,6-44 (14 ref).

King, A.C., Castro, C., Wilcox, S., Eyler, A.A., Sallis, J.F., & Brownson, R. (2000). Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of U.S. middle-aged and older-aged women, *Health Psychology*, 19, 354–64.

King, A.C., Jeffery, R.W., Fridinger, F., Dusenbury, L., Provence, S., Hedlund, S.A., & Spangler, K. (1995). Environmental and policy approaches to cardiovascular disease prevention through physical activity: Issues and opportunities, *Health Education Quarterly*, 22(4), 499-511.

Kirtland, K. A., Porter, D.E., Addy, C.L., Neet, M.J., Williams, J.E., Sharpe, P.A., Neff, L.J., Kimsey, D., Jr., & Ainsworth, B.E. (2003). Environmental measures of physical activity supports: Perception versus reality, *American Journal of Preventive Medicine*, 24(4), 323-331.

Klesges, R.C., Eck, L.H., Hanson, C.L., Haddock, C.K., & Klesges, L.M. (1990). Effects of obesity, social interactions, and physical environment on physical activity in preschoolers, *Health Psychology*, 9(4), 435-49.

Krizek, K., Birnhaum, A.S., Levinson, D.M. (2004). A schematic for focusing on youth in investigations of community design and physical activity, *American Journal of Health Promotion*, 19(1), 33-38.

Korpela, K. (2002). Children's Environment, In., R. Bechtel, & A., Churchman (Eds.), *Handbook of Environmental Psychology,* New York: J. Wiley & Sons, pp. 363-373.

Korpela, K., & Hartig, T. (1996). Restorative qualities of favorite places, *Journal of Environmental Psychology*, 16, 221-233.

Leslie, E., Owen, N., Salmon, J., Bauman, A., Sallis, J.F., & Lo, S.K. (1999). Insufficiently active Australian college students: perceived personal, social, and environmental influences, *Preventive Medicine*, 28, 20–7.

Lirgg, C.D. (1991). Gender differences in self-confidence in physical activity: a meta-analysis of recent studies, *Journal of Sport and Exercise Psychology*, 8, 294–310.

Malina, R.M. (1996). Tracking of physical activity and physical fitness across the lifespan, *Research Quarterly for Exercise & Sport*, 67, 48-57.

Marshall, S.J., Biddle, S., Sallis, J.F., McKenzie, T.L. & Conway, T.L. (2002). Clustering of Sedentary Behaviors and Physical Activity Among Youth: A Cross-National Study, *Pediatric Exercise Science*, 14(4), 401- 418.

McAuley, E., Jerome, G.J., Elavsky, S., Marquez, D.X., & Ramsey, S.N. (2003). Predicting long-term maintenance of physical activity in older adults, *Preventive Medicine,* 37(2), 110-118

Mcguire, M.T., Hannan, P.J., Neumark-Sztainer, D., Falkner Cossrow, N.H., & Story, M. (2002). Parental correlates of physical activity in a racially/ethnically diverse adolescent sample, *Journal of Adolescent Health*, 30, 253–261.

McGuire M.T., Neumark-Sztainer D.R., & Story, M. (2002). Correlates of Time Spent in Physical Activity and Television Viewing in a Multi-Racial Sample of Adolescents, *Pediatric Exercise Science*, 4,75-86.

McLeroy, K.R., Bibeau, D., Streckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs, *Health Education Quarterly*, 5:351–77.

Mirza, N.M., Kadow, K., Palmer, M., Solano, H., Rosche, C., & Yanobski, J.A. (2004). Prevalence of overweight among inner city Hispanic-American children and adolescents. *Obesity Research*, 12(8), 1298-310.

Molner, B.E., Gortmaker, S.L., Bull, F.C., & Buka, S.L. (2004). Unsafe to play? neighborhood disorder and lack of safety predict reduced physical activity among urban children and adolescents, *American Journal of Health Promotion*, 18(5),378-386.

Page, R.M., & Hammermeister, J. & Scanlan, A. (1996). Psychosocial and health-related characteristics of adolescent television viewers, *Child Study Journal*, 26(4), 319-331.

Pate, R.R.; Long, B.J.; & Heath, G. Descriptive epidemiology of physical activity in adolescents, *Pediatric Exercise Science* 6:434-447, 1994.

Pate, R.R., Pratt, M., Blair, S.N., Haskell, W.L., Macera, C.A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G.W., et al. (1995). Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine, *Journal of the American Medical Association,* 273(5), 402-407.

Pate, R.R., Trost, S.G., Mullis, R., Sallis, J.F., Wechsler, H., & Brown, D.R. (2000). Community Interventions to Promote Proper Nutrition and Physical Activity among Youth, *Preventive Medicine,* 31, S138–S149.

Richter, K.P., Harris, K.J., Paine-Andrews, A., Fawcett, S.B., Schmid, T.L., Lankenau, B.H., and Johnston, J. (2000). Measuring the Health Environment for Physical Activity and Nutrition among Youth: A Review of the Literature and Applications for Community Initiatives, *Preventive Medicine*, 31, S98–S111.

Reynolds, K., Killen, J, Bryson, S., Maron, D., Taylor, B., Maccoby, N, & Farquhar, J. (1990). Psychosocial predictors of physical activity in adolescents, *Preventive Medicine*, 19, 541-551.

Ronviak, L.S., Anderson, E.S., Winett, R.A. (2002). Social cognitive determinants of physical activity in young adults: a prospective structural equation analysis, *Annals of Behavioral Medicine,* 24(2), 149-156.

Sallis, J.F., Bauman, A., & Pratt, M. (1998). Environmental and policy interventions to promote physical activity, *American Journal of Preventive Medicine*, 15(4), 379-397.

Sallis, J.F., Buono, M.J., Roby, J.J., Micale, F.G., & Nelson (1993). Seven-day recall and other physical activity self-reports in children and adolescents, *Medicine and Science in Sports and Exercise, 25, 99-108.*

Sallis, J.F., Hovell, M.F., Hofstetter, C.R., Elder, J.P., Hackley, M., Caspersen, C.J., & Powell, K.E. (1990). Distance between homes and exercise facilities related to frequency of exercise among San Diego residents, *Public Health Report*, 105,179–85.

Sallis, J.F., Hovell, M.F., Hofstetter, C.R., Faucher, P, Elder, J.P., Blanchard, J., Caspersen, C.J., Powell, K.E., & Christensen, G. (1989). A multivariate study of

determinants of vigorous exercise in a community sample, *Preventive Medicine*, 18, 20–34.

Sallis, J.F., Johnson, M.F., Calfas, K.J., Caparosa, S, & Nichols, J. (1997). Assessing perceived environmental variables that may influence physical activity, *Research Quarterly for Exercise and Sport*, 68, 345-351.

Sallis, J.F., Kraft, K., & Linton, L.S. (2002). How the environment shapes physical activity: A transdisciplinary research agenda, *American Journal of Preventive Medicine*, 22(3), 208.

Sallis, J.F., McKenzie, T.L., Elder, J.P., Broyles, S.L. & Nader, P.R. (1997). Factors parents use in selecting play spaces for youth children, *Archive of Pediatric and Adolescent Medicine*, 151, 414-417.

Sallis, J.F., Nader, P.R., Broyles, S.L., Berry, C.C., Elder, J.P., McKenzie, T.L., & Nelsen, J.A. (1993). Correlates of physical activity at home in Mexican-American and Anglo-American preschool children, *Health Psychology*, 12(5), 390-398.

Sallis, J.F. & Owen, N. (1999). *Physical Activity and Behavioral Medicine*, Newbury Park, CA: Sage.

Sallis, J.F. & Owen, N. (2002). Ecological models of health behavior, In K. Glanz, B.K., Rimer, & F.M. Lewis (Eds.), *Health Behavior and Health Education: Theory, Research, and Practice*, Third Edition, San Francisco: Jossey–Bass, 165–184.

Sallis, J.F., Prochaska, J.J., & Taylor, W.C. (2000). A review of correlates of physical activity of children and adolescents, *Medicine and Science in Sports and Exercise*, 32(5), 963-975.

Sallis, J.F., Prochaska, J.J., Taylor, W.C., Hill, J.O., & Geraci, J.C. (1999). Correlates of Physical Activity in a National Sample of Girls and Boys in Grades 4 Through 12, *Health Psychology*, 18(4), 0278-6133.

Sallis, J.F., Simons-Morton, B.G., Stone, E.J., Corbin, C.B., Epstein, L.H., Faucett, N., Iannotti, R.J., Killen, J.D., Klesges, R.C., Petray, C.K., Rowland, T.W., & Taylor, W.C. (1992). Determinants of physical activity and interventions in youth, *Medicine and Science in Sports and Exercise*, 24:S248 –57.

Sallis, J.F., Taylor, W.C., Dowda, P., Freedson, P. S., & Pate, R.T. (2002). Correlates of physical activity for children in grades 1 through 12: comparing parent-reported and objectively measured physical activity, *Pediatric Exercise Science*, 14, 30-44.

Sallis, J.F., Zakarian, J.M., Hovell, M.F., & Hofstetter, C.R. (1996). Ethnic, socioeconomic, and sex differences in physical activity among adolescents, *Journal of clinical epidemiology*, 49(2), 125-34.

Schwarzer, R. (Ed.) (1992). Self-efficacy: Thought Control of Action, Washington: Washington, DC: Hemisphere.

Seefeldt, V.D., & Ewing, M.E. (1997). Youth sports in America: an overview. *President's Council on Physical Fitness and Sports Research Digest,* 2(11), 1–12.

Shaw, S.M., Bonen, A., & McCabe, J.F. (1991). Do more constraints mean less leisure? Examining the relationship between constraints and participation, *Journal Leisure Research*, 23, 286–300.

Sternfeld, B., Ainsworth, B.E., & Quesenberry, C.P. (1999). Physical activity patterns in a diverse population of women, *Preventive Medicine,* 28:313–23.

Stone, E.J., McKenzie, T.L., Welk, G.J. & Booth, M.L. (1998). Effects of physical activity interventions in youth review and synthesis, American Journal of Preventive Medicine, 15(4), 298-313.

Stucky-Ropp, R.C. & Dilorenzo, T.M. (1993). Determinants of exercise in children, *Preventive Medicine*, 22, 880-889.

Task Force on Community Preventive Services. (2002). Recommendations to increase physical activity in communities, *American Journal of Preventive Medicine*, 22(4S), 67-72.

Taylor, W.C., Blair, S.N., Cummings, S.S., et al. (1999). Childhood and adolescent physical activity patters and adult physical activity, *Medicine and Science in Sports and Exercise*, 21, 118-23.

Telama, R., Yang, X., Laakso, L., & Viikari, J. (1997). Physical activity in childhood and adolescents as predictor of physical activity in young adulthood, *American Journal of Preventive Medicine,* 13, 317-323.

Terre, L., Drabman, R.S., & Meydrechm E.F. (1990). Relationships among children's health-related behaviors: a multivariate, developmental perspective, *Prevention Medicine,* 19,134-146.

Troped, P.J., Saunders, R.P., Pate, R.R., Reininger, B., Ureda, J.R., & Thompson, S.J. (2001). Associations between self-reported and objective physical environment factors and use of a community rail-trail, *Preventive Medicine*, 32, 191–200.

Troped, P.J., Saunders, R.P., Pate, R.R., Reininger, B. & Addy, C.L. (2003). Correlates of recreational and transportation physical activity among adults in a New England community, Preventive Medicine, 37(4), 304-310.

Trost, S.G., Pate R.R., Saunders, R., Ward, D.S., Dowda, M., & Felton, G. (1997). A prospective study of the determinants of physical activity in rural fifth-grade children, *Preventive Medicine,* 26, 257-263.

Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments, *Journal of Environmental Psychology*, 11, 201-230.

U.S. Department of Agriculture, Food and Nutrition Service, Child Nutrition Programs - Income Eligibility Guidelines, *Federal Register*, Notices, (Vol. 68, No 49, pp. 12028-12031), March 13, 2003, Washington, DC: U.S. Government Printing Office.

U.S. Department of Health and Human Services. (1996). *Physical activity and health: a report of the Surgeon General*, Atlanta, GA: Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion.

U.S. Department of Health and Human Services. (2000). *Healthy People 2010,* Second Edition, Understanding and Improving Health and Objectives for Improving Health. Washington, DC: U.S. Government Printing Office. http://www.healthypeople.gov.

U.S. Department of Transportation, (DOT). (1994). *National Bicycling and Walking Study: Transportation Choices for a Changing America*, Washington, DC: DOT, Federal Highway Administration.

Van Vliet. W. (1983). Exploring "the forth environment"- an examination of the home range of city and suburban children, *Environment and Behavior*, 15, 567-588.

Wallace, L.S., Buckworth, J., Kirby T.E., & Sherman, W.M. (2000). Characteristics of exercise behavior among college students: application of social cognitive theory to predicting stage of change, *Preventive Medicine, 31(5), 494-505.*

Wilson, D.K., Kirtland, K.A., Ainsworth, B.E., & Addy, C.L. (2004). Socioeconomic status and perceptions of access and safety for physical activity, *Annals of Behavioral Medicine,* 28(1), 20-28.

Wohlwill, J.F., & Heft, H. (1987). The physical environment and the development of the child, In D. Stokols & I. Altman, *Handbook of Environmental Psychology,* (Vol. 1, pp. 281-328). New York: J. Wiley & Sons.

Wolf, A.M., Gortmaker, S.L., Cheung, L., Gray, H. M. Herzog, D.B., & Colditz, G.A. (1993). Activity, inactivity, and obesity: racial, ethnic, and age differences among schoolgirls, *American Journal of Public Health*, 83(11), 1625-1628.

Xiang, P., McBride, R., & Bruene. (2003). Relations of parent's beliefs to children's motivation in an elementary physical educations running program, *Journal of Teaching in Physical Education*, 22, 410-425.

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*, 23:314–24.