Title
Factors Predicting Thai Children's Physical Activity

Author
Wannasuntad, Supaporn

Publication Date
2007-06-22

Peer reviewed|Thesis/dissertation

FACTORS PREDICTING THAI CHILDREN'S PHYSICAL ACTIVITY

by

Supaporn Wannasuntad

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

NURSING

in the

GRADUATE DIVISION

of the

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

[redacted]

FACTORS PREDICTING THAI CHILDREN'S PHYSICAL ACTIVITY

ACKNOWLEDGEMENTS

This dissertation would never have been completed without support from several organizations and individuals. First, I would like to express my gratitude to the Thai government for granting me a scholarship to pursue my master's and doctorate in the United States. In addition, I would like to thank the following funding resources from the Pacific Rim, the Graduate Division's Research Award, the Sigma Theta Tau Alpha Eta Chapter, the Century Club Fund, and Professor Dr. Christine Kennedy. Without these sources of financial support, the research project would never have succeeded.

Second, I would like to express my deep appreciation to my wonderful dissertation committee, Professor Dr. Christine Kennedy, Professor Dr. Sally Rankin, Professor Dr. Anita Stewart, and Dr. Jyu-Lin Chen, for providing me with valuable suggestions, time, and immense support. They not only taught me how to do research but also served as role models for great scholarship and teaching. Having an opportunity to work with them was a real pleasure. Dr. Bruce Cooper was also extremely helpful in providing me with statistical advice.

Third, I would like to thank experts in the fields of physical activity and psychology, including Prof. Dr. Albert Bandura, Prof. Dr. James F. Sallis, Dr. Michelle M. Zive, Dr. Robert W. Motl, Dr. Nancy E. Sherwood, Dr. Tsu-Yin Wu, and Dr. Stewart G. Trost, for sharing their knowledge and instruments, and providing great advice.

Fourth, I would like to express my sincerely thank to Dr. Somchai Leethongin, Director of the Division of Physical Activity for Health, Thai Ministry of Public Health, Association, Prof. Dr. Kallaya Kijboonchoo, Institute of Nutrition, Mahidol University, and Associate Prof. Dr. Thanomwong Kritpet, Associate Dean, Academics and Research,

School of Sports Science, Chulalongkorn University for lending me ten accelerometers for using in this project. Their support inspired me to conduct a quality study to enhance the knowledge base in the field of physical activity of Thai children.

Next, I would like to thank the directors, teachers, and staffs of the Thewphaingarm School, Rachawinit School, Kasetsart University Laboratory School, Mae-Pra Fatima, Kahachumchon Lat Krabung, and Wat Kumpang School for the warm welcome and for allowing me to collect data inside the school. I am also grateful for everyone's excellent support on this project. I also would like to express my sincere thanks to the parents and children who devoted their time and efforts to provide the extensive data, plus their willingness to follow the study procedures of this project.

Writing the dissertation in the English language has been a very great challenge for me. Dr. Christine Kennedy, Dr. Anita Stewart, Dr. Norman Fineman, and Anne Becker helped me read and edit this dissertation. Please accept my gratitude and deep appreciation.

In addition, many thanks are extended to the Thai students at UCSF, friends outside UCSF, and the Stinson family, for helping me enter data, cheering me up, and providing me unlimited support. Thank you for always be there for me.

The dissertation was a final product that integrated knowledge from several areas. I would never forget to thank the many faculty members in the School of Nursing, UCSF, classmates, and friends who have shared with me their expertise for developing and completing this project.

I would like to thank my parents, Suthep Wannasuntad and Varee Wannsuntad, for their unlimited love plus devoting their time and money to prepare me with a solid academic background. I am very proud to be their daughter. And finally, I would like to thank my brothers, Chaijareon Wannasuntad, Chana Wannasuntad, and Chainarong Wannasuntad, for their endless love, care, and tremendous support. I also thank them and my closest friends, Pawaporn Paisarnwatcharakit, Juntra Uttsawakulkumnerd, and Chadarat Somthong for helping me find information from Thailand and collecting data, and also taking my father to see the doctor on my behalf, which allowed me to concentrate on my studying thus decreasing my concern about my father health.

Finally, there are many more people who worked behind the scenes to help me establish this work. Please accept my apology if I forgot to mention your names here. Thanks to all of you again for helping me develop and complete this promising project and also your encouragement and shaping of a novice scholar.

FACTOR PREDICTING THAI CHILDREN'S PHYSICAL ACTIVITY

Supaporn Wannasuntad, R.N., Ph.D.

University of California San Francisco, 2007

The purpose of this cross-sectional study is to: 1) describe the physical activity levels in Thai fourth-grade students in Bangkok; 2) explore factors that determine the level of physical activity in Thai fourth-grade students in Bangkok; and 3) report psychometric data from questionnaires used in this study.

A convenience sample of 398 healthy students (mean age: 10.0 yrs; S.D. 0.45 yrs.), from six elementary schools in Bangkok during the 2006 academic year, were enrolled in the study. Parents provided family demographic information, described how their children used their free time (time-use behavior), and assessed their family's support for physical activity. Children wore a pedometer (Walk-for-Life Duo) and filled out a pedometer log for six consecutive days. The children met with research assistants every weekday to record the number of steps they had taken that day. The children also completed four questionnaires (Child's Perceived Barriers to Play Actively, Child's Self-Efficacy to Play Actively, Child's Perceived Physical Activity Enjoyment, and Child's Perceived Social and Physical Environment for Physical Activity Scales).

The mean number of steps taken by the children was 10,079 steps/day (SD 2811). The mean number of steps taken on weekdays was 10,407 steps/day (SD 2927) and 8761 steps/day (SD 3317) on weekend days. Boys were significantly more active than girls (Boys 11,021 (SD 2917); Girls 9,168 (SD 2381); P<.001)

Hierarchical multiple regression analysis revealed that 9 variables explained 31 percent of the variance in physical activity. These were: gender, body mass index, number of hours watching television, number of hours playing actively outside, sibling/other child support, parental permission for their children to play actively outside, number of physical activity items/equipment available at home, a school policy promoting physical activity, and child's self-efficacy to overcome general barriers. Gender was the strongest predictor of physical activity. Once gender is controlled, each variable in the model explains only a small amount of the variance (1-3%) in physical activity.

Christine Kennedy, RN. PhD, FAAN

Christine M. Kennedy, RN, PhD, FAAN
Chair, Dissertation Committee

TABLE OF CONTENTS

TABEL OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Cont')

LIST OF TABLES (Cont')

LIST OF TABLES (Cont')

LIST OF FIGURES

CHAPTER I

THE STUDY PROBLEM

Introduction

Childhood obesity has increased steadily during the past decade in many parts of the world including Thailand. Fifteen percent of Thai children are overweight or obese. The highest percentage of overweight children occurs among preadolescent boys in high-income families living in urban areas (Ministry of Public Health Thailand, 2002; Nutrition Division, 2005). Eating behavior and physical activity are highly correlated with being overweight, based on energy intake and the energy expenditure equation (Goran & Treuth, 2001). Results of a meta-analysis (LeMura & Maziekas, 2002) concluded that exercise programs significantly reduced the percent of body fat, fat-free mass, and the body mass index in children (range 5-17 years). The investigators suggested reducing sedentary activities to reduce weight because these activities, such as television viewing, were significantly correlated with increased fat mass (Arluk, Branch, Swain, & Dowling, 2003; Dai, Labarthe, Grunbaum, Harrist, & Mueller, 2002; Deheeger, Rolland-Cachera, & Fontvieille, 1997).

Deheeger et al. (1997) suggested that physical activity helped improve body composition and the growth patterns in children, even though they concluded that body fat was significantly and positively associated with the time spent watching television and playing video games. Active children had a higher energy intake (higher carbohydrate and lower fat intake) than less active children. Active and less active children had a similar BMI at the age of 10 but differed in body composition. Active children had a higher proportion of fat-free mass and a lower proportion of fat mass and they had a later

adiposity rebound than less active children. Therefore, promoting physical activity and reducing sedentary behavior in childhood may prevent overweight and obesity (Fogelholm & Kukkonen-Harjula, 2000; Steinbeck, 2001). However, establishing physically active lifestyles in Thai school-aged children is a challenge due to the limited empirical published work in this area.

Statement of the Problem

Research on physical activity in Thai school-aged children is limited. Only one national survey of physical activity in Thai school-aged children was conducted in children aged 6-9 (N= 674) and 10-14 years-old (N = 821), which focused only on transportation and leisure time physical activity by way of parental report (Division of Exercise for Health, 2004). Thirty-eight percent of the parents reported that their children walked back and forth to school and 24 percent rode bicycles to school for 10-30 minute/day for 5 days/week. The younger children's leisure time physical activity was assessed by asking the parent whether or not the child had exercised or played sports or games that required physical movement of at least 30 minutes during the past seven days. Parents reported that 94 percent of the children had exercised 6-7 days a week and 6 reported no physical activity. The results from research using only parental reports of physical activity may not be valid when compared to those using objective measures such as a pedometer or an accelerometer. This study plans to use a pedometer to measure levels of physical activity in Thai school-aged children in order to produce more reliable results.

What is still unclear is the level of physical activity in school-aged children in Thailand. The current international research focuses on three major types of variables in relation to levels of physical activity: 1) demographic and biological variables, 2) psychological variables, and 3) environmental variables. First, studies of demographic and biological variables focus on gender, age, and socioeconomic status. The results from studies using objective measures of physical activity concluded that boys are more active than girls (Manios, Kafatos, & Codrington, 1999; Pate et al., 2002; Riddoch et al., 2004; Santos, Guerra, Ribeiro, Duarte, & Mota, 2003; Trost et al., 2002; Tudor-Locke, Ainsworth, Adair, Du, & Popkin, 2003; Vincent & Pangrazi, 2002; Woodfield, Duncan, Al-Nakeeb, Nevill, & Jenkins, 2002). The standard of activity was 13,000 steps per day for boys and 11,000 steps for girls (Vincent & Pangrazi, 2002). However, the level of physical activity varies by ethnic group. Non-Hispanic White children are more likely to engage in organized physical activity compared to Non-Hispanic Black or Hispanic children (Centers for Disease Control and Prevention, 2003). What is still unknown is whether the physical activity level of Thai children is lower or higher than that in other countries

The correlation of age and physical activity is still inconclusive when using an objective measure to assess physical activity. Younger children are more active than older children in some studies (Pate et al., 2002; Riddoch et al., 2004; Trost et al., 2002) and age has no correlation with physical activity in other studies (Santos et al., 2003; Vincent & Pangrazi, 2002).

How the family's socioeconomic status determines level of physical activity in children is also inconclusive. An international study showed that children with high family incomes had higher levels of daily energy expenditure than those with low family incomes (Woodfield et al., 2002). This result may not apply to Thai children since the prevalence of obesity is higher among children from families with higher income and education (Nutrition Division, 2005).

Fifteen psychological variables related to physical activity were reported in results from 54 published articles (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999). Perceived barriers to exercise are the most consistently negatively correlated factors of physical activity in children (Garcia et al., 1995; Stucky-Ropp & DiLorenzo, 1993). Two national surveys related to sport and exercise behavior in Thai children age 6-11 years old (The National Statistical Office & Ministry of Information and Communication Technology, 2003, 2004) reported that the major reason for not exercising was having no interest in exercise (83%), following by no time (7.56%), and no place (3.32%). How these perceptions of barriers influenced physical activity is not reported.

The enjoyment of physical education was highly correlated with physical activity both in children and adolescents in several studies (DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Dishman et al., 2005; Robbins, Pis, Pender, & Kazanis, 2004; Sallis et al., 1999; Salmon, Owen, Crawford, Bauman, & Sallis, 2003; Thompson et al., 2001; Wu & Pender, 2002). Thai children, especially boys, reported enjoyment as a major reason for exercise (48%) while girls reported the main reason for exercise was to complete physical education class. Health is not a major reason for exercise in Thai children (The National Statistical Office & Ministry of Information and Communication

Technology, 2003). The enjoyment of exercise may be related to levels of physical activity in different ways for Thai boys and girls.

Self-efficacy was reported as a mediator of physical activity in adolescents (Allison, Dwyer, & Makin, 1999; Dishman et al., 2004; Motl et al., 2002; O'Loughlin, Paradis, Kishchuk, Barnett, & Renaud, 1999; Strauss, Rodzilsky, Burack, & Colin, 2001; Trost, Pate, Ward, Saunders, & Riner, 1999a; Wu & Pender, 2002), but the effect of self-efficacy in children was still inconclusive in a comprehensive review (Sallis, Prochaska, & Taylor, 2000). No study was found that examined the relationship of self-efficacy and physical activity in Thai school-aged children.

Social and physical environments may be major factors in determining physical activity levels in school-aged children. Theoretically, children's cognition improves with age. The ability to think complexly or self-manage to overcome barriers to be physically active may be limited by age. Physical activity in school-aged children may be shaped by the social environment within the family such as parental encouragement of physical activity, driving the child to exercise, or playing actively with the child. These family support behaviors have been reported as a factors that promote physical activity in children and adolescents (Biddle & Goudas, 1996; O'Loughlin et al., 1999; Prochaska, Rodgers, & Sallis, 2002; Sallis et al., 1999; Stucky-Ropp & DiLorenzo, 1993). How much support Thai parents provide for their children is still unclear. How a parent's and child's gender influence supportive behavior related to physical activity also is still unknown.

Physical environments such as the neighborhood, school, or the home environment have been studied in relation to children's physical activity. The neighborhood

environment was examined for the availability of facilities related to children's physical activities such as the availability of general facilities, sport fields, and parks, and the level of neighborhood safety (S. Adkins, N. E. Sherwood, M. Story, & M. Davis, 2004; Fein, Plotnikoff, Wild, & Spence, 2004; Morgan et al., 2003; Mota, Almeida, Santos, & Ribeiro, 2005; Motl et al., 2005; Sallis, Kraft, & Linton, 2002; Timperio, Crawford, Telford, & Salmon, 2004). The results from four studies (S. Adkins et al., 2004; Fein et al., 2004; Morgan et al., 2003; Mota et al., 2005; Motl et al., 2005; Sallis, Kraft et al., 2002; Timperio et al., 2004) demonstrated that availability of facilities significantly predicted the level of children's physical activity. The influence of general neighborhood safety on physical activity was also studied (Adkins et al., 2004; Fein et al., 2004; Morgan et al., 2003; Mota et al., 2005; Motl et al., 2005; Sallis, Kraft et al., 2002; Timperio et al., 2004), but very few studies reported how general safety was related to physical activity in school-aged children, specifically those walking or cycling. Worry about strangers causing harm, which should be one of the concerns for children playing outside, was reported to have no significant correlation to walking or cycling in children (Timperio et al., 2004). Similarly, road safety could influence the level of physical activity in children, but general road safety and traffic safety were not significantly related to activity (Timperio et al., 2004); however, the number of traffic lights or crossings was found to significantly predict the level of children's physical activity. Studies related to children's physical activity in their physical environment are still rare. Thus results are still inconclusive regarding the influence of the neighborhood's physical environment on physical activity.

There are only a few studies exploring the school environment to predict physical activity. Two studies were conducted in adolescents aged 12-18 years old (Fein et al., 2004; Sallis et al., 2001), which reported that accessibility to athletic facilities, equipment availability, equipment quality, and the perceived importance of the resources are all significant predictors of physical activity in adolescents. The published articles related to school environment and physical activity are scare both internationally and specifically in Thailand.

Another unknown are which components of the physical environment can impact physical activity levels in children. Equipment availability at home has been reported as a variable that predicts physical activity in American adolescents (Motl et al., 2005). The other components such as parent support and parental rules relating to physical activity in children are needed to provide knowledge of how the home environment and parental practice would influence physical activity levels.

Due to the gaps in knowledge presented, this study will investigate the correlations of demographics (gender, body mass index, socioeconomic status, house location and house characteristics), child behaviors (time spent watching television and playing video/computer games, time spent playing outside, and active/inactive commute to and from school), physical activity cognition (child's perceived barriers, physical activity enjoyment, and self-efficacy), social influences (family supports-father/other male support, mother/other female support, and sibling/other child support-, frequency that parents allow their children to play outside, parent's perceived safety environment for the child to play outside, and favorite family activities), and environmental factors (social and physical environment in the neighborhood, school, and home) in predicting level of

physical activity, assessed by wearing a pedometer for six consecutive days, in Thai fourth-grade students in Bangkok.

Purpose of the Study

The purpose of this cross-sectional study was to: 1) describe the level of physical activity in Thai fourth-grade students in Bangkok; 2) explore factors determining physical activity including child characteristics and demographic data, child behaviors, child's social cognition, family influences, family support of physical activity, social and physical environments at home, in school, and in the neighborhood; 3) report the psychometric data from five questionnaires used in this study including: 1) Child's Perceived Barriers to Play Actively Questionnaire; 2) Child's Perceived Self-Efficacy to Play Actively Questionnaire; 3) Child's Perceived Physical Activity Enjoyment Scale; 4) Child Perceived Social and Physical Environment on Physical Activity Questionnaires; and 5) Family Support on Physical Activity Scale.

Significance

This is the first study in Thailand using a pedometer to measure physical activity level in Thai fourth-grade students. The comparison of physical activity levels between boys and girls, high- and low- income families, and those living in rural and urban areas on the level of the children's physical activity will provide knowledge related to the pattern of physical activity in Thai fourth grade children. The average number of steps per day will be reported as a norm of Thai fourth grade students in Bangkok.

The inclusion of multilevel factors of physical activity cognitive variables, social influences variables and physical environment to potentially predict the physical activity in children will shed light on which variables the investigator should be focus to develop a cultural specific program promoting an active lifestyle in Thai school-aged children.

CHAPTER II

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Introduction

An overview of definitions and pertinent research are presented to clarify a knowledge gap pertaining to the levels and patterns of physical activity in Thai school-aged children. A research question and study will then be presented based on this information. The research is related to the correlation between physical activity in school-aged children in Thailand and international studies of children. The conceptual framework as well as the definition of terms used in this study is also presented.

The Definition and Construct of Physical Activity

Physical activity was defined by Caspersen, Powell, & Christenson (1985) as *"any bodily movement produced by skeletal muscles that results in energy expenditure."* This definition indicates that physical activity is composed of two components: movement and energy expenditure. Another investigator (Freedson & Miller, 2000) has proposed that physical activity also involves a behavioral component, indicating that physical activity may be voluntary. According to these definitions, Mahar & Rowe (2002) then suggested that physical activity, in adults, is composed of at least three major dimensions: (a) a behavioral dimension, (b) a movement dimension, and (c) an energy expenditure dimension. Physical activity can be further conceptualized into the following sub-

dimensions: frequency, intensity, duration, mode (e.g. walking, running, dancing), context (occupation, housework, leisure-time), and energy expenditure.

Type and Pattern of Physical Activity in Children

Types and patterns of physical activity in children are different from those of adults. The types of physical activity in children are more unstructured. For example, *Exercise*, one type of physical activity, has been defined as "physical activity that is planned, structured, repetitive, and purposive in the sense that improvement or maintenance of one or more components of physical fitness is an objective" (p. 126) (Caspersen et al., 1985). In addition, the term "*playing sport*" is defined as "organized play that is accompanied by physical exertion, guided by a formal structure, organized within the context of formal and explicit rules of behavior and procedures" (p. 143) (Anshel et al., 1991). Physical activity in children is more unstructured like "active playing" as this is not particularly intended to increase fitness. The word "*play*" is defined as "physical activity that is free (i.e., unstructured), voluntarily begun, voluntarily continued, and voluntarily terminated" (Anshel et al., 1991). Play is more developmentally specific when describing the physical activities of children rather than the adult definitions of physical activity.

Children themselves perceive free play activity as one type of physical activity. The results from 15 focus group interviews of children in grades 1-6 (mean age 8.8 years), which asked them to list "moving your body" activities, included 31 activities that were classified as "free play activities" (e.g. biking, swimming, running, swinging, and skipping rope). The other 12 activities were classified as team sports (e.g. hockey,

basketball, soccer, baseball, and football) and individual sports (wrestling, karate, and gymnastics) (Levesque, Cargo, & Salsberg, 2004). These findings indicated that physical activity in children is composed of three components: free play activities, team sports, and individual sports.

The pattern of physical activity in children can be intermittent. The length of time children play a structured sport may not continue through a full activity like an adult's activity. The result of an observational study in children (ages 6-10 years old) found that the median duration of low- and moderate-intensity activities were 6 seconds whereas that of high-intensity activities was 3 seconds (Bailey et al., 1995). Nearly all bouts of vigorous activity (95%) lasted less than 15 seconds and only 0.1% of the bouts were longer than a minute. Periods of high-intensity activity never exceeded 10 minutes. Periods of rest were longer in proportion to periods of activities, but 95 percent of the rest intervals were less than 4 minutes and 15 seconds. This indicates that short, intermittent bouts of vigorous physical activity (with frequent rest periods of longer duration) are a typical pattern of physical activity among children of this age group.

The definition of physical activity in adults can be applied to those of school-aged children. However, the type of activity included in a tool to assess physical activity in school-aged children would include free play activity in addition to the list of activities related to individual and team structured sports and exercise. The criteria to evaluate the intensity of an activity only includes an activity that lasts longer than 15 minutes, which is common in adult assessment tools, but is not applied in this study.

Studies Related to Physical Activity of Thai School-Aged Children

This study will describe the physical activity pattern of school-aged children in Thailand. Three national surveys related to physical activity in school-aged children in Thailand have been published (Division of Exercise for Health, 2004; The National Statistical Office, 2002; The National Statistical Office & Ministry of Information and Communication Technology, 2003, 2004). The first was the sport survey (SS) (The National Statistical Office & Ministry of Information and Communication Technology, 2003), the second was an exercise behaviors survey (ES) (The National Statistical Office & Ministry of Information and Communication Technology, 2004), and the last research study was a physical activity survey (PAS) (Division of Exercise for Health, 2004). It is difficult to compare findings among these studies due to differences in the age groups studied and differences in the measures of physical activity employed. The results of each study are presented briefly.

1. The Sport Survey (SS)

The Sport Survey (SS) was a 2002 survey of sport playing behaviors in 79,560 Thais aged 6 years to over 60 years old (The National Statistical Office & Ministry of Information and Communication Technology, 2003). Only the results related to sport playing behavior in 6365 children (6-11 years old) were reported in this study. Seventy percent of children played sports/exercise for one to one and a half hours a day for one day a week; males were more active than females. Males played sport/exercise after school from 17:00 - 20:00 while females played from 14:00 – 17:00. The sports preferred by boys and girls were gender specific. Males preferred football (63 %) and exercise (9 %), while females preferred volleyball (22 %), exercise (16 %), and jogging

(15 %). They mostly played these sports or exercised at a school playground/stadium (69 %), around the house (17 %), and in free spaces (5 %). Their reasons for sports playing or exercise were for enjoyment (41 %) and for completing the physical education class's requirement (39 %). Health was not a primary reason for exercise in this age group. Males exercised for enjoyment but females did it for the physical education class's requirement. The children's major reasons for not engaging in exercise were lack of interest (83 %), followed by no time (8 %). No place, equipment, or supporter were not cited as major barriers (The National Statistical Office & Ministry of Information and Communication Technology, 2003).

The sport behaviors of children who are living in Bangkok were presented. Approximately 86 percent of children living in Bangkok played sports or exercised during the past week; the majority of them performed sports/exercise for 1-1:30 hour a day, one day a week, during the hours of 8:00 to 11:00 a.m. Based on the time reported, activities primarily happened at school. Activities preferences were exercise, football, jogging, swimming, and athletics. Most of the children performed sports/exercise at a school playground/stadium and around the house. Their reason for exercise was for enjoyment, completing physical education class' requirement, and health.

2. The Exercise Behavior Survey (EBS)

The second study was the 2004 national survey of exercise behavior conducted in children from age 11 years old through adults over 60 years old (The National Statistical Office & Ministry of Information and Communication Technology, 2004). The results related to sport and exercise behaviors of older children (11-14 years old; N = 4347) in this study were consistent with those of the Sport Survey (The National Statistical Office

& Ministry of Information and Communication Technology, 2003) These data are presented in Table 2.1.

Approximately 63 percent of children exercised during the previous week, for 30-60 minutes a day and for 3-5 days a week. They mostly played sports followed by running and aerobic exercise. Both males and females exercised at the school playground/stadium, around the house, and in free spaces. Their primarily reasons for exercise were related to health and social interactions (friend's encouragement). Their reasons for not performing exercise were lack of interest, lack of time, and lack of available places to play.

Table 2.1 Sports/Exercise of Children Surveyed in 2002 and 2004

Sports/Exercise Behavior	2002* Children aged 6-11 years old (N = 6365) %			2004** Children aged 11-14 years old (N = 4347) %		
Percentage of children playing sports/exercise	69.8 (Male: Female = 75.1: 64.3)			62.5 (Male: Female = 67.8: 57.1)		
Duration of exercise (mode)	1-1:30 hour : 47.69 % (Male: Female = 49.31: 45.75%)			31-60 minutes: 39.63 % (Male: Female = 36.57: 43.34%)		
Frequency of exercise	Total	Male	Female		Male	Female
One day a week	29.55	23.95	36.23	< 3 d./wk.	18.10	33.26
Five days a week	23.46	25.75	20.73	3-5 d./wk.	39.69	36.02
Seven days a week	12.83	16.06	8.97	6-7 d./wk	32.00	19.12
Time	Total	Male	Female	-		
17:00 – 19:59	39.37	46.39	30.99			
14:00 – 16:59	31.49	29.14	34.30			
Five popular sports/exercise	Male Football: 62.9 Exercise: 9.2 Jogging: 8.5 Athletics: 6.3 Volleyball: 2.8		Female Volleyball: 21.6 Exercise: 15.8 Jogging 15.2 Athletics: 13.1 Football: 9.4	Male Sports: 84.42 Running: 9.52 Aerobic: 00.91 Walking: 00.42		Female Sports: 65.41 Running: 18.33 Aerobic: 10.77 Fitness: 00.94 Walking: 00.87
Place for exercise	Total	Male	Female	Total	Male	Female
School playground	69.07	66.44	72.22	57.67	58.01	57.26
Around the house	17.36	18.51	15.99	18.37	15.69	21.62
Free space	5.33	6.36	4.10	9.77	12.08	6.96
Reasons for exercise	Total	Male	Female	Total	Male	Female
For enjoyment	41.24	48.29	32.82			
For complete physical education class	38.60	31.42	47.19			
For health	14.58	15.05	14.03	57.63	56.40	59.12
For competition	3.76	3.08	4.56			
For social	1.37	1.82	00.83			
Invited by friends				4.83	24.23	16.44
For stress reduction				2.36	2.07	2.70
For weight loss				1.42	0.83	2.14
Reasons for not exercise	Total	Male	Female	Total	Male	Female
No interest	82.81	81.81	83.52	76.20	76.20	76.21
No time	7.56	7.14	7.85	14.80	13.81	15.56
No place	3.32	3.74	3.01	4.91	5.38	4.55
No equipment	2.50	2.79	2.29	2.40	2.40	2.40
No supporter	00.61	00.67	00.56	-	-	-

Source: The National Statistical Office & Ministry of Information and Communication Technology (2003; 2004)

Exercise behaviors of children living in Bangkok (See Table 2.2) were similar to the behaviors of children in this age group from the whole country. Approximately 70 percent of the children exercised; boys exercised more intensely than the girls. Types of sports/exercise played by the children were sports, running, and aerobic exercise. Children reported exercising at the playground at their schools, around the house, free spaces, and public parks. The major reasons they exercised were for health (61%) and being invited by friends (20%); no gender differences were observed. The reasons given for not exercising were lack of interest (66%), lack of time (18%), and lack of available places to play (14%). Girls more often than boys reported lack of interest as the reason for not engaging in exercise; boys more than girls reported lack of an available place to play as a reason for not exercising.

Table 2.2. Exercise Behavior of Children Living in Bangkok Surveyed in 2002 & 2004

Sports/Exercise Behaviors of children living in Bangkok	2002 Aged 6-11 years old (N = 547) %	2004 Aged 11-14 years old (N = 400) %			
Percentage of playing sports/exercise (11- >60 years old) Age:	31.9 (1-1:30 hours a day and one day a week) Age 6-11 years old: 85.98 Age 12-14 years old: 90.20 Age 15-19 years old: 63.93	33.49 Age 11-14 years old: 69.94 Age 15-19 years old: 46.20 Age 20-24 years old: 28.38			
Frequency	1 day a week: 58.89 2 days a week: 15.92		Total	Male	Female
		3-5 days a week	37.55	41.02	34.33
		< 3 days a week	35.06	31.96	37.92
Duration (mode)	1-1:30 hrs: 50.71	31-60 minutes: 41.44 Male: > 60 minute: 39.25 Female: 31-60 minutes: 49.00			
Time	08:00 – 10:59 : 32.05 14:00 – 16:59 : 29.65 11:00 – 13:59 : 19.02 17:00 – 19:59 : 18:32				
Five popular sports/exercise	Exercise: 22.06 Football: 19.77 Jogging: 19.09 Swimming: 10.16 Athletics: 7.10		Total	Male	Female
		Sports	66.98	84.17	50.80
		Running	20.86	10.90	30.24
		Aerobic	7.88	1.69	13.63
		Fitness	0.02	1.47	2.84
Place for exercise		Total	Male	Female	
School playground	74.22	43.47	40.28	46.51	
Around the house	8.37	23.32	22.16	24.43	
Private playground	6.38				
Free space		12.45	9.35	15.36	
Public park		7.35	10.38	4.50	
Reasons for exercise		Total	Male	Female	
For enjoyment	64.14				
For complete physical education class	17.79				
For health	16.58	60.73	54.57	66.57	
Invited by friends		19.47	20.54	18.55	
For stress reduction		0.02	0.02	0.01	
Reasons for not exercise					
No interest	66.10	65.75	54.79	76.56	
No time	12.39	18.33	16.81	19.67	
No place	10.56	14.10	24.71	0.04	
No equipment	-				
No supporter	1.17				

Source: The National Statistical Office & Ministry of Information and Communication Technology (2003; 2004)

3. The Physical Activity Survey (PAS)

The final research study in this review is the most recent national survey conducted to assess physical activity in 10,878 Thai people ages 6 years to over 60 years old. The survey used a stratified-multistage sampling from 20 provinces (Division of Exercise for Health, 2004). The instruments used to assess physical activity in children were modified from the Youth Risk Behavior Survey (YRBS) developed in the U.S. (Brener et al., 2002) and the Physical Activity/Exercise Survey for Children Aged 6-14 Years Old (Department of Health, 2003). Physical activity in the children, age ranges of 6- 9 years (by parental report) and 10-14 years (self-reported), focused only on transportation and leisure time physical activities. The intensity of physical activity was assessed only in the children aged 10-14 years old. The data related to the physical activity in the children were analyzed in two age groups: 6-9 years old (N = 674) and 10-14 years old (N = 821). Only the results of these groups of children are presented below in Table 2.3.

Transportation Activity

The physical activity of 6-9-year-old children related to routine transportation was similar to those of 10-14-year-old children (See Table 3). Thirty-eight percent of the parents reported that their children walked back and forth to school, and 24 percent rode bicycles (Mode = 10-30 minutes/day and 5 days/ week). The rest (38%) went to school by school bus, the family car, or a public bus or motorcycle.

Table 2.3 Transportation and Leisure Time Physical Activity in Children

Constructs of physical activity	2004 Ages 6-9 years old N = 674 (Male 52.5%) %
Transportation	
Walking to school	
Yes	37.8 (10-19 minutes a day & 5 days a week)
No	62.2
Taking school's bus	35.6
Taking family/ relative's car	32.2
Riding bicycle	23.8
Public bus/ motorcycle	7.9
Leisure time	≥30 min./day
Exercising/ playing sport during a past week	94.2
For 1-2 days/week	10.8
For 3-4 days/week	12.0
For 5 days/week	9.8
For 6-7 days/week	61.6

Source: Division of Exercise for Health (2004)

Leisure Time

The leisure time physical activities of the younger children was assessed by asking the parents whether or not the child had exercised or played sports or games that required physical movement for at least 30 minutes during the past seven days. Ninety-four percent of parents reported that their children exercised 6-7 days a week. The rest of them (6 %) reported that their children engaged in no physical activities for the following reasons: They were playing games or watching television, doing homework, disliking exercise, getting tired easily during exercise, and being unhealthy.

Sedentary Leisure Time Activity

Watching television was the only sedentary leisure time activity that was surveyed in this study in children (See Table 2.4). Parents reported that 58.5 percent of their children watched television or played computer games more than 2 hours a day during the weekdays. Activities that the children performed other than watching television or

playing video game were playing with friends; doing homework/taking a special course; and playing music. For older children, 70 percent of the children reported watching television or playing computer's games more than 2 hours a day on weekdays. Thirty percent spent their time running or playing outside with friends, studying, doing homework, or taking an extra-curriculum course.

Table 2.4 Sedentary Activity of Children Ages 6-14 years old (2004)

Sedentary activity	2004			
	Ages 6-9 years old N = 674 (Male 52.5%) %		Ages 10-14 years old N = 821 (Male 52.5%) %	
	Yes	No	Yes	No
Watching television > 2 hrs/day during weekday (Mon. – Fri.)	58.5	41.5	70	30
For 5 days	34.3		37.4	
For 1-4 days	24.2		32.6	

Source: Division of Exercise for Health (2004)

The authors (Division of Exercise for Health, 2004) have compared the percentage of the children, categorized by age, gender, location, and weight status, who exercised consistently as recommended of Healthy People 2010 22.6 guideline (≥30 min, ≥ 5 d/wk.) (U.S. Department of Health and Human Services, 2000) and the Thai Ministry of Public Health (≥ 30 min/day, ≥ 3 days/wk.). These results were divided into three groups: 1) Reaching the recommendation (Reach-RC) (≥ 30 min/day, ≥ 5 days a week); 2) Less than the recommendation (Less-RC) (≥ 30 min/day, < 5 days a week), and 3) Non-exercise (No-Ex) (< 30 min/day) group. The results are presented in Table 2.5.

Seventy-one percent of the children met the recommendation; 23 % exercised less than the recommendation; and 6 % did not exercise. Boys' exercise rates were 3 percent higher than that of girls. The children living outside municipal areas had a higher

percentage of exercise compared to those living in municipal areas and Bangkok. The effect of weight status on exercise was inconclusive due to the very small sample size.

The Thai Ministry of Public Health (TMPH) recommends that children exercise at least 30 minutes a day for at least 3 day a week. Using the same categories as previously mentioned, most of the children (83%) exercised in accordance with the recommendations of the TMPH. Eleven percent of the children exercised at least 30 minutes a day, but less than 3 days a week (Less-RC group); and 6 % performed no exercise or exercised less than 30 minutes a day (No-Ex group) (See Table 2.5). Rates for males were higher than for the females, and children living outside and in municipal areas had higher rates of exercise consistent with the recommendation compared to those living in the city limits of Bangkok. Data pertaining to the percentage of children who met the TMPH activity recommendations, and how children's level of activity related to their weight were inconclusive due to the small sample size.

Table 2.5 International and Thai Ministry of Public Health's Exercise Recommendation

Exercising consistent with the recommendation	2004					
	Ages 6-9 years old N = 674 (Male 52.5%) %			Ages 10-14 years old N = 821 (Male 52.5%) %		
The Thai Ministry of Public Health's recommendation *	Reach-RC	Less-RC	No-Ex	Reach-RC	Less-RC	No-Ex
Total	83.4	10.8	5.8	83.8	7.8	8.4
Gender:					5.1	
Male	87.9	7.9	4.2	88.4	10.8	6.5
Female	78.4	14.1	7.5	78.7		10.5
Location:						
Bangkok	69.0	20.7	10.3	90.0	0.0	10.0
Male	66.7	21.2	12.1	93.6	0.0	6.4
Female	72.0	20.0	8.0	82.6	0.0	17.4
In-municipal area	83.0	8.5	8.5	80.7	9.1	10.2
Outside municipal area	85.3	10.3	4.4	83.9	8.4	7.7
Weight status: (% (n))	83.8 (543)	10.5 (68)	5.7 (37)	84.1 (670)	7.9 (63)	8.0 (64)
Underweight (-2 SD)	100 (5)	-	-	100 (4)	-	-
Normal weight (-2 SD to +2 SD)	83.8 (517)	10.5 (65)	5.7 (35)	84.5 (650)	7.8 (60)	7.7 (59)
Overweight (+2 SD to +3 SD)	80 (20)	12.0 (3)	8 (2)	65.3 (15)	13 (3)	21.7 (5)
Obese (+3 SD)	100 (1)	-	-	100.0 (1)	-	-
International recommendation**	Reach-RC	Less-RC	No-Ex	Reach-RC	Less-RC	No-Ex
Total	71.4	22.8	5.8	69.2	22.4	8.4
Gender:						
Male	72.9	22.9	4.2	75.6	17.9	6.5
Female	69.7	22.8	7.5	62.0	27.4	10.5
Location:						
Bangkok	55.2	34.5	10.3	80.0	10.0	10.0
Male	54.5	33.3	12.2	80.8	12.8	6.4
Female	56.0	36.0	8.0	78.3	4.3	17.4
In-municipal area	65.2	26.2	8.6	65.7	24.1	10.2
Outside municipal area	75.2	20.4	4.4	68.9	23.4	7.7
Weight status: (% (n))	71.3 (462)	23.0 (149)	5.7 (37)	69.4 (553)	22.6 (180)	8.0 (64)
Underweight (-2 SD)	80.0 (4)	20.0 (1)	-	100.0 (4)	-	-
Normal weight (-2 SD to +2 SD)	71.3 (440)	23.0 (142)	5.7 (35)	69.7 (536)	22.6 (174)	7.7 (59)
Overweight (+2 SD to +3 SD)	68.0 (17)	24.0 (6)	8.0 (2)	56.6 (13)	21.7 (5)	21.7 (5)
Obese (+3 SD)	100.0 (1)	-	-	-	100 (1)	-

* Thai MPH recommendation: (≥ 30 min/day, ≥ 3 days a week)

** Healthy People 2010 22.6 guideline (≥ 30 min/day, ≥ 5 days a week)

Source: Division of Exercise for Health (2004)

In summary, although all of these national studies related to physical activity in Thai children were cross-sectional surveys, used self-reporting, and measured different modes of physical activity, the results acknowledge some aspect of physical activity in Thai children. First, the percentage of the children who play sports or performed exercise in Thai school-aged children is high. This high percentage rate might reflect socially desirable reports by children and the parents. Using objective measurement such as pedometer or accelerometer for assessing level of physical activity in Thai children in this study would provide more empirical evidence of physical activity in Thai children.

Second, Thai children exercised less than children in the U.S. if one uses the Healthy People 2010 guidelines. Approximately 71 percent of Thai children aged 6-9 years old met the suggested guideline compared to 93 percent of American children. This result should be interpreted with caution because of methodological differences in the studies. Thai children's physical activity was measured by self-report; physical activity among American children was measured by an accelerometer.

Next, physical activity (MVPA) in Thai children decreases with age. Similar findings have been reported elsewhere using self-reports and objective methods to measure physical activity levels (Riddoch et al., 2004; Trost et al., 2002; Vincent & Pangrazi, 2002; Woodfield et al., 2002). The age span in Thai research is too broad to provide insight into when physical activity begins to decrease. The results from U.S. studies using an accelerometer to assess the level of physical activity suggests that the age at which physical activity level begins to drop is around 10-12 years old (Pate et al., 2002) or 4-6 grade (Trost et al., 2002).

In addition, there is a gender difference for activity preference and level of the physical activity; males are more active than females. This result is congruent with several studies around the world (Pate et al., 2002; Riddoch et al., 2004; Santos et al., 2003; Trost et al., 2002; Vincent & Pangrazi, 2002). The reason for these gender differences is still unclear. Both Thai and U.S. children also reported gender differences in preferred sports/activities (Centers for Disease Control and Prevention, 2003; The National Statistical Office & Ministry of Information and Communication Technology, 2003, 2004).

Next, a difference in geographical locations on the level of physical activity is also noted. Children living in Bangkok are less active than those from the in-municipal area or outside the municipal area (The National Statistical Office & Ministry of Information and Communication Technology, 2004). The reason for this is still unclear. The majority of children performed exercise during school hours and at the school playground or stadium. This might be because schools provided space and equipment for play activity, and was a meeting place for play companions. Children's home environments offered more limited opportunities for play..

Finally, most children stated that they exercised for enjoyment (64%) and only a few (18%) exercised as part of a physical education class requirement. The reasons that children in Bangkok do not exercise were that they had "no interest" (66%); having no time or place to play was stated by one-third of the children.

Review Studies Related to Factors Determining Physical Activity in School-aged Children

The review of articles related to the correlation of physical of activity in children is from publications in the PubMed database and journal from 1996-2006. Three groups of the correlations for physical activity are reviewed in this study: 1) Demographic variables; 2) Physical activity cognition variables and Social Variables; and 3) Environmental variable.

1. Demographic Variables

Demographic variables included in this review are age and gender. Three published articles report on the correlation between age and gender and physical activity by using an accelerometer, the gold standard of physical activity assessment, to measure physical activity level in children..

Trost et al. (2002) used an uniaxial accelerometer (CSA model 7146, Shalimar, FL) worn for 7 consecutive days to examine age and gender differences on physical activity in 375 American students in grades 1-12 (Grades 1-3 = 24.4%; Grades 4-6 = 24.7%; Grades 7-9 = 26%; and Grades 10-12 = 24.9%). The study concluded that 1) Daily moderate to vigorous physical activity (MVPA) and vigorous physical activity (VPA) had a significantly negative relationship with grade levels for both genders; 2) Males participated more in MVPA and VPA than females, with the largest difference in grades 1-3 for MVPA (18.9%) and grades 4-6 for VPA (57.1%); 3) Males had greater means for the weekly number of 5-, 10-, and 20-minute bouts of MVPA than females across all grades; and 4) Children from all grades performed few 5-, 10-, and 20- minute bouts of VPA over the 7-day period (the means of 20-min bouts were near zero in all grades), and

males performed more bouts of VPA than females; however, only those differences between grades 1-3 and 4-6 for 5- and 10- min bouts reached statistical significance.

Santos et al. (2003) conducted a study in Portugal to explore the effect of age and gender on physical activity in 157 children aged 8-15 years old, using an accelerometer (CSA model 7146, Shalimar, FL) worn for 3 consecutive days. The results were categorized in three age groups: 8-10 (N = 55), 11-13 (N = 40), and 14-16 years old (N = 60). The results demonstrated that moderate to vigorous physical activity time (MVPA) was increased by age both in males and females. Males engaged more in MVPA than females, did but this was only statistically significant in 11-13 years old group.

In Europe, Riddoch et al. (2004) used an accelerometer worn for 3 or 4 days (at least one weekend) to assess physical activity levels in a large number of children aged 9 to 15 years old (N = 2185) in four countries: Denmark, Portugal, Estonia, and Norway. The results revealed that physical activity was determined by age, gender, and country. The younger children were more active than the older children both for overall level of physical activity and for time spent on moderate to vigorous activities. Males were more active than females both in 9-year-old (21% more active) and 15-year-old groups (26% more active) while males spent more time engaging in activities of at least moderate intensity, 20 percent more for 9-year-old group and 36 percent more for 15-year old-group respectively.

In summary, the results from the above studies concluded that physical activity decreases with age, and that males are more active than females.

2. Child Behaviors, Physical Activity Cognition Variables, and Social Influences

Eight studies (seven studies and one meta-analysis) included predictor variables related to child behaviors, physical activity cognition, and social influences are reviewed in this section. Child behaviors included variables such as time spent watching television and time use behavior. Physical activity cognition included variables in relation to perceived barriers, self-efficacy, physical activity enjoyment and social influences variables are composed of variables such as family support, peer support, modeling, etc.

First, Stucky-Ropp et al. (1993) explored factors determining physical activity in the 242 5th and 6th grade students (mean age 11.2 years, SD 0.7) and their mothers (mean age 39.2 years, SD 4.5). The subjects were predominately white (93%) and of middle-class socioeconomic status. The regression analysis results showed that enjoyment of physical activity, friend and family support for physical activity, mother's perceived barriers to exercise, and mother's perceived family support for exercise significantly predicted physical activity in boys. For girls, enjoyment of physical activity, number of exercise-related items at home, mother's perceived family support for physical activity, mother's perceived barriers to exercise, and direct parental modeling of physical activity significantly predicted physical activity.

Pate et al. (1997) investigated correlates of physical activity in 361 fifth-grade students (mean age 10.7 years, SD .6) in a rural area of South Carolina. The majority of the students were African American. The correlates included in this study were psychosocial (social influences regarding physical activity, beliefs about physical activity, and physical activity self-efficacy) and environmental (home exercise equipment, mother's activity, father's activity, and friend's activity). The determinants

of moderate and vigorous physical activity were analyzed separately. According to the moderate physical activity, the result from multiple regression analysis revealed that age, gender, television watching, and exercise equipment at home significantly correlated with low level of moderate physical activity. With respect to vigorous physical activity, the results demonstrated that age, gender, television watching, and self-efficacy to seek support for physical activity were significant predictors. The authors concluded that gender and the amount of time watching television were the strongest correlates of low level of physical activity in rural African American adolescents. Children who watched television/ played video games for 3 or more hours after school were 2.9 times more likely to be classified as low level of moderate physical activity, than those who watched television less than this amount.

DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham (1998) conducted a longitudinal study to explore determinants of exercise by measuring predictive and criterion variables in two phases. In Phase 1 (5^{th} and 6^{th} grades) and Phase 2 (8^{th} and 9^{th} grades) of the study, data were collected from 111 mothers, whereas data from 80 fathers were collected at Phase 2 only. The child predictor variables included the child's self-efficacy for physical activity, direct parental modeling, child-friend and family modeling/support, the child's enjoyment of physical activity, home equipment, the child's exercise knowledge, negative indicators of physical activity (mother's report), and the child's interest in sports media. The adult predictor variables included mother/father/s physical activity level, mother/father's self-efficacy, mother/father-friend modeling support, mother/father-family support-rewards/punishment, mother/fathers' enjoyment of physical activity, and mother/father's barriers to exercise. The results from simultaneous stepwise regression

analysis demonstrated that the child's enjoyment of physical activity was the only consistent predictor of exercise during Phase 1. In Phase 2, the predictors for boys and girls were different. The child's exercise knowledge, mother's physical activity, and the child's and the mother's friend modeling/support predicted exercise for girls, whereas, the child's self-efficacy for physical activity, exercise knowledge, parental modeling, and interest in sports media predicted exercise in boys. Longitudinally, mother's self-efficacy, barriers to exercise, enjoyment of physical activity, and child self-efficacy for physical activity predicted exercise in girls; only the child's exercise knowledge predicted boys' physical activity. It could be concluded that determinants of physical activity differ between boys and girls and the pattern of these determinants changes over time.

Trost, Pate, Ward, Saunders, & Riner (1999b) compared the determinants of physical activity in 108 active and low active African-American sixth grade students by using CSA7164 accelerometer to measure level of physical activity. The studied variables included psychosocial (physical activity self-efficacy, social influences regarding physical activity, and beliefs regarding physical activity outcomes) and environmental (perceived physical activity of parents and peers, access to sporting and/or fitness equipment at home, involvement in community physical activity organizations, participation in community sports teams over the preceding six months, and self-reported hours spent watching television or playing video games). The results indicated that active boys reported significantly higher levels of self-efficacy, greater involvement in community physical activity organizations, and were more likely to perceive their mother as active when compared to the low-active boys. Active girls reported significantly

higher level of physical activity self-efficacy, greater positive beliefs in physical activity outcomes, and were significantly less likely to watch television or play video games greater than 3 hours a day when compared to the low-active girls.

O'Loughlin, Paradis, Kishchuk, Barnett, & Renaud (1999) studied correlates of physical inactivity and of participation in organized sports at and outside school among 2,285 elementary school students aged 9-13 years. The potential correlates of physical activity included socio-demographic variables (student's age, gender, family composition, number of years lived in Canada, family ethnic origin, parents' employment status, parents' educational attainment, household income sufficiency), subjects' body mass index, smoking history, and sedentary behavior (television viewing, video game playing), as well as psychosocial variables (perceived self-efficacy for physical activity, physical activity choices, and parental role modeling and support for physical activity). The result revealed that children who participated in organized sports programs at and outside school, those with higher perceived self-efficacy for physical activity, and those with more parental support for engaging in physical activity were more active.

A review of correlates of physical activity of children from 54 published studies in children (Sallis et al., 2000) concluded that perceived barriers was the most consistent negative correlate of physical activity.

Next, Strauss, Rodzilsky, Burack, & Colin (2001) studied the relationship between health beliefs, self-efficacy, social support, sedentary activities and physical activity levels in 92 children aged 10 to 16 years. Physical activity was measured by a motion detector (Actitrac: IM Systems, Baltimore, MD) for one week. Moderate levels and high levels of physical activity of children were analyzed. The results demonstrated that time

spent in sedentary behaviors was inversely correlated with the amount of moderate activity ($p<.001$) but not high-level activity. In contrast, self-efficacy scores and social influence scores were significantly correlated with time spent on high- level activity. One interpretation is that correlates of high and moderate level physical activity are different.

Finally, Sallis, Taylor, Dowda, Freedson, & Pate (2002) studied correlates of 21 predictive variables with vigorous activity in 781 children grade 1 to grade 12. The predictive variables included: 1) demographic variables (parent education, dual parent status, child's race/ethnicity, and number of children at home), child psychological & biological variables (body mass index, school grades, enjoyment of physical education, enjoyment of physical activity, coordination, use of recreational time, and diet quality), social variables (family influences, adult physical activity, and peer influences), and environmental variables (neighborhood characteristics, neighborhood safety, access to facilities, park distance, park safety, and park frequency). The results were reported separately for grade and gender. The authors concluded that the most consistent correlates of physical activity were peer support and use of afternoon time for active rather than sedentary activity. Peer support was the only significant correlate of physical activity, measured by accelerometer, in multiple subgroups.

A summary of the factors found to be significantly correlated with physical activity in elementary school students from this review is presented in Table 2.6. The results revealed that factors correlated with physical activity varied by gender and level of physical activity and the results were inconclusive.

Table 2.6 Summary of the Factors Significantly Correlating with Physical Activity in Elementary School Students

Correlates	(Sallis et al., 1999)		(Strauss et al., 2001)		(DiLorenzo et al., 1998)		(Trost et al., 1999b)		(O'Loughlin et al., 1999)	(Pate et al., 1997)		(Stucky-Ropp & DiLorenzo, 1993)	
	Boys	Girls	MPA	VPA	Boys	Girls	Boys	Girls		MVPA	VPA	Boys	Girls
Age			a	a						a	a		
Gender	a	a		a						a	a		
Participate in sport/ PA							a		a				
Use of afternoon time for exercise	a	a											
Spend less time on TV								a					
Time spent on TV viewing (inverse)			a							a	a		
Self-efficacy to PA				a			a	a	a		a*		
PA outcome								a					
Enjoyment	a				a	a						a	a
Time barriers (inverse)		a											
Perceived mother being active							a						
Mother PA/ Parent PA/ Parental modeling	a												a
Friends/ Parental/ Family support	a	a							a			a	
Mother perceived family support for exercise												a	a
Mother perceive barriers to exercise												a	a
Exercise equipment at home										a			a

a = correlation with physical activity; b = correlation with low-level of physical activity;
b* only subscale of seeking support for physical activity is significantly correlate with low-level of physical activity

3. Social and Physical Environment

From a literature search, only three published articles were conducted to explore association between social and physical environment on physical activity in children. Summary of each study are described briefly in this section.

First, Timperio et al (2004) studied association of perceptions of the neighborhood environment and walking and cycling among Australian younger children aged 5-6 yrs (N=291) and older children aged 10-12 years old (N=919). Parents reported frequency of their child walking or cycling to local destination and their perceptions of their neighborhood. Older children's perceptions of traffic, stranger, road safety, and sporting venues were assessed as well as their perception of their parents' views on these issues. The result indicated that older children walked or cycled to destinations more often compared to younger children. There were no differences in frequency of walking or cycling to specific destination according to SES among girls of younger children. Inversely, 5- to 6- year-old boys with high SES walked or cycled to destination more often than boys with medium SES. Among older children, boys with the highest SES walked or cycled to public transport more often than boys with the lowest SES (p=.006) and girls with the highest SES walked to or from school more often than those with a medium SES.

Among younger children, Boys whose parents believed that there was heavy traffic in their local streets were more than twice as likely as other boys to walk or cycle to destination. Girls whose parents owned more than one car and reported limited public transportation in their area were less likely to walk or cycle at least three times a week to destinations. After entering these variables into a multivariate logistic regression model

that control for SES, owning more than one car and a perception of limited public transportation remained significantly predicted walking and cycling among your girls.

Among older children, boys who believed there were no parks near where they live and whose parents believed that their child needed to cross several roads to reach play areas and that there were no lights or crossings for their child to use were less likely to walk or cycle to destinations three times a week or more. Boys whose family owned a dog were more likely to walk or cycle to local destinations at least three times per week. Girls who believed there were no parks near where they live and whose parents believed that their child needed to cross several roads to reach play areas, and that there were few sporting venues and limited public transportation in their area were less likely to walk or cycle to destinations three times a week or more. When parents' and children's perceptions of their local environment were entered into multivariate logistic regression models and adjusted for SES and potential clustering by school, 10- to 12-year-old boys whose parents believed there were no lights or crossings for their child to use were 60% less likely to walk or cycle. For 10- to 12-year-old girls, children who believed that there were no parks near where they live and whose parent believed that their child needed to cross several roads to reach play areas and that there was limited public transport in their area were less likely to walk or cycle.

Next, Weir, Etelson, & Brand (2006) examined the degree to which parents in a poor inner city and a middle- class suburban community limit their children's outdoor activity because of neighborhood safety concerns. Two hundred and four parents from inner city and one hundred and three parents from suburban participated in the study. Parents reported their child activity and their level of anxiety concerning according to

gangs, child aggression, crime, traffic, and personal safety in their neighborhood. Results indicated that inner city children engaged in less physical activity than suburban children ($P<.0001$). Inner city parents reported greater anxiety about neighborhood safety than suburban parent ($P<.0001$). Physical activity levels of children living in inner city were negatively correlated with parental anxiety about neighborhood safety ($r=-0.18$, $P<.05$). In conclusion, a safe environment increases physical activity of children.

Adkins, Sherwood, Story, & Davis (2004) conducted study to examined factors determining physical activity. The potential predictors included in this study were child body mass index, parent's perception of self-efficacy and support for helping daughter to be active, girl's perceived support from parents for physical activity, parent's and girl's perceived neighborhood safety and access to facilities, and family environment. Fifty two 8- to 10- year-old African American girls and their primary caregiver in the Minneapolis/St. Paul area participated in this study. Physical activity-related psychosocial variables of parents and children were measured by using self-report questionnaires. Physical activity levels were assessed by wearing an activity monitor for 3 days and the average minutes per day of moderate to vigorous activity between 12 p.m. and 6 p.m. were determined. The result demonstrated that body mass index was negatively correlated with moderate to vigorous activity ($r=-0.35$, $P<.001$). Parent's supports for daughter's activity were not significantly correlated with activity ($r=0.26$, $P<.06$). Girls' perception of parent's support for physical activity, perceived neighborhood safety and access to facilities, and family environment were not associated with girl's activity levels.

Sallis et al.(1999) examined an association between demographic variables (parent education, single parent, and race), child variables (such as use of afternoon time, enjoyment to physical education class, time barriers, general barriers, etc.), social variables (family support, importance of child's physical activity, parent physical activity, parent paid fees, parent physical activity enjoyment), and physical environmental variables (environmental barriers, supervised programs, and play rules) and physical activity in 1,504 parents and children in grades 4-12. Twenty-two explanatory variables were measured by self-report questionnaires and 11- items of child physical activity index were used to measure physical activity. Physical environmental characteristics included in this study were access to play space (3 items), play rules (5 items), supervised programs (10 items), and environmental barriers (3 items). The result from hierarchical multiple regressions were conducted separately for 6 age-gender subgroups. In grade 4- to 6- children, the overall model explained approximately 18% and 19% of the variance of physical activity in boys and girls, respectively. Demographic variables were fail to explain the percent of variance in physical activity (R^2 = .008). The child variables block explained 8 and 12 percent of the variance in physical activity in boys and girls, respectively, whereas social variables explained 9 and 7 percent, respectively. When control for all other variables in the model, environmental variables were non-significantly explained the variance of physical activity both in boys and girls.

Finally, Morgan et al.(2003) examined association of demographic/biological, psychological, social, and environment variables with self-report physical activity and accelerometer monitoring in Mexican-American (56 boys; 64 girls) and European-

American (49 boys; 45 girls) children (mean aged = 12.1 years). Thirty two potential explanatory variables included into the analysis. The psychological variables were physical self perception, weight loss motivation, barriers, and enjoy physical activity. The social variables were modeling by teachers, modeling by adults, supports from adults, transportation, and number of activity rules indoors. The environmental variables included opportunity for physical activity in a safe place, opportunity to join sports teams, neighborhood dogs unattended, and neighborhood exercisers. The results reveled that the overall model explained only 3 and 9 percent of the variance in self-report physical activity in boys and girls and explained 16 and 7 percent of the variance in accelerometer in boys and girls, respectively. Environment variables were non-significantly explained variance in physical activity measured by accelerometer both in boys and girls.

In summary, the construct of physical activity environment founded in existing studies are varied by study. It is less clear that what variables in physical activity environment determining physical activity in children. Most of the study in children focused on neighborhood environment. Study that included school and home environment is paucity. This study has included neighborhood, school, and home environment into the same study to intensive explore environmental perspective on physical activity level.

Conceptual Framework

The Social Cognitive Theory (Bandura, 1986) and Human Ecological Theory (Bronfenbrenner, 1979, 1986, 1989, 2000)) is used to ground the study.

Social Cognitive Theory (SCT) was a model proposed by Albert Bandura (1986) to understand the interactions between behavior, cognition, motivation, and emotion. Human behavior is determined through the interaction of personal (including cognitive, affective, and biological events), behavioral, and environmental factors. These factors reciprocally interact with each other bi-directionally, and the interaction between factors varies for different activities and under different circumstances (Figure 2.1) (Bandura, 1986, 1997).

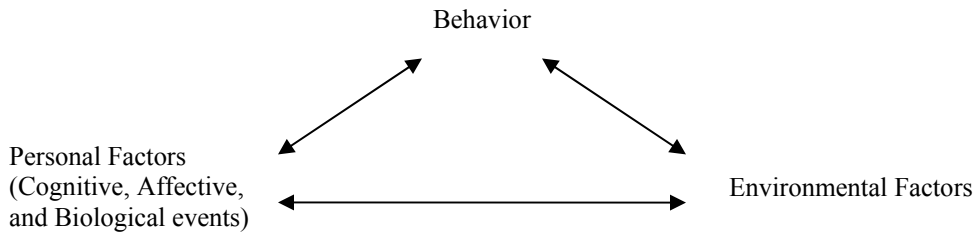


Figure 2.1. The Relationships between the Three Major Classes of Determinants in Triadic Reciprocal Causation in Social Cognitive Theory (Bandura, 1986)

In proposing SCT, Bandura (1986) revised his earlier publication of social learning theory (Bandura, 1977) and placed greater emphasis on the human cognitive ability to interact with the environment and produce desired behavioral outcomes. From the SCT theoretical perspective, Bandura (1986) believed that humans have the capabilities to organize, regulate, and manage the unfolding of events, with cognition playing a pivotal role in ones ability to construct reality, self-regulate, encode information, and perform

behaviors. Self-efficacy, the belief in one's ability to produce a desired outcome (Bandura, 1997), is a key cognitive thought that influences human action. If a person believes that they have power to produce results, they will put greater effort in their attempts to achieve and not give up easily. On the other hand, if a person believes that they have no power to make things happen, they will not attempt to produce results and become discouraged easily.

The Human Ecological Theory is used to expand the concept of environment in the Social Cognitive Theory into level of environment. The Human Ecological Theory (HET) was developed by Urie Bronfenbrenner (1979; 1986; 2000). It states that human behavior is a product of the interaction between an individual and its environment. Bronfenbrenner comprehensively classified the environment into 4 major levels: 1) *microsystem*, 2) *mesosystem*, 3) *exosystem*, and 4) *macrosystem* (Bronfenbrenner, 1979, 1986). *Microsystem* is an environment in which an individual lives and most directly interacts with other individuals (p.22). The microsystem of children could be family, school, peers, or a neighborhood. *Mesosystem* is the interrelation between two or more microsystems that can affect the developmental process of an individual; for instance, the school and family interact to influence the child's performance and behavior in school (p.25). *Exosystem* refers to the social setting that indirectly effects the individual's micro- or mesosystem; for example, parents' employment, parents' social networks, and the community (Bronfenbrenner, 1979) (p.25). Macrosystem refers to the cultural context, beliefs or ideologies that exist in lower-order systems (p.26), such as global change, ethnicity, politics, and health policy.

From the perspective from these two theories, the conceptual framework used for this study is presented in Figure 2.2.

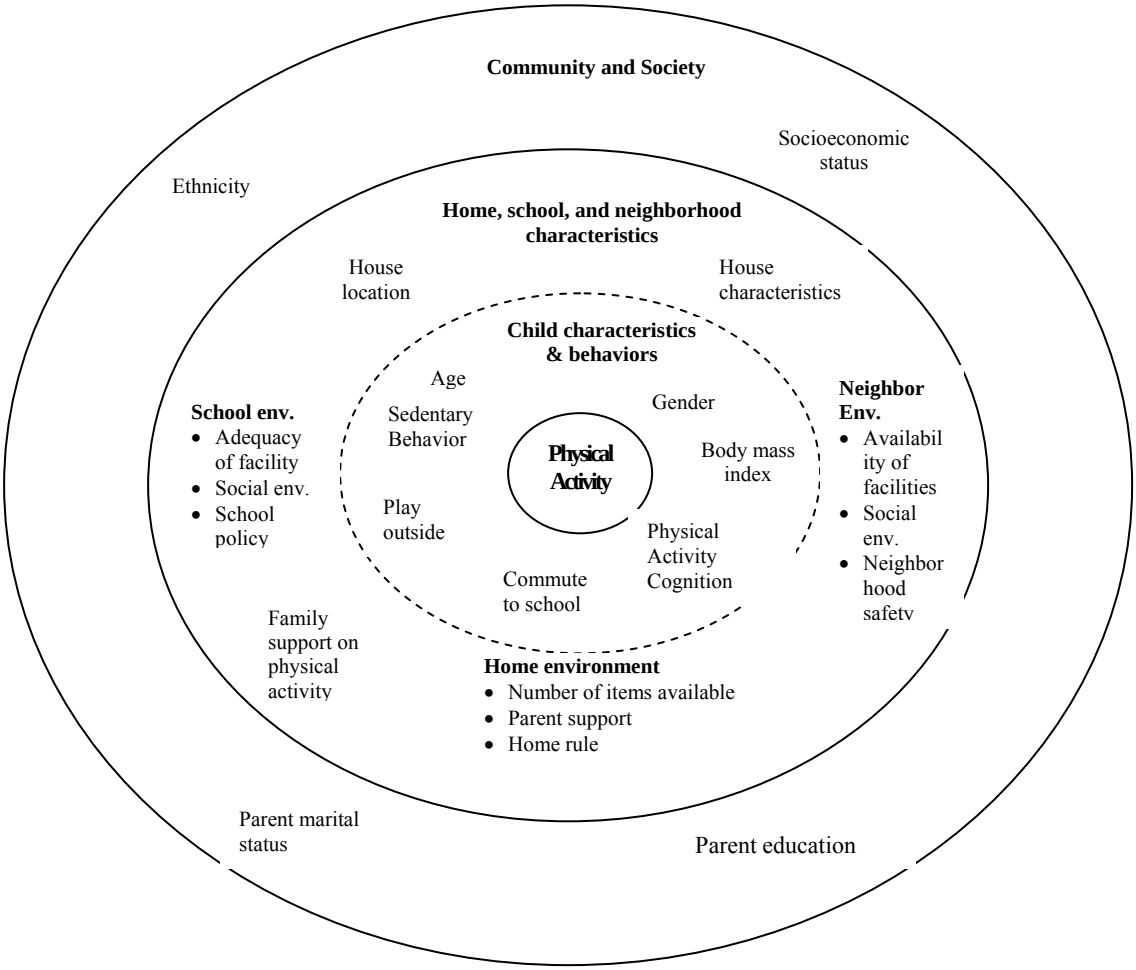


Figure 2.2 Conceptual Framework of the Study

The framework demonstrates inner circle (physical activity) as the main outcome of this study. The next circle presents individual's characteristics which include: 1) child's biological characteristic, such as age, gender, and body mass index; 2) child's physical activity cognition such as perceived barriers to play actively, perceived self-efficacy to play actively, and perceived physical activity enjoyment; 3) child's behaviors including time spent on watching television or playing video/computer game, and time spent on

playing outside, and commute to school. The second next circle from inside demonstrates the *microsystem* level of the model. This level includes environment in which the child lives and most directly interact with other. Regarding physical activity in children, neighborhood, school, and home environment all play a significant role on level of physical activity in children. The neighborhood environment focused in this study is availability of facilities related to physical activity, social environment in neighborhood, and neighborhood safety. The school environment is composed of adequacy of facilities/equipment, social environment at school, and school policy. The home environment is consisted of number of items/equipment available at home, parent support, and home rule. *Mesosystem i*s the interaction between two or more microsystems will produce physical activity level. *Exosystem* refers to the social setting that indirectly affects the individual's micro or mesosystem. In the model, socio-economic status (family income and parents' level of education) and marital status of the parents is included. The *macrosystem,* which includes such structures as health policy, health education policy, and social norms, is not included in the model because it is beyond the scope of this study.

Research Objective

Three research objectives are included in this study.

1. To describe the level of physical activity in Thai fourth-grade students in Bangkok classified by demographic characteristics.

2. To explore factors determining physical activity measured by a pedometer. The possible factors included: 1) Child characteristics and demographic data (gender, body

mass index, house location, house characteristics, family income); 2) Child behaviors (number of hours spent watching television, number of hours spent watching video games, number of hours playing actively outside, and active/inactive commute to school); 3) Child physical activity cognition (perceived barriers, perceived self-efficacy, and perceived physical activity enjoyment); 4) Social influences (frequency that parents allow their children to play outside, parents' perceived safety regarding playing actively outside, and families' favorite activities and family support of physical activity-father/other male support, mother/other female support, and sibling/other child support); 5) Home environment (number of items/ equipment available at home, parent support, and home rules pertaining to active play); 6) School environment (adequacy of facilities/equipment, social environment, and school policy promote physical activity); and 7) Neighborhood environment (number of facilities available , social environment, and neighborhood safety).

3. To report the psychometric data of five questionnaires used in this study including: 1) Child's Perceived Barriers to Play Actively Scale; 2) Child's Perceived Self-Efficacy to Play Actively Scale; 3) Child's Perceived Physical Activity Enjoyment Scale; 4) Child Perceived Social and Physical Environment for Physical Activity Scales; and 5) Family Support for Physical Activity Scales.

CHAPTER III

METHODOLOGY

Introduction

This chapter presents a research methodology designed to answer the two research questions: Among fourth-grade students in Bangkok, Thailand, 1) Do differences in gender, body mass index, socioeconomic status, house location, house characteristics, parents' level of education, and parents' marital status account for differences in the their activity levels as measured by number of steps taken daily? and 2) Does a child's characteristics, behaviors, social cognition, family influences, and perceived social and environmental support at home, school, and neighborhood predict level of physical activity? As described below, physical activity (the main dependent variable) was measured using self-reports, and pedometers. The study design, setting, sample characteristics, data collection, instruments used, and data analysis are explained in this chapter.

Research Design

This research utilized a cross-sectional descriptive study design to describe the level of physical activity and explore factors that predict level of physical activity.

Fourth-grade students enrolling in academic year 2006 in six schools in Bangkok were asked to wear a pedometer all day for 6 consecutive days, and fill out a pedometer log, which asked the times that the child put on and took off the pedometer and the number of steps and active activities he/she performed when wearing the pedometer. The

students were also asked to fill out a previous-day physical activity recall log for three days (two weekdays and one weekend day) in the classroom with assistance. A subgroup of participants was invited to wear an accelerometer coupled with the pedometer to validate the self-reported physical activity recall. In addition, the students were asked to complete a one time set of four self-report questionnaires in the classroom with assistance. These questionnaires included questions regarding barriers to play actively, self-efficacy to play actively, physical activity enjoyment, and environmental factors related to physical activity. The parents of the children were asked to fill out a three-page questionnaire about the family and the child's personal information, child and family time-use behaviors and family support pertaining to physical activity. The data collection was conducted over a three-month period from November 2006 to January 2007.

Description of Research Setting

Schools in Bangkok were the settings for this study. Bangkok is the capital of Thailand located in a central part of the country. Bangkok is composed of 50 districts, which can be divided by administrative area into 6 major zones: 1) Burapa; 2) Rattanakosin; 3) Srinakarin; 4) Choapaya; 5) Krungthonneur; and 6) Krungthontai (See Figure 1). Each administrative zone has specific social-economic characteristics. The Burapa zone is a transition zone from low density residential and agricultural areas to a more densely populated residential and business center of northern Bangkok. The Rattanakosin zone is composed of an historic area and government offices in some districts, and a center of business, trading, and tourist services in other districts. The Srinakarin zone was a residential and agricultural area that has gradually turned into an

industrial and business center east of Bangkok. The Chaopaya zone is a business area along the Chaopaya river, the most important river of Bangkok. The Krungthonneur zone is composed of a historic area in five of eight districts; the other three districts are high density residential areas and center of business and trading west of Bangkok. The Krungthontai zone is defined as a low density residential area combined with some industrial and agricultural areas.

A single district was conveniently selected from each zone. Since there are four major educational organizations that administer elementary schools in Bangkok, and students enrolled in the school under each organization are of different socio-economic statuses; the study examined six schools to represent fourth-grade students in Bangkok based on their location by administrative zone and their organizational.affiliation. The six schools included in this study were: 1) Thewphaingarm School, 2) Mae-pra Fatima School, 3) Kasetsart University Laboratory School, 4) Rachawinit School, 5) Kahachoomchon Lat Krabrung, School, and 6) Wat Kumpang (See Figure 3.1.).

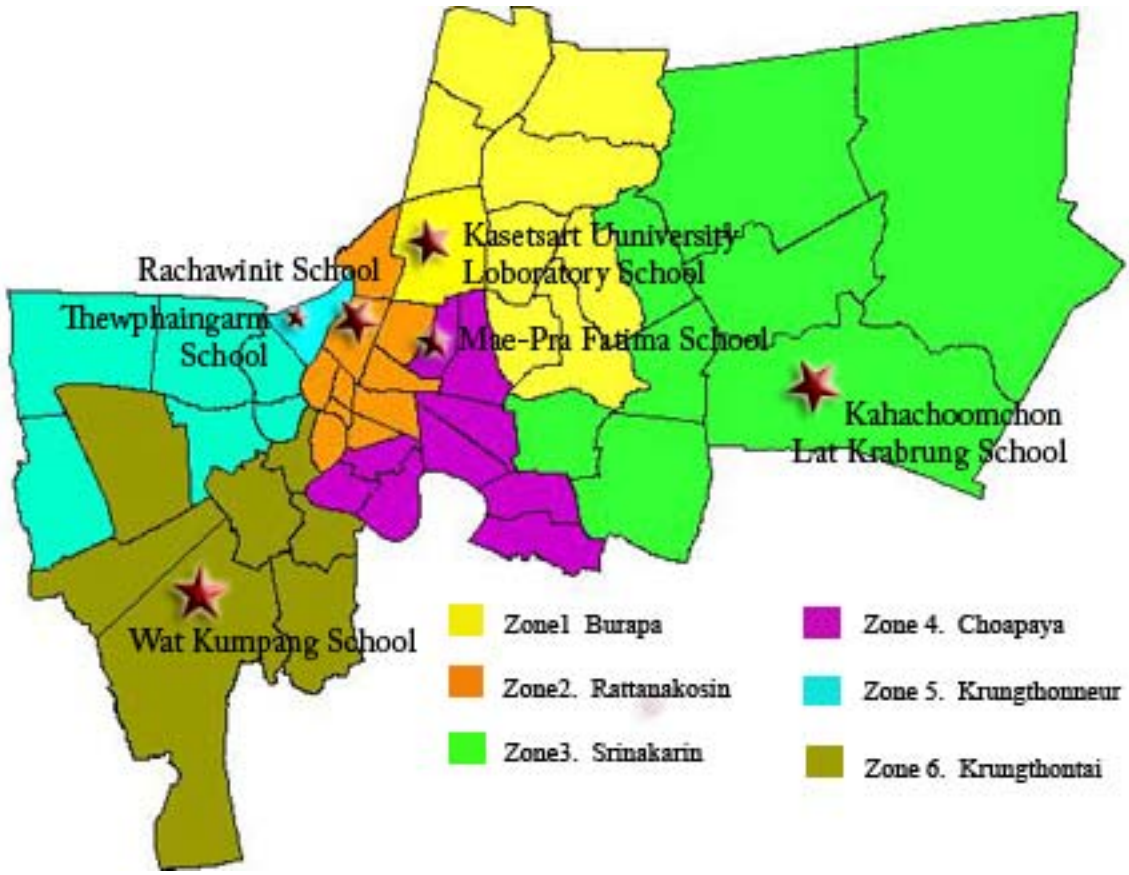


Figure 3.1. Bangkok Map of 50 Districts Categorized by Administrative Zone

Sample

1) Human Subjects Assurance

This study was approved by the University of California, San Francisco Committee on Human Research (H7511-28588-01 and H7511-29331-01). Informed consent was obtained from the parent(s) of each child. Assent to be a participant in the study was also obtained from each subject in accordance with the guidelines of the Committee on Human Research at UCSF (see Appendix A for consent and assent forms).

2) Nature and Size of Sample

The fourth-grade students eligible for participating in this study were approximately 10 years old and healthy who were enrolled in the school in academic year 2006. The total number of eligible students enrolled in academic year 2006 in the six administrative zones and administered by the four educational organizations was different as seen in Table 3.1.

Table 3.1. Total number of fourth- grade students in Bangkok categorized by administrative zone and educational organization

Administrative zones	MOE*		BMP*		MOUF*		Private*	
	N school	N student	N school	N student	N school	N student	N school	N student
1. Burapa	3	607	61	10147	1 1	430 112	68	8121
2. Rattanakosin	12	1935	53	3493	1 1	253 107	75	6730
3. Srinakarin	2	306	118	10187			46	4770
4. Chaopaya	9	1163	43	5616	1	220	78	8439
5. Krungthonneur	8	765	73	6469			59	4386
6. Krungthontai	4	744	85	9984	1	57	68	6830
Total	38	5,520	433	45,896	6	1,179	394	39,276

*MOE: Ministry of Education BMP: Bangkok Metropolitan
MOUF: Ministry of University Affairs Private: Private Education

The sample size was estimated based on regression coefficients of demographic variables, psychological variables, and environmental variables that predicted physical activity in previous studies (Fein et al., 2004; Morgan et al., 2003). The result of Morgan et al.'s study (2003) revealed that demographic variables explained <5 percent of activity counts measured by accelerometer; psychological variables explained 5-12 percent of various accelerometer counts; and environmental variables explained <1 percent of the

variance. The total model explained 7-16 percent of the variance in activity counts. Fein, Plotnikoff, Wild, & Spence (2004) reported that home, neighborhood, and school environments explained 5 percent of the variances in relation to physical activity. The authors of this study set R^2 at .04 for estimating the sample size. The *nQuery Advisor V. 4 program* (Elashoff, 2000), was used to calculate the sample size. When the sample size is 352, the multiple linear regression test of $R^2 = 0$ (α=.05), when including seven normally distributed covariates in the model, will have 80 percent power to detect an $R^2 = 0.04$. Since the study requested students to wear a pedometer for six consecutive days, I anticipated that some students might forget to wear the pedometer or would not be able to meet with the investigators in every session. Therefore, I estimated of 12 percent rate of attrition. The total sample needed for this study was 394 students.

3) Criteria for Sample Selection

Participants were selected based on the following inclusion criteria: 1) Fourth-grade students enrolling in the academic year 2006 in a school located in Bangkok; 2) No history of illness that could limit physical movement, such as heart disease, polio, broken leg, etc.; and 3) Permission from parents to have their children participate in the study. The plan to recruit participants into the study is presented in Table 2.

The investigator approached the directors of the selected schools to explain the study and obtain their support. After receiving a support letter from the director of the school, the investigator met the head of the teacher in charge of fourth-grade students to explain the study and to conveniently select 3-7 classrooms to recruit students into the study (the number of classrooms selected from each school varied by mutual agreement between the teacher-in charge of each school and the investigator). The teachers in

charge of the selected classrooms were asked for assistance to distribute sealed envelopes containing the recruitment letter, the recruitment response letter, and a return envelope to the child to bring to the parents to fill out and return to the researcher's box within two weeks. The investigator reviewed all returned recruitment response letters. All parents that responded affirmatively were contacted by phone to explain the study, answer any questions they might have, and screen to exclude children with limitations in physical movement. The parents of eligible children received the consent form (See Appendix A) taken by their child to review and sign if they agreed to have their child participate in this study. The children who assented to participate in the study with their parents' permission participated in this study.

Table 3.2. The Recruitment Plan of Fourth-grade Students into the Study Classified by Administrative area, Socio-economic Status and Educational Organization.

	School's name	Administrative zone	Educational organization	SES	# of students participated
1	Thewphaingarm School	Krungthonnuer	Private Education	High	60
2	Mae-Rra Fatima School	Chaopaya	Private Education	Moderate to High	60
3	Kahachoomchon Lat Krabung school	Srinakarin	Bangkok Metropolitan	Low to Moderate	60
4	Wat Kumpang	Krungthontai	Bangkok Metropolitan	Low to moderate	80
5	Rachawinit School	Rattanakosin	Ministry of Education	Moderate to High	60
6	Kasetsart University Laboratory School	Burapa	Ministry of University Affairs	Moderate to High	80
Total					400

Data Collection Methods

1) Techniques and Procedures

Data collection was conducted by the Co-Principal Investigator (Co-PI) with assistance from four research assistances (RA) in all six schools. The research assistants were given a three-hour orientation. The orientation session included: 1) a description of their roles and an introduction to the research; 2) instruction about wearing a pedometer and its functioning; 3) instruction about how to fill out a pedometer log and how to check for completeness and accuracy of the data; and 4) an introduction to the questionnaires that were used in this study, and clarification of the wording in the tools.

The Co-PI and RA met the students for five consecutive weekdays. The first session start on a Tuesday, Wednesday, or Thursday. The schedule of data collection for each school is presented in Table 3.3. Approximately 60 students from each school participated in the study. Activities goals to achieve in each session are summarized in Table 3.4. The first session lasted for 90 minutes; subsequent meetings lasted 60 minutes.

Table 3.3 Data Collection Schedule

November 2006						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		8	9	10	11	12
		Thew*	Thew	Thew	Thew	Thew
13	14	15	16	17	18	19
Thew	Thew	Rach*	Rach	Rach	Rach	Rach
20	21	22	23	24	25	26
Rach	Rach					
27	28	29	30			
	Kaset*	Kaset	Kaset			
December 2006						
				1	2	3
				Kaset	Kaset	Kaset
4	5	6	7	8	9	10
Kaset		Maepra*	Maepra	Maepra	Maepra	Maepra
11	12	13	14	15	16	17
Maepra	Maepra		Kaha*	Kaha	Kaha	Kaha
18	19	20	21	22	23	24
Kaha	Kaha	Kaha	Kump*	Kump	Kump	Kump
25	26	27	28	29	30	31
Kump	Kump	Kump				
January 2007						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
	Kump*	Kump	Kump	Kump	Kump	Kump
15	16	17	18	19	20	21
Kump			Kaset*	Kaset	Kaset	Kaset
22	23	24	25	26	27	28
Kaset	Kaset	Kaset				

* Thew = Thewphaingarm School Rach = Rachawinit School;
Kaset = Kasetsart University Laboratory School Maepra = Mae-pra Fatima School
Kaha = Kahachoomchon Lat Kabrung School Kump = Wat Kumpang School

Table 3.4 Data Collection Procedure for Each School

Day	Co-PI's activity	RA's activity	Time (min)
1	• Meet students to explain the study • Introduce a pedometer and demonstrating how to wear it in the right position • Instruct how to record a pedometer wearing log • Measure stride length and validate a pedometer • Asking the children to bring the Family and Child Information Questionnaire enclosed in the package to the parent to fill out and bring it back	• Distribute research packages, pencil, and a pedometer to the student • Assist students to wear a pedometer at the right position • Be with four small groups of children to help and answer questions • Three RA assist the Co-PI measure stride length and validate a pedometer • One RA takes children's body weight and height	90
2	• Greet and ask the student to take a pedometer off and bring it with a pedometer wearing log to an assigned RA • Ask if the child has played the pedometer, such as shaking it for fun or resetting it than defined time • Distribute a set of 4 questionnaires related to social cognitive and environment related to physical activity and instruct how to answer • Return a reset pedometer to the children and assist them wearing it correctly • Hand out a pedometer wearing log for the children to fill out	• Record number of steps showed on the pedometer on an according pedometer wearing log; check for completeness of the log; and interview the child to check whether or not the child has forgotten to wear it, reset it, or shaken it • Check for a completeness of answers in the questionnaires • Reset a pedometer and return it to the children and help him wear it correctly	60
3-5	• Activity related to a pedometer repeated the day 2's session, • Distribute the Previous Day Physical Activity Checklist to the children and instruct how to answer the questionnaire	• Activity related to pedometer wearing repeated the day 2's session • Help the assigned group of students during filling out the questionnaire and check for completeness of answers.	60

In the first session, the investigator met with participants to assign identification numbers for each student and explain the study. Each participant received a research package including a pedometer, pedometer wearing instructions, a pedometer wearing log, the Family and Child Information Questionnaire sealed in an envelope, a pencil, and an eraser. The investigator then instructed students how a pedometer functioned and demonstrated how to wear it (see the detail of a pedometer wearing instruction in Appendix B). The student was asked to wear a pedometer from waking up in the morning until going to bed for 6 consecutive days, except when bathing, swimming, or participating in any water activities, and sleeping. The student also received a pedometer wearing log (see Appendix B) to specify the times the put on or took the pedometer, the reason for taking it off, and the number of steps taken displayed on the pedometer screen. Instruction about how to record the number of steps taking in the pedometer-wearing log (see Appendix B) was also provided.

Next, the students were divided into two groups to complete the next task at two stations. The first group was asked to measure stride length and validated operation of the pedometer; the other group was asked to measure their weight and height. Then, the groups were switched to complete both tasks.

The investigator and the three research assistants organized to measure stride length and validate the pedometer by setting it at zero, and then asking the student to walk 20 steps. The number of steps displayed on the pedometer was checked to validate its accuracy, the endpoint was marked, and the distance traveled was divided by 20 to obtain an average stride length. This study allowed 10 percent of error for each pedometer. For example, a step count of 20±2 steps was defined as being valid and the pedometer was

certified to be used in the study. If the step count was outside this range, the investigator asked the student to repeat walking or change pedometers if necessary.

Body weight and height were taken by a research assistant. The SECA 840 Bella digital scale (SECA Corporation, Maryland) with report ± 0.5 percent accuracy was used to weigh students in their student uniform and shoeless in a private room. The SECA Model 214 Road Rod portable stadiometer (SECA Corporation, Maryland) was used to measure each student's height.

At the end of session 1, the investigator asked the students to have their parent(s) fill out the Family and Child Information Questionnaire enclosed in the research package Return envelopes were provided, and students were asked to bring back the questionnaire by the fifth session of the study.

In the second session, students met with the investigator and four research assistants. The students were divided by identification number into four groups. Each RA was assigned to work with one group of the students. Each group of students was asked to take a pedometer off and bring it with the pedometer-wearing log to the assigned RA. The RA recorded the number of steps shown on the pedometer screen and asked: 1) if the student had forgotten to wear the pedometer; 2) if they had reset the pedometer since wearing it and meeting with the RA; 3) if they had played with the pedometer such as shaking it or jumping with it on in order to increase the number of steps deliberately. If the number of steps taken was more than 10,000 per day, the RA interviewed the student about his/her previous day's activities.

Next, the investigator distributed a set of four questionnaires including 1) Child's Perceived Barriers to Play Activity scales; 2) Child's Self-efficacy to Play actively; 3)

Child's Perceived Physical Activity Enjoyment; and 4) Child's Perceived Social and Physical Environment on Physical Activity (see all questionnaires in Appendix C). The investigator explained to the students what the questionnaire asked and how to answer. The investigator and RA assisted students as needed. The RA checked for completeness of answers. After that, the student received a reset pedometer back from the RA and received a pedometer wearing log. The investigator ended this session thanking the students for their cooperation, reminding them to meet with the research team on the next weekday, and providing a snack.

For the third to fifth session, the activities related to pedometer wearing discussed in session two were repeated. In these three sessions, the students were asked to fill out the Previous Day Physical Activity Recall Checklist (see in Appendix C) in every session. The students received a weekend version to fill out if they met the investigator on Monday and received a weekday version for the other days.

A snack and refreshment were provided to participants for the first four sessions. At the end of the last session, students received a notebook as a reward for their participation.

2) Instruments

2.1 Pedometer –The Walk-4-Life (Duo) pedometer is manufactured in Japan and designed to measure step counts and activity time. The Walk-4-Life pedometer has been tested on children for accuracy, and has proved to have 95 percent accuracy. Students were asked to wear the pedometer on their belt or waistband, halfway between the belly button and hip. Specific instructions included wearing it for six consecutive days from

time of awakening until time bedtime except during bathing, swimming, or participating in any water activity. The instructions of pedometer wearing are provided in Appendix B

2.2 Family and Child Demographic Questionnaire: The tool is composed of three sections designed for a parent to complete (see Appendix C). The first section contains 16 items asking about the child's and family's personal information including the child's birthday and gender, parents' body weight and height, parents' education, house's postal code, marital status of the parent, family income, house characteristics, etc.

A 7- item set in the second session of this tool asked the parent about the family's time-use behaviors. The items asked what the child likes to do after school, during weekdays and weekends, how often the parents allowed the child to play outside, how safe it was for the child to play outside, how much free time the family had and a favorite activity the family likes to do during free time.

The third session assessed parental support of physical activity. The 15-item tool was developed by modifying the tools used in the Amherst Health and Activity Study and the PACE+School Study (Prochaska et al., 2002; Sallis, Taylor et al., 2002) to assess frequency of parental support for physical activity in five social support behaviors: (a) encouragement, (b) participation, (c) transportation, (d) watching, and (e) praising. The modified tool followed the model of the Prochaska et al. tool (2002). Modifications were made to the wording in the item and response options. The modified tool asked about the same family supportive behaviors as the original tool (Sallis, Taylor et al., 2002). The response option of this tool is a 5-point Likert scale.

The frequency of social support behaviors of family (father or adult male, mother or adult female, and sibling or other children in the family) during a typical week was rated

by the parent on a 5-point Likert scale ranging from never (code 1) to greater than 5 times per week (code 5). The total score could range from 5-75. The scale was tested in 63 parent-child pairs and two week test-retest reliability of the scale was strong (ICC = .81) (Sallis, Taylor et al., 2002). The internal consistency of the items was α =.78 in Sallis et al.'s study (2002) and α =.77 in Prochaska et al.'s study (2002).

2.3 Child's Perceived Barriers to Play Actively Scale**:** A 13-item tool of perceived barriers to play actively was modified from the Perceived Barrier Scale (Wu, Ronis, Pender, & Jwo, 2002), originally developed to assess barriers to exercise in Taiwanese adolescents. Three modifications were made: (1) This study used the term "barriers to play actively" instead of "barriers to exercise" because it was more appropriate for children; (2) Two items from the original tool omitted ("I don't like to exercise," and "I don't know how to do certain kinds of exercise"); and (3) Three items were added to the scale ("The weather is bad for playing actively"; "I don't have my parent's permission"; and "There are too many cars running past the playing area") because they were identified by the students in the first pilot test as being potential barriers for playing actively. The final version of the tool (see Appendix C) asked students to rate using a 4-point Likert scale ranging from strongly disagree (code 1) to strongly agree (code 4) how much they agreed or disagreed that the barrier stated in each item was a barrier for them to play actively. The possible range of scores was from 13 to 52. Higher scores were interpreted as indicating higher barriers to play actively.

Construct validity of the original tool has been established (Wu et al., 2002) by using confirmatory factor analysis. The three-factor model (time constraints, environment surroundings, and personal issues) demonstrated a good overall fit. The

internal consistency of the overall barriers scale (N=969) was α 0.79. The reliability test in a large sample size of Taiwanese adolescents (N=977) has been reported at .81 (Wu & Pender, 2002).

4. Child's Perceived Self-Efficacy to Play Actively Scale: A 13-item tool of various situations that make it difficult for children to be physically active was included for the child to judge his/her level of confidence to overcome the barriers to be physically active. This tool (see Appendix C) was developed by using the guide for constructing self-efficacy scales provided by Prof. Albert Bandura (Stanford University 1997). Students were asked to rate their level of confidence to play actively when they faced each situation in the item in 5-level Likert scale ranging from "not confident at all" (code 1) to "very confident" (code 5). The possible scores ranged from 0-52. Higher scores indicated a higher sense of self-efficacy to play actively.

5. Child Perceived Physical Activity Enjoyment Scale: A 19-item scale evaluating the level of enjoyment children felt when playing actively (for example, statement such as "When I play actively…I enjoy it"; "When I play actively… I dislike it", were used to assess children's enjoyment of physical activity; see Appendix C). Sixteen items used in this tool were derived from Physical Activity Enjoyment Scale (PACES) originally developed by Motl et al. (2001) to measure enjoyment of physical activity in adolescent girls. Three newly developed items were added to this tool from the results of interviewing Thai children conducted during the first pilot test of the tool ("When I play actively… it makes me healthy" , "…I feel fresh", and "it make me tired"). The 5-point Likert scale ranging from strongly disagree (code 1) to strongly agree (code 5) was used for the child to rate his/her level of agreement or disagreement

with each statement. The "not enjoy" statements were recoded and all items summed. The possible scores of the scale ranged from 18 to 90. Higher scores indicated more enjoyment of physical activity. The construct validity and factorial validity was tested by Motl et al. (2001) and indicated that the PACES was a valid measure of physical activity enjoyment.

6 Child Perceived Social and Physical Environment for Physical Activity: This tool was developed by gathering questions from several existing tools (Fein et al., 2004), (Prochaska et al., 2002), (Sallis, Taylor et al., 2002), and (Timperio et al., 2004) and adding some items to measure social and physical environments in the neighborhood, school, and home (see Appendix C for the tool). In the neighborhood environment, the scale assessed availability of activity facilities, environmental safety, and social environment related to physical activity. A list of 9 facilities (ie. free space in which to run around, presence of a sport field, presence of a safe place for biking or a bike lane,…) was developed to assess availability of facilities related to physical activity in the neighborhood. The response option was dichotomous (Yes =1; No = 0). Three items asked about neighborhood safety (for example, "How safe is it to play outside near where you live", "How worried are you about strangers when you play outside"). Students were asked to answer the question on three choice options according to the question. The other four items asked about their social environment as it related to physical activity in the neighborhood (for example, "How often do you see children play outside in your neighborhood" and "How often do your neighbors play actively outside with you"). Three answer choices corresponding to the questions were used as a response option.

The items were summed for the neighborhood environment domain. Higher scores indicated a neighborhood environment that promoted physical activity.

Regarding the school environment domain, three subscales queried the availability of facilities at school, school policy pertaining to activity, and the school environment as it related to physical activity. Five items were created to assess availability and adequacy of the school's facilities. Students were asked to answer by choosing among three choices: "Yes, very adequate" (code 3); "Yes, not adequate" (code 2); and "No" (code 1). Three items assessed the school's physical activity policy (for example, "Does your school allow students to play actively during recess?" Does your school allow students to use equipment after school?") Children were asked to answer "Yes" = 1 or "No" = 0). The other three questions were developed to assess the social environment in the school. An example of the items was: "How many other students play actively with you at school?" and "How many students in your school play actively during recess?" Students were asked to answer using a three choice option. The total score of this domain was created by adding up all responses in the domain. Higher scores indicated a school environment that promoted physical activity.

The domain of home environment related to physical activity was assessed for three subscales: availability of equipment at home, family support, and parental rules related to physical activity. A list of seven types of equipment such as balls, bicycles, badminton or tennis racquets, etc… was used to assess the availability of equipment that promoted physical activity. Children were asked whether or not they had any of the listed pieces of equipment at home. The response options were "Yes (code 1) or "No" (code 0). Three items related to family support behaviors related to physical activity were

developed. These included: encouragement for active play, provision of transportation, and participation in physical activity. Children responded using three multiple choice options. Finally, two more items were designed that asked about parents' rules related to physical activity ("Does your parent allow you to play outside after school?"). The children were asked to respond using one of three answers. The total score for the home environment domain is the sum of scores from each item.

7. Previous Day Physical Activity Recall Checklist (School-Day and Non-School Day version): A modified Self-Administered Physical Activity Checklists questionnaire (Sallis et al., 1996) and Yesterday Activity Checklist (Sallis et al., 1993) were used to assess type and context of activity (see Appendix C). The list of activities was modified for congruence with activities performed by Thai children. Children were asked to check any type of activity they had done the previous day and also rate the activity's level of intensity (from 0 = "Not tired at all" to 3 = "Very tired) when they performed the activity. The duration of time children spent watching television, playing video games, and playing actively outside was assessed. Mode of transportation to school was included in the school version. Children were asked to fill out the questionnaire three times (on two weekdays and on one weekend day).

All tools employed in this study were originally developed in English and were translated into Thai by the Co-PI and two doctoral students who are competent in both Thai and English. The tools then were pilot tested for comprehension by using cognitive interview techniques suggested by Willis (2005) in a group of ten fourth- grade students at Wat Sameanaree School, Bangkok. Thailand. The revised version of the tools was pilot tested again in a different group of ten fourth grade students in the same school.

The final versions of the Child's Perceived Barriers to Play Actively Scale, the Child's Perceived Self-Efficacy to Play Actively Scale, the Child's Perceived Physical Activity Enjoyment Scale, and Child's Perceived Social and Physical Environment for Physical Activity Scales were administered to another group of 30 fourth-grade students in the same school twice, one week apart, for test-retest reliability.

Data Analysis

The data were analyzed using SPSS software (version 15). The statistics used to analyzed data to answer each research question are described below. .

Hypothesis 1: There will be a statistically significant difference in mean levels of physical activity between males and females, children with high and low income, and children living in urban, suburb, and periphery of Bangkok. The standard descriptive statistics of physical activity were categorized by gender, family income, and location. The independent t-test was used to compare mean of physical activity in boys and girls, and students with high and low family income. The one-way ANOVA statistic was utilized to analyze to compare mean of physical activity among children living in urban, suburb, and periphery of Bangkok. The pos-hoc analysis was further analyzed for identifying the mean difference between pair. The level of statistical significant was set at .05.

Hypothesis 2: The child characteristics, child's behaviors, Social influences, family support, child physical activity cognition, and home, school, and neighborhood environment are significantly predicting physical activity in Thai children. The data were analyzed by using multiple series of multiple regression analysis statistics. In the first series, predictors and dependent variable of each group of variables were added into the model simultaneously. The 11 separate models were analyzed. The variables that significantly predicted physical activity were kept for next series of analysis. In the second series of analysis, the variables obtained from the first analysis were added into the model using hierarchical regression analysis. Several series of analysis were analyzed by using hierarchical regression analysis until a parsimonious model was obtained. The steps of entering variables into the model are presented in detail in the results section of this dissertation

CHAPTER IV

RESULTS

Introduction

Results of the study are presented in this chapter. The chapter is organized as follows: First, sample characteristics are described, which include acceptance, refusal and retention. Second, the chapter reviews how missing data are handled. Third, item analysis and reliability of instruments used in this study are analyzed and presented. Fourth, the chapter presents descriptive and bivariate statistics of physical activity categorized by child demographics and family demographics. The fifth and last section of the chapter reports the results of multiple regression analysis to analyze factors that predict physical activity.

Acceptance and Refusal Rates

A total of 440 parents of fourth grade students who met the inclusion criteria were asked to allow their child to participate in the study. Students were drawn from the following six schools: The Thewphaingarm School, Rachawinit School, Kasetsart University Laboratory School, Mae-Pra Fatima, Kahachoomchon Lat Krabung School, and Wat Kumpang School. Parents of 402 students agreed to have their children participate in the study. Thirty-eight parents (9.5%) refused to have their children participate. Parents' major reasons for not allowing their children to participate were: (1) they were unable to allow their children to join every session; and (2) they were doubtful their children could follow the study's procedures. Four (1%) students decided to drop out of the study. The final sample consisted of 398 subjects (90% of those invited; all

met the inclusion criteria). The sample, categorized by school affiliation and gender, is presented in Table 4.1.

Table 4.1 The Final Subjects Categorized by Schools

School	Gender		Total
	Male	Female	
Thewphaingarm	36	22	58
Rachawinit	33	28	61
Kasetsart University Laboratory School	29	50	79
Mae-pra Fatima	29	31	60
Kahachumchon Lat Krabrung	30	30	60
Wat Kumpang	40	40	80
Total	197	201	398

Incidence and Management of Missing Data

The incidence of missing data was varied by activity (See Table 4.2.) Missing data of child and family demographics and family time use behaviors were left as missing. All scales used in this study, including Family Support Scale, Child's Perceived Barriers to Play Actively Scale, Child's Perceived Self-Efficacy to Play Actively Scale, Child's Perceived Physical Activity Enjoyment Scale, and Child's Perceived Social and Physical Environment for Physical Activity Scales, were scored when 80% of the items were answered within each of the scales and subscales. Then, the missing data from the scales were left as missing. Lastly, the cases of missing data from wearing a pedometer for 6 consecutive days were rescored by including a case of 5- days wearing with at least

one weekend. Then, the missing data after this rescoring were left as missing and omitted from the final analysis, causing the sample size to vary.

Table 4.2 Missing Data Categorized by Instruments and Activities

	Missing data before management	
	N	%
Parent Questionnaire (Child and Family Demographics Questionnaire)		
Family Support Scale	127	31.9
Child Questionnaire		
Child's Perceived Barriers to Play Actively Scale	22	5.5
Child's Perceived Self-efficacy to Play Actively Scale	8	2.0
Child's Perceived Physical Activity Enjoyment Scale	10	2.5
Child's Perceived Social and Physical Environment for Physical Activity Scales		
• Availability of Facilities in Neighborhood Scale	10	2.5
• Neighborhood Safety Scale	5	1.3
• Social Environment in Neighborhood Scale	5	1.3
• Availability of Facilities in School Scale	10	2.5
• School Policy	6	1.5
• Social Environment in School Scale	7	1.8
• Availability of Equipment at Home Scale	3	0.7
• Parent Support Scale	2	0.5
• Parent Rule Scale	5	1.3
Activity Monitors		
Pedometer wearing for 6 days	93	23.4

C. Analysis of the Instrument

Five tools used in this study were analyzed for item analysis, internal consistency reliability, and exploratory factor analysis to determine the quality of the tool. The item analysis technique, including examination of interitem correlations and item-total scale correlations were examined for all scales used in this study. The interitem correlation should be between .30 and .70. When interitem correlations are consistently above .70,

that indicates that items are redundant. When interitem correlations are consistently below .30, that indicates a lack of a substantive relationship among items (Nunnally, 1978). Item-total scale correlations measure the relationship between the score of a test item and the total test score. The more each item correlates with the total test score, the higher all items correlate with each other (higher alpha) (Nunally, 1978).

Cronbach's alpha coefficients were calculated to assess the internal consistency of each of the scales used in this study. An alpha coefficient of at least .80 indicated a highly reliable instrument (Nunnally & Bernstein, 1994). The test-retest reliability of all scales, except the Family Support Scale, was tested in a pilot study of 30 students. Exploratory factor analysis of each scale was used to explore the number of factors.

1. Family Support for Physical Activity Scale

Item Analysis. A total of 15 items with complete answers were analyzed statistically and for internal consistency. One hundred and thirty three cases that had missing data (33.4%) were excluded from the final analysis. This high rate of missing data occurred because some of the questions asked did not apply to all respondents. For example, the item that asked "How often does the father/other adult male in the family encourage the child to play actively/sports?" was left blank when no father/other adult male was present in the family. Similarly, the item that asked "How often does a sibling or other child in the family encourage the child to play actively/sports?" was left blank by a parent who had only one child in the family. A total of 265 cases with complete answers were analyzed for this scale. Mean, standard deviation, and item-scale

correlation for each item are presented in Table 4.3. The average item mean was 2.43 ranging from 2.06 to 2.79. The interitem correlation ranged from .08-.73.

Table 4.3 Descriptive Statistics for Family Support for Physical Activity

Item	Mean	S.D.	N
How often does the father/other adult male in the family encourage the child to play actively/sports?	2.64	1.198	265
How often does the mother/ adult female in the family encourage the child to play actively/sports?	2.79	1.186	265
How often does a sibling or other children in the family encourage the child to play actively/sports?	2.44	1.350	265
How often does the father/other adult male in the family participate in PA or play a sport with the child?	2.34	1.100	265
How often does the mother/ adult female in the family participate in PA or play a sport with the child?	2.40	1.174	265
How often does a sibling or other children in the family participate in PA or play a sport with the child?	2.54	1.317	265
How often does the father/other adult male in the family take or drive the child to play actively/sports?	2.27	1.119	265
How often does the mother/ adult female in the family take or drive the child to play actively/sports?	2.32	1.122	265
How often does a sibling or other children in the family take or drive the child to play actively/sports?	2.06	1.197	265
How often does the father/other adult male in the family watch the child play actively/sports?	2.29	1.035	265
How often does the mother/ adult female in the family watch the child play actively/sports?	2.52	1.178	265
How often does a sibling or other children in the family watch the child play actively/sports?	2.30	1.285	265
How often does the father/other adult male in the family tell the child that he/she is doing very well in playing/ playing sports/exercise?	2.54	1.128	265
How often does the mother/ adult female in the family tell the child that he/she is doing very well in playing/playing sports/exercise?	2.73	1.132	265
How often does a sibling or other children in the family tell the child that he/she is doing very well in playing/playing sports/exercise?	2.22	1.258	265

NOTE: Response choices 1-5; high scores indicates more support

Factor Analysis. The interitem correlations of some items were very low (.08 or .15). This may have occurred because the items in the scale did not load on one factor to measure only one thing. An exploratory factor analysis was performed with a sample size of 265. Principal components analysis with varimax rotation revealed three factors. Factor 1 (Sibling/other child support) explained 39.6% of the variance, with 5 items loading at .69 or higher. Factor 2 (Father/adult male support) explained 15.4 % of the variance, with 5 items loading at ≥ .73. Factor 3 (Mother/Adult female support) explained 8.7% of the variance, with 5 items loading at ≥ .66.

The results of the factor analysis revealed that items related to family support of physical activity comprised three subscales: sibling/other child support, father/other adult male support, and mother/other adult female support.

Final Measures. No items were omitted due to an item-scale correlation of less than .30. Interitem correlations and item-total scale correlations were calculated for these three subscales: father/adult male support, mother/ adult female support, and sibling/other child support. Reliability of the subscales using Cronbach's Alpha coefficient ranged from .82 to .87. The mean, standard deviation, interitem and item-total scale correlations are presented in Table 4.4. The reliability, interitem correlation and item-total correlation determined the appropriateness of using these scales for the Thai population. Although the validity of the tool has been established for American parents, it has not been established for Thais.

Table 4.4 Family Support for Physical Activity Subscales: Descriptive Statistics

Scale	N	Scale Mean	SD	# of items	Cronbach's alpha	Inter-item Correlation	Item-total Correlation
Father support	371	2.4 (2.3-2.6)	1.1	5	.85	.43-364	.81-.85
Mother support	382	2.6 (2.4-2.8)	1.1	5	.82	.37-.62	.51-.67
Sibling support	271	2.3 (2.1-2.5)	1.3	5	.87	.47-.74	.59-.73

2. Child's Perceived Barriers to Play Actively Scale (CPBPAS)

Item Analysis and Factor Analysis. A total of 13 items in this scale were examined. The interitem correlation was between .10-.47 (Mean .25), which is relatively low. Factor analysis of the CPBPAS was analyzed using the principal components method by defining for one factor loading to test for a single scale. The factor loadings of the items ranged from .39 to .65 as presented in Table 4.5.

Table 4.5 Descriptive Statistics, Item and Factor Analysis of the Child's Perceived Barriers to Play Actively Scale (N=376)

Items	Mean	SD	Factor Loading	Item-total Correlation
I don't have time	1.63	.74	.46	.37
I don't have a good place for playing actively	1.53	.78	.63	.52
I don't have equipment to play actively	1.49	.76	.53	.43
I have too much homework to do	2.03	.84	.60	.50
I don't have anyone to play actively with	1.57	.83	.56	.45
There are other more interesting things to do	1.82	.83	.46	.36
There are too many cars running past the play area	1.80	.93	.62	.50
The weather is bad for playing actively	1.51	.71	.60	.48
I don't have the right clothes/shoes to wear	1.34	.69	.60	.48
I am too tired	1.45	.73	.58	.47
I have too many chores to do	1.67	.74	.39	.30
I don't have my parent's permission	1.60	.82	.65	.54
I had physical education class earlier today	1.45	.76	.52	.41
Total	20.9	5.6		

NOTE: Response choices 1-5; A high score indicates more support

Final Measures. To examine the reliability of this scale, all 13 items were used. There were 376 valid cases and 22 cases with the missing data 22 (5.5%). The Cronbach's alpha coefficient was .81. The item-total correlations ranged between .30 and .54. The item, "I have too many chores to do" had the lowest item-total correlation (.30). When the investigator reanalyzed reliability by omitting this item from the analysis, the reliability was decreased. No items in the scale provided higher reliability when deleted from the scale. The investigator decided to keep all 13 items in the scale. The descriptive statistics and item-total correlations are presented in Table 4.5

3. Child's Perceived Self-Efficacy to Play Actively Scale (CSES)

Item Analysis. Descriptive statistics for each item and item-correlations are presented in Table 4.6.

Table 4.6 Descriptive Statistics of Child's Perceived Self-Efficacy to Play Actively Scale

Items	Mean	SD	N
When you have no friend to play with	2.97	1.21	390
When you feel bored	2.89	1.20	390
When you feel tired	2.55	1.17	390
When you do not enjoy playing actively	2.57	1.23	390
When there is no appropriate place to play	2.68	1.32	390
When you are too busy with homework	2.32	1.27	390
When another activity is more interesting	2.94	1.28	390
When you feel stressed	2.69	1.33	390
When you feel depressed	2.39	1.30	390
When you are too busy helping your parent do household chores or other things	2.77	1.22	390
When your parent do not supporting you to play actively outside	2.13	1.29	390
When the weather is not good to play actively outside	2.14	1.20	390
When you have no time	2.17	1.25	390

NOTE: Response choices 1-5, high score indicates more support

Factor Analysis. Principal components analysis yielded 2 factors. Factor 1 (self-efficacy to overcome internal affective barriers) explained 37.7% of the variance with factor loadings from .51-.67. Factor 2 (self-efficacy to overcome general barriers) explained 10.4% of the variance with factor loading between .58-.78 (see Table 4.7)

Table 4.7 Factor Analysis of the Child Perceived Self-Efficacy to Play Actively Scale

Items	Factor Loading	
	Factor 1	**Factor 2**
When you feel bored,	**.676**	.141
When you feel depressed	**.664**	.234
When you feel tired	**.661**	.268
When you feel stressed	**.657**	.167
When you do not enjoy playing actively	**.624**	.308
When another activity is more interesting	**.615**	.076
When you have no friend to play with	**.512**	.197
When your parent do not supporting you to play actively outside	.090	**.783**
When you have no time	.251	**.731**
When the weather is not good to play actively outside	.083	**.723**
When you are too busy with homework	.357	**.620**
When there is no appropriate place to play	.276	**.605**
When you are too busy helping your parent do house chore or other things	.329	**.578**
Total % of Variance	37.7	10.4

Final Measures. Item analysis of two subscales obtained from the factor analysis was examined. The descriptive statistics, interitem correlations, item-scale correlations and internal consistency of the two subscales are presented in Table 4.8. The Cronbach's alpha coefficients were .79 and .81.

Table 4.8 Descriptive Statistics, Item analysis, and Reliability of Subscales in Child's Perceived Self-Efficacy to Play Actively Scale

Scale	N	Scale mean	SD	# of items	Cronbach's alpha	Inter-item Correlations	Item-Scale Correlation
Self-efficacy to overcome affective barriers	393	19.1	5.8	7	.79	.21-.53	.42-.58
Self-efficacy to overcome general barriers	394	14.1	5.4	6	.81	.32-.49	.52-.64

4. Child's Perceived Physical Activity Enjoyment Scale (CPPAES)

Item Analysis. Inter-item correlations were as low as .005 in some item pairs and as high as .68 in others. Low interitem correlations were found mostly in items with recoded scores. The mean of the items ranged from 3.17 to 4.5. The distributions of the score for all 19 items were negatively skewed, and skewness ranged from -.336 to -1.99. This finding indicated that among scores, which were coded from 1-5, a large number of students in the study answered at the far right side of the scale (4 or 5). These scores may reflect either students' enjoyment of active play or merely indicate that the item cannot discriminate between high and low enjoyment. The item that deviated most from a normal distribution was a recoded item, "When I play actively it makes me depressed" (Mean 4.5; SD .92; Skew -1.99; and Kurtosis 3.6), which can be seen in Table 4.9. The item "When I play actively, it makes me tired" was omitted from further analysis because it measured a physiological response and because feeling more tired should not be interpreted as having lower enjoyment.

Table 4.9 Descriptive Statistics of Child's Perceived Physical Activity Enjoyment Scale

Item	N		Mean	SD	Skew-ness	Kurtosis	Percentiles		
		Missing					25	50	75
When I play actively, I enjoy it	398	0	4.06	1.10	-.88	-.05	3	4	5
Recode: I feel bored	398	0	4.16	1.03	-1.06	.39	3	5	5
Recode: I dislike it	396	2	4.21	1.07	-1.35	1.11	4	5	5
I find that active play is fun	398	0	4.19	1.07	-1.21	.64	4	5	5
Recode: It is not fun at all	398	0	4.25	1.08	-1.35	.90	4	5	5
Active play gives me energy	395	3	3.57	1.26	-.34	-.96	3	3	5
Recode: It makes me depressed	398	0	4.50	.92	-1.99	3.60	4	5	5
Active play is very pleasant	398	0	3.87	1.18	-.72	-.54	3	4	5
My body feels good	397	1	4.01	1.15	-.92	-.11	3	4	5
I get something out of active play	397	1	3.97	1.14	-.86	-.16	3	4	5
Active play is very exciting	398	0	3.25	1.21	-.10	-.77	3	3	4
Recode It frustrates me	398	0	4.13	1.07	-1.15	.56	4	4	5
Recode : It's not at all interesting	397	1	4.30	1.01	-1.21	.41	4	5	5
Active play gives me a strong feeling of success	396	2	3.58	1.18	-.33	-.80	3	4	5
Active play feels good	396	2	3.95	1.16	-.87	-.19	3	4	5
Recode: I feel as though I would rather be doing something else	398	0	3.79	1.19	-.66	-.53	3	4	5
Active play makes me healthy	397	1	4.21	1.11	-1.24	.56	3	5	5
Active play makes me feel fresh	397	1	3.98	1.10	-.77	-.35	3	4	5
Recode: It makes me tired	398	0	3.17	1.28	-.10	-.95	2	3	4

Minimum score = 1; Maximum score = 5; and Range = 4, for all items

Factor Analysis. Using the remaining 17 items, the principal components method was employed using extraction with a varimax rotation to analyze the factors in the scale. The analysis identified two factors: One item "When I play actively, it frustrates me" did

not load perfectly in any factor and was omitted. All 16 remaining items loaded clearly on two factors. The positively worded items loaded on one factor; negatively worded items loaded on the other as seen in Table 4.10. This two-factor loading may be substantive and meaningful, or it may be artificial and meaningless. The confirmatory factor analysis to test this two-factor model will be conducted after the end of this study.

Table 4.10 Factor Loadings of the Items in the CPPAES

When I play actively….	Factor	
	Positive item	Negative item
It feels good	**.779**	.191
My body feels good	**.778**	.215
It feels fresh	**.757**	.244
It gives me a strong feeling of success	**.743**	.016
It's very pleasant	**.711**	.294
It makes me healthy	**.709**	.120
I get something out of it	**.692**	.066
It gives me energy	**.641**	.062
I find fun	**.637**	.350
It's very exciting	**.631**	.078
I enjoy it	**.554**	.325
Recode Score: I dislike it	.053	**.799**
Recode Score: I feel bored	.153	**.762**
Recode Score: It is not fun at all	.150	**.754**
Recode Score: I feel as though I would rather be doing something else	.120	**.702**
Recode Score: It's not at all interesting	.261	**.651**
% of variance	**41.02**	**14.27**

Final Measures. The investigator decided to use only positively worded items to scale perceived physical activity enjoyment. Negatively worded items were omitted from further analysis. The total of 398 cases, with 13 cases missing (3.3%) was analyzed for reliability. The investigator conducted item analysis again for the scale with positively worded items. The results are presented in Table 4.11.

Table 4.11 Descriptive Statistics and Reliability of the Child's Perceived Physical Activity Enjoyment Final Scale

Scale	Valid/ missing	Scale mean	SD	# item	Cronbach's alpha	Inter-item Correlation	Item-total Correlation
Positively worded items	388/10	42.74	9.0	11	.90	.29-.68	.55-.75

5. Child's Perceived Social and Physical Environment for Physical Activity Scales

The Child's Perceived Social and Physical Environment for Physical Activity Scales (SPEPA) investigated three play environments: 1) the neighborhood, 2) the school, and 3) the home. The scores were analyzed separately by each environment.

5.1 Neighborhood Environment for Physical Activity

The Neighborhood Environment Scale comprised 16 items. The first 9 items, which had a dichotomous response option (Yes =1: No=0), queried about the availability of each of nine types of facilities related to physical activity. The frequencies for each item are presented in Table 4.12. Because a Cronbach's coefficient to assess internal consistency cannot be determined from dichotomous data, a test-retest strategy was used to assess reliability in which thirty students were tested one week apart. A factor analysis

was not performed on this data set. A count of the total number of facilities available in a neighborhood (possible range 0-9) was used for further analysis. .

Table 4.12. Frequency of Availability of Facilities in the Neighborhood

Please mark which place is available in your neighborhood	N		Median	Mode	Yes		No	
	Valid	Missing			N	%	N	%
a. Free space in which to run around	389	9	1.00	1	312	80.2	77	19.8
b. Playground with apparatus	389	9	.00	0	173	44.5	216	55.5
c. Sports field	389	9	.00	0	172	44.2	217	55.8
d. Safe place for biking or a bike lane	387	11	1.00	1	245	63.3	142	36.7
e. Running track	388	10	.00	0	128	33.0	260	67.0
f. Footpath/ sidewalk	388	10	1.00	1	291	75.0	97	25.0
g. River/ swimming pool	390	8	.00	0	171	43.8	219	56.2
h. Public park	386	12	1.00	1	198	51.3	188	48.7
i. Public recreation center/ youth center	388	10	.00	0	133	34.3	255	65.7

The remaining 7 items in the neighborhood environment scale were designed to assess safety and social environment for physical activity in the neighborhood. All items were examined for item analysis and internal consistency reliability. The results are presented in Table 4.13. The item “How often do your neighbors mind if children make noise when playing outside?” yielded an interitem correlation as low as .00. The investigator omitted this item from the scale and reran the item analysis.

Table 4.13 Item Analysis of Neighborhood Environmental Scale

Item	Mean	SD	N	Inter-item correlation	Item-total correlation
2. How safe are the roads when you walk outside your neighborhood?	2.17	.517	391	-.01-.39	.28
3. How safe is it to play outside near where you live?	2.12	.604	391	.10-.39	.35
4. How worried are you about strangers when you play outside?	1.83	.691	391	.03-.20	.17
5. How often do you see children playing outside in your neighborhood?	2.49	.705	391	.03-.29	.20
6. How often do your neighbors complain about children making noise when playing outside?	2.35	.666	391	.00-.18	-.03
7. How friendly with you are the children in your neighborhood?	2.26	.623	391	.00-.25	.35
8. How often do your neighbors play actively outside with you	1.74	.837	391	.04-.34	.28
Total	14.97	2.3			

NOTE: Response choices 1-3; A high score indicates more support ADD

The results of an item analysis of the 6 items, omitting the item, "How often do your neighbors mind that children are making noise when playing outside?" are presented in Table 4.14. The Cronbach's Alpha Coefficient of the scale increased to .54. Although an item "How worried are you about strangers when you play outside?" also produced an interitem correlation as low as .03 and item-total correlation as low as .14, the investigator decided to keep this item for further principal components analysis.

Table 4.14 Item Analysis of Neighborhood Environmental Scale (omitted item #6)

Item	Mean	SD	N	Inter-item correlation	Item-total correlation
2. How safe are the roads when you walk outside in your neighborhood?	2.17	.517	391	.08-.39	.29
3. How safe is it to play outside near where you live?	2.12	.604	391	.11-.39	.33
4. How worried are you about strangers when you play outside?	1.83	.691	391	.03-.11	.14
5. How often do you see children play outside in your neighborhood?	2.49	.705	391	.03-.29	.28
7. How friendly are children in your neighborhood to you?	2.26	.623	391	.07.34	.37
8. How often do your neighbors play actively outside with you	1.74	.837	391	.05-.34	.33
Total	12.62	2.2			

A principal components analysis with a Varimax rotation revealed two factors. Factor 1 (Social environment in neighborhood) explained 31.3% of the variance. Factor 2 (neighborhood safety) explained 20.1% of the variance. Table 4.15 presents the result of a factor analysis. A report of the item analysis and reliability of social environment and neighborhood safety are available in Table 4.16.

Table 4.15 Factor Analysis of Neighborhood Environment Scales

Items	Components	
	Social Environment in Neighborhood	Neighborhood Safety
8. How often do your neighbors play actively outside with you	**.757**	.041
5. Recode: How often do you see children play outside in your neighborhood?	**.702**	-.010
7. How friendly are children in your neighborhood to you?	**.700**	.169
3. How safe is it to play outside near where you live?	.146	**.784**
2. How safe are the roads when you walk outside in your neighborhood?	.144	**.732**
4. How worried are you about strangers when you play outside?	-.059	**.551**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax

Table 4.16 Neighborhood Environment Scales' Statistics

Scale	Valid/ missing	Scale mean	SD	# items	Cronbach's alpha	Inter-item Correlation	Item-total Correlation
Social Environment in Neighborhood	393/5	6.5	1.6	3	.54	.25-.34	.32-.38
Neighborhood Safety	393/5	6.1	1.3	3	.45	.10*-.39	.18**-.33

* How safe are the roads when you walk outside in your neighborhood & How worried are you about strangers when you play outside?
**How safe is it to play outside near where you live?

5.2 School Environment for Physical Activity

A total of 10 items in the School Environment for Physical Activity Scale were designed to ask students about the availability and accessibility of facilities, school policy, and the social environment related to physical activity at the school. The response options for items about school policy were dichotomous (yes, no); the other items used a

three-point Likert scale. The investigator rescored the dichotomous data from item #12-14 by adding up the scores of these three items. The new score ranged from 0-3. Because there were only 5 students that answered "0", the investigator decided to collapse 0 with 1 to yield a final score that ranged from 1-3 so that the item has the same number of levels as the others in the factor analysis.

The result from the principal components method with Varimax rotation extraction technique revealed 3 factors, which are displayed in Table 4.17. Factor 1 (availability of facilities at school), Factor 2 (social environment in school), and Factor 3 (school policy) explained respectively 20.2, 18.5, and 12.6% of the variance..

Table 4.17 Factor Analysis of the School Environment for Physical Activity Scales

	Component		
	1	2	3
9 b. Free space for you to play actively	**.711**	.045	.002
9.c. Indoor sport field (gym)	**.639**	.236	-.134
9.a Outdoor sport field - has in your school?	**.609**	-.137	-.013
10. Does your school have sports equipment for students to use?	**.550**	-.140	.379
16-Rocode-Collape- How many of students in your school play actively during recess?	.002	**.722**	.070
15. Collapse-How many other students play actively with you at school?	-.095	**.659**	-.057
17-Recode-Collape. How many of students in your school play actively after school?	.088	**.627**	.072
12-14 rescore to a 1-3 count (collapsed 0 with 1)	-.063	.125	**.929**

Final Measures. Descriptive statistics of the items in the scale to assess the availability of facilities at school, the social environment of the school, and school's policy, as well as to assess internal consistency, interitem correlations, and item-total correlations are presented in tables 4.18 and 4.19.

Table 4.18 Item Analysis of the Availability of Facilities at School Scale

	Mean	SD	N	Min	Max	Inter item correlation	Item-total correlation
9.a Does your school have an outdoor sports field?	2.79	.473	388	1	3	.12-.27	.236
9.c. Does your school have an indoor sports field (gym)?	2.38	.749	388	1	3	.15-.24	.279
10. Does your school have sports equipment for students to use?	2.78	.430	388	1	3	.12-.22	.257
9 b. Does your school have free space for you to play actively?	2.86	.366	388	1	3	.22-.27	.354
Total	10.81	1.3	388	4	12	.12-.27	

NOTE: Response choices 1-3; A high score indicates more support

Cronbach's coefficient = .46 (N = 388; Missing 10 (2.5%)

Table 4.19 Item Analysis of the Social Environment in School Scale

	Mean	SD	N	Min	Max	Inter item correlation	Item-total correlation
15. How many other students play actively with you at school?	2.40	.755	391	1	3	.16-.25	.258
16. Recode-How many of students in your school play actively during recess?	2.36	.671	391	1	3	.22-.25	.308
17. Recode-How many of students in your school play actively after school?	2.10	.711	391	1	3	.16-.22	.238
Total	6.86	1.5	391	3	9	.16-.25	

Cronbach's coefficient 0.44; N = 391; Missing 7 (1.8%)

Table 4.20 Descriptive Statistics of Items in the School Policy Scale

Item	Valid/ Missing	Mean	SD	Min/ Max	Yes		No	
					N	%	N	%
12. Does your school allow students to play actively during recess?	393/5	.90	.303	0/1	353	89.8	40	10.1
13. Does your school allow students to play actively after school?	397/1	.57	.495	0/1	228	57.3	169	42.5
14. Does your school allow students to use equipment after school?	396/2	.68	.466	0/1	270	68.2	126	31.8
	Valid/ Missing	Mean	SD	Min/ Max	Frequency (%)			
					1	2	3	
12-14 collapsed to a 1-3 count (0 collapsed with 1) for analysis	392/6	2.17	.707	1/3	70 (17.9)	185 (47.2)	137 (34.9)	

5.3 Home environment

Twelve items were designed to assess availability of items related to physical activity at home, parent's support of physical activity, and parent's rules related to physical activity. Subjects were asked to enumerate the availability at home of 7 types of sports equipment such as balls, a bicycle, badminton or tennis racquets by responding with a "yes"(code 1) or "no" (code 0) answer. The total number of these items available at home were counted and used for further analysis. The descriptive statistics of the answered provided by the subjects is presented in Table 4.21.

Table 4.21 Descriptive Statistics of Availability of Equipment at Home

Please mark which item you have in your house or yard	N		Mean	Min/ Max	Yes (1)		No (0)	
	Valid	Missing			N	%	N	%
18.a Ball	395	3	.79	0/1	313	79.2	82	20.8
18.b Bicycle	395	3	.83	0/1	328	83.0	67	16.8
18.c Badminton or tennis racquet	395	3	.79	0/1	313	79.2	82	20.8
18.d Running shoes	394	4	.82	0/1	322	81.7	72	18.3
18.e Swimming suit	394	4	.84	0/1	330	83.8	64	16.2
18.f Jump rope	394	4	.71	0/1	280	71.1	114	28.9
18.g Table tennis racquet	395	3	.68	0/1	268	67.8	127	32.2
Total			5.5					

Five items designed to assess parents' support of physical activity and rules related to physical activity were analyzed in a factor analysis using the principal components extraction technique with varimax rotation. As the results presented in Table 4.22 show, the items loaded onto 2 factors. Three items related to parents' support loaded in Factor 1 (.54-.79), which explained 34.7% of the variance; two items related to parents' rules loaded in Factor 2 (.85), which explained 24 % of variance.

Table 4.22 Factor Analysis of Home Environment Scales

Item	Component	
	1	2
23. How often your family members take/drive you to play actively/play sports/ exercise?	**.789**	.060
22. How often your family tell you that you should play actively or exercise	**.743**	.081
19. How many family members play actively outside with you?	**.537**	.049
21. Does your parent allow you to play outside during weekend?	.073	**.854**
20. Does your parent allow you to play outside after school?	.084	**.851**
% of variance	34.7	24.0

Three items in the scale assessing parents' support of physical activity as well as the items assessing parent rules related to physical activity were run for item analysis and reliability of the scale. The results are presented in Table 4.23.

Table 4.23 Item Analysis and Reliability of the Parent Support and Parent Rule Scales

Scale	Valid/ missing	Scale mean	SD	# item	Cronbach's alpha	Inter-item Correlations	Item-total Correlation
Parents' support	396/2	5.56	1.6	3	.46	.13-.36	.20-.37
Parents' rules	393/5	4.42	1.1	2	.63	.47	.47

All the scales used in this study, except those pertaining to the demographic and family information questionnaire, are summarized in Table 4.24. A correlation matrix of the scales used in this study is presented in Table 4.25.

Table 4.24 Psychometrics Properties of the Final Scales Used in This Study

Scale	# of items	Valid/ Missing	Mean	S.D.	Possible range	Observed range	Item-total correlation	Reliability		Factor loading	Direction of High score
								α (N)	Test-retest		
Family Support on Physical Activity Scale (FSPAS)											
Father Support (FS)	5	371/27	12.01	4.4	5-25	5-25	.81-.85	.85	-	.74-.79	Higher support
Mother Support (MS)	5	382/16	12.87	4.4	5-25	5-25	.51-.67	.82	-	.66-.74	Higher support
Sibling Support (SS)	5	271/127	11.59	5.2	5-25	5-25	.59-.73	.87	-	.69-.82	Higher support
Child's Perceived Barriers to Playing Actively Scale											
Barriers	13	376/22	20.9	5.6	13-52	13-52	0.30-0.54	.81 (376)	.63 N=21	.39-.63	Higher barrier
Child's Perceived Self-efficacy to Playing Actively Scale											
Self-efficacy to Overcome Affective State (SE-AFF)	7	393/5	19.1	5.8	7-35	7-35	.42-.58	.79 (393)	.64 N=26	.51-.67	High self-efficacy
Self-efficacy to Overcome General Barriers (SE-GEN)	6	394/4	14.1	5.4	6-30	6-30	.52-.64	.81 (390)	.63 N=27	.58-.78	High self-efficacy
Self-efficacy to playing actively (SE-PA)	13	390/8	33.2	9.9	13-65	13-65	.41-.60	.87 (390)	.67 N=29	.50-.69	High self-efficacy
Child's Perceived Physical Activity Enjoyment Scale											
Child perceived Physical Activity Enjoyment (PAEJ)	11	388/10	42.7	9.0	11-55	11-55	.55-.75	.90 (380)	.67 N= 24	.55-.78	High enjoyment

Table 4.24 Psychometrics Properties of the Scales Used in This Study (Con't)

Scale	# of items	Valid/ Missing	Mean	S.D.	Possible range	Observed range	Item-total correlation	Reliability		Factor loading	Direction of High score
								α (N)	Test-retest		
Child's Perceived Physical and Social Environment Scales											
Neighborhood Environment											
Number of facilitators available in a neighbor (NB-FAC)	9	388/10	4.71	2.5	0-9	0-9	N/A	-	.50 N=27	N/A	Greater number of facilities available
Neighborhood Social Environment (NB-SEN)	3	393/5	6.49	1.6	3-9	3-9	.32-.38	.54 (393)	.60 N=26	.70-.76	Social env. promote PA.
Neighborhood Safety (NB-SFT)	3	393/5	6.13	1.3	3-9	3-9	.18-.33	.45 (393)	.57 N=26	.55-.78	Safer Environment
School Environment											
Availability of Facility/equipment at School (SCH-FAC)	4	388/10	10.81	1.3	4-12	4-12	.24-.34	.46 (388)	.34 N=29	.55-.71	Greater number of facilities available
Social Environment at School (SCH-SEN)	3	391/7	6.86	1.5	3-9	3-9	.24-.31	.44 (391)	.30 N=28	.63-.72	Social env. Promote PA.
School Policy (SCH-POL)	3	392/6	2.17	.7	1-3	1-3	N/A	N/A	.55 N=28	.93	Policy promote Physical activity
Home Environment											
Availability of Equipment at Home (HM-EQU)	7	395/3	5.5	1.5	0-7	1-7	N/A	N/A	.50 N=29	N/A	Greater number of facilities available
Parental Support on Physical Activity at Home (HM-PS)	3	396/2	5.56	1.6	3-9	3-9	.20-.37	.46 (396)	.70 N=28	.54-.79	Higher support to promote PA
Rule at Home (HM-RU)	2	393/5	4.4	1.0	2-6	2-6	.46-.46	.63 (393)	.57 N=29	.85-.85	Rule promote PA

PA: Physical Activity

Table 4.25 Correlation Matrix of the Final Scales Used in This Study

	1. FS	2. MS	3. SS	4. Barriers	5. SE-AFF	6. SE-GEN	7. PAEJ	8. NB-FAC	9. NB-SEN	10. NB-SFT	11. SCH-FAC	12. SCH-SEN	13. SCH-POL	14. HM-EQU	15. HM-PS	16. HM-RU	17. NOSPHR
1. FS	-																
2. MS	.56**	-															
3. SS	.31**	.43**	-														
4. Barriers	-.08	-.06	-.02	-													
5. SE-AFF	.12*	.09	-.02	-.14**	-												
6. SE-GEN	.12*	.06	.02	-.11*	.59**	-											
7. PAEJ	.08	.12*	.09	-.17**	.33**	.25*	-										
8. NB-FAC	.08	.06	.08	-.16**	.14**	.21*	.17**	-									
9. NB-SEN	.04	.00	.06	-.15**	.17**	.22*	.10	.16*	-								
10. NB-SFT	.11*	.03	-.04	-.08	.21**	.23**	.02	.31**	.20**	-							
11. SCH-FAC	.10	.06	.07	-.07	.04	-.04	.07	.03	-.04	.04	-						
12. SCH-SEN	.13*	.09	.11	-.13**	.20**	.12*	.23**	.14**	.19**	.11*	.03	-					
13. SCH-POL	.02	.10	.09	-.00	.07	.05	.10	.08	.02	.06	.01	.11*	-				
14. HM-EQU	.04	.12*	.06	-.06	.13*	.02	.15**	.16**	-.03	-.02	.28**	.15**	.03	-			
15. HM-PS	.12*	.08	-.02	-.18**	.27*	.25*	.28**	.21**	.17**	.23**	.04	.29**	.16**	.22**	-		
16. HM-RU	.00	.05	-.02	-.16**	.03	.06	.04	.17**	.25**	.23**	-.08	.00	.16**	-.03	.18**	-	
17. NOSPHR	.00	.01	.15*	-.05	-.01	.11*	.03	.07	.23*	.09	-.17**	-.03	.16**	-.17**	.03	.14**	-

* Significant level ≤ .05
** Significant level ≤ .01

1. FS: Father Support; 2. MS: Mother Support; 3. SS: Sibling Support; 4. Barriers: Child's Perceived Barriers to Play Actively Score;
5. SE-AFF: Child's Perceived Self-Efficacy to Play Actively-Overcome Internal Affective; 6. SE-GEN: Child's Perceived Self-Efficacy to Playing Actively-Overcome General Barriers; 7. PAEJ: Child's Perceived Physical Activity Enjoyment; 8. NB-FAC: Availability of Facilities in a Neighborhood;
9. NB-SEN: Neighborhood Social Environment; 10. NB-SFT: Neighborhood Safety; 11. SCH-FAC: Adequacy of Facilities/Equipment at School;
12. SCH-SEN: Social Environment at School; 13. SCH-POL: School Policy Promote Physical Activity; 14. HM-EQU: Number of Item/Equipment Available at Home; 15. HM-PS: Parent Support at home; 16. HM-RU: Home Rule; 17. NOSPHR: Average Number of Steps per Wearing Hour.

Demographic Characteristics

Data pertaining to child's and family's demographic characteristics are presented in Table 4.26. The majority of the participants were 10-year-old Thai children. The total number of males was similar to the total number of females. All of the participants were fourth grade students from 6 schools located in the Bangkok metropolitan area. The number of participants from each school ranged from 58 to 80. The majority of the children were of normal weight with a mean body mass index of approximately 19 (SD 3.99). One-third of the participants were from high-income families (with a family income greater than 50,000 Baht/month). Two-thirds of the participants lived in high-density urban areas; the rest lived in suburban Bangkok and the Bangkok periphery. The majority of the participants lived in a house or a townhouse (small houses built next to one another that shared a common wall). The majority of the participants' parents were couples living together, and approximately 78% of the parents had normal weights with mean body mass indexes of 23.9 for fathers and 22.7 for mothers. The majority of the parents had graduated college with a Bachelor's degree. Parents in this study had an average of two children living in the same household. The mean indicated that two of the children were less than 15 years of age. The average number of family members living in the same household was five people. Generally, mothers in the study spent three hours more with their children than fathers both during the week and on weekends.

Table 4.26 Descriptive Statistics of Child and Family (N = 398)

Variable	N	%	Mean	SD	Mix/Max
Child Characteristics					
Age (yrs)			10.00	.44	8.89-11.64
Gender					
Male	197	49.5			
Female	201	50.5			
School					
Thewphaingarm	58	14.6			
Rachawinit	61	15.3			
Kasetsart University Laboratory School	79	19.8			
Mae-pra Fatima	60	15.1			
Keha Choomchon Lat Krabung	60	15.1			
Wat Kumpang	80	20.1			
Body Mass Index			18.72	3.99	12.3-31.8
Family Characteristics					
Family income					
Less than 10,000 Baht	71	18.0			
10,001 – 20,000 Baht	73	18.5			
20,001 – 30,000 Baht	51	12.9			
30,001 – 40,000 Baht	29	7.4			
400,001 – 50,000 Baht	35	8.9			
Greater than 50,000 Baht	135	34.3			
House location					
Urban Bangkok	248	62.5			
Suburban Bangkok	109	27.5			
Bangkok Periphery	40	10.1			
Housing characteristics					
Rented room/ flat	82	20.7			
Condominium/Apartment	13	3.3			
Row building/ Townhouse	127	32.0			
House	167	42.1			
Other	8	2.0			
Marital status					
Couple- Living together	312	78.4			
Couple - Living far away	39	9.8			
Divorce	29	7.3			
Widow	18	4.5			
Father's body mass index	346		23.91	3.39	15.2-36.2
Mother's body mass index	362		22.74	3.94	13.8-37.3

Table 4.26 Continued

Variable	N	%	Mean	SD	Mix/Max
Father education					
Grade 6 or lower	74	19.5			
Grade 7 - 12	66	17.4			
Vocational certificate	40	10.6			
Bachelor degree	132	34.8			
Higher than Bachelor degree	67	17.7			
Mother education					
Grade 6 or lower	94	24.1			
Grade 7 - 12	68	17.4			
Vocational certificate	42	10.8			
Bachelor degree	138	35.4			
Higher than Bachelor degree	48	12.3			
Number of family members			5.03	2.15	1-15
Number of children			1.98	.9	1-8
1	118	30.2			
2	191	48.8			
3	59	15.1			
≥ 4	23	6			
Number of children <15 years old living in the same house			1.98	.89	0-7
Number of hours father spent with the child during weekdays			7.93	6.11	0-24
Number of hours father spent with the child during weekends			15.19	8.9	0-24
Number of hours mother spent with the child during weekdays			10.51	6.2	0-24
Number of hours mother spent with the child during weekends			18.39	8.0	0-24

Descriptive Statistics of Time Use Behaviors of Children and Family

Descriptive statistics of time use behaviors of children and their families and of parents' perceptions of their children's safety when playing without parental supervision are presented in Table 4.27. The majority of the parents (70%) reported that their child spent most free time at home or taking a class after school. Only 15% of children in this study actively played outside after school. Parents also reported that their children spent much free time engaged in inactive activities both during the week and on weekends; however, children were more active on the weekend than during the week.

Most parents allowed their children to play actively outside the house. Forty-eight percent reported that they sometimes allowed their children to play outside the house; and Forty-one percent reported they always allowed their children to play outside the house. A small number of the parents reported rarely allowing their child to play actively outside. Thus about 80 percent of parents in this study perceived that it was safe for their children to play outside without parental supervision, and approximately 20% perceived that it was unsafe.

When parents were asked to rate the amount of free time they had, most perceived that they had an average amount of free time, and approximately 25 percent perceived that they had little free time. The favorite family activity during free time was watching television, followed by walking in a mall, cleaning house, and eating out together. When activity was categorized into active and inactive activities, families preferred to do active versus inactive activities about equally.

Table 4.27 Descriptive Statistics of Time Use Behavior of Children and Family (N=398)

Variable	Mean	SD	Mix/Max	N	%
Activities the child usually does after school	2.68	1.30	1-5	394	
Take extra-class at school				121	30.7
Take extra-class outside the school				16	4.1
Spend most of the time at home				161	40.9
Play outside				61	15.5
Other				35	8.9
Activity the child likes to do on weekdays during his/her free time	1.92	.91	1-3	395	
More inactive activity				179	45.3
More active activity				67	17.0
Active equal to inactive activity				149	37.7
Activity the child likes to do on weekends during his/her free time	2.0	.87	1-3	392	
More inactive activity				147	37.5
More active activity				99	25.3
Active equal to inactive activity				146	37.2
How often the parents allow their children to play outside the house	1.7	.66	1-3	395	
Always				163	41.3
Sometimes				189	47.8
Rarely				43	10.9
Safety level of children playing outside without parents' supervision	2.85	.88	1-5	395	
Very safe				26	6.6
Safe				95	24.1
Somewhat safe				199	50.4
Unsafe				62	15.7
Very unsafe				13	3.3
Parents' perception of free time the family has	1.83	.55	1-3	395	
Little				98	24.8
Average				266	67.3
Plenty				31	7.8

Table 4.27 Continued

Variable	N	%
A favorite activity the family likes to do during free time (choose >1 activity)	395	
Walk in a mall	125	31.6
Go to a park	39	9.9
Watch television	217	54.9
Take care of/clean house	92	23.3
Go to exercise together	45	11.4
Take child to exercise	49	12.4
Eat out together	94	23.8
Other		
A favorite activity family likes to do during free time (choose one activity)	255	
Walk in a mall	41	16.1
Go to a park	7	2.7
Watch television	114	44.7
Take care of/clean house	39	15.3
Go to exercise together	11	4.3
Take child to exercise	13	5.1
Eat out together	20	7.8
Other	10	3.9

Descriptive Statistics of Family Support on Physical Activity

The descriptive statistics of family support of physical activity is reported in Table 4.28. These statistics include father or adult male support, mother or adult female support, and sibling or other child support. Family support of physical activity is rated at approximately 2.5 on a scale of 1 to 5. Mothers gave the most support for physical activity, followed by fathers, and then the sibling(s).

Fathers or adult males supported male children at a significantly higher rate than female children ($p = .03$). No difference in support from mothers and siblings was noted between the genders. There are no statistically significant differences in support between children that live in high- and low income families.

Table 4.28 Descriptive Statistics of Family Support for Physical Activity

Variable	N	Mean	SD	Mix/Max
Father/ adult male support	371	2.41	.88	1-5
Male	181	2.52*	.96	1-5
Female	190	2.32*	.79	1-5
Low income (< 50,000 BTH/month)	243	2.40	.93	1-5
High income (≥ 50,000 BTH/month)	124	2.43	.79	1-5
Mother/ adult female support	382	2.58	.87	1-5
Male	187	2.60	.90	1-5
Female	195	2.55	.85	1-5
Low income (< 50,000 BTH/month)	249	2.56	.90	1-5
High income (≥ 50,000 BTH/month)	129	2.60	.83	1-5
Sibling/ other child support	271	2.32	1.04	1-5
Male	125	2.32	1.04	1.5
Female	146	2.32	1.05	1-5
Low income (< 50,000 BTH/month)	192	2.30	1.03	1-5
High income (≥ 50,000 BTH/month)	76	2.34	1.03	1-5

P-value < .05

Descriptive Statistics of Children's Physical Activity Behaviors

Children's physical activity behaviors included how they commuted to school, how many hours they spent watching television, playing video or computer games, and how many hours they spent playing actively outside the house .Physical activity behaviors are presented in Table 4.29.

The majority of the children in this study went to school by an electric/gas-powered vehicle including a car, school bus, public transportation bus, or motorcycle. Only 15 percent of the children actively commuted to school either by walking (9%) or bicycling (5%). The average time it took for children to walk to school was 21.25 minutes (SD 14.26), ranging from 5 to 60 minutes. Similarly, children spent an average of 19.5 minute (SD 12.8; minimum time = five minutes, maximum time = 50 minutes. The number of children walking from school to home was five percent higher than that of children who walked to school; the number of the children bicycling from school was one percent lower. On the way back from school, children spent an average of 26.56 minutes (SD16.2) walking and 20.59 minutes (SD 12.2) bicycling.

During the week, approximately 65 percent of the children played actively outside after school; thirty-five percent did not. On weekends, the children were more active than the weekdays. Approximately 74 percent of the children in this study played actively outside during the weekend. The number of hours the children spent playing actively outside the house was 1.1 hours (SD 1.1) on weekdays and 2.3 hours (SD 2.3) on weekend days. The average number of hours the children spent playing actively outside during weekdays and a weekend day were1.7 hours (SD 1.6). The majority of the

children played actively outside for 30-60 minutes. The average time the children spent in active play during weekdays and the weekend is presented in Table 4.29.

Approximately nine percent of the children reported not watching television during weekdays; approximately 60 percent reported watching television two hours per day or less; about 31 percent reported watching television for more than two hours a day. The average number of hours spent watching television on weekdays was1.9 hours per day (SD 1.3) with a median of 1 hour. Children watched more television on weekends. The average number of hours spent watching television on weekends was 3.2 hours (SD 2.1) per day with a median of 3 hours. Approximately 6% reported watching no television during the weekends. In contrast, approximately 57% reported watching up to three hours per day, and approximately 38% watched television more than 3 hours a day during on weekends. The average time spent watching television weekly (weekday + weekend /2) was 2.6 hours a day (SD 1.5) with a median of 2 hours. Approximately half of the children watched television on average of more than 2 hours a day. Graph 4.1 displays the average number of hours that children spent watching television.

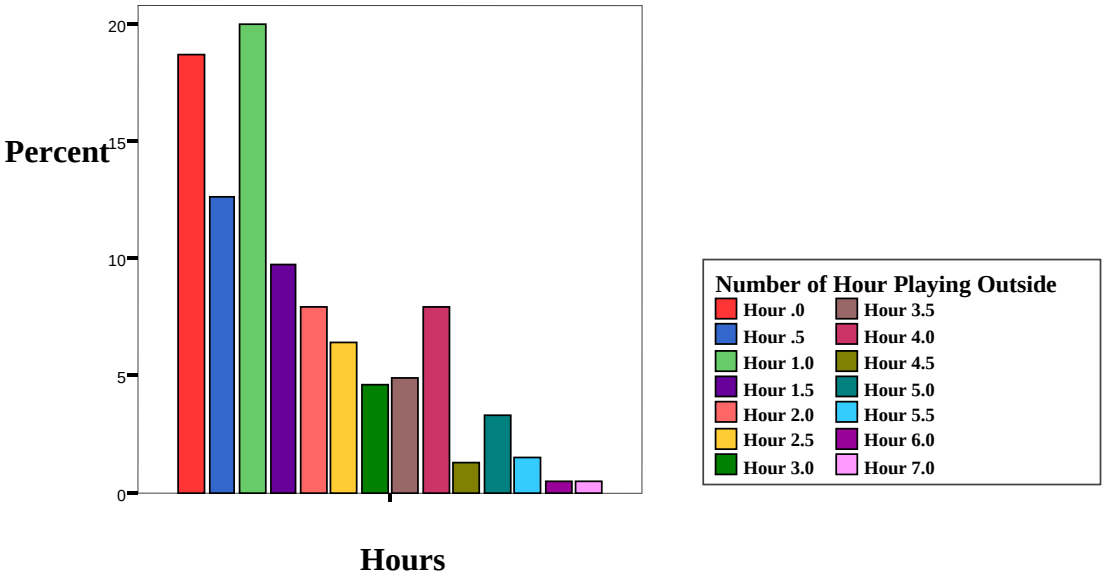
Table 4.29 Descriptive Statistics of the Children's Physical Activity Behaviors (N = 398)

Variable	Mean	SD	Mix-Max	N	%
The way to commute to school					
Walking				36	9.3
Bicycling				21	5.4
Car /Public transportation				327	84.3
Other				4	1
The way to commute back from school					
Walking				59	15.2
Bicycling				17	4.4
Car/Public transportation				299	77.1
Other				13	3.4
On weekdays, the student is playing actively outside after school for (hr)	1.1	1.1	0-4	328	
On weekend, the student is playing actively outside during weekend for (hr)	2.3	2.3	0-7	378	
Average number of hours the student is playing actively outside	1.7	1.6	0-7	328	
In a typical week, the student takes physical activity class for (min/wk)	79.24	26.14	50-120	397	
In a typical day, the student reported being physically actively for (min/day)	85.02	74.65	10-360	397	
Numbers of days the students are being physical active per week (day/wk.)	4.56	2.06	1-7	395	
Day of the week that students usually plays actively				398	
Monday				185	46.5
Tuesday				163	41.0
Wednesday				254	63.8
Thursday				172	43.2
Friday				255	64.1
Saturday				260	65.3
Sunday				278	69.8
Period of time that students usually play actively during weekday				325	
Before school				19	5.8
During recess				97	29.8
After school				181	55.7
After dinner				28	8.6

Table 4.29 (Continued)

Variable	N	%
Period of time that students usually play actively during weekend	374	
Before noon	119	31.8
12:00 -18:00	157	42.0
After 18.00	98	26.2
Place where students usually play actively	313	78.6
Free space near the house	110	35.1
Space inside the gate/ fence	57	18.2
Sports field at school	79	25.2
Park	49	15.7
Other	18	5.8
A person who student usually plays actively with	347	87.2
Parent/Care taker	27	7.8
Sibling/Other child living together	119	34.3
Friend(s) at school	67	19.3
Neighbor(s)	98	28.2
Playing alone	36	10.4
How parent promotes student to be active (answer > 1 choice)	392	
Participation	221	
Giving a ride	220	
Encouraging	124	
Providing equipment	151	
Barriers of being physically active (answer > 1 choice)	390	
No time	172	
No equipment	45	
No friend to play with	74	
No appropriated place	46	
No permission from parent	63	
No mood	73	
Other	21	

Graph 4.1. Average Number of Hour Playing Outside (N=390)



Students' favorite physical activities ranked by frequency were running, walking, football (soccer), badminton, bicycling, swimming, rope jump, jumping, exercising, and basketball. Types of activities were gender specific. Running, football (soccer), walking, bicycling, swimming, and basketball comprised males' favorite activities. For females, the most favored activities were running, walking, badminton, bicycling, swimming, and jumping.

Table 4.30 Rank of the Activities Reported Usually Played by the Children

Activity	Rank	Frequency
All students (N=398)		
Running	1	326
Walking	2	108
Soccer (Football in Thai)/ play ball	3	110
Badminton	4	91
Bicycling	5	88
Swimming	6	76
Rope jump	7	68
Jumping	8	42
Exercising	9	31
Basketball	10	29
Males (N=197)		
Running	1	151
Soccer (Football in Thai) & play ball	2	101
Walking	3	49
Bicycling	4	35
Swimming	5	34
Basketball	6	34
Females (N=201)		
Running	1	74
Walking	2	59
Badminton	3	57
Bicycling	4	53
Swimming	5	42
Jumping	6	25

Descriptive Statistics of the Children's Inactive Behaviors

Descriptive statistics of the children's inactive behaviors described the number of hours they spent watching television and playing video/computer games during the weekday and on the weekend. These data are presented in Table 4.31.

Approximately nine percent of the children reported watching no television on weekdays; approximately 60 percent reported watching television two hours a day or

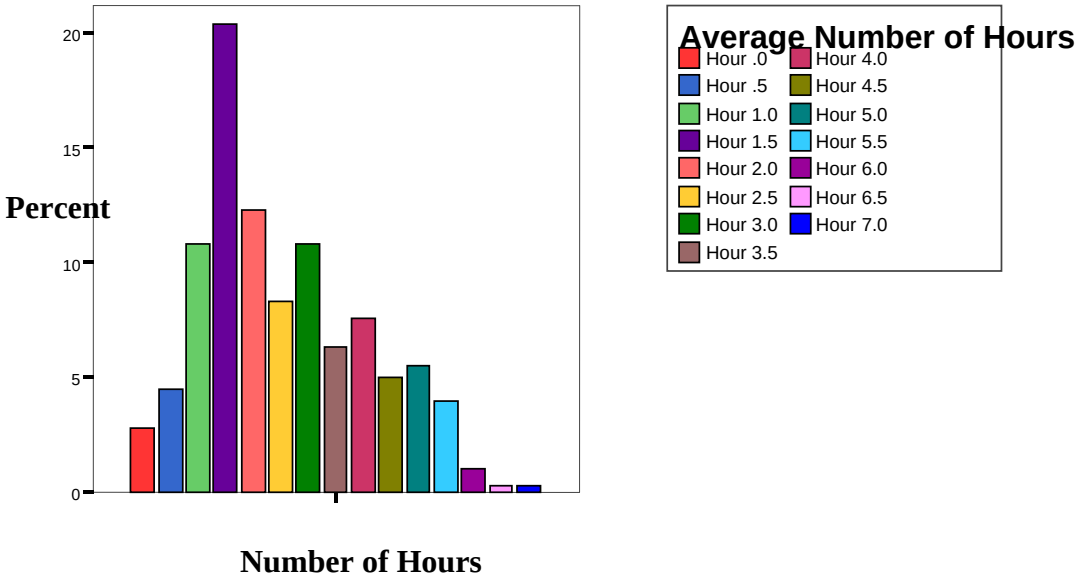
less; 30.8 percent reported watching television more than 2 hours a day during the week. The average number of hours spent watching television during the weekday was 1.9 hours a day (SD 1.3) with a median of 1 hour. Children watched more television on weekends. The average number of hours spent watching television during the weekend was 3.2 hours (SD 2.1) a day, with a median of 3 hours. Approximately six percent reported watching no television during the weekend; approximately 57% reported watching television 3 hours a day or less; approximately 38% watched television more than 3 hours a day on weekends. The average time spent watching television (weekday + weekend /2) was 2.6 hours a day (SD 1.5), with a median of 2 hours. Approximately half of the children watched television on average more than 2 hours a day. These data are presented in Graph 4.2.

Approximately 60% of the children reported not playing video or computer games on weekdays. Twenty-six percent reported playing video/computer games for one hour/day on weekdays; seven percent reported playing video/computer games for two hours/day; five percent reported playing video/computer games for three hours/day. The mean number of hours children spent playing video/computer games on the weekdays was .64 hour/day. Approximately 40% of the children reported not playing video games on weekends. Seventeen percent reported playing video/computer games for one hour/day; eleven percent .reported playing video/computer games for two hours/day; eight percent reported playing video/computer games for three hours/day. Approximately 16 percent of the children played video/computer games more than 3 hours a day on weekends. The mean time spent playing video/computer games on weekends was 1.5 hours/day (SD 2.07). These data are presented in Graph 4.3

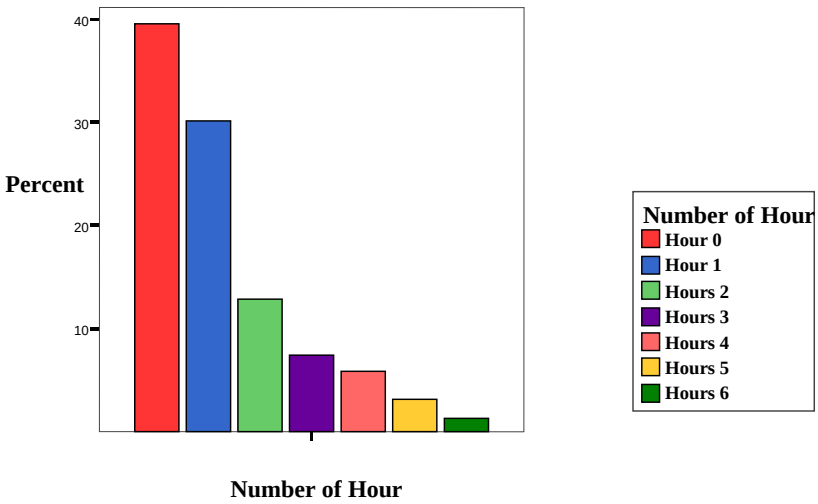
Table 4.31 Descriptive Statistics of the Children's Inactive Behaviors

Variable	Mean	SD	Mix/Max	N
Number of hours the student watched TV during weekdays (hr/day)	1.9	1.3	0-6	395
Number of hours the student watched TV during the weekend (hr/day)	3.2	2.1	0-7	385
Average number of hours spent on watching television (hr/day)	2.6	1.5	0-7	385
Number of hours playing video/computer game on weekdays (hr/day)	.64	.98	0-5	384
Number of hours playing video/computer game during weekend (hr/day)	1.53	2.1	0-7	379
Average number of hours spent on playing video/computer game (hr.)	1.2	1.5	0-6	392

Graph 4.2. Average Number of Hour Spent of Watching Television



Graph 4.3 Average Number of Hour Playing VDO/Computer Game (N = 392)



Descriptive Statistics of the Physical Activity Cognition Variables

Descriptive statistics pertaining to children's perceived barriers to active play actively, their perceived self-efficacy to overcome such barriers, and the enjoyment they experienced during physical activity are reported in Table 4.32.

Table 4.32 Descriptive Statistics of the Physical Activity Cognition Variables by Gender and Income

Variable	N	Mean	SD	Mix/Max
Barriers to playing actively (Barriers)	397	1.61	.43	1-4
Male	196	1.64	.43	1-3
Female	201	1.59	.44	1-4
Low income (< 50,000 BTH/month)	258	1.58	.41	1-3
High income (≥ 50,000 BTH/month)	135	1.67	.47	1-4
Self-efficacy to overcome affective state to playing actively (SE-AFF)	398	2.72	.83	1-5
Male	197	2.78	.87	1.3-5
Female	201	2.65	.79	1-5
Low income (< 50,000 BTH/month)	259	2.68	.82	1-5
High income (≥ 50,000 BTH/month)	135	2.77	.85	1-5
Self-efficacy to overcome general barriers to playing actively (SE-GEN)	398	2.37	.91	1-5
Male	197	2.45	.91	1-5
Female	201	2.29	.90	1-5
Low income (< 50,000 BTH/month)	259	2.44	.89	1-5
High income (≥ 50,000 BTH/month)	135	2.21	.91	1.3-5
Physical activity enjoyment (PAEJ)	398	3.88	.83	1.4-5
Male	197	3.84	.89	1.4-5
Female	201	3.92	.77	1.8-5
Low income (< 50,000 BTH/month)	259	3.91	.79	1.4-5
High income (≥ 50,000 BTH/month)	135	3.82	.89	1.6-5

On a scale of 1-4, students rated their perceived barriers to physical activity on average as 1.61 (SD .43), which indicated they perceived few barriers. No gender differences were found. However, students from high-income families reported more barriers to active play than did those from low- income families.

Students rated their level of self-efficacy to be physically active as 2.7 when faced with internal affective barriers, and as 2.4 for general barriers, both of which indicate little to moderate confidence in their ability to overcome barriers. There were no gender differences for either measure of self-efficacy. There were no class differences in the scores for perceived self-efficacy to overcome internal affective barriers. However, students from low-income families had a significantly higher score of self-efficacy to overcome general barriers compared to those from high-income families.

Students perceived a great deal of enjoyment from physical activity, rating their mean level of enjoyment as 3.88 (SD .83) on 1-5 scale. There were no gender or family income differences on the physical activity enjoyment scores.

Descriptive Statistics of the Perceived Physical and Social Environment

The descriptive statistics for perceived neighborhood, school, and home environments related to physical activity are reported in Table 4.33.

Table 4.33 Descriptive Statistics of the Perceived Physical and Social Environment

Variable	N	Mean	SD	Mix/Max
Neighborhood Environment				
Availability of facilities in a Neighborhood (NB-FAC)	395	4.70	2.43	0-9
Neighborhood social environment (NB-SEN)	393	2.16	.53	1-3
Neighborhood safety (NB-SFT)	393	2.04	.42	1-3
School Environment				
Availability of facilities at school (SCH-FAC)	388	2.70	.32	1.8-3
Social environment at school (SCH-SEN)	394	2.29	.49	1-3
School policy (SCH-POL)	392	2.17	.71	1-3
Home Environment				
Availability of equipment at home (HM-EQU)	395	5.45	1.53	1-7
Parent support (HM-PS)	396	1.85	.52	1-3
Parent rule (HM-RU)	393	2.21	.53	1-3

Students rated the number of physical activity facilities available to them in their neighborhood as 4.7 out of nine possible choices. They scored the social environment in their neighborhood as 2.16 (SD .53), on a 1-to- 3 scale. In short, students perceived that their social environment promoted physical activity at an average to high level. Regarding neighborhood safety, students rated the safety of their neighborhood as 2.04 on a 1-to- 3 scale level with 1 determined as unsafe and 3 as very safe.

Regarding the school environment, students perceived that their school facilities, such as activity spaces, sports fields, etc., were available and fairly adequate. The mean score of the social environment at the school was 2.29 on a 1- to 3- scale, where a score of 3 indicated a supportive social environment for physical activity. Similarly, students also perceived that their schools had good policies to promote physical activity.

In the home environment, students reporting having on average 5.5 of the seven listed types of physical activity equipment, meaning that students had at home almost all of the items on the list. Regarding parent support at home, the mean score was 1.85 (SD .5) on a 1-3 scale. This can be interpreted to mean that students perceived an average level of support for physical activity from their parents. Students also rated highly their parent's rules related to physical activity (mean = 2.2 on a 1-3 scale), meaning that their parents' rules at home supported physical activity.

Descriptive Statistics of the Number of Steps

Data about the number of steps taken by students daily was measured by asking them to wear a pedometer for 6 consecutive days, from waking up until bedtime, excepting times for bathing and performing water activities such as swimming. These statistics are presented in Table 4.34.

Table 4.34 Descriptive Statistics of the Number of Steps from Wearing a Pedometer

Variable	N	Mean	SD	Min/Max
Average number of step per day				
Average number of steps/day (wore ≥ 10 hrs/day for 6 days)	356	10079	2811	4607 – 18967
Average wearing hour for 6 days	356	12.9	1.1	10.2-15.9
Average number of steps/day of weekday (wore ≥ 10 hrs/day for 4 days)	381	10407	2924	4291/18267
Average number of steps/day for weekend (wore ≥ 10 hrs/day for 2 days)	354	8761	3317	1945/18457
Average number of step per wearing hour				
Average number of step/wearing hour (wore ≥ 10 hrs/day for 6 days)	355	792	226.7	359-1504
Average number of step/wearing hour for weekday	371	818	233.6	329-1593
Average number of step/wearing hour for weekend	360	739	306	156.8-2185.7

The average number of steps per day presented in this study included only the cases where the students wore a pedometer at least 10 hours per day. The average number of hours students wore a pedometer for 6 consecutive days was approximately 13 hours per day, ranging from 10.2 to 15.9 hours a day. The average number of steps taken per day was 10,079 steps per day (SD 2811), ranging from 4,607 to 18,968 steps per day.

Since the number of hours students wore a pedometer was individual and variable, the investigator calculated the average number of steps per hour. The average number of steps per hour was 792 (SD 227), ranging from 359-1504 steps per hour. The number of steps per wearing hour on weekdays (4 weekdays) and weekends (Saturday and Sunday) was 818 and 739 respectively.

Analysis of Study's Objective 1

The first objective of this study was to describe the level of physical activity of Thai fourth grade students in Bangkok, which was measured by a pedometer. The results presented in Table 4.35 include description of the number of steps taken by students per hour broken down by gender, school, family income, house location, house characteristics, marital status of the parent, and parents' level of education.

The number of steps per day for male and female students was 11,021 (SD 2917) and 9,168 (SD 2381), respectively. Thus, the number of steps taken by boys in the sample was significantly higher than that for girls (p-value less than .001).

The number of steps per day varied significantly by school (p-value less than .001; $F_{5, 350} = 8.69$). The ranking of the schools, from highest to the lowest number of steps taken by students per day were: Wat Kumpang School (Mean 11,105; SD 2764), Kasetsart University Laboratory School, Kahachoomchon Lat Krabung School, Mae-pra Fatima School, Rachawinit School, and Thewphaingarm School (Mean 8,110; SD 2130). Post-hoc analysis revealed that the number of steps of the students from Thewphaingarm were significantly lower than those from Wat Kumpang, Kasetsart University Laboratory School, and Kahachoomchon Lat krabung School. There were no significant differences in the number of steps per day from students of Rachawinit and Mae-pra Fatima School with the other schools.

Table 4.35 Descriptive Statistics of the Number of Steps by Child and Family Demographics

Variable	N	Mean	SD	df	T/F	P-value
Gender**	355			354	6.58	.000
1. Male	175	11021.38	2916.50			
2. Female	181	9167.73	2380.51			
Weight status	356					
1. Normal weight (BMI<20 kg/m^2)	251	10168.56	2797.62	2,353	.443	.642
2. Over weight (BMI 20-24 kg/m^2)	68	9896.64	2841.98			
3. Obesity (BMI>24 kg/m^2)	37	9806.00	2891.24			
School**	356			5,350	8.69	.000
1. Thewphaingarm	49	8109.87	2129.84			
2. Rachawinit	53	9702.34	2765.82			
3. Kasetsart University Laboratory School	64	10580.53	2969.17			
4. Mae-pra Fatima	57	9770.55	2990.55			
5. Kahachoomchon Lat Krabung	55	10477.03	2090.02			
5. Wat Kumpang	78	11104.90	2764.37			
Family income	352			2,349	1.48	.230
1. Low	180	10208.74	2725.59			
2. Average	57	9495.58	2565.64			
3. High	115	10163.81	3034.76			
Location	355			2,352	2.94	.054
1. Inner Bangkok	223	9967.66	2934.40			
2. Suburb Bangkok	96	10576.66	2488.25			
3. Bangkok periphery	36	9344.87	2662.58			
House characteristic	348			3,344	2.08	.102
1. Rental room/flat	78	10701.84	2633.67			
2. Condominium/ apartment	11	9187.68	2503.70			
3. Townhouse	113	9854.96	2670.71			
4. House	146	9923.28	2932.96			

Table 4.35 Continued

Variable	N	Mean	SD	df	T/F	P-value
Marital status*	356			2,353	4.04	.018
1. Couple living together	279	9860.12	2699.58			
2. Couple living separately	35	10994.89	3512.93	G1 & G2 (P = .077)		
				G1 & G3 (P = .145)		
3. Divorce/ Widowed	42	10769.22	2693.62	G2 & G3 (P = .939)		
Father education*	339			2,336	3.987	.019
< Bachelor's degree	165	10326.32	2652.42			
Bachelor's degree	117	9478.95	2718.82	G1 & G2 (P = .045)		
> Bachelor's degree	57	10504.36	3328.77	G1 & G3 (P = .918)		
				G2 & G3 (P = .078)		
Mother education	349			2,346	.693	.501
< Bachelor's degree	189	10172.06	2606.69			
Bachelor's degree	118	9825.88	2931.06			
> Bachelor's degree	42	10287.68	3350.95			

* P < .05
** P < .001

The number of steps taken per day by students from low-income families (Mean 10209; SD 2725), high-income families (Mean 10164; SD 3035), and average-income families (Mean 9496; SD 2565) were not significantly different (p-value .23)

The number of steps taken daily by students living in suburban Bangkok and those living in inner Bangkok or Bangkok's periphery were not significantly different (p = .054).

Although the number of steps taken by of students living in a rental room/flat (Mean 10,702 steps per day; SD 2,634) was higher than those living in a house (Mean 9,924 steps per day; SD 2,933), in a townhouse (Mean 9,855 steps per day; SD 2671), and a condominium/apartment (Mean 9,188 steps per day; SD 2,504), these differences were not significant (p = .102).

However, the number of steps taken daily by students, as assessed by parents' marital status was significantly different at p = .02. Students with a parent living separately walked the most number of steps (Mean 10,995 steps per day; SD 2,504), following by those students with a divorced or widowed parent (Mean 10,769 steps per day; SD 2,694), and then by those students whose parents lived together (Mean 9,860 steps per day; SD 2,700). The number of steps taken by students with parents living separately was significantly higher than that for students whose parents lived together, but was not significantly different from that of students who had a divorced or widowed parent.

Students who had a father who graduated with more or less than a Bachelor's degree were more active than those whose father graduated with a Bachelor's degree, but the differences were not significant. Similarly, students who had a mother who graduated with more or less than a Bachelor's degree were more active than those whose mother graduated with a Bachelor's degree, but again, the differences were not significant.

Bivariate Correlations between the Variables in the Study and the Number of Steps

Pearson correlation coefficients for the variables in this study and for the number of daily steps taken by students are reported in this section in Tables 4.36 to 4.43. Correlations between children's and their parents' body mass indexes and number of steps taken daily are reported in the Table 4.36.

The body mass index of a parent correlates significantly with his/her child's body mass index. The mother's body mass index has a higher correlation with the child's

when compared to those of the father (Mother r = .26, p<.001: Father r =.20, p<.001. However, the body mass indices of parents and children have no significant correlation with the number of steps taken daily by children..

Table 4.36 Pearson Correlation between Body Mass Index and the Number of Steps

Variables	Child BMI (N=398)	Father BMI (N=346)	Mother BMI (N=362)	NOSPH (N=355)
Child's body mass index (BMI) (N = 398)	-			
Father's body mass index (BMI) (N =346)	.20**	-		
Mother's body mass index (BMI) (N=362)	.26**	.15**	-	
Number of steps per wearing hour 6 days (NOSPH) (N=355)	-.08	-.04	.06	-

** p < .001

Pearson correlation coefficients of the number of family members, number of children, and the number of children less than 15 years old living in the same household and the number of steps per wearing hour are presented in Table 4.37. Number of family members, number of children, and the number of children less than 15 years old living in the same house were not significantly correlated with the number of steps/hour taken by children.

Table 4.37 Pearson Correlation of the Number of Family Members and the Number of Steps

Variables	NOFM (N=393)	NOC (391)	NOK (N=394)	NOSPH (N=355)
Number of family members living together (NOFM)	-			
Number of children the parent have (NOC)	.27**	-		
Number of children (<15 years) living together (NOK)	.62**	.65**	-	
Number of steps per wearing hour over 6 days (NOSPH)	.09	.06	.10	-

** $p < .001$

Pearson correlations between the number of hours a parent spent with his/her child on weekdays and weekends and the number of steps/hour taken by children are presented in Table 4.38. The number of hours a parent spent with a child was not significantly correlated with the child's walking activity.

Table 4.38 Pearson Correlation of the Number of Hours Parents Spent on the Child and the Number of Steps

Variables	# of hr Father Weekday (N=366)	# of hr Father Weekend (N=364)	# of hr Mother Weekday (N=384)	# of hr Mother Weekend (N=380)	NOSPH (N=355)
Number of hours father spent with the child on a weekday	-				
Number of hours father spent with the child on the weekend	.59**	-			
Number of hours mother spent with the child on a weekday	.53**	.30**	-		
Number of hours mother spent with the child on weekend	.26**	.56**	.56**	-	
Number of steps per wearing hour over 6 days (NOSPH)	-.04	-.03	-.00	-.01	-

** $p < .001$

Pearson correlations of family support and promotion of physical activity and the number of steps/hour by a child in the family are presented in Table 4.39. Support of physical activity by fathers and mothers had no significant correlation with the number of steps/hour taken by a child. However, sibling support was significantly and positively associated with the number of steps/hour taken by the children. Family support including support from fathers, mothers, and siblings was also positively correlated with the walking activity of the children ($r = .13$, $p<.05$).

Table 4.39 Pearson Correlation of Family Support and the Number of Steps

Variables	Father Support N=371	Mother Support N=382	Sibling support N=271	Family support N=267	NOSPH N=355
Father or adult male support	-				
Mother or adult female support	.56**	-			
Sibling or other child support	.31**	.43**	-		
Number of steps per wearing hour over 6 days (NOSPH)	.00	.01	.15*	.13*	-

* $p < .05$ (2-tailed)
** $p < .01$ (2-tailed)

Pearson correlations of physical activity cognition and walking activity are presented in Table 4.40. Physical activity cognition variables included perceived barriers to physical activity, perceived self-efficacy to overcome internal affective barriers, self-efficacy to overcome general barriers, self-efficacy to playing activity, and enjoyment of physical activity. Self-efficacy to play actively has two subscales: perceived self-efficacy to overcome internal affective barriers, and self-efficacy to overcome general barriers. The perceived barriers, self-efficacy to overcome internal affective barriers, self-efficacy to playing actively, and enjoyment of physical activity scales were slightly or not significantly correlated with the number of steps taken per hour by children. Only self-efficacy to overcome general barriers had a significant positive correlation ($r=.11$, $p<.05$) with the number of steps per wearing hour.

Table 4.40 Pearson Correlation of Physical Activity Cognition and the Number of Steps

Variables	Barriers N=397	SE-AFF N=398	SE-GEN N=398	SE-PA N=398	PAEJ N=398	NOSPH N=355
Perceived Barriers (Barriers)	-					
Self-efficacy to overcome affective state (SE-AFF)	-.14**	-				
Self-efficacy to overcome general barriers (SE-GEN)	-.11*	.59**	-			
Self-efficacy to playing actively (SE-PA)	-.14**	.90**	.88**	-		
Physical Activity Enjoyment (PAEJ)	-.17**	.33**	.25**	.32**	-	
Number of steps per wearing hour over 6 days (NOSPH)	-.05	-.01	.11*	.06	.03	-

* $p < .05$ (2-tailed)
** $p < .01$ (2-tailed)

Pearson correlations between the neighborhood environment and the number of steps taken by children per wearing hour are presented in Table 4.41. The results of this analysis show that the availability of facilities in neighborhoods and neighborhood safety had a low or nonsignificant correlation with the number of steps per wearing hour. However, the social environment in a neighborhood is significantly correlated ($r=.23$; $p<.01$) with the walking activity of children in the sample. The total score of the neighborhood environment also had a significant positive correlation with the number of steps per wearing hour ($r=.17$, $p<.01$).

Table 4.41 Pearson Correlation of the Neighborhood Environment and the Number of Steps

Variables	NB-FAC N=395	NB-SEN N=393	NB-SFT N=393	NB ENV N=388	NOSPH N=355
Availability of facilities in a neighborhood (NB-FAC)	-				
Neighborhood social environment (NB-SEN)	.16**	-			
Neighborhood safety (NB-SFT)	.31**	.20**	-		
Number of steps per wearing hour over 6 days (NOSPH)	.07	.23**	.09	.17**	-

** $p < .01$ (2-tailed)

Pearson correlations for the school environment and the number of steps taken are presented in Table 4.42. The availability of facilities at the school and the school's physical activity policy was significantly but negatively correlated ($r = -17$, $p<.01$ and $r =-.16$, $p<.01$, respectively) with walking activity. However, the social environment of the school had no significant correlation with the number of steps per wearing hour. The total score of the school environment also had no significant relationship with number of steps per wearing hour.

Table 4.42 Pearson Correlation of the School Environment and the Number of Steps

Variables	SCH-FAC N=388	SCH-SEN N=394	SCH-POL N=392	SCH ENV N=385	NOSPH N=355
Adequacy of facilities/equipment at School (SCH-FAC)	-				
Social environment at school (SCH-SEN)	.03	-			
School policy promote physical activity (SCH-POL)	.01	.11*	-		
Number of steps per wearing hour 6 days (NOSPH)	-.17**	-.03	-.16**	-.08	-

* $p < .05$ (2-tailed)
** $p < .01$ (2-tailed)

Pearson correlations of the home environment and the number of steps per wearing hour are presented in Table 4.43. The number of items/equipment available at home and parent support had no significant correlation with the number of steps per hour taken by children. But physical activity rules at home whereby parents allowed their children to play outside did have a significant positive correlation with the walking activity of their children.

Table 4.43 Pearson Correlation of the Home Environment and the Number of Steps

Variables	HM-EQU N=395	HM-PS N=396	HM-RU N=393	HM-ENV N=391	NOSPH N=355
Number of items/equipment at home (HM-EQU)	-				
Parent support at home (HM-PS)	.22**	-			
Rule at home (HM-RU)	-.03	.18**	-		
Number of steps per wearing hour over 6 days (NOSPH)	-.17	.03	.14**	-.03	-

** $p < .01$ (2-tailed)

Analysis of Study's Objective 2

The second objective of the study was to investigate the factors that predicted physical activity as measured by a pedometer in Thai fourth grade students in Bangkok.

To determine what factors predicted physical activity, data were analyzed by utilizing multiple regression analysis provided in SPSS program version 15. In this study, there are 34 variables that are possible predictors of physical activity. To increase the power of analysis, the investigator entered only a few variables at a time into the same multiple regression model and then ran many separate simultaneous regression analyses. The 34 study variables can be categorized into 11 groups, which include: 1) child's characteristics, 2) family's socioeconomic status, 3) parent's body mass index, 4) house's location and characteristics, 5) child's behavior, 6) social Influences, 7) family support of physical activity, 8) physical activity cognition, 9) neighborhood environment, 10) school environment, and 11) home environment.

The first series of analyses entered each group of variables into the same model and then ran a simultaneous multiple regression analysis. A total of eleven multiple regression models were run separately. The variables that signified a unique contribution in predicting the number of steps at p-value ≤ .10 were included for further analysis. The results of the simultaneous multiple regression analysis are presented in Table 4.44.

In model #1, the child's characteristics including gender and the child's body mass index were entered into the regression model. The model significantly predicted the number of steps ($F_{2, 350} = 32.02$, $p<.001$), accounting for 16% of the total variance of physical activity. Both gender and body mass index were significantly unique factors for predicting physical activity.

In model #2, family income (average and high) was entered into the regression model, accounting for 2.8% of the variance in physical activity ($F_{2, 346} = 5.03$, $p=.007$). Average family income as well as high family income uniquely predicted physical activity ($t = -2.55$, $p= .01$ and $t = -2.73$, $p= .01$, respectively).

In model #3, parents' body mass index was entered into the model, and did not predict physical activity ($F_{2, 296} = .77$, $p=.46$). Neither father's nor mother's body mass index contributed to the variance of physical activity (t -1.08, p=.28; t .79, p=.43). Therefore, parent body mass indices were omitted from further analysis.

In model #4 house location and characteristics were entered into the model. The model did not predict physical activity ($F_{3, 340}= 1.80$, $p=.15$). House location and house characteristics did not uniquely predict physical activity.

In model #5, the child's behaviors were entered into the regression model. These included the number of hours watching television, the number of hours playing video

games, the number of hours playing actively outside, and whether or not the child walked to and from school. The result showed that the overall model accounted for 6% of the total variance for physical activity and significantly predicted physical activity (F1, 334=5.29, p<.001). The number of hours watching television negatively predicted physical activity (t -2.69, p= .008); the number of hours playing actively outside uniquely predicted physical activity (t =2.77, p = .006). Walking to and from school also uniquely contributed to the model (t =2.35, p =.02). The number of hours playing video games did not significantly contribute to the variance for physical activity (t=.96, p=.34). The number of hours playing video games will be omitted from further analysis.

In model #6, parents' perceived safety of a child's play outside the home, parents' permission for a child to play outside, and family's favorite activities were entered into the regression model. The model accounted for 6% of the variance for physical activity with a significant prediction of physical activity (F5, 221=2.79, p<.02). Always allowing a child to play outside had a unique contribution to physical activity (t 2.70, p =.008). The other predictors in the model were not unique contributors to the level of physical activity.

Model #7 included family support for physical activity. The model explained only 3% of the variance and was not a significant predictor of physical activity (F3, 233=2.77, p=.09). Among the three variables in the model, only sibling support uniquely predicted physical activity (t 2.13, p=.03).

Model #8 included physical activity cognition, including child's perceived barriers, child's perceived self-efficacy to overcome internal affective barriers, self-efficacy to overcome general barriers, and physical activity enjoyment. The model explained only

3% of the variance in physical activity with a significant prediction of physical activity ($F_{4, 347}=2.8$, $p<.03$). Only self-efficacy to overcome internal affective barriers and self-efficacy to overcome general barriers uniquely predicted physical activity ($t=-2.39$, $p=.02$ and $t= -2.76$, $p=.006$).

In model #9, the availability of facilities in a neighborhood, the neighborhood social environment, and neighborhood safety were entered into the regression model. The model accounted for 4.5% of the variance in physical activity ($F_{3, 341}=5.32$, $p=.001$). Only neighborhood social environment uniquely predicted physical activity ($t=3.70$, $p<.001$).

Model # 10 entered into the regression model factors of the school environment including adequacy of facilities/equipment, social environment, and social policy promoting physical activity. The model explained 6% of the total variance of physical activity ($F_{3, 338}=6.62$, $p<.001$). The adequacy of facilities/equipment and school policy were unique contributors to the variance of physical activity ($t=-3.35$, $p=.001$ and $t=2.90$, $p=.004$, respectively).

Model #11 included number of items/equipment at home, parent support, and parent rule into the model. The model explained 5% of the total variance, with significant prediction of the physical activity level ($F_{3, 343}=.001$). Availability of equipment at home and parent rule are unique predictors of physical activity ($t=-3.4$, $p=.001$; $t=2.07$, $p=.04$).

In summary, a total of 16 predictors significantly and uniquely predicted physical activity and were included in the next step of the analysis. The predictors included: gender, body mass index, family income (average and high), number of hours watching television, number of hours playing actively outside, walking to and from school, parental permission for children to play outside, sibling/other child support, child's self-efficacy to overcome internal affective barriers, child's self-efficacy to overcome general barriers, the neighborhood social environment, the adequacy of facilities/equipment at school, school policy, number of items/equipment available at home, and parent rules regarding physical activity.

Table 4.44 Multiple Regression Analysis of Factors Explaining Physical Activity (Number of Steps) through 11 simultaneous models

Model	Variables	M/%	SD	df	Standardized Beta	R^2	F - Value	t-value	P-value
1	**Child characteristics**			**2,350**		**.155**	**32.022**		**.000**
	Gender (female)				.390			-7.843	**.000**
	Body mass index	18.596	3.909		.135			-2.727	**.007**
2	**Family Socioeconomic status**			**2,346**		**.028**	**5.030**		**.007**
	Family income (Average)				-.142			-2.547	.011
	Family income (High)				-.143			-2.576	.010
3	**Parent's body mass index**			**2,296**		**.005**	**.769**		**.464**
	Father's body mass index	23.903	3.46		-.028			-1.079	.281
	Mother's body mass index	22.637	3.95		.018			.791	.430
4	**House's location & characteristics**			**3,340**		**.016**	**1.801**		**.147**
	House's location (Suburb Bangkok)	.28	.449		.064			1.158	.248
	House's location (Bangkok periphery)	.10	.303		-.088			-1.590	.113
	House characteristics (House)	.42	.494		-.029			-.542	.588
5	**Child's Behaviors**			**4,334**		**.06**	**5.294**		**.000**
	Number of hours watching TV	2.82	1.512		-.152			-2.690	.008
	Number of hours playing video games	1.18	1.381		.054			.963	.336
	Number of hours playing actively outside	1.92	1.569		.156			2.767	.006
	Active commute to school	.23	.420		.127			2.353	.019

Table 4.42 Multiple Regression Analysis of Factors Explaining Physical Activity through 11 simultaneous models (Continued)

Model	Variables	M/%	SD	df	Standardized Beta	R^2	F - Value	t-value	P-value
6	**Social Influences**			**5,221**		**.059**	**2.794**		**.018**
	Parent allowed child to play outside- rarely (code 00)								
	Parent allowed child to play outside- sometimes	.48	.501		.101			.890	.374
	Parent allowed child to play outside- always	.42	.494		.311			2.697	.008
	Parent perceived unsafe for the child playing outside								
	Parent perceived somewhat safe for the child playing outside	.53	.500		.021			.223	.824
	Parent perceived safe for the child playing outside	.30	.459		.034			.357	.721
	Family's favorite activity (active activity)	.45	.499		-.013			-.199	.842
7	**Family support for physical activity**			**3,233**		**.034**	**2.765**		**.091**
	Father/adult male support	2.406	.8734		.072			.919	.359
	Mother/adult female support	2.565	.8916		-.052			-.643	.521
	Sibling/other child support	2.319	1.0229		.151			2.132	.034
8	**Physical Activity Cognition**			**4,347**		**.031**	**2.812**		**.025**
	Child's perceived barriers	1.598	.4331		-.086			-1.597	.111
	Self-efficacy (SE-AFF)	2.719	.8192		-.161			-2.392	.017
	Self-efficacy (SE-GEN)	2.376	.9134		.180			2.758	.006
	Physical activity enjoyment	3.919	.8111		.005			.085	.932

Table 4.44 Multiple Regression Analysis of Factors Explaining Physical Activity (Number of Steps) through 11 simultaneous models (Continued)

Model	Variables	M/%	SD	df	Standardized Beta	R^2	F - Value	t-value	P-value
9	**Neighborhood environment**			**3,341**		**.045**	**5.315**		**.001**
	Availability of facilities	4.71	2.446		.030			.540	.590
	Neighborhood social environment	2.1816	.53240		.201			3.698	.000
	Neighborhood safety	2.0473	.42226		.012			.211	.833
10	**School environment**			**3,338**		**.056**	**6.624**		**.000**
	Adequacy of facilities/equipment	2.686	.3347		-.177			-3.352	.001
	Social environment in school	2.310	.4845		-.057			-1.063	.288
	School policy promoting physical activity	2.16	.702		.154			2.897	.004
11	**Home environment**			**3,343**		**.048**	**5.784**		**.001**
	Number of items/equipment available at home	5.44	1.535		-.186			-3.400	.001
	Parent support	1.876	.5277		.035			.634	.527
	Parent rule	2.222	.5210		.111			2.071	.039

The second series of analyses was performed by dividing the 16 predictors gleaned from the first step of the analysis into two groups: 1) child's characteristics and behaviors, and 2) child's physical activity cognition and environment. The variables included in the group of child characteristics and behaviors were divided into three blocks: *Block #1*- Child characteristics (gender and body mass index); *Block #2*- Child behaviors (number of hours spent watching television, number of hours playing actively outside, and an active commute to school); *Block #3*- Family income (average and high family income).. The variables in Block #1-3 were entered into the regression model as a series of hierarchical multiple linear regressions. The variables that uniquely predicted physical activity at a significant level of $\leq .10$, when controlled for other variables in the model, were selected for further analysis.

The variables included in the child's physical activity cognition and environment group were divided into 5 blocks as follows: *Block#1*- Self-efficacy (self-efficacy to overcome internal affective barriers and self-efficacy to overcome general barriers); *Block#2*- Social Influences (sibling/other child support and parent always allowing the child to play outside), *Block #3*- Social environment in neighborhood, *Block #4*- School environment (adequacy of facilities at the school and school policy), and *Block #5*- Home environment (number of item/equipment available at home and home rules regarding physical activity). The variable in each block were entered into the model as a series of hierarchical multiple linear regressions. The variables that uniquely predicted physical activity at significant level of $\leq .10$, when controlled for other variables in the model, were selected for the further analysis.

The results of the hierarchical multiple linear regression analysis of the child's characteristics and behaviors accounted for 20% of the variance for physical activity in the overall model. Block #1 (gender and child body mass index) explained 15% of the variance predicting physical activity (F2, 336=29.17, p<.001). Adding Block #2 into the model accounted for an additional 3% (R^2 change =.033) of the variance (F3, 333=4.45, p=.004). Entering Block #3 into the model accounted for an additional 2% (R^2 change =.02) of the variance. All variables in this hierarchical multiple regression model, except actively commuting to school (t=.52, p=.60), significantly and uniquely predicted physical activity at significant levels ranging from <.001 to .06 when the other variables in the model were controlled for. The tolerance of the model ranges from .74-.94, which means that colinearity was not a problem in this analysis. The variables added into the subsequent analysis were gender, body mass index, number of hours spent watching television, number of hours playing actively outside, and average and high family income.

The overall model of the hierarchical multiple linear regression of the child's physical activity cognition and environmental predictors accounted for 19% of the variance for physical activity (R^2 = .19). Block #1 (self-efficacy) explained 4% of the variance (F2, 228 = 4.80, p=.009). Adding Block #2 (social influences) and #3 (social environment in the neighborhood), accounted for an additional of 6% (F2, 226= 7.13, p=.001) and 2% (F1, 225= 4.17, p=.04) of the variance respectively. Adding Block #4 (adequacy of facilities/ equipment at school and school physical activity policy) into the model accounted for an additional 2% of the variance and the model was not significantly predictive of physical activity (F2, 223=2.76, p=.07). Adding the last Block (home

environment) into the model, account for an additional five percent of the variance of physical activity (F2, 221=7.21, p=.001). Tolerance ranged between .63-.99. The univariate variables that uniquely contributed to predicting physical activity in this hierarchical multiple linear regression model are: self-efficacy to overcome general barriers, sibling/other child support, parental permission for the child to play outside, the social environment in the neighborhood, school policy, and number of items/equipment available at home.. These variables were included into the next step of analysis. The univariate variables that uniquely predicted physical activity at a significant level ≤ .10 were included into the model.

The third series of analysis included all the variables that uniquely predicted physical activity from the second series of analysis into a seven-step hierarchical regression model. The variables were also grouped conceptually. The variables that uniquely predicted physical activity when controlling for the other variables in the model at a significance level of ≤ .10 were selected to run in the next series of hierarchical multiple linear regressions. To accomplish a parsimonious model of the factors that predict physical activity, two series of hierarchical regression models were analyzed until the all variables adding to the model significantly predicted physical activity at p ≤.05. The methodology and results of the last step of the hierarchical multiple linear regression analysis are presented below.

The final step of the analysis was performed by adding all 9 variables that significantly and uniquely predicted physical activity from the third series analysis. The variables were divided into six blocks of variables: Block #1-Child characteristics (gender and body mass index); Block #2- Child behaviors (number of hours spent

watching television and the number of hours playing actively outside); Block #3- Social Influences (Sibling/other child support and parent always allowing the child to play outside); Block#4- Number of items/equipment available at home; Block #5- School policy; and Block #6- Self-efficacy to overcome general barriers. Each block of variables was entered into the model as a hierarchical step in order of the number of the block. The results of the hierarchical regression model of these factors in predicting physical activity are presented in Table 4.45.

Block #1 (gender and body mass index) was entered first into the model. The overall model significantly predicted physical activity ($F_{2,231}$=24.95, p<.001), and accounted for 18% of the explained variance (R^2 .18). Gender was significant in predicting physical activity when controlling for body mass index (t= -6.91, p<.001), and accounted for 17% of the variance (sr^2 = .17). Body mass index had a significantly unique contribution to physical activity when controlling for gender (t= -6.91, p<.001), but accounted for only 2% of the explained variance (sr^2 = .02).

In the second step, Block #2- Child behaviors (number of hours spent watching television and the number of hours playing actively outside) were added into the model. The overall model explained approximately 22% of the total variance for physical activity (R^2.22; $F_{2,229}$=6.45; p=.002). Adding children's behavior variables into the model accounted for an additional 4.4% of the variance (R^2 Change .044). The number of hours watching television had a significantly unique contribution of 2% of the explained variance (t=-.16, p=.03; sr^2 = .02), when controlled for gender, body mass index, and the number of hours playing activity outside. Similarly, the number of hours playing actively outside contributed approximately 3% of the total variance of physical activity with a

significance level at .003 (t=3.048) when controlling for the other variables in the regression model.

In the next step, Block#3- Social Influences (sibling/other child support and parent always allowing the child to play outside) is added into the model. The overall model significantly predicted physical activity ($F_{2,227}$=7.03, p=.001), accounting for approximately 27% of the total variance of physical activity (R^2 .269). When adding these two variables into the model, all previously entered variables still remained significant predictors of physical activity. Sibling/other child support and the parent always allowing the child to play outside added an additional 4.7% to the explained variance (R^2 Change .044). Both the items, sibling/other child support and the parent always allowing the child to play outside, significantly and uniquely contributed to the prediction for physical activity (t=2.22, p=.03 and t=3.08, p=.002) when controlling for the other variables in the regression model. They also accounted for two and three percent respectively of the total variance of physical activity (sr^2 = .02 and sr2 = .03).

In step 4, number of items/equipment available at home was added into the model. The overall model accounted for 29% of the variance in predicting physical activity (R^2.289; F1,226=.6.384, p=.012). After controlling for gender, body mass index, number of hours watching television, number of hours playing actively outside, sibling/other child support, and parental permission for the child to play actively outside, entering the variable, the number of items/equipment available at home, into the model accounted for an additional 2% of the variance (R^2 Change .02; t=-2.53, p=.012).

In the next step, school policy promoting physical activity was added into the model. The overall model accounted for 30% of the variance for predicting physical

activity (R^2.301; $F_{1,225}$ =.3.974, p=.047). After controlling for gender, body mass index, number of hours watching television, number of hours playing actively outside, sibling/other child support, the parent always allowing the child to play actively outside, and the number of items/equipment available at home, entering the variable of school policy promoting physical activity, accounted for an additional 1% of the variance (R^2 Change .01; t= 1.993, p=.047).

In the sixth and last step, self-efficacy to overcome general barriers was entered into the model. The overall model accounted for 31% of the total variance explaining physical activity (R^2.314; $F_{1,224}$=4.215, p=.041). All existing variables in the model remained significantly predictive for physical activity. Self-efficacy to overcome general barriers accounted for an additional 1% of the variance (R^2 Change .013; t= 2.053, p=.041), when controlling for gender, body mass index, number of hours watching television, number of hours playing actively outside, sibling/other child support, the parent always allowing the child to play actively outside, the number of items/equipment available at home, and school policy promoted physical activity.

Table4.45 Hierarchical Regression Model of Factors associated with physical activity (pedometer)

Variables		*Step1*	*Step 2*	*Step3*	*Step4*	*Step5*	*Step6*
Gender Male (code 0) Female (code 1)	ß sr2 t /P-value	-.414 .17 -6.907/.000	-.390 .15 -6.591/.000	-.376 .14 -6.501/.000	-.348 .11 -5.971/.000	-.335 .11 -5.747/.000	-.321 .10 -5.519/.000
Body mass index	ß sr2 t /P-value	-.128 .02 -2.130/ .034	-.130 .02 -2.210/ .028	-.164 .02 -2.792/.006	-.158 .02 -2.725/.007	-.155 .02 -2.697/.008	-.151 .02 -2.632/.009
Number of hours watching television	ß sr2 t /P-value		-.160 .02 -2.640/ .029	-.123 .01 -2.052/ .041	-.117 .01 -1.968/.050	-.123 .02 -2.080/.039	-.138 .02 -2.329/.021
Number of hours playing actively outside	ß sr2 t /P-value		.187 .03 3.048/ .003	.157 .02 2.608/.010	.141 .02 2.361/.019	.152 .02 2.547/.012	.146 .02 2.455/.015
Sibling/other child support	ß sr2 t /P-value			.126 .02 2.216/.028	.135 .02 2.399/.017	.129 .02 2.307/.022	.126 .02 2.263/.025
Parent allowing child to play outside- always	ß sr2 t /P-value			.183 .03 3.076/.002	.190 .03 3.237/.001	.189 .04 3.240/.001	.181 .03 3.106/.002
Number of items/equipment available at home (HM-EQU)	ß sr2 t /P-value				-.146 .02 -2.527/.012	-.154 .02 -2.683/.008	-.158 .02 -2.770/.006
School policy promoting physical activity (SCH-POL)	ß sr2 t /P-value					.113 .01 1.993/.047	.112 .01 1.996/.047
Self-efficacy to overcome general barriers	ß sr2 t /P-value						.116 .01 2.053/.041
B/Standard Error		1036.170/ 70.857	1046.119/ 72.921	971.894/ 77.444	1065.788/ 85.085	986.286/ 93.466	922.182/ 97.918
Cum R2		.178	.221	.269	.289	.301	.314
R^2 Change		.178	.044	.047	.020	.012	.013
df/F-Change		2,231/24.948	2,229/6.445	2,227/7.302	1,226/6.384	1,225/3.974	1,224/ 4.215
P-Value		**.000**	**.002**	**.001**	**.012**	**.047**	**.041**

Summary of Major Findings

This section summarizes the findings that relate to Objective #1 of the study: to describe the level of physical activity in Thai fourth grade students in Bangkok. The summary is organized by the category of variables.

1. Child characteristics

Thai fourth grade male students were more active than female students (Male 11,021 steps per day (SD 2,917); Female 9,168 steps per day (SD 2,381). Students studying in different schools had significantly different levels of physical activity ($F_{5,350}=8.69$, $p<.001$). Students with different levels of family income, house locations, and house characteristics had no significant difference in their level of physical activity. A child's body mass index had no significant correlation with physical activity.

2. Family characteristics

Parents' body mass index, number of family members living together, number of children the parents have, the number of children less than 15 years old living together, and the number of hours the parent spent with the child during weekdays and weekends had no significant correlation with physical activity. Students whose parents lived together as a couple had a significantly lower of levels of physical activity compared to those whose parents lived separately, but there was no significant difference in physical activity when compared to those students with divorced/ widowed parents. The students who have fathers who graduated with more or less than a Bachelor's degree were more active than those whose fathers graduated with a Bachelor's degree ($F_{2,336}=3.987$, $p=.019$). However, the mother's education did not affect the student's activity ($F_{2,346}=.693$, $p=.501$).

3. Child's behaviors

The number of hours watching television and the number of hours playing video games had no significant correlation with physical activity. In contrast, the number of hours playing actively outside and an active commute to school had a significant correlation with physical activity.

4. Social influences

Parents perceived safety for the child playing outside without supervision is not significantly correlated with physical activity, but the frequency that parents permit their child to play actively outside is significantly negatively correlated with physical activity (r -.18, p=.001) . Family's favorite activity (active or inactive) had no significant correlation with physical activity.

5. Family support

Father/other male support and mother/other female support had no significant correlation with physical activity but sibling support had a significant positive correlation with physical activity (r =.15, p<.05)

6. Physical activity cognition

Perceived barriers, self-efficacy to overcome internal affective barriers, and physical activity enjoyment had no significant correlation with physical activity. Only self-efficacy to overcome general barriers had a positive correlation with physical activity (r=.11, p<.05).

7. Neighborhood environment

The number of facilities available in a neighborhood and neighborhood safety had no significant correlation with physical activity; only social environment in the neighborhood had a significant correlation with physical activity ($r=.23$, $p<.01$).

8. School environment

Regarding school environment, adequacy of facilities available at the school and a school policy that promoted physical activity had a significant negative affect on physical activity ($r= -.17$, $p<.01$; $r= -.16$, $p<.01$, respectively). Surprisingly, social environment at school had no significant correlation with physical activity.

9. Home environment

The number of items/equipment available at home and parental support at home had no significant correlation with physical activity, but home rules promoting physical activity had a significant positive impact on physical activity.

In brief, variables associated with physical activity were: gender, school, parents' marital status, father's education, number of hours playing actively outside an active commute to school, frequency of parent's permitting the child to play actively outside, sibling support, self-efficacy to overcome general barriers, social environment in neighborhood, adequacy of facilities available at school, school policy promoted physical activity, and home rules to promote physical activity.

The section below presents findings corresponding to the study's Objective #2: to explore the factors predicting physical activity assessed by a pedometer.

Findings from the results of a hierarchical multiple regression analysis revealed that gender, body mass index, number of hours watching television, number of hours playing actively outside, sibling/other child support, parental permission for their children always to play actively outside, the number of items/equipment available at home, school policy promoted physical activity, and self-efficacy to overcome general barriers predicted the level of physical activity of 31% of the variance for physical activity. Gender was the strongest predictor of physical activity. When controlled for gender, each variable in the model explained only a small amount of the variance (1-3%) of physical activity.

CHAPTER V

Introduction

The aims of this descriptive study were: 1) to describe physical activity; and 2) to study the factors that determine the level of physical activity in Thai fourth grade students in Bangkok. This chapter discusses the major findings of the study and their significance, the strengths and limitations of the study, the implications of the study for nursing research and practice, and recommendations for future research and conclusion.

Interpretation of Findings

Objective One

To describe the level of physical activity in Thai fourth grade students in Bangkok.

The average number of steps taken daily by Thai fourth graders (as measured by a pedometer) is 10,079 (SD 2,811). Boys averaged 11,031 steps per day (SD 2,916), and girls 9,167 steps per day (SD 2,380). The average number of steps taken on weekdays is 10,407 (SD 2,924) steps per day (Male 11,530.5±2,980.5; Female 9,358.3±2,448.5). The average number of steps taken on weekends is 8,761(SD 3,317) (Male 9,195.3±3,367.1; Female 8,355.1±3,226.1). These findings are based on the activity levels of students who wore pedometers for at least 10 hours a day for 6 consecutive days (four weekdays and two weekend days).

Thus: 1) Thai children in Bangkok are less active than children from other regions as reported in many published articles; 2) Boys are more active than girls; and 3) Thai children in Bangkok are more active during the week than on weekends.

The number of steps taken daily by Thai children in Bangkok is lower than that reported in six published studies of children in other regions of the world. Rowlands, Eston, & Ingledew (1999), for example, studied the level of physical activity in 17 boys and 17 girls, ages 9.5±0.7(SD) yr., living in North Wales, United Kingdom. The number of steps taken daily (as measured by using a pedometer wearing for 6 days) was 16,035.4±5,998.7 steps per day for boys and 12,728.7±4,026.3 steps per day for girls.

Another study (Vincent & Pangrazi, 2002) of a large group of 6-12-year-old American children (N=711) living in the Northwest U.S found that the mean step counts of these children (as measured by sealed pedometers for 4 consecutive weekdays) ranged from 10,479-11,274 for girls and 12,300-13,989 for boys. Boys were significantly more active than girls ($F=90.16$, $p<.01$) but there were no differences in step counts by age ($F=0.78$, $p=.587$). The investigators suggested that a standard daily activity rate might be approximately 13,000 steps for boys and 11,000 steps girls.

In addition, the same group of investigators (Vincent, Pangrazi, Raustorp, Tomson, & Cuddihy, 2003) compared step counts and body mass index of children in the United States, Sweden, and Australia (N=1954; 995 boys and 959 girls). Children in the study wore a pedometer from the first hour of class until the time they went to bed for four consecutive weekdays. Step counts were reported separately for boys and girls. Among boys, the average step count ranged from 15,673 to 18,346 for Swedish children, 13,864 to 15,023 for Australian children and 12,554 to 13,872 for American children. Among

girls, the mean step count ranged from 12,041 to 14,825 for Swedish children, 11,221 to 12,322 for Australian children and 10,661 to 11,383 for American children. In sum, this study reported that Swedish children are more active than either Australian or American children.

In New Zealand (J. S. Duncan, Schofield, & Duncan, 2006) examined levels of physical activity (as measured by sealed multiday memory pedometers worn for 3 weekdays and two weekend days) in 1,115 five to twelve-year-old children (536 boys, 579 girls). The mean daily step counts for boys on weekdays and weekend days were 16,133±3,864 and 12,702±5,048 respectively; for girls, it was 14,124±3,286 and 11,158±4,309 respectively. The step counts are significantly different on weekdays and weekend days, between boys and girls, and vary significantly by age, ethnicity, and socioeconomic status. Number of step counts are more strongly correlates with percent body fat than with body mass index.

Two studies compared activity levels in children on weekdays and weekends. Duncan et al. (M. J. Duncan, Al-Nakeeb, Woodfield, & Lyons, 2007) studied 208 British primary school students (101 boys and 107 girls; mean age 9.3±0.9years) from central England. Mean steps/day (as measured by a sealed pedometer worn for 4 consecutive days, two weekends and two weekdays) were significantly higher on weekdays (13,827±3,820) than on weekends (10,334±4,436) ($p<.001$). Mean step counts in boys (12,263±3,789) were significantly higher than those of girls (11,748±3,310) ($p<.05$). Approximately 28% of the boys met a target of 15,000 steps/day, and 46.7% of the girls met a target of 12,000 steps/day, rates that have been recommended by (Tudor-Locke et al., 2004). The second study (Bassett et al., 2007) examined the physical activity levels

and body mass indices of 6-18-year-old children (N=139) living in a nontechnological farming community (an Old Order Amish Community). The average step count per day was 15,563±3,702 for 7 consecutive days, 17,525±4,443 for 4 weekdays, and 10,661±4,208 for Friday, Saturday, and Sunday). The number of steps taken by boys was significantly higher than that for girls ($p<0.001$). However, no significant differences were found by age group. The mean of step counts of 9-12 years old boy and girls were 16,999±3,557 and 13,834±2,407, respectively.

These comparisons provide evidence that the number of steps taken daily by Thai children in Bangkok is significantly lower than that of children in other regions of the world. Also, boys are more active than girls. As in other regions, Thai children in Bangkok are more active during weekdays than on weekends

The President's Council on Physical Fitness and Sports (2001) encourages children ages 6-17 years old to walk at least 13,000 steps/day for boys, and 11,000 steps/day for girls. Thai children attained approximately 2,000 steps/day less than this recommendation.

Tudor-Locke et al. (2004) suggest that 15,000 steps/day for boys and 12,000 steps/day for girls marks the activity threshold between normal weight and overweight/obese children. In this study, only 11.4% of Thai boys and 12.7% of Thai girls met or exceeded this recommendation. Duncan, Schofield, & Duncan (2007), based on pedometer measurements taken on both weekdays and weekends, suggest that the step count targets for reducing the risk of excess body fat in children is 16,000 steps/day for boys and 13,000 steps/day for girls. Instead of body mass index, these authors used

percent of body fat (>85th percentile as overweight; <85th as non-overweight) as a reference for measuring obesity.

Rowlands & Eston (2005) have proposed that boys take 13,000 steps/day, and that girls take 12,000 steps/day. The investigators had a small group of 34 children aged 8-10 years old wear Tritrac accelerometers and Yamac pedometers to assess the number of steps taken when the children performed 60 or more minutes of moderate activity. Their results revealed that boys and girls who performed ≥60 minutes of moderate activity attained the recommended activity goals.

It appears that Thai children are less active than children in Sweden, North Wales, Australia, America, New Zealand, and Central England and that their level of physical activity is less than existing recommendations. However, this conclusion should be interpreted with caution. Step counts may be unreliable across studies given differences in the ethnicity and age, of the children studied, the variation in the number and kind of days tracked, and differences in the models of pedometers used and method of measuring number of steps. Since, there are no studies in international journals that report on step count studies of other Asian children and no study that reports on the normative daily step counts of children in Thailand, the results of this study lack a comparative context.

It is possible, of course, that the number of steps taken daily by Thai children is truly lower than that of other children studied. But the central point of activity research in children is not merely to catalog the level of activity in children. It is to understand how level of physical activity affects the health of children. The suggested number of steps mentioned above are based on the percent of body fat or the body mass index using the international body mass index (Cole, Bellizzi, Flegal, & Dietz, 2000) to categorize the

weight status of children. When using this international standard to assess the weight status of the children in this study (BMI < 20= normal weight; BMI 20-23.99=overweight; BMI >24=obesity), this study finds that 69.3 percent of the children in the study are of normal weight; 18 percent are overweight, and, and 11.8 percent are obese. Thus, the percent of children in Thailand who are classified as overweight/obese by this standard is approximately 30%, a figure that is higher than that indicated by the current survey of weight status of children aged 6-14 years in Bangkok, which uses a Thai standard for weight and height (Nutrition Division, 2005)reported that Thai children in Bangkok have a 6.2 percent risk of being overweight (>+1.5SD-+2SD) and a 16.7% being overweight/obesity (>+2SD).

The low level of step counts in Thai children may be explained as an artifact of excluding some activities performed by Thai students from the study. For example, during the study period, students from Thewphaingarm School and Mae-Pra Fatima School had swimming for their physical education class. The average numbers of steps of children from these two schools were lower than for the other four schools in the study because swimming was not a measured activity. Moreover, children in this study also reported biking as one of their favorite activities, and biking was performed by both genders. But because pedometers do not measure swimming or biking activity, these activities were excluded from analysis**.** In sum, step counts may not be an ideal measure of physical activity.

Another possible explanation for why Thai children were found to take fewer steps daily than children in other samples could be that the Thai children did not wear the pedometer as instructed. When the investigator randomly called parents of the sampled

children, some reported that their children went out to play without wearing their pedometer but did not record this lapse in their log. In sum, the lower step counts of Thai children may be the result of methodological and epistemological issues.

Objective #2:

To study factors determining physical activity in Thai fourth grade students in Bangkok.

A central finding of this study is that multiple and specific factors predict children's level of physical activity. The study found that gender, body mass index, number of hours spent watching television, the number of hours children playing actively outside, support from siblings/other children , parental permission for children to play actively outside, the number of items/equipment available at home, a school policy that promoted physical activity, and children's self-efficacy to overcome general barriers to physical activities explained 31 percent of the variance in predicting physical activity.

Child characteristics (gender and body mass index) explained approximately 18 percent of the variance. When controlled for body mass index, gender uniquely accounted for approximately 16 percent of the variance. Adding children's behaviors (number of hours watching television and number of hours playing actively outside) in the model accounted for an additional 4.4% of the variance. Similarly, adding Social Influences (support from siblings/other children and parental permission to play actively outside) into the model accounted for an additional 4.7 percent of the variance. Adding environmental factors (number of activity items/equipment available at home and presence of a school policy to promote physical activity) into the model, added an

additional 3 percent of the explained variance. Finally, adding children's self-efficacy to overcome general barriers into the model, accounted for an additional one percent of the variance. Gender is the strongest predictor of physical activity; when gender is controlled for, each variable in the model explains only one to three percent of the total variance for physical activity.

The observation about gender is consistent with the results of a national survey in Thailand (Division of Exercise for Health, 2004) and many other well designed studies, in western countries (Sallis et al., 1999; Santos et al., 2003; Strauss et al., 2001; Trost et al., 2002; Trost et al., 1999a; Vincent & Pangrazi, 2002). All studies reported that boys are more active than girls.

The reason why girls are LESS active than boys in Thailand is not well understood. One reason might be the biological differences between boys and girls; another reason might be social and environmental factors. There is a paucity of research that explores biological mechanisms in relation to physical activity in males and females. In this study, it is possible that social and environmental factors influenced the physical activity levels of the boys and girls studied. Thai society has very well defined gender role expectations. Vigorous and highly active behaviors are more culturally acceptable for boys than for girls. These normative social/cultural expectations may differentiate parenting styles for boys and girls.

This study used pedometers to measure physical activity, an instrument that is unable to measure the intensity of physical activity. Other studies that have utilized accelerometers to measure intensity of physical activity have revealed that boys engage in more moderate to vigorous activity than do girls (Pate et al., 2002; Riddoch et al., 2004;

Sherar, Esliger, Baxter-Jones, & Tremblay, 2007; Trost et al., 2002). Higher step counts among boys might be explained by their engaging in higher intensity activity. Thai boys tend to prefer high intensity activities such as soccer and basketball compared to girls, who prefer badminton. Soccer and basketball game encourage children to run actively during the match. This could increase number of step counts in boys.

Sedentary behaviors were captured by data on television viewing and playing video/ computer games. Thai children in this study watched television for 1.9 hours a day (SD 1.3) during weekdays, and 30.8 percent of the children reported watching television more than 2 hours/day on weekdays. During weekends, children spent more time watching television (3.2 hours; SD 2.1). Indeed, thirty-eight percent of the children in the sample reported watching more than three hours of television/day on weekends.

The mean number of hours of television reported in this study is lower than those reported in previous studies of Thai children. A national survey (Ruangdaraganon, Kotchabhakdi, Udomsubpayakul, Kunanusont, & Suriyawongpaisal, 2002)of Thai children aged 6-12 years old, for example, revealed that 62 percent of children watched television/played video games one to three hours/day, and that approximately 7 percent of the children spent more than three hours watching television. Mo-suwan et al.'s study (2004) reported that Thai children aged 6-13 years old spent 2.8 hours per day (2.5 hours per day during weekdays and 4.2 hours per day on weekends). One explanation for why the viewing hours reported in this study are lower than those results from Ruangdaraganon et al.'s study (2002) might be that the latter study included in viewing time hours spent playing video games. In addition, the numbers of hours from both

studies (Mo-suwan et al., 2004; Ruangdaraganon et al., 2002) were reported by caregivers, while the results from this study were reported by the children directly.

Thai children watch television less than American children, who are reported to watch 3.5 hours of television per day (Roberts, 2000), but more than Chinese children, who are reported to watch only one hour of television per day (Waller, Du, & Popkin, 2003). The availability of television programming (cable service) might be one factor that contributes to a higher level of television viewing. Cable television service was available in Thailand before the study period, whereas the Chinese study was conducted before cable television was available..

The relationship between television viewing and physical activity is still a controversial issue. In this study, results of the analyses using Pearson correlation coefficients demonstrated no significant correlation between television viewing and physical activity. But television viewing has a significant correlation with physical activity when it is simultaneously entered into the multiple regression model along with with the number of hours playing video/ computer games, the number of hours of active outside play, and actively commuting to school. This significant correlation remains when television viewing is added to the hierarchical regression model. Television viewing uniquely explained two percent of the variance in physical activity when other variables in the model are controlled for.

Significance of the findings

The results of this study may be of interest to a number of Thai public officials including the public health administrator, the Bangkok metropolitan city planner, school administrators, and school and community nurses. The results could be used to guide building environments in schools, homes, and neighborhoods that promote physical activity in children. In addition, the results from this study could be used to construct step-counts goals for children to prevent childhood obesity.

This study is the first to report the daily step counts of Thai students in Bangkok schools. Moreover, this study comprehensively explores many possible factors that explain the level of activity among Bangkok children including children's characteristics, children's behaviors, family influences, children's social cognition, and the home, school, and neighborhood environment.

This study also spelled out the multiple factors that predict level of physical activity among children. These results could be used to develop a multilevel program to promote physical activity. Also, the step counts reported in this study in relation to a body mass index could compared with those of children from other regions to gain more understanding about the level of activity of children in Thailand and to prevent overweight/obesity in Thai children.

Strengths and Limitations of the Study

First, the investigators carefully recruited schools from six administrative areas of the Bangkok metropolitan area, and from all the major educational institutes, choosing schools with children from a range of socio-economic groups in order achieve a large, representative sample of the children in Bangkok. The number of students recruited into the study is estimated based on the proportion of children in each educational institute. Second, this is the first study about Thai children that uses a pedometer to measure level of physical activity in a large number of students in Bangkok. The step counts reported tracked activity on both weekdays and weekends. The tools and scales used in the study were developed carefully in order to reduce measurement errors in this study. Finally, this study examined multiple factors that could possibly correlate with physical activity in children such as children's characteristics, children's behaviors, family influences, and home, school, and neighborhood environments. The results have important implications for what needs to be done to promote physical activity among Thai children.

Some limitations of the study need further improvement. First, data were collected from November to January, which is winter in Thailand. Since activity levels vary by season and day of the week (Rowlands & Hughes, 2006), measurements of level of physical activity should be conducted all year long, to track seasonal variation.

Next, using a pedometer to measure level of physical activity may underestimate level of physical activity because a pedometer does not measure biking and swimming (G. Welk, 2002; G. J. Welk, Corbin, & Dale, 2000). Both bicycling and swimming are reported as two of the favorite activities performed by children. Next, this study included

only Thai fourth grade students with a mean age of 10 years old. As a result, the findings may not be generalizable to children in other age groups.

In addition, the tools used in this study have been tested and re-retested on Thai students, but only in very small samples. Although, the validity of most of the tools has been established in other populations, it has not been establish in Thai children. In addition, the score from Child's Perceived Physical Activity Enjoyment Scale showed a lack of variation. Most of the students perceived high level of enjoyment. This tool might need to be modified to gain greater sensitivity in determining level of enjoyment. Finally, the Child's Perceived Environment to Playing Actively is a three-point level scale. As a result, the students tended to answer at the midpoint. Modification of this tool is essential to enhance sensitivity in determining level of environmental support in the home, school, and neighborhood.

Implication for Nursing

1. Nursing research

Nursing research dealing with the factors that influence level of physical activity among children is scant. The results of this study could be used to build nursing knowledge in the fields of children's, school-based programs to promote health and physical activity and prevent obesity. In addition, some tools developed for this study such as Child's Perceived Self-efficacy to Play Actively could be used in other studies.

2. Nursing Practice

Many aspects of the results of this study could be used by school nurses, community nurses, or pediatric nurses to guide interventions for promoting active

lifestyles in children. The program to promote physical activity in children should be focused on girls and on activity during weekdays. Replacing television viewing time with time spent playing actively outside could increase level of physical activity. Promoting healthy social environments in families should be included in the program. Promoting children's self-efficacy to overcome general barriers could enhance level of physical activity.

Recommendations for Future Research

This study investigated physical activity among only fourth grade students, which resulted in a lack of generalizability of its findings to children in other age groups. The study should be replicated employing a sample composed of children from different age groups. Also a longitudinal study design would be preferable.

Since pedometers are practical aids for self-monitoring to promote physical activity both in overweight and normal weight children and it is less expensive than accelerometer, it should be used for self-monitoring in intervention program. A follow-up study should include students from across Thailand and compare step counts of children of different weights.

Promoting moderate to vigorous physical activity produces several health benefits, such as preventing overweight/obesity and several chronic diseases. Currently, there is a paucity of data relating to how much activity is necessary to gain health benefits associated with exercise. Using an accelerometer, which measures time, duration, and intensity of activity, instead of a pedometer could enhance our understandings about patterns of physical activity in Thai children. Also, level of physical activity should be

assessed in all seasons to reduce the potential bias that results from measuring physical activity in one season only.

Alike with other studies, this study found that environmental factors explain small amounts of variance in physical activity. Little is known about what structures inside the home, school, and neighborhood environment really have an impact on level of physical activity in children. A follow-up should look at factors other than those reported here that may impact children's level of physical activity, such as the provision of bicycle parking in schools. Inclusion of other putative factors in the questionnaire could enhance understanding of the social and physical environmental factors that contribute to higher levels of physical activity.

This study reported data drawn from both parents and children. However, the investigator asked different questions of them. A future study should remedy this problem by asking parents and children the same questions in order to shed light on the similarities and differences in children's and parents' perceptions

Since the results of this study revealed that gender is the strongest predictor of physical activity, further studies should focus on identifying those gender-related factors that differentiate the activity patterns of girls and boys.

Conclusion

This descriptive study was conducted with 398 fourth grade students in Bangkok. The aims of the study were to describe children's level of physical activity, and to explore the factors that determine physical activity. This is one of the first studies about activity among Thai children that used a pedometer to measure level of physical activity

and to study multiple factors including children's characteristics and measures of the social and physical environment that can influence physical activity levels. The major results revealed that Thai children attained a lower number of steps compared to children in Europe, Australia, and America. Boys were more active than girls. The factors that were significantly and independently associated with physical activity of Thai children living in Bangkok when controlling for the other variables were gender, body mass index, number of hours watching television, number of hours playing actively outside, sibling/other children's support, parental permission for children to play outside, the number of items/equipment available at home, school policy promoting physical activity, and children's self-efficacy to overcome general barriers. Gender was the strongest predictor accounting for 10% of the variance predicting physical activity. When controlling for gender, other variables in the model account for only one to three percent of the variance of physical activity. The overall model explained 31 percent of the variance of physical activity.

The results from this study provide baseline information on the number of step counts in Thai fourth grade student living in Bangkok. The results from this study indicate a need to develop a multilevel approach to provide programs to promote physical activity during weekends, especially in girls, and decrease the number of hours spent on watching television in Thai children living in Bangkok. Building and promoting safe environments and promoting supportive social environments in neighborhoods could in turn encourage parents to allow their children to play outside and increase sibling/other child support on physical activity. School policies promoting physical activity should be designed and implemented. Increasing self-efficacy to play actively by creating

supportive environments at home, in schools, and in neighborhoods is a promising strategy to enhance levels of physical activity in children. These results can be used in future research and nursing practice to help promote health lifestyles amongst the Thai population.

References

Adkins, S., Sherwood, N. E., Story, M., & Davis, M. (2004). Physical activity among African-American girls: the role of parents and the home environment. *Obesity Research, 12 Suppl*, 38S-45S.

Adkins, S., Sherwood, N. E., Story, M., & Davis, M. (2004). Physical Activity among African-American Girls: The Role of Parents and the Home Environment. *Obesity Res, 12*(suppl_1), 38S-45.

Allison, K. R., Dwyer, J. J., & Makin, S. (1999). Self-efficacy and participation in vigorous physical activity by high school students. *Health Education and Behavior, 26*(1), 12-24.

Anshel, M. H., Freedson, P., Hamill, J., Haywood, K., M., H., & Plowman, S. A. (1991). *Dictionary of the Sport and Exercise Sciences.* Champaign, IL: Human Kinetics.

Arluk, S. L., Branch, J. D., Swain, D. P., & Dowling, E. A. (2003). Childhood obesity's relationship to time spent in sedentary behavior. *Military Medicine, 168*(7), 583-586.

Bailey, R. C., Olson, J., Pepper, S. L., Porszasz, J., Barstow, T. J., & Cooper, D. M. (1995). The level and tempo of children's physical activities: an observational study. *Medicine and Science in Sports and Exercise, 27*(7), 1033-1041.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs: N. J.: Prentice-Hall.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

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

Bassett, D. R., Jr., Tremblay, M. S., Esliger, D. W., Copeland, J. L., Barnes, J. D., & Huntington, G. E. (2007). Physical activity and body mass index of children in an old order Amish community. *Medicine and Science in Sports and Exercise, 39*(3), 410-415.

Biddle, S., & Goudas, M. (1996). Analysis of children's physical activity and its association with adult encouragement and social cognitive variables. *Journal of School Health, 66*(2), 75-78.

Brener, N. D., Kann, L., McManus, T., Kinchen, S. A., Sundberg, E. C., & Ross, J. G. (2002). Reliability of the 1999 youth risk behavior survey questionnaire. *Journal of Adolescent Health, 31*(4), 336-342.

Bronfenbrenner, U. (1979). *The ecology of human development*. Massachusetts: Harvard University Press.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology, 22*(6), 723-742.

Bronfenbrenner, U. (1989). The ecological system theory. In R. Vasta (Ed.), *Annals of child development (Vol. 6, pp. 187-249).* Greenwich, CT: JAI.

Bronfenbrenner, U. (2000). *Ecological Systems Theory*. Washington, DC: American Psychological Association.

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports, 100*(2), 126-131.

Centers for Disease Control and Prevention. (2003). Physical activity levels among children aged 9-13 years--United States, 2002. *MMWR. Morbidity and Mortality Weekly Report, 52*(33), 785-788.

Cole, T. J., Bellizzi, M. C., Flegal, K. M., & Dietz, W. H. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ, 320*(7244), 1240-1243.

Dai, S., Labarthe, D. R., Grunbaum, J. A., Harrist, R. B., & Mueller, W. H. (2002). Longitudinal analysis of changes in indices of obesity from age 8 years to age 18 years: Project HeartBeat! *American Journal of Epidemiology, 156*(8), 720-729.

Deheeger, M., Rolland-Cachera, M. F., & Fontvieille, A. M. (1997). Physical activity and body composition in 10 year old French children: linkages with nutritional intake? *International Journal of Obesity and Related Metabolic Disorders, 21*(5), 372-379.

Department of Health. (2003). *The Physical Activity / Exercise Survey for Children Aged 6-14 Years Old [in Thai].* Nontaburi: Department of Health, Ministry of Public Health, Thailand.

DiLorenzo, T. M., Stucky-Ropp, R. C., Vander Wal, J. S., & Gotham, H. J. (1998). Determinants of exercise among children. II. A longitudinal analysis. *Preventive Medicine, 27*(3), 470-477.

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

Dishman, R. K., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M., et al. (2005). Enjoyment mediates effects of a school-based physical-activity intervention. *Medicine and Science in Sports and Exercise, 37*(3), 478-487.

Division of Exercise for Health. (2004). *The report of exercise situation in 2004 [in Thai].* Nontaburi: Department of Health, Ministry of Public Health, Thailand.

Duncan, J. S., Schofield, G., & Duncan, E. K. (2006). Pedometer-determined physical activity and body composition in New Zealand children. *Medicine and Science in Sports and Exercise, 38*(8), 1402-1409.

Duncan, J. S., Schofield, G., & Duncan, E. K. (2007). Step count recommendations for children based on body fat. *Preventive Medicine, 44*(1), 42-44.

Duncan, M. J., Al-Nakeeb, Y., Woodfield, L., & Lyons, M. (2007). Pedometer determined physical activity levels in primary school children from central England. *Preventive Medicine, 44*(5), 416-420.

Elashoff, J. D. (2000). *nQuery Advisor V. 4 user's guide.* Boston, MA:: Statistical Solutions.

Fein, A. J., Plotnikoff, R. C., Wild, T. C., & Spence, J. C. (2004). Perceived environment and physical activity in youth. *Int J Behav Med, 11*(3), 135-142.

Fogelholm, M., & Kukkonen-Harjula, K. (2000). Does physical activity prevent weight gain--a systematic review. *Obes Rev, 1*(2), 95-111.

Freedson, P. S., & Miller, K. (2000). Objective monitoring of physical activity using motion sensors and heart rate. *Research Quarterly for Exercise and Sport, 71*(2 Suppl), S21-29.

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

Goran, M. I., & Treuth, M. S. (2001). Energy expenditure, physical activity, and obesity in children. *Pediatric Clinics of North America, 48*(4), 931-953.

LeMura, L. M., & Maziekas, M. T. (2002). Factors that alter body fat, body mass, and fat-free mass in pediatric obesity. *Medicine and Science in Sports and Exercise, 34*(3), 487-496.

Levesque, L., Cargo, M., & Salsberg, J. (2004). Development of the Physical Activity Interactive Recall (PAIR) for Aboriginal children. *Int J Behav Nutr Phys Act, 1*(1), 8.

Mahar, M. T., & Rowe, D. A. (2002). Construct validity in physical activity research. In G. J. Welk (Ed.), *Physical activity assessments for health-related research.* (pp. 51-72). Champaign, IL: Human Kinetics.

Manios, Y., Kafatos, A., & Codrington, C. (1999). Gender differences in physical activity and physical fitness in young children in Crete. *Journal of Sports Medicine and Physical Fitness, 39*(1), 24-30.

Ministry of Public Health Thailand. (2002). *Report the nutritional status of students enrolling in provincial elementary schools of an academic year 2001 [in Thai]*: Nutrition Division, Department of Health, Ministry of Public Health.

Morgan, C. F., McKenzie, T. L., Sallis, J. F., Broyles, S. L., Zive, M. M., & Nader, P. R. (2003). Personal, social, and environmental correlates of physical activity in a bi-ethnic sample of adolescents. *Pediatric Exercise Science, 15*(3), 288-301.

Mo-suwan, L., Isranurug, S., Ruengdaraganond, N., Nantamongkonchai, S., Sa-nga, P., Nitiruengchars, K., et al. (2004). *Research report: Holistic development of Thai children: Its association with family factors and child rearing*. Bangkok: The Thailand Research Fund.

Mota, J., Almeida, M., Santos, P., & Ribeiro, J. C. (2005). Perceived Neighborhood Environments and physical activity in adolescents. *Preventive Medicine, In Press, Corrected Proof*.

Motl, R. W., Dishman, R. K., Saunders, R., Dowda, M., Felton, G., & Pate, R. R. (2001). Measuring enjoyment of physical activity in adolescent girls. *American Journal of Preventive Medicine, 21*(2), 110-117.

Motl, R. W., Dishman, R. K., Ward, D. S., Saunders, R. P., Dowda, M., Felton, G., et al. (2002). Examining social-cognitive determinants of intention and physical activity among black and white adolescent girls using structural equation modeling. *Health Psychology, 21*(5), 459-467.

Motl, R. W., Dishman, R. K., Ward, D. S., Saunders, R. P., Dowda, M., Felton, G., et al. (2005). Perceived physical environment and physical activity across one year among adolescent girls: self-efficacy as a possible mediator? *Journal of Adolescent Health, 37*(5), 403-408.

Nunally, J. C. (1978). *Psychometric theory*. New York, NY: McGraw Hill.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. New York: McGraw-Hill.

Nutrition Division. (2005). *Report: The survey of nutritional and weight status of people living in Bangkok 2003-2004 [in Thai].* Nontaburi: Department of Health, Ministry of Public Health , Thailand.

O'Loughlin, J., Paradis, G., Kishchuk, N., Barnett, T., & Renaud, L. (1999). Prevalence and correlates of physical activity behaviors among elementary schoolchildren in multiethnic, low income, inner-city neighborhoods in Montreal, Canada. *Annals of Epidemiology, 9*(7), 397-407.

Pate, R. R., Freedson, P. S., Sallis, J. F., Taylor, W. C., Sirard, J., Trost, S. G., et al. (2002). Compliance with physical activity guidelines: prevalence in a population of children and youth. *Annals of Epidemiology, 12*(5), 303-308.

Pate, R. R., Trost, S. G., Felton, G. M., Ward, D. S., Dowda, M., & Saunders, R. (1997). Correlates of physical activity behavior in rural youth. *Research Quarterly for Exercise and Sport, 68*(3), 241-248.

President's Council on Physical Fitness and Sports. (2001). *The President's Challenge: Physical Activity and Fitness Awards Program.* Bloomington, IN: President's Council on Physical Fitness and Sports.

Prochaska, J. J., Rodgers, M. W., & Sallis, J. F. (2002). Association of parent and peer support with adolescent physical activity. *Research Quarterly for Exercise and Sport, 73*(2), 206-210.

Riddoch, C. J., Bo Andersen, L., Wedderkopp, N., Harro, M., Klasson-Heggebo, L., Sardinha, L. B., et al. (2004). Physical activity levels and patterns of 9- and 15-yr-old European children. *Medicine and Science in Sports and Exercise, 36*(1), 86-92.

Robbins, L. B., Pis, M. B., Pender, N. J., & Kazanis, A. S. (2004). Exercise self-efficacy, enjoyment, and feeling states among adolescents. *Western Journal of Nursing Research, 26*(7), 699-715; discussion 716-621.

Roberts, D. F. (2000). Media and youth: access, exposure, and privatization. *Journal of Adolescent Health, 27*(2 Suppl), 8-14.

Rowlands, A. V., & Eston, R. G. (2005). Comparison of accelerometer and pedometer measures of physical activity in boys and girls, ages 8-10 years. *Research Quarterly for Exercise and Sport, 76*(3), 251-257.

Rowlands, A. V., Eston, R. G., & Ingledew, D. K. (1999). Relationship between activity levels, aerobic fitness, and body fat in 8- to 10-yr-old children. *Journal of Applied Physiology, 86*(4), 1428-1435.

Rowlands, A. V., & Hughes, D. R. (2006). Variability of physical activity patterns by type of day and season in 8-10-year-old boys. *Research Quarterly for Exercise and Sport, 77*(3), 391-395.

Ruangdaraganon, N., Kotchabhakdi, N., Udomsubpayakul, U., Kunanusont, C., & Suriyawongpaisal, P. (2002). The association between television viewing and childhood obesity: a national survey in Thailand. *Journal of the Medical Association of Thailand, 85 Suppl 4*, S1075-1080.

Sallis, J. F., Condon, S. A., Goggin, K. J., Roby, J. J., Kolody, B., & Alcaraz, J. E. (1993). The development of self-administered physical activity surveys for 4th grade students. *Research Quarterly for Exercise and Sport, 64*(1), 25-31.

Sallis, J. F., Conway, T. L., Prochaska, J. J., McKenzie, T. L., Marshall, S. J., & Brown, M. (2001). The association of school environments with youth physical activity. *American Journal of Public Health, 91*(4), 618-620.

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., 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), 410-415.

Sallis, J. F., Strikmiller, P. K., Harsha, D. W., Feldman, H. A., Ehlinger, S., Stone, E. J., et al. (1996). Validation of interviewer- and self-administered physical activity checklists for fifth grade students. *Medicine and Science in Sports and Exercise, 28*(7), 840-851.

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

Salmon, J., Owen, N., Crawford, D., Bauman, A., & Sallis, J. F. (2003). Physical activity and sedentary behavior: a population-based study of barriers, enjoyment, and preference. *Health Psychology, 22*(2), 178-188.

Santos, P., Guerra, S., Ribeiro, J. C., Duarte, J. A., & Mota, J. (2003). Age and gender-related physical activity. A descriptive study in children using accelerometry. *Journal of Sports Medicine and Physical Fitness, 43*(1), 85-89.

Sherar, L. B., Esliger, D. W., Baxter-Jones, A. D., & Tremblay, M. S. (2007). Age and gender differences in youth physical activity: does physical maturity matter? *Medicine and Science in Sports and Exercise, 39*(5), 830-835.

Steinbeck, K. S. (2001). The importance of physical activity in the prevention of overweight and obesity in childhood: a review and an opinion. *Obes Rev, 2*(2), 117-130.

Strauss, R. S., Rodzilsky, D., Burack, G., & Colin, M. (2001). Psychosocial correlates of physical activity in healthy children. *Archives of Pediatrics and Adolescent Medicine, 155*(8), 897-902.

Stucky-Ropp, R. C., & DiLorenzo, T. M. (1993). Determinants of exercise in children. *Preventive Medicine, 22*(6), 880-889.

The National Statistical Office. (2002). *The time use survey 2001[in Thai]*. Bangkok, Thailand: Statistical Data Bank and Information Dissemination Division.

The National Statistical Office & Ministry of Information and Communication Technology. (2003). *Report of the sport played and sport watching behavior survey 2002.* Bangkok, Thailand: Statistical Forecasting Bureau.

The National Statistical Office & Ministry of Information and Communication Technology. (2004). *Report of the exercise behavior survey 2004.* Bangkok, Thailand: Statistical Forecasting Bureau.

Thompson, J. L., Davis, S. M., Gittelsohn, J., Going, S., Becenti, A., Metcalfe, L., et al. (2001). Patterns of physical activity among American Indian children: an assessment of barriers and support. *Journal of Community Health, 26*(6), 423-445.

Timperio, A., Crawford, D., Telford, A., & Salmon, J. (2004). Perceptions about the local neighborhood and walking and cycling among children. *Preventive Medicine, 38*(1), 39-47.

Trost, S. G., Pate, R. R., Sallis, J. F., Freedson, P. S., Taylor, W. C., Dowda, M., et al. (2002). Age and gender differences in objectively measured physical activity in youth. *Medicine and Science in Sports and Exercise, 34*(2), 350-355.

Trost, S. G., Pate, R. R., Ward, D. S., Saunders, R., & Riner, W. (1999a). Correlates of objectively measured physical activity in preadolescent youth. *American Journal of Preventive Medicine, 17*(2), 120-126.

Trost, S. G., Pate, R. R., Ward, D. S., Saunders, R., & Riner, W. (1999b). Determinants of physical activity in active and low-active, sixth grade African-American youth. *Journal of School Health, 69*(1), 29-34.

Tudor-Locke, C., Ainsworth, B. E., Adair, L. S., Du, S., & Popkin, B. M. (2003). Physical activity and inactivity in Chinese school-aged youth: the China Health and Nutrition Survey. *International Journal of Obesity and Related Metabolic Disorders, 27*(9), 1093-1099.

Tudor-Locke, C., Pangrazi, R. P., Corbin, C. B., Rutherford, W. J., Vincent, S. D., Raustorp, A., et al. (2004). BMI-referenced standards for recommended pedometer-determined steps/day in children. *Preventive Medicine, 38*(6), 857-864.

U.S. Department of Health and Human Services. (2000). *Healthy People 2010.* Washington, D.C.: U.S. Government Printing Office.

Vincent, S. D., & Pangrazi, R. P. (2002). An examination of the activity patterns of elementary school children. *Pediatric Exercise Science, 14*(4), 432-441.

Vincent, S. D., Pangrazi, R. P., Raustorp, A., Tomson, L. M., & Cuddihy, T. F. (2003). Activity levels and body mass index of children in the United States, Sweden, and Australia. *Medicine and Science in Sports and Exercise, 35*(8), 1367-1373.

Waller, C. E., Du, S., & Popkin, B. M. (2003). Patterns of overweight, inactivity, and snacking in Chinese children. *Obesity Research, 11*(8), 957-961.

Weir, L. A., Etelson, D., & Brand, D. A. (2006). Parents' perceptions of neighborhood safety and children's physical activity. *Preventive Medicine, 43*(3), 212-217.

Welk, G. (2002). *Physical activity assessments for health-related research*. Champaign, IL: Human Kinetics.

Welk, G. J., Corbin, C. B., & Dale, D. (2000). Measurement issues in the assessment of physical activity in children. *Research Quarterly for Exercise and Sport, 71*(2 Suppl), S59-73.

Willis, G. B. (2005). *Cognitive interviewing: A tool for improving questionnaire design*. Thousand Oaks: Sage Publications.

Woodfield, L., Duncan, M., Al-Nakeeb, Y., Nevill, A., & Jenkins, C. (2002). Sex, ethnic and socio-economic differences in children's physical activity. *Pediatric Exercise Science, 14*(3), 277-285.

Wu, T. Y., & Pender, N. (2002). Determinants of physical activity among Taiwanese adolescents: an application of the health promotion model. *Research in Nursing and Health, 25*(1), 25-36.

Wu, T. Y., Ronis, D. L., Pender, N., & Jwo, J. L. (2002). Development of questionnaires to measure physical activity cognitions among Taiwanese adolescents. *Preventive Medicine, 35*(1), 54-64.

APPENDIX A

1 CHR Approval letter

2 Consent Form

3. Assent Form

COMMITTEE ON HUMAN RESEARCH
OFFICE OF RESEARCH, Box 0962
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
www.research.ucsf.edu/chr/Apply/chrApprovalCond.asp
chr@ucsf.edu
(415) 476-1814

CHR APPROVAL LETTER

TO: Christine Kennedy, R.N., Ph.D.
Box 0606

Supaporn Wannasuntad, MSN
Box 0606,

RE: Correlates of Physical Activity in Thai Fourth Grade Students in Bangkok: Children and Parent Perception (Pilot Study)

The Committee on Human Research (CHR) has reviewed and approved this application to involve humans as research subjects. This included a review of all documents attached to the original copy of this letter.

Specifically, the review included but was not limited to the following documents:
Two Consent Forms, Dated 2/1/06
Two Assent Forms. Dated 2/1/06

The CHR is the Institutional Review Board (IRB) for UCSF and its affiliates. UCSF holds Office of Human Research Protections Federalwide Assurance number FWA00000068. See the CHR website for a list of other applicable FWA's.

COMMENT: Please replace the previous approval letter you received for approval #H7511-28588-01 with this letter. This letter identifies that the condition has been removed, as it has been statisfied.

APPROVAL NUMBER: H7511-28588-01. This number is a UCSF CHR number and should be used on all correspondence, consent forms and patient charts as appropriate.

APPROVAL DATE: March 2, 2006 **EXPIRATION DATE:** March 2, 2007 **Expedited Review**

GENERAL CONDITIONS OF APPROVAL: Please refer to www.research.ucsf.edu/chr/Apply/chrApprovalCond.asp for a description of the general conditions of CHR approval. In particular, the study must be renewed by the expiration date if work is to continue. Also, prior CHR approval is required before implementing any changes in the consent documents or any changes in the protocol unless those changes are required urgently for the safety of the subjects.

HIPAA "Privacy Rule" (45CFR164): This study does not involve access to, or creation or disclosure of Protected Health Information (PHI).

Sincerely,

Susan H. Sniderman, M.D.
Chair, Committee on Human Research

cc:

COMMITTEE ON HUMAN RESEARCH
OFFICE OF RESEARCH, Box 0962
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
www.research.ucsf.edu/chr/Apply/chrApprovalCond.asp
chr@ucsf.edu
(415) 476-1814

CHR APPROVAL LETTER

TO: Christine Kennedy, R.N., Ph.D.
Box 0606

Supaporn Wannasuntad, MSN
Box 0606.

RE: Correlates of Social Cognition and Perceived Enviroment on Physical Activity in Thai Fourth Grade Students in Bangkok

The Committee on Human Research (CHR) has reviewed and approved this application to involve humans as research subjects. This included a review of all documents attached to the original copy of this letter.

Specifically, the review included but was not limited to the following documents:
AIM IV-VI Assent Form, Dated 6/27/06
AIM I-III Assent Forms, Dated 10/19/06
AIM 4-6 Consent Form, Dated 10/19/06
AIM 1-3 Consent Form, Dated 10/19/06

The CHR is the Institutional Review Board (IRB) for UCSF and its affiliates. UCSF holds Office of Human Research Protections Federalwide Assurance number FWA00000068. See the CHR website for a list of other applicable FWA's.

APPROVAL NUMBER: H7511-29331-01. This number is a UCSF CHR number and should be used on all correspondence, consent forms and patient charts as appropriate.

APPROVAL DATE: January 16, 2007 **EXPIRATION DATE:** July 27, 2007 **Expedited Review**

ENERAL CONDITIONS OF APPROVAL: Please refer to www.research.ucsf.edu/chr/Apply/chrApprovalCond.asp for a description of the general conditions of CHR approval. In particular, the study must be renewed by the expiration date if work is to continue. Also, prior CHR approval is required before implementing any changes in the consent documents or any changes in the protocol unless those changes are required urgently for the safety of the subjects.

HIPAA "Privacy Rule" (45CFR164): This study does not involve access to, or creation or disclosure of Protected Health Information (PHI).

Sincerely,

Carol S. Viele, RN, MS
Vice Chair, Committee on Human Research

cc:

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
CONSENT TO PARTICIPATE IN A RESEARCH STUDY (AIM I-III)

Study Title: "The Correlates of Social Cognition and Perceived Environment on Physical Activity in Thai Fourth Grade Students in Bangkok"

This is a research study about daily activity of Thai fourth-grade students living in Bangkok. The study researchers, Christine Kennedy, PhD, RN, and Supaporn Wannasuntad, RN, MSN, from the University of California San Francisco, Department of Family Health Care Nursing, will explain this study to you.

Research studies include only people who choose to take part. Please take your time to make your decision about participating, and discuss your decision with your family or friends if you wish. If you have any questions, you may ask the researchers.

You are being asked to let your child take part in this study because you are the parent of a healthy fourth-grade student enrolled in a school in Bangkok.

Why is this study being done?

The purpose of this study is to learn more about how fourth-grade students living in Bangkok spend time on daily activity as well as to understand what might make the students be more physical active.

How many people will take part in this study?

About 400 students will take part in this study. All of them will be students who are studying in the fourth grade in elementary schools located in Bangkok.

What will happen if I take part in this research study?

If you agree, the following procedures will occur:

First, your child will need to have "screening" to find out if he/she can participate in the study. I will call to ask you whether or not your child have any illness that can limit his/her physical movement. If not, he/she can join this study.

If the screening exam shows that you can be in the main part of the study and you choose to continue, this is what will happen next:

- You will be asked to help your child fill out a questionnaire about the child's personal information and family demographic data. It should take about 5 minutes to complete this questionnaire.
- Students who join this study will be assigned to either a group answering a set of questionnaires/ wearing a 'pedometer'- a tiny device designed for counting steps- or a

group answering a set of questionnaires/ wearing both a 'pedometer' and 'accelerometer' – a tiny device for measuring body movement.

- If your child is assigned to the group answering a set of questionnaires/ wearing a pedometer. He/she will meet with the researcher (Supaporn Wannasuntad) for 4 sessions.
    - The first session, he/she will receive a set of questionnaires to answer about his/her opinion on what might support or hinder his/her physical activity. It should take about 40 minutes to complete this set of questionnaires. Then, your child will be measured for his/her weight and height one time in a private room.
    - The second session, he/she will meet with the researcher to learn how to wear a pedometer on his/her belt or waistband. He/she will have their stride length measured. Then, he/she will be asked to wear a pedometer for 3-7 days. The number of day for wearing a pedometer will be informed by the researcher during the session. He/she will also receive a questionnaire to record activity he/she does during yesterday. This session should take about 50 minutes.
    - The third and fourth session, the researcher will meet your child at school to record the number of steps has on his/her pedometer and talk about any problems that may come up during wearing a pedometer and asking he/her record activity he/she did yesterday. Each session should take about 20 minute to finish.

- **Study location:** All these procedures will be done at your child school.

How long will I be in the study?

If your child is in the group of answering a set of questionnaires/ wearing a pedometer, he/she will meet with the researcher for a total of about 130 minutes. If your child is in a group of answering a set of questionnaires and wearing a pedometer/ accelerometer, he/she will meet with the research for a total of about 150 minutes in this study. However, he/she will spend a total of about 3 to 7 days to wear a pedometer/accelerometer for this study.

Can I stop my child being in the study?

Yes. You can decide to stop your child being in the study at any time. Just tell the study researcher right away if you wish to stop your child being in the study.

Also, the study researcher may stop your child from taking part in this study at any time if he or she believes it is in your child best interest, if your child does not follow the study activities, or if the study is stopped.

What side effects or risks can I expect from being in the study?

There are no known physical risks or discomforts associated with taking part in this study.

Are there benefits to taking part in the study?

There will be no direct benefit to you from participating in this study. However, the information that you provide may help health professionals better understand/learn more about physical activity in Thai children.

What other choices do I have if I do not take part in this study?

You are free to choose not to participate in the study. If you decide not to take part in this study, there will be no penalty to you or your child.

Will information about me be kept private?

We will do our best to make sure that the personal information gathered for this study is kept private. However, we cannot guarantee total privacy. Your personal information may be given out if required by law. If information from this study is published or presented at scientific meetings, your name and other personal information will not be used.

Organizations that may look at and/or copy your research records for research, quality assurance, and data analysis include:

- The Dissertation Committee
- UCSF's Committee on Human Research

What are the costs of taking part in this study?

You will not be charged for any of the study procedures.

Will I be paid for taking part in this study?

In return for your child's time, effort and travel expenses, your child will be paid $5 ($1 = 37 Baht) if he/she join this study. Your child will be paid in cash immediately after he/she completes his/her participation in the study.

What are my rights if I take part in this study?

Taking part in this study is your choice. You may choose either to allow your child to take part or not to take part in the study. If you decide to allow him/her taking part in this study, he/her may leave the study at any time. No matter what decision you make, there will be no penalty to you in any way.

Who can answer my questions about the study?

You can talk to the researcher(s) about any questions or concerns you have about this study. Contact the researcher Supaporn Wannasuntad in Thailand at (07) 050-4900 or (02) 951-1118.

If you have any questions, comments, or concerns about your child taking part in this study, first talk to the researcher (above). If for any reason you do not wish to do this, or you still have concerns after doing so, you may contact the office of the **Committee on Human Research**, UCSF's Institutional Review Board (a group of people who review the research to protect your rights).

You can reach the CHR office at **415-476-1814**, 8 am to 5 pm, Monday through Friday. Or you may write to: Committee on Human Research, Box 0962, University of California, San Francisco (UCSF), San Francisco, CA 94143, USA.

****

CONSENT

You have been given a copy of this consent form to keep.

PARTICIPATION IN RESEARCH IS VOLUNTARY. You have the right to decline to let your child be in this study, or to withdraw from it at any point without penalty or loss of benefits to which you are otherwise entitled.

The person being considered for this study is unable to consent for himself/herself because he/she is a minor. By signing below, you are giving your permission for your child to be included in this study.

Date	Parent or Legal Guardian
Date	Person Obtaining Consent

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO (UCSF)

ASSENT TO BE IN A RESEARCH STUDY ABOUT PHYSICAL ACTIVITY (Aim I-III)

For children 7-12 years old

Why are we meeting with you?

We want to tell you about something we are doing called a research study. A research study is when researchers collect a lot of information to learn more about something. Dr. Christine Kennedy and I, Supaporn Wannasuntad, are doing a study to learn more about children's activity. After we tell you about it, we will ask if you'd like to be in this study or not.

Why are we doing this study?

We want to find out how children your age spend time on daily activity and learn more about what might help you be more active. So we are getting information from lots of boys and girls like you.

In the whole study, there will be about 400 children who join the study.

What will happen to you if you are in this study?

Only if you agree, three things will happen:

1. You will be asked to bring a questionnaire asking about your personal information to your parent to fill out and bring it back to me within a week.
2. You will be weighed and your height measured.
3. You will be assigned to do one of this:

    - You will be asked to fill out a set of questionnaires in a classroom during free time and to wear a pedometer- a tiny device (like a pager) clipped on your belt or waistband to count your steps- for 3-7 days, as well as record activity you did yesterday for three times (one weekday and one weekend).

    Or

    - You will be asked to fill out a set of questionnaires in a classroom during free time and to wear a pedometer coupled with an accelerometer- a tiny device wore at your waist to measure movement- for 3 to 7 days a "pedometer" or "accelerometer" – a tiny device (like a pager) clipped on your belt or waistband to count your steps- for 7 days. You will also be asked to fill out

the activities you did yesterday for three times (two weekday and one weekend).

- While wearing the device, you will meet us at school four time during school-days for about 10-15 minutes to record the number on the device and talk about any questions or problems you have while wearing the device or recording your activity.

Will this study hurt?

No, there is no pain in this study.

Do you have any questions?

You can ask questions any time. You can ask now. You can ask later. You can talk to me or you can talk to someone else.

Do you have to be in this study?

No, you don't. No one will be mad at you if you don't want to do this. If you don't want to be in this study, just tell us. Or if you do want to be in the study, tell us that. And, remember, you can say yes now and change your mind later. It's up to you.

If you don't want to be in this study, just tell us.

If you want to be in this study, just tell us.
The researcher (Ms. Wannasuntad) will give you a copy of this form to keep.
****

SIGNATURE OF PERSON CONDUCTING ASSENT DISCUSSION

I have explained the study to _____(*print name of child here*) in language he/she can understand, and the child has agreed to be in the study.

_____ _____
Signature of Person Conducting Assent Discussion Date

_____
Name of Person Conducting Assent Discussion (*print*)

APPENDIX B

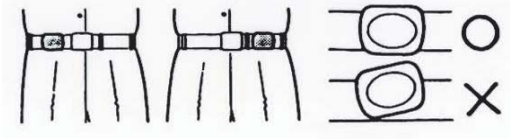
1 Pedometer Wearing Instruction

2 Pedometer Wearing Log

Instruction for Pedometer Monitoring

Today I will show you a tiny device call “pedometer”. It is like a small pager. You will be asked to wear this machine for **6** days starting from today.

It is for counting your movement when you clip it on your belt or waistband. May I have one volunteer go to the front of the class; I will show you how to clip this tiny machine on your belt or waistband.
[The researcher slides the clip onto a belt or waistband- halfway between belly button and hip and attaches the security strap clip onto a belt loop as a picture]



Now I will give you a machine and you will clip it on a belt or waistband. I will then check with every ones.

Next, I will take your stride length. From this start point on the ground, please put the fronts of your shoes at the starting point stand with your feet together. Take 20 steps and stop. I will mark your stopping point on the ground and measure the distance you walk.

[The researcher will check the number of steps it recorded (without taking it off from the belt). If it doesn’t read **18-22** steps, the researcher will move pedometer to a different spot on the belt or waistband and repeat until the researcher find the most accurate position. If it read 18-22 steps, the researcher will ask the student to remember the right spot].

Now all of you know where you will put a pedometer on. Please remember it and put it on the same place when you wear it. If it is moved from this position, please bring it back to this position. You will go back home with this machine. Please don’t open it and don’t reset any bottom on its screen because it won’t work ok if you do. Please wear it all the time for 3-7 days staring from today except when you are going to take a bath, swim, or go to bed. Please put a pedometer back on the right position right after finish swimming or bathing. Please remember to wear it every morning as soon as you finish dressing.

I will schedule to meet you three day a week at school during morning or lunch recess to check if the machine is working properly and help you if you encounter any problems during wearing the pedometer. You can also call me at 07-050-4900 if you have a question.

Any question? If no more question, I will see you again tomorrow. Please don’t forget to wear it every morning. Thank you very much.

ID ……
Pedometer # ……

Pedometer Wearing Log

Day	Time start wearing a pedometer	Number of Step	Time took off pedometer	Number of Step	Reason for taking a pedometer off

Since start wearing a pedometer yesterday, have you pressed a <u>Reset</u> ? □ **Yes** □ **No**

Have you forget to wear a pedometer? □ **Yes** □ **No**

Activity Note: ……

……

……

APPENDIX C: QUESTIONNAIRES

1. Child and Family Information Questionnaire
2. Child's Perceived Barriers to Play Actively Scale
3. Child's Perceived Self-Efficacy to Play Actively Scale
4. Child's Perceived Physical Activity Enjoyment Scale
5. Child's Perceived Social and Physical Environment for Physical Activity
6. Previous Day Physical Activity Recall Checklist (School Day)
7. Previous Day Physical Activity Recall Checklist (Non-School Day)

ID ……

Date.....

Family Information Questionnaire

Please answer questions by filling out your answer and mark X on a corresponding choice.

1. Student's birth day …….....

2. Student's gender ☐ Male ☐ Female

3. Does the student have any health problem that can limit his/ her physical activity

   ☐ Yes ☐ No

4. The student father's age ..... years old; Body weight ..... Kg.; Height ..... Cm.

5. The student father's education

   ☐ Grade 6 or lower ☐ Grade 7 – 12 ☐ Vocational education certificate

   ☐ Bachelor's degree ☐ Higher than Bachelor's degree

6. The student's mother age ..... years old; Body weight ..... Kg.; Height ..... Cm.

7. The student mother's education

   ☐ Grade 6 or lower ☐ Grade 7 – 12 ☐ Vocational education certificate

   ☐ Bachelor's degree ☐ Higher than Bachelor's degree

8. Your house's postal code .....

9. Marital status

   ☐ Couple living together ☐ Couple living separately

   ☐ Divorce ☐ Widow/ Widower

10. Total income per month of student's parents

    ☐ Less than 10,000 Baht ☐ 10,001 – 20,000 Baht ☐ 20,001 – 30,000 Baht

    ☐ 30,001 –40,000 Baht ☐ 40,001 – 50,000 Baht ☐ Higher than 50,000 Baht

ID ……

Date.....

Family Information Questionnaire

Please answer questions by filling out your answer and mark X on a corresponding choice.

11. Number of member living in the same house .....

12. Total number of your children .....

13. Number of children aged under 15 living in the same house .....

14. The student's father spends time with the child on weekday for ..... hrs a day; on weekend for ..... hrs a day.

15. The student's mother spends time with the child on weekday for ..... hrs a day ; on weekend for ..... hrs a day. 16. Your house is:

16. Your house is:

☐ Rental room/ flat ☐ Condominium/ Apartment ☐ Business building/ Townhouse

☐ House ☐ Other, please specify ……..

Family's Time Use Behavior

Please mark X on a corresponding choice.

1. Where is the child after the end of the school day?

   1. Taking extra-class at the school
   2. Taking extra-class outside the school
   3. Staying at home with adult supervision
   4. Staying at home without adult supervision
   5. Staying at the relatives or friends' home
   6. Other, please specify .....

2. An activity the child likes to do on weekday during his/ her free time is

   1. Mostly the child likes to watch television, listen to music, or play computer game, or read a book
   2. Mostly the child likes to play outside, bike, or play sports
   3. The child likes to stay at home watching television, playing computer game, or reading as same as playing outside the house, biking, or playing sports

ID ……

Date.....

Family's Time Use Behavior (Cont')

Please mark X on a corresponding choice.

3. An activity your child likes to do on weekend during his/her free time is
   1. Mostly the child like to watch television, listen to music, or play computer game, or read a book
   2. Mostly the child like to play outside, bike, or play sports
   3. The child like to stay at home watching television, playing computer game, or reading as same as playing outside the house, biking, or playing sports

4. How often do you allow your child to play outside the house
   1. Always
   2. Sometimes
   3. Rarely

5. Do you think how safe for your child playing outside the house without your supervision?
   1. Very safe
   2. Safe
   3. Somewhat safe
   4. Unsafe
   5. Very unsafe

6. How much free time your family have?
   1. Having little free time
   2. Having average free time
   3. Having lots of free time

7. What is a favorite activity your family likes to do during free time?
   1. Walking in a mall
   2. Going to a public park
   3. Watching television or relaxing at home.
   4. Taking care/ cleaning a house
   5. Exercising with your child
   6. Taking your child to exercise
   7. Eating out together
   8. Other, please specify .....

ID ……

Date.....

Family Support for Physical Activity Scale

During a typical week, how often your family members do the following

	Never	Once a week	2 – 3 times a week	4-5 times a week	Every-day of a week
1 **Encourage** (tell or suggest) the child to play actively or playing sport					
a. Father or other male adult in the family					
b. Mother or female adult in the family					
c. Sibling or other children in the family					
2 **Participate** in physical activity or playing a sport with the child					
a. Father or other male adult in the family					
b. Mother or female adult in the family					
c. Sibling or other children in the family					
3 **Taking or driving** the child to a place where the child can play actively, exercise or play sport					
a. Father or other male adult in the family					
b. Mother or female adult in the family					
c. Sibling or other children in the family					
4 **Watch** the child playing actively, playing sport, or exercise					
a. Father or other male adult in the family					
b. Mother or female adult in the family					
c. Sibling or other children in the family					
5 **Tell the child that he/she do very well** in playing actively, playing sport, or exercise					
a. Father or other male adult in the family					
b. Mother or female adult in the family					
c. Sibling or other children in the family					

Thank you very much for your cooperation

Child's Perceived Barriers to Play Actively Scale

Please tell us about things that make it difficult for you to play actively outside or exercise by check (√) on the box that is true for you

.I can't be able to play actively everyday because	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I don't have time	1	2	3	4
2. I have too many chores to do	1	2	3	4
3. I don't have a good place for playing actively	1	2	3	4
4. The weather is bad for playing actively	1	2	3	4
5. I didn't have the right clothes/shoes to wear when I play actively outside	1	2	3	4
6. I don't have equipment to play actively (e.g. ball, badminton racquet, etc.)	1	2	3	4
7. I have too much homework to do	1	2	3	4
8. I don't have anyone to play actively with me	1	2	3	4
9. I am too tired	1	2	3	4
10. I don't have my parent' permission	1	2	3	4
11. I had Physical Education class earlier today which already provided me enough exercise	1	2	3	4
12. There are other more interesting things to do (e.g. watching television, playing video games)	1	2	3	4
13. There are too many cars running pass the played area.	1	2	3	4

Child's Perceived Self-Efficacy to Play Actively Scale

Please check √ on the number corresponding to your level of confidence to play actively when you face with difference situations

Situation	Not confidence at all	Little confidence	Somewhat confidence	Confidence	Very confidence
1. When you have no friend to play with, How much confidence are you that you can play actively	1	2	3	4	5
2. When you feel bored, How much confidence are you that you can play actively	1	2	3	4	5
3. When you feel tired, How much confidence are you that you can play actively	1	2	3	4	5
4. When you do not enjoy playing actively, How much confidence are you that you can play actively	1	2	3	4	5
5. When there is no appropriate place to play, How much confidence are you that you can play actively	1	2	3	4	5
6. When you are too busy with homework, How much confidence are you that you can play actively	1	2	3	4	5
7. When another activity is more interesting (playing video game, reading cartoon, watching TV), How much confidence are you that you can play actively	1	2	3	4	5
8. When you feel stressed, How much confidence are you that you can play actively	1	2	3	4	5
9. When you feel depressed, How much confidence are you that you can play active	1	2	3	4	5
10. When you are too busy helping my parent do house chore or other things, How much confidence are you that you can play actively	1	2	3	4	5
11. When your parent do not supporting you to play actively outside, How much confidence are you that you can play actively	1	2	3	4	5
12. When the weather is not good to play actively outside, How much confidence are you that you can play actively	1	2	3	4	5
13. When you have no time, How much confidence are you that you can play actively	1	2	3	4	5

Child's Perceived Physical Activity Enjoyment Scale

Each sentence below is a feeling occurred when you play actively.
Please check (√) on the box that best describe how much you 'disagree' or 'agree' with the sentence.

When I play actively ……	Strongly disagree	Disagree a little	Neither agree nor disagree	Agree a little	Strongly agree
1. … I enjoy it.					
2. … I feel bored.					
3. … I dislike it.					
4. … I find fun.					
5. … it's not fun at all.					
6. … it gives me energy.					
7. … it makes me depressed.					
8. … it's very pleasant.					
9. … my body feels good.					
10 … I get something out of it.					
11…. it's very exciting.					
12. …if frustrates me.					
13. …it's not at all interesting.					
14. …it gives me a strong feeling of success					
15. …it feels good.					
16. …I feel as though I would rather be doing something else.					
17 …it makes me healthy					
18. ...I feel fresh					
19. ...it makes me tired					

Child's Perceived Social and Physical Environment on Physical Activity Scales

Please answer following questions about your **NEIGHBORHOOD** by writing a check (√) on a corresponding choice

1 Please mark which places available for you to play outdoor in **your neighborhood**

	Yes	No
a. Free space for run around	[1]	[0]
b. Playground with apparatus	[1]	[0]
c. Sport field (soccer, badminton, tennis court, etc)	[1]	[0]
d. Safe place for bike or bike lane	[1]	[0]
e. Running track	[1]	[0]
f. Footpath/ sidewalk	[1]	[0]
g. River/ swimming pool	[1]	[0]
h. Public park	[1]	[0]
i. Public recreation center/ youth center	[1]	[0]

2. How safe are the roads with you walk outside in **your neighborhood**?
   1. Very safe
   2. Slightly safe
   3. Not safe

3. How safe is it to play outside near where you live?
   1. Very safe
   2. Slightly safe
   3. Not safe

4. How worried are you about strangers when you play outside?
   1. Very worried
   2. Slightly worried
   3. Not worried

5. How often do you see children play outside in **your neighborhood**?
   1. Very often
   2. Sometimes
   3. Few times

6. How often do **your neighbors** mind if children make noise when playing outside?
   1. Very often
   2. Sometimes
   3. Few times
   4. Never

7. How friendly are children in **your neighborhood** to you?
   1. Very friendly
   2. Slightly friendly
   3. Not friendly

8 How often do your neighbors play actively outside with you
1. 0-2 time a week
2. 3-5 times a week
3. 6-7 times a week

Please answer following questions about your **SCHOOL** by writing a check (√) on a corresponding choice

9 Please check which one has in **your school**

	Yes, Very adequate	Yes, Not adequate	No
a. Outdoor sport field	[3]	[2]	[1]
b. Indoor sport field (gym)	[3]	[2]	[1]
c. Free space for you to play actively	[3]	[2]	[1]

10. Does **your school** have sport equipment for students to use? [3] [2] [1]

	Yes	No
12. Does **your school** allow students to play actively during recess?	[1]	[0]
13. Does **your school** allow students to play actively after school?	[1]	[0]
14. Does **your school** allow student to use equipment after school?	[1]	[0]

15. How many other students **play actively** with you at school
1. 0
2. 1-2
3. 3-4
4. 5 or more

16. How many of students in **your school play actively during recess**?
1. Most of the students
2. Some of the students
3. Few of the students
4 None

17. How many of students in **your school play actively after school** ?
1. Most of the students
2. Some of the students
3. Few of the students
4 None

Please answer following questions about your **HOME** by writing a check (√) on a corresponding choice

18. Please mark on the items you have in **your house or yards**

	Yes	No
a. Ball (soccer ball, basket ball, volleyball, plastic ball, etc..)	[1]	[0]
b. Bicycle	[1]	[0]
c. Badminton or tennis racquet	[1]	[0]
d. Running shoes	[1]	[0]
e. Swimming suit	[1]	[0]
f. Jumped rope	[1]	[0]
g. Table tennis racquet	[1]	[0]

19. How many **family members play actively** outside with you?
    1. 0
    2. 1
    3. 2
    4. 3 or more

20 Does **your parent** allow you to play outside **after school**?
    1. Not allow at all
    2. Allow to play if you finish your homework/ assigned house work
    3. Always allow

21 Does **your parent** allow you to play outside **during weekend**?
    1. Not allow at all
    2. Allow to play if you finish your homework/ assigned house work
    3. Always allow

22 How often your family members tell you that you should play actively or exercise
    1. Never
    2. Now and then
    3. Often
    4. Always

23 How often your family members take/drive you to play actively/play sport/exercise?
    1. Never
    2. Now and then
    3. Often
    4. Always

ACTIVITY RECALL CHECKLIST (SCHOOL DAY)

Please think about all **ACTIVITY** you did **YESTERDAY**

This questionnaire asking about activities you did yesterday in 3 periods:

1. Before school
2. During school
3. After school

1. Please read a list of activities and think if you did each activity **YESTERDAY**

   If yes, please write down an amount of time you have done the activity in minute on the corresponding box

   If no, please write - on the box

2. And, please rate a level of tiredness (0 – 3) when you do the activity

Write	0	when you feel	Not tired at all
Write	1	when you feel	Little tired, breathe faster
Write	2	when you feel	Somewhat tired, breathe faster, some sweating
Write	3	when you feel	Very tired, breathing hard, feel heat, and lot of sweating

ACTIVITY RECALL CHECKLIST (SCHOOL DAY)

Activities	Before School		During School		After School	
	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired
Sitting quietly, lying quietly						
Watching television, video, movie						
Playing video games						
Playing board game						
Listen to music						
Reading for fun						
Talking on the phone/chatting with friend						
Working at computer or desk						
Studying in class or drawing						
Reading, doing homework						
Washing dishes						
Sweeping floors, cleaning, mopping						
Washing clothes						
Riding in a bus/ car						
Walking						
Mix Walking/ Running						
Running/ Jogging						
Bicycling						
Rope jumping						
Outdoor play: e.g. climbing trees, Hide and Seek, playgroup apparatus						

ACTIVITY RECALL CHECKLIST (SCHOOL DAY)

Activities	Before School		During School		After School	
	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired
Ball playing: e.g. kickball, dodge ball, 4-square						
Exercise: push-ups, sit-ups, jumping jacks						
Slow dance						
Aerobic dance						
Gymnastics						
Karate, Judo, Tae kwon do						
Table-Tennis						
Badminton						
Tennis						
Volleyball						
Soccer						
Basketball						
Swimming						
Swimming laps						
Others 1. …….. …….. 2. ……...…….. 3. ……...…….. 4. ……....……..	…….. …….. …….. ….……..	…….. …… …… …..……..	…….. …….. …….. ….……..	…….. …… …… …..……..	…….. …….. …….. ….……..	…….. …… …… …..……..

Activities	Before School	After School
Yesterday, I watched TV/ Video for →	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hr ☐ 1 ½ - 2 hrs	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hr. ☐ 1 ½ - 2 hrs. ☐ 2 – 3 hrs ☐ > 3 hrs.
Yesterday, I spent time on video games or computer games for →	☐ 0 min ☐ 1-30 min ☐ 31-60 min	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hr. ☐ 1 ½ - 2 hrs. ☐ 2 – 3 hrs ☐ > 3 hrs.
Yesterday, I play actively outside after school for →		☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hr. ☐ 1 ½ - 2 hrs. ☐ 2 – 3 hrs ☐ > 3 hrs.
Yesterday, do you have physical education class? ☐ No ☐ Yes, please specify type of activity …….		

I go to school by	I come back from school by
( ) Car/ Bus/ Motorcycle ( ) Walking, time spent for walking …… ……. min. ( ) Biking, time spent for biking …… min. ( ) Other, please specify …….	( ) Car/ Bus/ Motorcycle ( ) Walking, time spent for walking …… ……. min. ( ) Biking, time spent for biking …… min. ( ) Other, please specify …….
I slept at ……..……. pm. and woke up at …….. am.	

Thank you very much

ACTIVITY RECALL CHECKLIST (NON-SCHOOL DAY)

Please think about all **ACTIVITY** you did **YESTERDAY**

This questionnaire asking about activities you did yesterday in 3 periods:

1. Before noon
2. Noon – 18.00
3. After 18.00 to time go to bed

1. Please read a list of activities and think if you did each activity **YESTERDAY**

   If yes, please write down an amount of time you have done the activity in minute on the corresponding box

   If no, please write - on the box

2. And, please rate a level of tiredness (0 – 3) when you do the activity

Write	0	when you feel	Not tired at all
Write	1	when you feel	Little tired, breathe faster
Write	2	when you feel	Somewhat tired, breathe faster, some sweating
Write	3	when you feel	Very tired, breathing hard, feel heat, and lot of sweating

ACTIVITY RECALL CHECKLIST (NON- SCHOOL DAY)

Activities	Before Noon		Noon – 18.00		After 18.00 - Bed	
	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired
Sitting quietly, lying quietly						
Watching television, video, movie						
Playing video games						
Playing board game						
Listen to music						
Reading for fun						
Talking on the phone/chatting with friend						
Working at computer or desk						
Studying in class or drawing						
Reading, doing homework						
Washing dishes						
Sweeping floors, cleaning, mopping						
Washing clothes						
Riding in a bus/ car						
Walking						
Mix Walking/ Running						
Running/ Jogging						
Bicycling						
Rope jumping						
Outdoor play: e.g. climbing trees, Hide and Seek, playgroup apparatus						

ACTIVITY RECALL CHECKLIST (NON- SCHOOL DAY)

Activities	Before Noon		Noon – 18.00		After 18.00 - Bed	
	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired	Do the activity in minutes	0 = Not tired at all 1 = Little tired 2 = Somewhat tired 3 = Very tired
Ball playing: e.g. kickball, dodge ball, 4-square						
Exercise: push-ups, sit-ups, jumping jacks						
Slow dance						
Aerobic dance						
Gymnastics						
Karate, Judo, Tae kwon do						
Table-Tennis						
Badminton						
Tennis						
Volleyball						
Soccer						
Basketball						
Swimming						
Swimming laps						
Others 1. …….. …….. 2. ……..…….. 3. ……..…….. 4. ……	…….. …… …… ……	…….. …… …… ……..	…….. …….. …….. ……	…….. …… …… ……	…….. …….. …….. ……..	…….. …… …… ……..

Activities	Before Noon	Noon – 18.00	18.00 - Bed
Yesterday, I watched TV/ Video for →	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs.	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs.	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs.
Yesterday, I spent time on video games or computer games for →	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs.	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs.	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs.
Yesterday, I play actively outside the house for →	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs. ☐ > 3 hrs.	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs. ☐ > 3 hrs.	☐ 0 min ☐ 1-30 min ☐ 31-60 min ☐ 1-1 ½ hrs ☐ 1 ½ - 2 hrs ☐ 2-3 hrs. ☐ > 3 hrs.

I slept at ……..……. p.m. and woke up at …….. a.m.

APPENDIX D: THAI VERSION

1. Consent Form

2. Assent Form

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
CONSENT TO PARTICIPATE IN A RESEARCH STUDY (AIM I - III)
มหาวิทยาลัยแคลิฟอเนีย ซานฟานซิสโก
แบบฟอร์มเซ็นต์ยินยอมเข้าร่วมในงานวิจัย (วัตถุประสงค์ 1 - 3)

หัวข้องานวิจัย: ปัจจัยด้านจิตสังคมและการรับรู้สิ่งแวดล้อมที่มีต่อการเคลื่อนไหวร่างกายของเด็กนักเรียนชั้นประถมปีที่ 4 ในกรุงเทพมหานคร

งานวิจัยนี้เป็นการศึกษาเกี่ยวกับกิจกรรมประจำวันของนักเรียนชั้นประถมศึกษาปีที่ 4 ที่อาศัยอยู่ในกรุงเทพมหานคร โดยผู้วิจัยประกอบด้วย ดร. คริสทีน เคเนดี้ (Christine Kennedy) อาจารย์พยาบาล และ สุภาพร วรรณสันทัด นักศึกษาปริญญาเอกจากมหาวิทยาลัย แคลิฟอเนีย ซานฟานซิสโก ภาควิชาการพยาบาลครอบครัว จะเป็นผู้อธิบายงานวิจัยนี้ให้ท่านทราบ

งานวิจัยมีเกณฑ์กำหนดว่าผู้ใดสามารถเข้าร่วมในงานวิจัยนี้ได้ ขอความกรุณาท่านสละเวลาเพื่อปรึกษากับบุคคลในครอบครัวท่านก่อนตัดสินใจต่อการเข้าร่วมในการวิจัย หากท่านมีปัญหาใด ท่านสามารถสอบถามผู้วิจัยได้

ผู้วิจัยใคร่ขอให้ท่านอนุญาติให้บุตรของท่านเข้าร่วมในงานวิจัยนี้ เนื่องจากบุตรของท่านเป็นเด็กนักเรียนประถมศึกษาชั้นปีที่ 4 ที่ศึกษาอยู่ในโรงเรียนที่ตั้งอยู่ในกรุงเทพมหานคร และไม่มีปัญหาเกี่ยวกับการเคลื่อนไหวร่างกาย

ทำไมถึงต้องมีงานวิจัยนี้

จุดประสงค์ของงานวิจัยนี้คือมุ่งศึกษาการใช้เวลาในการทำกิจกรรมประจำวันของนักเรียนประถมศึกษาชั้นปีที่ 4 ในกรุงเทพมหานคร และศึกษาปัจจัยที่ส่งเสริมการเคลื่อนไหวร่างกายในนักเรียน

มีคนจำนวนเท่าใดเข้าร่วมในงานวิจัยนี้

งานวิจัยนี้จะประกอบด้วยนักเรียน 400 คน นักเรียนทั้งหมดที่เข้าร่วมในงานวิจัยนี้เป็นนักเรียนประถมศึกษาชั้นปีที่ 4 ที่เรียนอยู่ในโรงเรียนประถมศึกษาในกรุงเทพมหานคร

จะมีอะไรเกิดขึ้นถ้าท่านตัดสินใจเข้าร่วมในงานวิจัยนี้

หากท่านและบุตรเข้าร่วมในงานวิจัยนี้ จะมีขั้นตอนเหล่านี้เกิดขึ้น

เริ่มแรก เราจะคัดกรองว่าบุตรของท่านสามารถเข้าร่วมในงานวิจัยได้หรือไม่ โดยผู้วิจัยจะโทรติดต่อท่านเพื่อซักถามเกี่ยวกับประวัติสุขภาพ ถ้าบุตรท่านไม่มีการเจ็บป่วยที่เกี่ยวข้องการกับทำกิจกรรมเคลื่อนไหวร่างกาย บุตรท่านสามารถเข้าร่วมในการวิจัยได้

หากบุตรของท่านผ่านการคัดกรองให้เข้าร่วมในงานวิจัยนี้ได้ สิ่งต่อไปนี้จะเกิดขึ้น

- ท่านจะถูกขอร้องให้ช่วยบุตรของท่านตอบแบบสอบถามที่เกี่ยวข้องกับข้อมูลส่วนบุคคลของบุตรท่าน รายได้ครอบครัว และพฤติกรรมการใช้เวลาว่างของครอบครัว ท่านต้องใช้เวลาแค่ 5 นาทีในการตอบแบบสอบถามนี้
- บุตรของท่านจะได้รับการชั่งน้ำหนักและวัดส่วนสูงจำนวน 1 ครั้งช่วงที่พบกับผู้วิจัย
- นักเรียนที่เข้าร่วมวิจัยในครั้งนี้จะถูกจัดแบ่งออกเป็น 2 กลุ่ม คือ 1) กลุ่มที่ตอบแบบสอบถาม และ ติดเครื่องวัดจำนวนก้าว เรียกว่า พีโดมิเตอร์ (pedometer) และ 2) กลุ่มที่ตอบแบบสอบถามและติดเครื่องวัดจำนวนก้าว พีโดมิเตอร์ พร้อมกับเครื่องแอสซีลีโรมิเตอร์ (accelerometer) ซึ่งเป็นเครื่องขนาดเล็กคล้ายกับเพจเจอร์ ติดไว้ที่เข็มขัดกางเกง เพื่อวัดการเคลื่อนไหวร่างกาย
    - ถ้าบุตรท่านอยู่ในกลุ่มที่ตอบแบบสอบถามและติดเครื่องวัดพีโดมิเตอร์ บุตรของท่านจะพบกับผู้วิจัยจำนวน 4 ครั้ง เพื่อ
        - ครั้งที่ 1 บุตรของท่านจะได้รับแบบสอบถาม 1 ชุดที่ถามความคิดเห็นถึงปัจจัยที่เกี่ยวข้องกับการเคลื่อนไหวร่างกาย การตอบแบบสอบถามจะใช้เวลาประมาณ 40 นาที หลังจากนั้น บุตรของท่านจะได้รับการชั่งน้ำหนักและวัดส่วนสูงจำนวน 1 ครั้ง
        - ครั้งที่ 2 บุตรของท่านจะพบกับผู้วิจัยเพื่อชมการสาธิตสวมเครื่องวัดจำนวนก้าวและ วัดความยาวของจำนวนก้าว หลังจากนั้นนักเรียนจะถูกขอให้สวมเครื่องวัดจำนวนก้าวเป็นเวลา 3-7 วัน และบุตรของท่านจะได้รับแบบบันทึกกิจกรรมเคลื่อนไหวร่างกายจำนวน 1 ชุด เพื่อบันทึกกิจกรรมเคลื่อนไหวร่างกายที่ทำในวันที่ผ่านมา ระยะเวลาที่ใช้ในการพบกับผู้วิจัยนี้ประมาณ 50 นาที
        - ครั้งที่ 3-4 ผู้วิจัยจะพบนักเรียนที่โรงเรียนเพื่อบันทกจำนวนก้าวที่วัดได้ และพูดคุยปัญหาที่อาจจะเกิดขึ้นได้ขณะที่สวมเครื่องวัดจำนวนก้าว และบันทึกกิจกรรมที่ทำในวันที่ผ่านมา การพบครั้งนี้ใช้เวลาประมาณ 20 นาทีต่อครั้ง
    - ถ้าบุตรของท่านอยู่ในกลุ่มที่ตอบแแบบสอบถามและติดเครื่องวัดจำนวนก้าวพร้อมกับเครื่อง แอสซีรีโรมิเตอร์ กิจกรรมที่ทำจะเช่นเดียวกับอีกกลุ่มหนึ่ง ยกเว้นบุตรของท่านจะติดเครื่องแอสซีรีโรมิเตอร์เพิ่มอีก 1 เครื่อง

- สถานที่ที่ใช้ในการวิจัย: กิจกรรมในงานวิจัยนี้จะเกิดขึ้นที่โรงเรียนที่บุตรท่านเรียนอยู่ ตามเวลาสะดวกของบุตรท่านและผู้วิจัย

ระยะเวลานานเท่าใดสำหรับการเข้าร่วมในการวิจัยครั้งนี้

กรณีที่บุตรของท่านถูกจัดให้อยู่ในกลุ่มที่ตอบแบบสอบถามและสวมเครื่องพีโดมิเตอร์ การเข้าร่วมในงานวิจัยนี้จะใช้เวลาทั้งหมด ประมาณ 130 นาที กรณีที่บุตรของท่านถูกจัดอยู่ในกลุ่มที่ตอบแบบสอบถาม ติดเครื่องวัดจำนวนก้าวและเครื่องแอสซีรีโรมิเตอร์ การเข้าร่วมในการวิจัยนี้จะใช้เวลาทั้งหมดประมาณ 150 นาที ในการวิจัยนี้บุตรของท่านจะสวมเครื่องนับก้าว เป็นเวลาทั้งสิ้นรวม 6 วัน

ท่านสามารถจะถอนตัวจากการวิจัยได้หรือไม่

ได้ ท่านสามารถให้บุตรของท่านถอนตัวจากการวิจัยนี้ได้ทุกเวลา ขอให้ท่านบอกกล่าวผู้วิจัยได้ทันทีหากท่านต้องการจะถอนตัวบุตรท่านจากการเข้าร่วมในงานวิจัยนี้

ในทางกลับกัน ผู้วิจัยอาจจะขอให้บุตรท่านหยุดเข้าร่วมในงานวิจัยนี้หากผู้วิจัยเห็นว่าเป็นการกระทำที่ให้ประโยชน์สูงสุดแก่บุตรท่าน หรือกรณีที่งานวิจัยนี้ต้องหยุดลงก่อนกำหนด

ผลข้างเคียงหรือความเสี่ยงอะไรที่อาจจะเกิดขึ้นจากการเข้าร่วมในงานวิจัยนี้

ไม่มีผลข้างเคียงหรือความไม่สุขสบายใดเกิดขึ้นจากการเข้าร่วมในการศึกษานี้

ผลประโยชน์ใดจะเกิดขึ้นต่อการเข้าร่วมในงานวิจัยนี้

ไม่มีผลประโยชน์โดยตรงเกิดขึ้นแก่ท่านสำหรับการเข้าร่วมในงานวิจัยนี้ อย่างไรก็ตาม ข้อมูลที่ได้จากท่านจะช่วยให้บุคลากรทางสุขภาพเข้าใจเกี่ยวกับการทำกิจกรรมเคลื่อนไหวร่างกายของเด็กวัยเรียนในประเทศไทยมากขึ้น

ท่านมีทางเลือกอื่นหรือไม่หากท่านตัดสินใจไม่เข้าร่วมในงานวิจัยนี้

ท่านมีอิสระที่จะตัดสินใจไม่เข้าร่วมในงานวิจัยนี้ ถ้าท่านตัดสินใจไม่เข้าร่วมในงานวิจัยนี้ จะไม่มีบทลงโทษหรือผลกระทบใดๆ เกิดขึ้นแก่ท่าน

ข้อมูลเกี่ยวกับท่านจะได้รับการเก็บรักษาเป็นความลับหรือไม่

กลุ่มผู้วิจัยจะพยายามทำให้ดีที่สุดที่จะเก็บรักษาข้อมูลต่างๆ ที่ได้จากงานวิจัยนี้ให้เป็นความลับ อย่างไรก็ตาม ผู้วิจัยไม่สามารถให้การรับรองได้เต็มที่ ข้อมูลส่วนบุคคลของท่านอาจจะถูกเปิดเผยหากเป็นข้อกำหนดตามกฎหมาย หากผลงานวิจัยนี้ตีพิมพ์เผยแพร่หรือนำเสนอในการประชุมวิชาการ ชื่อและข้อมูลส่วนบุคคลของท่าานจะไม่ถูกเปิดเผย

องค์กรที่อาจจะขอดู และ/หรือ สำเนา ข้อมูลของท่านเพื่อการวิจัย การประกันคุณภาพ และการวิเคราะห์ผลการวิจัย ประกอบด้วย:

- คณะกรรมการควบคุมวิทยานิพนธ์ (The Dissertation Committee)
- คณะกรรมการพิจารณาการวิจัยในมนุษย์ของมหาวิทยาลัยแคลิฟอเนีย ซานฟานซิสโก (UCSF's Committee on Human Research)

ค่าใช้จ่ายในการเข้าร่วมในงานวิจัยนี้

ท่านไม่ต้องเสียค่าใช้จ่ายใดๆ ในการเข้าร่วมในการวิจัยนี้

ท่านจะได้รับค่าตอบแทนในการเข้าร่วมงานวิจัยนี้หรือไม่

เพื่อเป็นการตอบแทนต่อการเสียเวลา บุตรของท่านจะได้รับขนมและเครื่องดื่ม จำนวนทั้ง 5 ครั้งที่พบกับผู้วิจัย และในคาบสุดท้ายที่พบกับผู้วิจัย บุตรของท่านจะได้รับของขวัญ ได้แก่ สมุดโน๊ต และดินสอ ราคาอยู่ระหว่าง 30 – 40 บาท เป็นรางวัลในการเข้าร่วมในงานวิจัยนี้

อะไรคือสิทธิ์ของท่านหากท่านเข้าร่วมในงานวิจัยนี้

การเข้าร่วมในงานวิจัยนี้เป็นความสมัครใจ ท่านอาจจะเลือกให้บุตรท่านเข้าร่วมหรือไม่เข้าร่วมในการวิจัยนี้ได้ หากท่านตัดสินใจให้บุตรท่านเข้าร่วมในการวิจัยนี้ ท่านสามารถจะถอนตัวบุตรท่านออกจากการวิจัยได้ตลอดเวลา ไม่ว่าท่านจะตัดสินใจอย่างไร การตัดสินใจของท่านจะไม่มีผลกระทบต่อท่านและบุตรของท่านในทุกๆ ทาง

ใครสามารถตอบปัญหาของท่านเกี่ยวกับงานวิจัยนี้

ท่านสามารถซักถามผู้วิจัยเกี่ยวกับปัญหาต่างๆ หรือข้อกังขาที่ท่านมีต่องานวิจัยนี้ ท่านสามารถติดต่อ สุภาพร วรรณสันทัด ได้ที่เบอร์โทร (07) 050-4900 (มือถือ) หรือ (02) 951-1118.

กรณีที่ท่านมีคำถาม ข้อคิดเห็น หรือข้อกังขา เกี่ยวกับการที่บุตรของท่านเข้าร่วมในงานวิจัยนี้ ในขั้นต้นขอให้ท่านพูดคุยกับนักวิจัยข้างต้น หากด้วยเหตุผลใดก็ตามที่ท่านไม่ต้องการจะทำเช่นนั้น หรือท่านยังมีข้อกังขาภายหลังการพูดคุย ท่านสามารถติดต่อสำนักงานคณะกรรมการพิจารณางานวิจัยในมนุษย์ (the Committee on Human Research) ซึ่งเป็นหน่วยงานของมหาวิทยาลัยแคลิฟอเนีย ซานฟานซิสโก ที่แต่งตั้งกลุ่มบุคคลขึ้นมาพิจารณางานวิจัยนี้เพื่อปกป้องสิทธิ์ของท่าน

ท่านสามารถติดต่อ สำนักงานคณะกรรมการพิจารณางานวิจัยในมนุษย์ (the CHR office) ที่เบอร์โทร 01-415-476-1814, 8.00 น. ถึง 17.00 น. วันจันทร์ ถึง วันศุกร์ หรือ ท่านอาจจะเขียนข้อคิดเห็นส่งไปยัง: Committee on Human Research, Box 0962, University of California, San Francisco (UCSF), San Francisco, CA 94143, USA.

****

การให้การยินยอม

ท่านจะได้รับสำเนาของแบบฟอร์มเซ็นต์ยินยอมเข้าร่วมในงานวิจัยฉบับนี้เพื่อแก็บไว้เป็นหลักฐาน

การเข้าร่วมในการวิจัยเป็นความสมัครใจ ท่านมีสิทธิ์ที่จะปฏิเสธไม่ให้บุตรท่านเข้าร่วมในงานวิจัยนี้หรือสามารถถอนตัวบุตรท่านออกจากการวิจัยนี้ได้ตลอดเวลาโดยไม่มีความผิดหรือสูญเสียผลประโยชน์ใดๆ

บุคคลผู้ซึ่งถูกพิจารณาให้เข้าร่วมในงานวิจัยนี้ไม่สามารถเซ็นต์ยินยอมให้ตนเองได้ เนื่องจากบุคคลนั้นยังไม่บรรลุนิติภาวะ การเซ็นต์ชื่อที่ข้างล่างนี้ถือว่าท่านได้อนุญาตให้บุตรของท่านเข้าร่วมในงานวิจัยนี้

วันที่	บิดา มารดา หรือ ผู้ปกครอง
วันที่	ลายเซ็นต์บุคคลผู้ได้รับอนุญาต (ผู้วิจัย)

มหาวิทยาลัยแคลิฟอเนีย ซานฟานซิสโก
การยินยอมเข้าร่วมในการวิจัยเรื่อง การทำกิจกรรมเคลื่อนไหวร่างกาย (วัตถุประสงค์ 1–3)
สำหรับเด็กอายุ 7 – 12 ปี

ทำไมพวกเราขอพบนักเรียน

พวกเราต้องการจะบอกนักเรียนว่าพวกเรากำลังทำวิจัยอยู่ การทำวิจัยคือการที่มีการเก็บรวบรวมข้อมูลจำนวนมากเพื่อต้องการเรียนรู้เกี่ยวกับเรื่องใดเรื่องหนึ่ง ดอกเตอร์คริสทีน เคเนดี้ และดิฉัน สุภาพร วรรณสันทัด กำลังทำวิจัยเพื่อเรียนรู้เกี่ยวกับการทำกิจกรรมเคลื่อนไหวร่างกายในเด็ก หลังจากพวกเราเล่างานวิจัยให้ฟังแล้ว พวกเราจะถามนักเรียนว่านักเรียนต้องการเข้าร่วมในงานวิจัยนี้หรือไม่

ทำไมพวกเราถึงทำการวิจัยนี้

พวกเราต้องการศึกษาว่าเด็กอายุเท่านักเรียนนั้นใช้เวลาในการทำกิจกรรมเคลื่อนไหวร่างการอย่างไร และต้องการรู้ว่าอะไรที่สามารถช่วยให้นักเรียนมีกิจกรรมเคลื่อนไหวร่างกาย ดังนั้นเราจึงเก็บข้อมูลจากเด็กอย่างนักเรียนหลายคนทั้งผู้ชายและผู้หญิง

ในการศึกษานี้ จะมีนักเรียนทั้งหมด 400 คนที่เข้าร่วมในงานวิจัยนี้

ถ้านักเรียนเข้าร่วมในการวิจัยนี้จะมีอะไรเกิดขึ้นต่อไป

เมื่อนักเรียนยินยอมเข้าร่วมวิจัย จะมี 3 สิ่งเกิดขึ้น

1. นักเรียนจะนำแบบสอบถามที่ถามเกี่ยวกับข้อมูลส่วนตัวที่พวกเราแจกให้กลับไปให้คุณพ่อคุณแม่ช่วยตอบให้ แล้วนักเรียนนำกลับมาให้พวกเราภายในอาทิตย์นั้น
2. นักเรียนจะถูกขอให้ชั่งน้ำหนักและวัดส่วนสูง
3. นักเรียนจะถูกแบ่งให้ทำงานใดงานหนึ่งต่อไปนี้
    - นักเรียนจะถูกขอให้ตอบแบบสอบถามจำนวนหนึ่งชุด (มี 5 แบบสอบถาม) ในห้องเรียนในช่วงเวลาว่าง และนักเรียนจะสวมเครื่องวัดจำนวนก้าวติดไว้ที่บริเวณเข็มขัดเป็นเวลา

6 วัน และบันทึกกิจกรรมที่นักเรียนทำเมื่อวานนี้ 3 ครั้ง (วันราชการ 2 ครั้งและวันหยุดราชการ 1 ครั้ง)

หรือ

- นักเรียนจะถูกขอให้ตอบแบบสอบถามจำนวนหนึ่งชุด (มี 5 แบบสอบถาม) และ ติดเครื่องวัดจำนวนก้าวเรียกว่า พีโดมิเตอร์ พร้อมกับ เครื่อง แอสซีลีโรมิเตอร์ เป็นเครื่องมือเล็กๆ คล้ายเพจเจอร์ ติดไว้ที่เข็มขัดหรือขอบกางเกงเพื่อวัดการเคลื่อนไหวร่างกาย เป็นเวลา 6 วัน และบันทึกกิจกรรมเคลื่อนไหวร่างกายที่ทำเมื่อวานนี้จำนวน 3 ครั้ง (วันราชการ 2 ครั้ง และวันอาทิตย์อีก 1 ครั้ง)
- ในระหว่างที่ติดเครื่องวัดจำนวนก้าวนั้น นักเรียนจะพบกับพวกเราอีกจำนวน 4 ครั้ง ครั้งละประมาณ 10 – 15 นาที เพื่อจดบันทึกจำนวนและ เซทเครื่องใหม่ และ พูดคุยปัญหาที่นักเรียนอาจมีในขณะที่ติดเครื่องวัดจำนวนก้าว

การศึกษานี้จะทำให้เกิดความเจ็บปวดไหม

ไม่ การศึกษานี้ไม่ทำให้เจ็บปวดเลย

นักเรียนจะถามปัญหาได้ไหม

นักเรียนสามารถถามปัญหาได้ตลอดเวลา นักเรียนสามารถถามในตอนนี้ นักเรียนสามารถถามภายหลัง นักเรียนสามารถถามฉันหรือถามคนอื่นที่ทำวิจัยนี้

นักเรียนจำเป็นต้องเข้าร่วมในการศึกษานี้ไหม

ไม่จำเป็น ไม่มีใครจะไม่พอใจนักเรียนถ้านักเรียนไม่ต้องการจะเข้าร่วมในงานวิจัยนี้ เพียงแค่บอกให้พวกเราทราบ หรือถ้านักเรียนต้องการจะเข้าร่วมในการวิจัยนี้ ขอให้บอกพวกเรา และจำไว้เสมอว่า นักเรียนสามารถตอบรับตอนนี้แล้วเปลี่ยนใจภายหลังได้ แล้วแต่นักเรียน

หากนักเรียนไม่ต้องการเข้าร่วมในการวิจัยนี้ ขอให้บอกพวกเรา

หากนักเรียนต้องการเข้าร่วมในการวิจัยนี้ ก็ขอให้บอกพวกเรา
ผู้วิจัย (สุภาพร วรรณสันทัด) จะแจกสำเนาของแบบฟอร์มนี้ให้นักเรียนเก็บไว้เป็นหลักฐาน
****

ลายเซ็นต์ของบุคคลที่อธิบายการศึกษาและขอคำยินยอมจากนักเรียน

ดิฉันได้อธิบายงานวิจัยนี้ให้แก่ _____ _____(พิมพ์ชื่อนักเรียนที่นี่) ด้วยภาษาที่นักเรียนสามารถเข้าใจได้ และนักเรียนได้ยินยอมเข้าร่วมในงานวิจัยนี้

_____ _____

ลายเซ็นต์ของบุคคลที่อธิบายการศึกษาและขอคำยินยอม วันที่

_____

ชื่อ-นามสกุลของบุคคลที่อธิบายการศึกษาและขอคำยินยอมตัวบรรจง

APPENDIX E: THAI VERSION

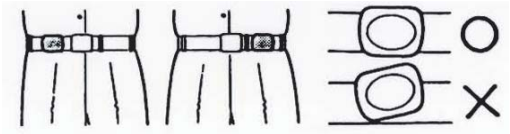
I Pedometer Wearing Instruction

II Pedometer Wearing Log

คำอธิบายเรื่องเครื่องวัดจำนวนก้าว

วันนี้ พี่จะอธิบายและสาธิตเรื่องเครื่องพีโดมิเตอร์ เครื่องนี้แหละค่ะ ขนาดเล็กๆ ที่พี่จะขอให้น้องติดไว้ที่เข็มขัดหรือที่ขอบกระโปรงหรือกางเกง 6 วันติดต่อกัน นับแต่วันนี้

เครื่องพีโดมิเตอร์นี้ใช้สำหรับนับจำนวนก้าวเมื่อเราติดไว้ที่เข็มขัด พี่ขอนักเรียนมาที่หน้าห้องหนึ่งคน พี่จะโชว์วิธีการติดเครื่องให้นักเรียนดู [ผู้วิจัยติดเครื่องเข้ากับขอบกางเกง กระโปรงหรือแข็มขัดในตำแหน่งดังรูป]



ตอนนี้ครูจะแจกเครื่องพีโดมิเตอร์ให้นักเรียนคนละ 1 เครื่อง ให้นักเรียนติดเครื่องไว้ตามที่พี่ทำให้ดู แล้วพี่จะเช็คทีละคนว่าทำได้ถูกต้องไหม

ต่อไปครูจะวัดความยาวของก้าวของนักเรียนเพื่อคำนวณระยะทาง ขอให้นักเรียนเริ่มจากจุดนี้ให้หัวรองเท้าแตะเส้นที่พี่ขีดไว้ แล้วเดิน 20 ก้าวแล้วหยุด พี่จะขีดเส้นเมื่อนักเรียนเดินถึงก้าวที่ 20 แล้วพี่จะวัดระยะทางนั้น
[นักวิจัยจะเช็คจำนวนก้าวบนเครื่องพี่โดมิเตอร์ ถ้าเครื่องอ่านค่าได้ระหว่าง 18-22 ผู้วิจัยขอให้นักเรียนจำตำแหน่งที่เครื่องติดให้ถูกต้อง กรณีที่เครื่องอ่านได้นอกเหนือจาก 18-22 ผู้วิจัยจะเลื่อนตำแหน่งเครื่องให้ถูกต้อง แล้วทำซ้ำ].

ตอนนี้ทุกคนรู้แล้วนะค่ะว่าจะติดเครื่องไว้ที่ไหน ถ้าเครื่องเลื่อนไปจากตำแหน่งเดิม ขอให้เลื่อนให้อยู่ในตำแหน่งนี้ ขอให้นักเรียนอย่าเปิดเครื่องหรือกดปุ่มเล่น วันนี้นักเรียนจะกลับบ้านโดยมีเครื่องนี้ติดตัวไปด้วยตลอด 6 วัน จะถอดออกเฉพาะเวลานอน หรือเวลาที่ทำกิจกรรมที่ทำให้เครื่องเปียกน้ำได้ เช่น อาบน้ำ ว่ายน้ำ ถ้าถอดออกขณะอาบน้ำ ขอให้ติดใหม่ที่ตำแหน่งเดิมทันทีหลังอาบน้ำเสร็จ ขอให้ติดเครื่องทันทีหลังแต่งตัวเสร็จตอนเช้าทุกวัน

ขอให้นักเรียนจำเวลาที่ติดเครื่องและถอดเครื่องออกไว้ พี่จะถามตอนที่เราพบกัน เราจะพบกันทุกวันที่โรงเรียนในช่วงเช้าหรือพักกลางวันเพื่อเช็คเครื่องและพูดคุยเกี่ยวกับปัญหาที่เกิดขณะที่ติดเครื่องนี้ ถ้ามีปัญหาสงสัย นักเรียนสามารถติดต่อพี่ได้ที่ 07-050-4900

นักเรียนมีข้อสงสัยอะไรไหม ถ้าไม่มีเราจะไปชั่งน้ำหนัก และวัดส่วนสูง เสร็จแล้วพบกันใหม่พรุ่งนี้ อย่าลืมติดเครื่องทุกเช้านะคะ ขอบคุณมากค่ะ

เลขประจำตัววิจัย..... .....

เลขที่เครื่องนับก้าว.....

แบบบันทึกเวลาการสวมเครื่องพีโดมิเตอร์

วันที่	เวลาเริ่มสวมเครื่อง	จำนวนก้าว	เวลาถอดเครื่อง	จำนวนก้าว	เหตุผลที่ถอดเครื่องออก

ตั้งแต่สวมเครื่องเมื่อวานนี้ นักเรียนได้กดปุ่มเหลืองหรือไม่ □ กด □ ไม่กด

นักเรียนลืมสวมเครื่องนับก้าวหรือไม่ □ ลืม □ ไม่ลืม

บันทึกกิจกรรม: .....

.....

APPENDIX F:

QUESTIONNAIRES: THAI VERSION

1. Family Information Questionnaire
2. Child's Perceived Barriers to Play Actively Scale
3. Child's Perceived Self-Efficacy to Play Actively Scale
4. Child Perceived Physical Activity Enjoyment Scale
5. Child's Perceived Social and Physical Environment Scales
6. Previous Day Physical Activity Checklist (School-Day)
7. Previous Day Physical Activity Checklist (Non-School Day)

เลขประจำตัวในการวิจัย ….....….

วันที่ .....

แบบสอบถามข้อมูลของครอบครัว

ขอความกรุณาผู้ปกครองตอบแบบสอบถามนี้ โดยเติมคำในช่องว่าง และ เขียนเครื่องหมาย X หน้าตัวเลือกที่เป็นคำตอบของท่าน

1. วันเกิดของนักเรียน วันที่ ..... เดือน ..... พ.ศ. .....

2. เพศ ของนักเรียน ☐ ชาย ☐ หญิง

3. นักเรียนมีปัญหาสุขภาพที่ทำให้ต้องจำกัดการออกกำลังกาย หรือไม่

☐ มี ☐ ไม่มี

4. บิดาของนักเรียน อายุ ..... ปี น้ำหนัก ..... กก. ส่วนสูง ..... ซม.

5. การศึกษาสูงสุดของบิดาของนักเรียน

☐ ประถมศึกษาหรือต่ำกว่า ☐ มัธยมศึกษา ☐ ประกาศนียบัตรวิชาชีพ
☐ ปริญญาตรี ☐ สูงกว่าปริญญาตรี

6. มารดาของนักเรียน อายุ ..... ปี น้ำหนัก ..... กก. ส่วนสูง ..... ซม.

7. การศึกษาสูงสุดของมารดาของนักเรียน

☐ ประถมศึกษาหรือต่ำกว่า ☐ มัธยมศึกษา ☐ ประกาศนียบัตรวิชาชีพ
☐ ปริญญาตรี ☐ สูงกว่าปริญญาตรี

8. รหัสไปรษณีย์ของบ้านท่าน .....

9. สถานภาพสมรส

☐ คู่ อยู่ด้วยกัน ☐ คู่ อยู่ไกลกัน
☐ หย่า ☐ หม้าย

10. รายได้รวมของบิดา และ มารดา ต่อ เดือน

☐ น้อยกว่า 10,000 บาท ☐ 10,001 – 20,000 บาท ☐ 20,001 – 30,000 บาท
☐ 30,001 – 40,000 บาท ☐ 40,001 – 50,000 บาท ☐ มากกว่า 50,000 บาท

เลขประจำตัวในการวิจัย ….....….

วันที่ .....

แบบสอบถามข้อมูลของครอบครัว

ขอความกรุณาผู้ปกครองตอบแบบสอบถามนี้ โดยเติมคำในช่องว่าง และ เขียนเครื่องหมาย X หน้าตัวเลือกที่เป็นคำตอบของท่าน

11. จำนวนสมาชิกที่อาศัยอยู่ในบ้านเดียวกัน ..... คน

12. จำนวนบุตร ..... คน

13. จำนวนเด็กอายุต่ำกว่า 15 ปี ที่อาศัยรวมอยู่ในบ้านเดียวกัน ..... คน

14. บิดา มีเวลาอยู่กับนักเรียนในวันราชการวันละ ....ชั่วโมง.; และในวันหยุดราชการ วันละ .....ชั่วโมง

15 มารดามีเวลาอยู่กับนักเรียนในวันราชการวันละ .....ชั่วโมง; และในวันหยุดราชการ วันละ .....ชั่วโมง

16. บ้านที่ท่านอาศัยอยู่เป็น

☐ ห้องเช่า หรือ แฟลต ☐ คอนโดมีเนียม หรือ อพาทเม้นท์ ☐ ตึกแถว หรือ ทาวเฮาส์
☐ บ้านเดี่ยว ☐ อื่นๆ ระบุ .....

พฤติกรรมการใช้เวลาว่างของนักเรียนและครอบครัว

โปรดเขียนเครื่องหมาย X หน้าตัวเลือกที่เป็นคำตอบของท่าน

1. เมื่อเลิกเรียนแล้ว ส่วนใหญ่นักเรียนอยู่ที่ไหน
   1. เรียนพิเศษ ต่อที่โรงเรียน
   2. เรียนพิเศษต่อที่อื่น
   3. อยู่บ้าน มีผู้ใหญ่ดูแล
   4. อยู่บ้าน ไม่มีผู้ใหญ่อยู่ดูแล
   5. อยู่บ้านญาติ หรือ บ้านเพื่อน
   6. อื่นๆ โปรดระบุ .....

2. กิจกรรมที่นักเรียนชอบทำเวลาว่าง ในวันราชการคือ
   1. ส่วนใหญ่ชอบอยู่กับบ้าน ดูทีวี อ่านหนังสือ ฟังเพลง หรือเล่นคอมพิวเตอร์
   2. ส่วนใหญ่ชอบออกไปวิ่งเล่นนอกบ้าน ขี่จักรยาน หรือเล่นกีฬา
   3. ชอบอยู่บ้าน ดูทีวี อ่านหนังสือ พอพอกับชอบออกไปวิ่งเล่นนอกบ้าน

เลขประจำตัวในการวิจัย ….....….

วันที่ .....

พฤติกรรมการใช้เวลาว่างของนักเรียนและครอบครัว (ต่อ)

3. กิจกรรมที่นักเรียนชอบทำเวลาว่าง ในวันเสาร์-อาทิตย์ คือ
   1. ส่วนใหญ่ชอบอยู่กับบ้าน ดูทีวี อ่านหนังสือ ฟังเพลง หรือเล่นคอมพิวเตอร์
   2. ส่วนใหญ่ชอบออกไปวิ่งเล่นนอกบ้าน ขี่จักรยาน หรือเล่นกีฬา
   3. ชอบอยู่บ้าน ดูทีวี อ่านหนังสือ พอพอกับชอบออกไปวิ่งเล่นนอกบ้าน

4. ท่านอนุญาตให้นักเรียนออกไปเล่นนอกบ้านบ่อยแค่ไหน
   1. อนุญาตตลอดเวลา
   2. อนุญาตนานๆ ครั้ง
   3. แทบจะไม่อนุญาตเลย

5. การเล่นนอกบ้านบริเวณที่นักเรียนอาศัย โดยไม่มีผู้ใหญ่คอยดูแล ปลอดภัยแค่ไหน
   1. ปลอดภัยมากที่สุด
   2. ปลอดภัยมาก
   3. ค่อนข้างปลอดภัย
   4. ไม่ปลอดภัย
   5. ไม่ปลอดภัยมากที่สุด

6. ครอบครัวท่านมีเวลาว่าง
   1. มีเวลาว่างน้อย
   2. มีเวลาว่างพอควร
   3. มีเวลาว่างมาก

7. กิจกรรมที่ครอบครัวมักเลือกทำเวลาว่าง
   1. ไปเดินศูนย์การค้า
   2. ไปเที่ยวสวนสาธารณะ
   3. พักผ่อน ดูทีวีอยู่ที่บ้าน
   4. ช่วยกันดูแล ทำความสะอาดบ้าน
   5. ออกกำลังกายกับลูก
   6. พาลูกไปออกกำลังกาย
   7. ไปทานอาหารนอกบ้าน
   8. อื่นๆ โปรดระบุ .....

เลขประจำตัวในการวิจัย ….....

วันที่ .....

แบบสอบถามการสนับสนุนของครอบครัวต่อการเคลื่อนไหวร่างกาย

<u>โดยปกติในช่วงเวลาหนึ่งสัปดาห์</u> บ่อยแค่ไหนที่สมาชิกในครอบครัวทำดังนี้

	ไม่เคยทำ	1 ครั้งต่อสัปดาห์	2 – 3 ครั้ง ต่อสัปดาห์	4-5 ครั้งต่อสัปดาห์	ทุกวันของสัปดาห์
1 **กระตุ้น (บอกหรือแนะนำ)** ให้นักเรียนมีกิจกรรมเคลื่อนไหวร่างกายหรือเล่นกีฬา					
ก. บิดา หรือ ผู้ใหญ่ที่เป็นผู้ชายในบ้าน	.				
ข. มารดา หรือ ผู้ใหญ่ที่เป็นผู้หญิงอยู่ในบ้าน					
ค. เด็กอื่นๆ ในบ้าน					
2 **ทำกิจกรรมการเคลื่อนไหวร่างกายหรือออกกำลังกาย** กับนักเรียน					
ก. บิดา หรือ ผู้ใหญ่ที่เป็นผู้ชายในบ้าน					
ข. มารดา หรือ ผู้ใหญ่ที่เป็นผู้หญิงอยู่ในบ้าน					
ค. เด็กอื่นๆ ในบ้าน					
3 **รับ-ส่งนักเรียน**ไปยังสถานที่ที่นักเรียนสามารถวิ่งเล่น ออกกำลังกาย หรือเล่นกีฬา					
ก. บิดา หรือ ผู้ใหญ่ที่เป็นผู้ชายในบ้าน					
ข. มารดา หรือ ผู้ใหญ่ที่เป็นผู้หญิงอยู่ในบ้าน					
ค. เด็กอื่นๆ ในบ้าน					
4 **นั่งชมนักเรียน**ทำกิจกรรมเคลื่อนไหวร่างกายหรือเล่นกีฬา					
ก. บิดา หรือ ผู้ใหญ่ที่เป็นผู้ชายในบ้าน					
ข. มารดา หรือ ผู้ใหญ่ที่เป็นผู้หญิงอยู่ในบ้าน					
ค. เด็กอื่นๆ ในบ้าน					
5 **ชมเชย**นักเรียนว่าทำได้ดีในกิจกรรมเคลื่อนไหวร่างกายหรือเล่นกีฬา					
ก. บิดา หรือ ผู้ใหญ่ที่เป็นผู้ชายในบ้าน					
ข. มารดา หรือ ผู้ใหญ่ที่เป็นผู้หญิงอยู่ในบ้าน					
ค. เด็กอื่นๆ ในบ้าน					

ขอบคุณค่ะ

การรับรู้อุปสรรคในการออกกำลังกาย

สถานการณ์ต่อไปนี้เป็นปัญหาอุปสรรคของการเล่นเคลื่อนไหวร่างกาย
โปรดอ่านข้อคำถาม แล้วคิดว่า สถานการณ์นั้น เป็นความจริงสำหรับนักเรียนหรือไม่ โดยทำเครื่องหมาย √ ลงในช่องที่ตรงกับความคิดเห็นของนักเรียน

ฉันเล่นเคลื่อนไหวร่างกายทุกวันไม่ได้ เพราะว่า.....	**ไม่จริงอย่างยิ่ง**	**จริงบางส่วน**	**จริง**	**จริงมากที่สุด**
1. .....ฉันไม่มีเวลา	1	2	3	4
2. .....ฉันต้องช่วยทำงานบ้านหลายอย่าง	1	2	3	4
3. ..... ไม่มีสถานที่ที่เหมาะสมให้ฉันเล่น	1	2	3	4
4. .....อากาศไม่ดีสำหรับไปเล่นนอกบ้าน	1	2	3	4
5. ..... ฉันไม่มีเสื้อผ้าหรือรองเท้าที่เหมาะสมสำหรับการเล่นนั้น	1	2	3	4
6. .....ฉันไม่มีอุปกรณ์สำหรับเล่นเคลื่อนไหวร่างกาย	1	2	3	4
7. .....ฉันมีการบ้านมากที่จะต้องทำ	1	2	3	4
8. .....ฉันไม่มีเพื่อนไปเล่นนอกบ้านด้วย	1	2	3	4
9. .....ฉันเหนื่อยเกินกว่าจะทำกิจกรรมเคลื่อนไหวร่างกาย	1	2	3	4
10. .....พ่อแม่ไม่อนุญาตให้ไปเล่นนอกบ้าน	1	2	3	4
11. .....การออกกำลังกายในวิชาพลศึกษานั้นเป็นการออกกำลังกายที่เพียงพอแล้ว	1	2	3	4
12. ..... ฉันเลือกทำกิจกรรมอื่นที่น่าสนใจกว่าการเล่นเคลื่อนไหวร่างกาย (เช่น ดูทีวี เล่นวิดิโอเกมส์ หรือ คอมพิวเตอร์)	1	2	3	4
13. ..... มีรถวิ่งผ่านไปมามากในบริเวณที่เล่น	1	2	3	4

แบบวัดความเชื่อมั่นในตนเองของเด็กนักเรียนต่อการเล่นเคลื่อนไหวร่างกาย

โปรดทำเครื่องหมาย √ บนตัวเลขที่ตรงกับระดับความมั่นใจของนักเรียนว่านักเรียนจะสามารถเล่นเคลื่อนไหวร่างกายได้

สถานการณ์	ไม่มั่นใจเลย	มั่นใจเล็กน้อย	มั่นใจพอควร	มั่นใจมาก	มั่นใจมากที่สุด
1. เมื่อนักเรียนไม่มีเพื่อนไปเล่นด้วย นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
2. เมื่อนักเรียนรู้สึกเบื่ออยู่ นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
3. เมื่อนักเรียนรู้สึกเหนื่อย นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
4. เมื่อกิจกรรมเคลื่อนไหวร่างกายนั้นไม่สนุก นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
5. เมื่อไม่มีสถานที่ที่เหมาะสมสำหรับเล่น นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
6. เมื่อนักเรียนมีการบ้านมาก นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
7. เมื่อมีกิจกรรมอื่นๆ ที่น่าสนใจกว่าให้เลือกทำ (เช่น เล่นวิดิโอเกมส์ อ่านการ์ตูน ดูทีวี) นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5

แบบวัดความเชื่อมั่นในตนเองของเด็กนักเรียนต่อการเล่นเคลื่อนไหวร่างกาย (ต่อ)

สถานการณ์	ไม่มั่นใจเลย	มั่นใจเล็กน้อย	มั่นใจพอควร	มั่นใจมาก	มั่นใจมากที่สุด
8. เมื่อนักเรียนรู้สึกเครียด นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
9. เมื่อนักเรียนรู้สึกซึมเศร้า นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
10. เมื่อนักเรียนต้องช่วยพ่อแม่ทำงานบ้านหรืองานอื่นๆ นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
11. เมื่อพ่อแม่/ ผู้เลี้ยงดูไม่อนุญาตให้ออกไปเล่น นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
12. เมื่ออากาศไม่เหมาะสมที่จะออกไปเล่นข้างนอก นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5
13. เมื่อนักเรียนไม่มีเวลา นักเรียนมั่นใจมากน้อยแค่ไหนว่านักเรียนจะสามารถออกไปเล่นเคลื่อนไหวร่างกาย	1	2	3	4	5

แบบวัดความสนุกสนานในการเล่นเคลื่อนไหวร่างกาย

จงอ่านสถานการณ์แต่ละข้อที่เป็นความรู้สึกที่เกิดขึ้นขณะทำกิจกรรมเคลื่อนไหวร่างกาย แล้ว จงทำเครื่องหมาย (√) ในช่องที่ตรงกับระดับความคิดเห็น 'ไม่เห็นด้วย' ถึง'เห็นด้วย' ของนักเรียน

สถานการณ์	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วยเล็กน้อย	รู้สึกกลางๆ	เห็นด้วยเล็กน้อย	เห็นด้วยอย่างยิ่ง
1. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย... ฉันมีความสุข					
2. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ฉันรู้สึกเบื่อ					
3. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... ฉันไม่ชอบ					
4. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... ฉันรู้สึกสนุก					
5. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... มันไม่สนุกเลย					
6. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... มันทำให้ฉันรู้สึกมีพลัง					
7. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... มันทำให้ฉันซึมเศร้า					
8. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... มันเพลิดเพลินมาก					
9. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... ร่างกายฉันรู้สึกดี					
10 เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย ... ฉันได้ประโยชน์บางสิ่งบางอย่างกลับมา					

แบบวัดความสนุกสนานในการเล่นเคลื่อนไหวร่างกาย (ต่อ)

สถานการณ์	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วยเล็กน้อย	รู้สึกกลางๆ	เห็นด้วยเล็กน้อย	เห็นด้วยอย่างยิ่ง
11 เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย .....มันน่าตื่นเต้นมาก					
12. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย..... มันทำให้ฉันสับสน					
13. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย..... มันไม่น่าสนใจเอาเสียเลย					
14. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย…มันทำให้ฉันรู้สึกประสบความสำเร็จ					
15. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย….....ฉันรู้สึกดี					
16. เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย….....ฉันรู้สึกว่าฉันควรจะทำอย่างอื่นมากกว่า					
17 เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย... มันทำให้ร่างกายฉันแข็งแรง					
18 เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย..... ฉันรู้สึกสดชื่น แจ่มใส					
19 เมื่อฉันทำกิจกรรมเคลื่อนไหวร่างกาย.....มันทำให้ฉันรู้สึกเหนื่อย					

แบบวัดการรับรู้สิ่งแวดล้อมต่อการเคลื่อนไหวร่างกาย

จงตอบคำถามที่เกี่ยวข้องกับ **<u>เพื่อนบ้านของนักเรียน</u>** โดยเขียนเครื่องหมาย √ ที่ตรงกับความเห็นของนักเรียน

1 **<u>ในชุมชนที่นักเรียนอาศัย</u>** มีสถานที่ต่อไปนี้หรือไม่

	มี	ไม่มี
a. ที่ว่างสำหรับวิ่งเล่น	[1]	[0]
b. สนามเด็กเล่นพร้อมเครื่องเล่น	[1]	[0]
c. สนามกีฬา (ฟุตบอล, แบตมินตัน, เทนนิส, อื่นๆ ....)	[1]	[0]
d. ที่ที่ปลอดภัยสำหรับขี่จักรยาน	[1]	[0]
e. ลู่สำหรับวิ่ง	[1]	[0]
f. ฟุตบาท ทางเดิน	[1]	[0]
g. แม่น้ำ สระว่ายน้ำ	[1]	[0]
h. สวนสาธารณะ	[1]	[0]
i. ศูนย์นันทนาการ ศูนย์เยาวชน	[1]	[0]

2. ถนน**บริเวณที่นักเรียนอาศัย**ปลอดภัยแค่ไหน
   1. ปลอดภัยมาก
   2. ค่อนข้างปลอดภัย
   3. ไม่ปลอดภัย

3. การเล่นนอกบ้าน**บริเวณที่นักเรียนอาศัย** ปลอดภัยแค่ไหน
   1. ปลอดภัยมาก
   2. ค่อนข้างปลอดภัย
   3. ไม่ปลอดภัย

4. ท่านกังวลเกี่ยวกับคนแปลกหน้ามากแค่ไหนขณะที่เล่นนอกบ้าน
   1. กังวลมาก
   2. ค่อนข้างกังวล
   3. ไม่กังวล

5. บ่อยครั้งแค่ไหนที่นักเรียนเห็น**เด็กแถวบ้าน**ออกมาเล่นนอกบ้าน
   1. บ่อยครั้งมาก
   2. บางครั้ง
   3. น้อยครั้ง

แบบวัดการรับรู้สิ่งแวดล้อมต่อการเคลื่อนไหวร่างกาย (ต่อ)

6. บ่อยครั้งแค่ไหนที่**เพื่อนบ้านของนักเรียน**ไม่พอใจถ้าเด็กๆ บริเวณบ้านเล่นกันเสียงดัง
   1. บ่อยครั้งมาก
   2. บางครั้ง
   3. น้อยครั้ง
   4. ไม่เคย

7. **เด็กแถวบ้านนักเรียน**เป็นมิตรกับท่านมากแค่ไหน
   1. เป็นมิตรอย่างมาก
   2. ค่อนข้างเป็นมิตร
   3. ไม่เป็นมิตร

8. **เด็กแถวบ้านนักเรียน**ออกมาเล่นเคลื่อนไหวร่างกายนอกบ้านกับนักเรียนบ่อยแค่ไหน
   1. 0 – 2 ครั้งต่อสัปดาห์
   2. 3 – 5 ครั้งต่อสัปดาห์
   3. 6 – 7 ครั้งต่อสัปดาห์

กรุณาตอบคำถามข้างล่างนี้เกี่ยวกับ **<u>โรงเรียนของท่าน</u>** โดยเขียนเครื่องหมาย √ ที่ตรงกับความเห็นของนักเรียน

9 **โรงเรียนที่นักเรียนเรียนอยู่** มีสถานที่ต่อไปนี้หรือไม่

	มี พอเพียงมาก	มี ไม่พอเพียง	ไม่มี
a. สนามกีฬากลางแจ้ง	[3]	[2]	[1]
b. สนามเด็กเล่นพร้อมอุปกรณ์เด็กเล่น	[3]	[2]	[1]
c. ที่ว่างสำหรับเล่นเคลื่อนไหวร่างกายกับเพื่อน	[3]	[2]	[1]

10. **โรงเรียนที่นักเรียนเรียนอยู่**มีอุปกรณ์กีฬาให้นักเรียนเล่นหรือไม่	มี พอเพียงมาก [3]	มี ไม่พอเพียง [2]	ไม่มี [1]

แบบวัดการรับรู้สิ่งแวดล้อมต่อการเคลื่อนไหวร่างกาย (ต่อ)

12.	**โรงเรียนที่นักเรียนเรียนอยู่**อนุญาตให้นักเรียนวิ่งเล่นระหว่างพักหรือไม่	อนุญาต [1]	ไม่อนุญาต [0]
13.	**โรงเรียนที่นักเรียนเรียนอยู่**อนุญาตให้นักเรียนเล่นซุกซนหลังเลิกเรียนหรือไม่	อนุญาต [1]	ไม่อนุญาต [0]
14.	**โรงเรียนที่นักเรียนเรียนอยู่**อนุญาตให้นักเรียนใช้อุปกรณ์กีฬาหลังเลิกเรียนหรือไม่	อนุญาต [1]	ไม่อนุญาต [0]

15. นักเรียนมีเพื่อนนักเรียนกี่คนที่**เล่นเคลื่อนไหวร่างกาย**กับนักเรียนที่โรงเรียน
    1. 0 คน
    2. 1-2 คน
    3. 3-4 คน
    4. 5 คน หรือ มากกว่า

16. นักเรียนทั้งโรงเรียนจำนวนเท่าใดที่เล่นเคลื่อนไหวร่างกาย**<u>ขณะช่วงพัก</u>**
    1. นักเรียนส่วนใหญ่
    2. นักเรียนบางส่วน
    3. นักเรียนจำนวนน้อย
    4 ไม่มีเลย

17. นักเรียนทั้งโรงเรียนจำนวนเท่าใดที่เล่นเคลื่อนไหวร่างกาย**หลังเลิกเรียนที่โรงเรียน**
    1. นักเรียนส่วนใหญ่
    2. นักเรียนบางส่วน
    3. นักเรียนจำนวนน้อย
    4 ไม่มีเลย

แบบวัดการรับรู้สิ่งแวดล้อมต่อการเคลื่อนไหวร่างกาย (ต่อ)

กรุณาตอบคำถามที่เกี่ยวกับ**<u>สิ่งแวดล้อมในบ้าน</u>**ของท่าน โดยเขียนเครื่องหมาย √ ที่ตรงกับความเห็นของนักเรียน

18. **<u>ในบ้านนักเรียน</u>**มีอุปกรณ์ต่อไปนี้หรือไม่

	มี	ไม่มี
a. ลูกบอล (ฟุตบอล บาสเกตบอล วอลเล่ย์บอล ลูกบอลพาสติก และอื่นๆ	[1]	[0]
b. จักรยาน	[1]	[0]
c. ไม้แบต หรือไม้เทนนิส	[1]	[0]
d. รองเท้าสำหรับวิ่ง	[1]	[0]
e. ชุดว่ายน้ำ	[1]	[0]
f. เชือกหรือยางสำหรับกระโดด	[1]	[0]
g. ไม้และลูกปิงปอง	[1]	[0]

19. **สมาชิกในครอบครัวท่าน**จำนวนกี่คนที่**เล่นเคลื่อนไหวร่างกายนอกบ้าน**กับนักเรียน

1 0 คน
2 1 คน
3 2 คน
4 3 คนหรือมากกว่า

20 **บิดามารดาของนักเรียน**อนุญาตให้ท่านเล่นนอกบ้าน**หลังเลิกเรียน**หรือไม่

1 ไม่อนุญาตเลย
2 อนุญาตถ้าท่านทำการบ้านเสร็จเรียบร้อยแล้ว
3 อนุญาตเสมอ

21 **บิดามารดาของนักเรียน**อนุญาตให้นักเรียนเล่นนอกบ้าน**ในระหว่างวันหยุด**หรือไม่

1 ไม่อนุญาตเลย
2 อนุญาตถ้าท่านทำการบ้านเสร็จเรียบร้อยแล้ว
3 อนุญาตเสมอ

แบบวัดการรับรู้สิ่งแวดล้อมต่อการเคลื่อนไหวร่างกาย (ต่อ)

22 บ่อยแค่ไหนที่สมาชิกในบ้าน **บอกนักเรียน**ว่า นักเรียนควรจะทำกิจกรรมเคลื่อนไหวร่างกาย หรือ ออกกำลังกาย

1. ไม่เคยทำเลย
2. ทำนานๆ ครั้ง
3. ทำค่อนข้างบ่อย
4. ทำเป็นประจำ

23 บ่อยแค่ไหนที่สมาชิกในครอบครัว **พานักเรียน**ไปที่ที่นักเรียนสามารถทำกิจกรรมเคลื่อนไหวร่างกายหรือออกกำลังกาย

1. ไม่เคยทำเลย
2. ทำนานๆ ครั้ง
3. ทำค่อนข้างบ่อย
4. ทำเป็นประจำ

แบบบันทึกกิจกรรมประจำวัน (วันราชการ)

ขอนักเรียนจงนึกถึงกิจกรรมที่นักเรียนได้ทำไปเมื่อวานนี้ เฉพาะเมื่อวานนี้เท่านั้น

แบบสอบถามนี้ **ถามเกี่ยวกับกิจกรรมที่นักเรียนได้ทำไปเมื่อวานนี้ใน 3 ช่วงเวลา** ดังนี้

1. ช่วงตื่นนอนถึงก่อนไปโรงเรียน
2. ขณะอยู่ที่โรงเรียน
3. หลังเลิกเรียน

ขอนักเรียน 1. จงอ่านชื่อกิจกรรม และนึกว่า นักเรียนทำกิจกรรมนั้นๆ หรือไม่ **เมื่อวานนี้**

หากนักเรียน**ทำกิจกรรม**นั้น ขอให้เขียนระยะเวลาเป็นนาที ในช่อง **ทำ** ของกิจกรรมนั้นและให้ตรงกับช่วงเวลาที่นักเรียนทำกิจกรรมนั้น

หากนักเรียน**ไม่ได้ทำกิจกรรม**นั้นๆ ให้เขียนเครื่องหมาย **-** ในช่อง **ทำ**

2. ขอให้นักเรียนนึกว่าขณะที่ทำกิจกรรมนั้น นักเรียนรู้สึกเหนื่อยแค่ไหน เวลาที่ทำกิจกรรมนั้นๆ

เขียนเลข	0	เมื่อนักเรียน	ไม่เหนื่อยเลย เวลาทำกิจกรรมนั้น
เขียนเลข	1	เมื่อนักเรียน	เหนื่อยเล็กน้อย หายใจเร็วขึ้น
เขียนเลข	2	เมื่อนักเรียน	เหนื่อยปานกลาง หายใจเร็วมากขึ้น เหงื่อออก
เขียนเลข	3	เมื่อนักเรียน	เหนื่อยมาก หายใจเหนื่อยหอบ ร้อน เหงื่อออกมาก

แบบบันทึกกิจกรรมประจำวัน (วันราชการ)

กิจกรรม	ก่อนมาโรงเรียน		ขณะอยู่ที่โรงเรียน		หลังโรงเรียนเลิก	
	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก
นั่งเล่นเงียบๆ นอนเล่นเงียบๆ						
ดูโทรทัศน์ ดูหนัง						
เล่นวิดิโอเกมส์						
เล่นเกมส์ต่างๆ เช่น หมากฮอส หมากรุก โดมิโน						
ฟังเพลง						
อ่านหนังสืออ่านเล่น						
นั่งคุยเล่นกับเพื่อน / คุยโทรศัพท์						
ทำงานหน้าจอคอมพิวเตอร์						
เรียนในห้องเรียน วาดรูป						
อ่านหนังสือเรียน ทำการบ้าน						
ล้างจาน						
กวาดบ้าน ทำความสะอาด เช็ดถู						
ซักผ้า						
นั่งรถ						
เดิน						
เกมส์วิ่งเคลื่อนไหวร่างกายกับเพื่อน เช่น วิ่งไล่จับ วิ่งเปรี้ยว แปะแข็ง						
เดินผสมวิ่ง						
วิ่ง						

กิจกรรม	ก่อนมาโรงเรียน		ขณะอยู่ที่โรงเรียน		หลังโรงเรียนเลิก	
	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก
ขี่จักรยาน						
กระโดดเชือก						
เล่นนอกบ้าน เช่น ปีนต้นไม้ เล่นในสนามมีอุปกรณ์เด็กเล่น เล่นซ่อนหา						
เล่นบอล เช่น เตาะบอล เลี้ยงบอล เตะบอล ขี่ม้าส่งเมือง						
ออกกำลังกาย เช่น ซิทอัพ วิดพื้น						
เต้นช้าๆ						
เต้นแอโรบิค						
ยิมนาสติก						
คาราเต้ ยูโด เทควอนโด						
ปิงปอง						
แบตมินตัน						
เทนนิส						
วอลเล่ย์บอล						
ฟุตบอล						
บาสเกตบอล						
ว่ายน้ำ						
ว่ายน้ำแข่งขัน						

กิจกรรม	ก่อนมาโรงเรียน		ขณะอยู่ที่โรงเรียน		หลังโรงเรียนเลิก	
	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก
อื่นๆ (กิจกรรมที่นักเรียนทำเมื่อวานนี้ที่ไม่อยู่ในรายการข้างบน)						
1. …….....	.....	.....	.....	.....	.....	.....
2…….....	.....	.....	.....	.....	.....	.....
3. …….....	.....	.....	.....	.....	.....	.....
4. …….....	.....….	.....……	....……	.....……	.....…...	.....…….

กิจกรรม	ก่อนมาโรงเรียน	หลังเลิกเรียน
เมื่อวานนี้ ฉันดูโทรทัศน์นาน →	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม.	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม. ☐ > 3 ชม.
เมื่อวานนี้ ฉันเล่นวิดิโอเกมส์หรือคอมพิวเตอร์เกมส์นาน →	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม.
เมื่อวานนี้ ฉันออกไปเล่นนอกบ้าน หลังเลิกเรียนนาน →		☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม. ☐ > 3 ชม.
เมื่อวานนี้ ฉันมีเรียนวิชาพลศึกษาหรือกีฬา หรือไม่ ☐ ไม่เรียน ☐ เรียน ประเภทกิจกรรม		

ฉันมาโรงเรียนโดย ( ) นั่งรถยนต์ ( ) นั่งรถเมล์ ( ) นั่งรถมอเตอไซด์ ( ) เดิน เป็นระยะเวลา .... นาที. ( ) ขี่จักรยาน เป็นระยะเวลา ..... นาที ( ) อื่นๆ ระบุ	ฉันเดินทางกลับจากโรงเรียนโดย ( ) นั่งรถยนต์ ( ) นั่งรถเมล์ ( ) นั่งรถมอเตอไซด์ ( ) เดิน เป็นระยะเวลา .... นาที. ( ) ขี่จักรยาน เป็นระยะเวลา ..... นาที ( ) อื่นๆ ระบุ .....
ฉันนอนเวลา ..... น. และตื่นนอนเวลา ..... น.	

ขอบคุณนักเรียนมากนะคะ

แบบบันทึกกิจกรรมประจำวัน (วันเหยุดราชการ)

ขอนักเรียนจงนึกถึงกิจกรรมที่นักเรียนได้ทำไปเมื่อวันเสาร์ หรือ วันอาทิตย์ ที่ผ่านมา ใน 3 ช่วงเวลา

แบบสอบถามนี้ **ถามเกี่ยวกับกิจกรรมที่นักเรียนได้ทำไปเมื่อวันอาทิตย์ ตั้งแต่ตื่นนอน จนถึงเวลาเข้านอน ใน 3 ช่วงเวลา** ดังนี้

1. ก่อนเที่ยง 2. 12.00 น. - 18.00 น. 3. หลัง 18.00 น. - เวลานอน

ขอนักเรียน 1. จงอ่านชื่อกิจกรรม และนึกว่า นักเรียนทำกิจกรรมนั้นๆ หรือไม่ **เมื่อวานนี้**

หากนักเรียน**ทำกิจกรรม**นั้น ขอให้เขียนระยะเวลาเป็นนาที ในช่อง **ทำ** ให้ตรงกับช่วงเวลาที่นักเรียนได้ทำกิจกรรมนั้น

หากนักเรียน**ไม่ได้ทำกิจกรรม**นั้นๆ ให้เขียนเครื่องหมาย **-** ในช่อง **ทำ**

2. และขอให้นักเรียนนึกว่ากิจกรรมนั้น ทำให้นักเรียนเหนื่อยแค่ไหน เวลาที่ทำกิจกรรมนั้นๆ

เขียนเลข	0	เมื่อนักเรียน	ไม่เหนื่อยเลย เวลาทำกิจกรรมนั้น
เขียนเลข	1	เมื่อนักเรียน	เหนื่อยเล็กน้อย หายใจเร็วขึ้น
เขียนเลข	2	เมื่อนักเรียน	เหนื่อยปานกลาง หายใจเร็วมากขึ้น เหงื่อออก
เขียนเลข	3	เมื่อนักเรียน	เหนื่อยมาก หายใจเหนื่อยหอบ ร้อน เหงื่อออกมาก

แบบบันทึกกิจกรรมประจำวัน (วันหยุดราชการ)

กิจกรรม	ช่วงตื่นนอนถึง 12.00 น.		ช่วง 12.00 - 18.00 น.		ช่วง 18.01 – เวลาเข้านอน	
	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก
นั่งเล่นเงียบๆ นอนเล่นเงียบๆ						
ดูโทรทัศน์ ดูหนัง						
เล่นวิดิโอเกมส์						
เล่นเกมส์ต่างๆ เช่น หมากฮอส หมากรุก โดมิโน						
ฟังเพลง						
อ่านหนังสืออ่านเล่น						
นั่งคุยเล่นกับเพื่อน / คุยโทรศัพท์						
ทำงานหน้าจอคอมพิวเตอร์						
เรียนในห้องเรียน วาดรูป						
อ่านหนังสือเรียน ทำการบ้าน						
ล้างจาน						
กวาดบ้าน ทำความสะอาด เช็ดถู						
ซักผ้า						
นั่งรถ						
เดิน						
เกมส์วิ่งเคลื่อนไหวร่างกายกับเพื่อน เช่น วิ่งไล่จับ วิ่งเปรี้ยว แปะแข็ง						
เดินผสมวิ่ง						
วิ่ง						

กิจกรรม	ช่วงตื่นนอนถึง 12.00 น.		ช่วง 12.00 - 18.00 น.		ช่วง 18.01 – เวลาเข้านอน	
	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก
ขี่จักรยาน						
กระโดดเชือก						
เล่นนอกบ้าน เช่น ปีนต้นไม้ เล่นในสนามมีอุปกรณ์เด็กเล่น เล่นซ่อนหา						
เล่นบอล เช่น เตาะบอล เลี้ยงบอล เตะบอล ขี่ม้าส่งเมือง						
ออกกำลังกาย เช่น ซิทอัพ วิดพื้น						
เต้นช้าๆ						
เต้นแอโรบิค						
ยิมนาสติก						
คาราเต้ ยูโด เทควอนโด						
ปิงปอง						
แบดมินตัน						
เทนนิส						
วอลเล่ย์บอล						
ฟุตบอล						
บาสเกตบอล						
ว่ายน้ำ						
ว่ายน้ำแข่งขัน						

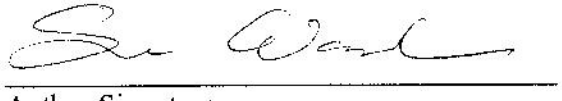
กิจกรรม	ช่วงตื่นนอนถึง 12.00 น.		ช่วง 12.00 - 18.00 น.		ช่วง 18.01 – เวลาเข้านอน	
	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก	ทำนาน (นาที)	0 = ไม่เหนื่อยเลย 1 = เหนื่อยเล็กน้อย 2 = เหนื่อยปานกลาง 3 = เหนื่อยมาก
อื่นๆ (กิจกรรมที่นักเรียนทำเมื่อวานนี้ที่ไม่อยู่ในรายการข้างบน)						
1. …….....	.....	.....	.....	.....	.....	.....
2…….....	.....	.....	.....	.....	.....	.....
3. …….....	.....	.....	.....	.....	.....	.....
4. …….....	.....	.....	.....	.....	.....	.....

กิจกรรม	ช่วงตื่นนอน ถึง ก่อน 12.00 น.	ช่วง 12.00 – 18.00 น.	ช่วง หลัง 18.00 น. - เข้านอน
ฉันดูโทรทัศน์นาน →	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม.	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม.	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม.
ฉันเล่นวิดิโอเกมส์หรือคอมพิวเตอร์เกมส์นาน →	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม.	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม.	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม.
ฉันออกไปเล่นนอกบ้านนาน →	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม. ☐ > 3 ชม.	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม. ☐ > 3 ชม.	☐ 0 นาที ☐ 1-30 นาที ☐ 31-60 นาที ☐ 1-1 ½ ชม. ☐ 1 ½ - 2 ชม. ☐ 2 – 3 ชม. ☐ > 3 ชม.
ฉันนอนเวลา ……..... น. และตื่นนอนเวลา …….. น.			

Publishing Agreement

It is the policy of the University to encourage the distribution of all theses and dissertations. Copies of all UCSF theses and dissertations will be routed to the library via the Graduate Division. The library will make all theses and dissertations accessible to the public and will preserve these to the best of their abilities, in perpetuity.

Please sign the following statement:
I hereby grant permission to the Graduate Division of the University of California, San Francisco to release copies of my thesis or dissertation to the Campus Library to provide access and preservation, in whole or in part, in perpetuity.



Author Signature

6/15/2007

Date