

5-1996

Associations between Family Factors and Pre-adolescent Children's Fitness

Kim Lizabeth Bellnier
The College at Brockport

Follow this and additional works at: https://digitalcommons.brockport.edu/pes_theses

 Part of the [Health and Physical Education Commons](#), and the [Sports Studies Commons](#)

Repository Citation

Bellnier, Kim Lizabeth, "Associations between Family Factors and Pre-adolescent Children's Fitness" (1996). *Kinesiology, Sport Studies, and Physical Education Master's Theses*. 46.
https://digitalcommons.brockport.edu/pes_theses/46

This Thesis is brought to you for free and open access by the Kinesiology, Sport Studies and Physical Education at Digital Commons @Brockport. It has been accepted for inclusion in Kinesiology, Sport Studies, and Physical Education Master's Theses by an authorized administrator of Digital Commons @Brockport. For more information, please contact kmyers@brockport.edu.

**Associations Between Family Factors and
Pre-adolescent Children's Fitness**

by

Kim Lizabeth Bellnier

A thesis submitted to the graduate faculty, Department of Health Science of the State University of New York, College at Brockport, in partial fulfillment of the requirements for the degree.

Master of Science in Education

(Health Education)

May 1996

Douglas M. Scheidt, Ph.D.

Chair

Nat Goodhartz, Ph.D.

Committee Member

Patti Follansbee, Ph.D.

Committee Member

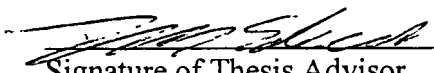
THESIS APPROVAL

To the Graduate Faculty of Health Science:

The committee has examined the thesis of

Kim Lizabeth Bellnier, entitled "Associations Between Family Factors and Pre-adolescent Children's Fitness," find it satisfactory and recommend it be accepted.

Douglas M. Scheidt, Ph.D.



Signature of Thesis Advisor

6-5-96
Date

Patti Follansbee, Ph.D.



Signature of Committee Member

6/6/96
Date

Nat Goodhartz, Ph.D.



Signature of Committee Member

6/6/96
Date

ABSTRACT

This study examined the associations between family factors including: parental support/involvement, parental exercise behavior, parental rewards, children's perceptions of parental exercise behavior and children's fitness. The data were collected via a questionnaire for parents and a questionnaire for the fifth grade children from The Village Elementary School in Hilton, New York. The PACER test for cardiorespiratory endurance from the FITNESSGRAM test battery was also administered to the fifth grade students. Only paternal behaviors were significantly related to children's fitness. Therefore, a post hoc analysis was conducted to examine possible gender differences.

For the variables of parental involvement/support, and parental exercise behavior there was a statistically significant relationship found between paternal involvement, paternal exercise habits and girls' fitness. In addition, there was a significant association found between girls' perceptions of father's exercise behavior and girls' fitness.

There was no relationship found between parental rewards and children's fitness. Children's activity was significantly associated with their own fitness and children's perceptions of their parent's exercise behavior was correlated with their parent's self-report of personal exercise behavior.

Implications of this study include the importance of father's modeling of exercise and its relationship with daughter's fitness.

ACKNOWLEDGMENTS

I would like to acknowledge **Dr. Doug Scheidt** for all of his help with this project. He devoted many hours assisting me and I sincerely appreciate his commitment and excellent teaching.

I would also like to acknowledge **Mrs. Roberta Bellnier** who spent endless hours typing and refining this thesis. It is rare to have a mother-in-law who is not only wonderful personally, but who is also an outstanding person professionally. Thank you so much for your help.

In addition, I would like to thank **Mrs. Kathy Sansocie** for all those extra hours throughout the years she spent babysitting my son, Hank. Thanks to her I could work on this degree with my son safe and happy while I was away at class.

DEDICATION

I would like to dedicate this thesis and degree to my family.

To my husband, **Ed**, who has supported me in so many ways, and had the unbelievable patience to put up with me during this last year.

To my son, **Hank**: The hardest part of earning this degree was all the precious time I had to spend away from you.

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
Statement of Problem.....	1
Statement of Purpose.....	3
Rationale.....	3
Hypotheses.....	7
Definition of Terms.....	8
Limitations of Study.....	10
II. REVIEW OF THE LITERATURE	11
Current Status of Children's Fitness.....	11
Children's Activity Status.....	15
Adult Fitness and Activity.....	19
Social Learning Theory.....	22
Parental Influence on Children's Fitness/Activity.....	27
Assessment Techniques.....	34
III. METHODOLOGY	40
Sample.....	41
Instruments.....	41
Procedure.....	41
Fitness.....	47
Statistical Analysis.....	49
Pilot Test.....	49

IV. RESULTS..... 51
Sample51
Frequency Analyses-Parents' Survey51
Frequency Analyses-Children's Survey.....63
Children's Survey Composites.....67
PACER Analysis.....68
Correlation Analyses68
Post Hoc Analyses75
Summary of Data78

V. DISCUSSION..... 80
Introduction.....80
Implications81
Recommendations.....83
Summary/Limitations/Conclusions85

VI. REFERENCES..... 88
Appendix A..... 96
Appendix B..... 101
Appendix C 102

Chapter One

Introduction

Statement Of The Problem

The decline of children's fitness levels is a significant public health problem. According to Duncan, Boyce, Itami and Puffenberger (1983), children's fitness levels are currently low and children are not as fit as they once were. Baseline data from Healthy People (DHHS, 1990) indicated that only 66% of youth aged 10 through 17 in 1984 engaged in vigorous physical activity (i.e., activity that promotes the development and maintenance of cardiorespiratory fitness three or more days per week for 20 or more minutes per session). Data were not available for children under 18, but for people 18 or over, only 22 % were involved in light to moderate physical activity for at least 30 minutes five or more times per week.

In other research, low levels of children's physical activity and fitness were also discovered. During 1963/65 The National Center for Health Statistics analyzed triceps and subscapular skinfold measurements and the National Children and Youth Fitness Study II (NCYFS) data scores were compared to the findings of that analysis. The NCYFS II (Ross & Pate, 1987) found that six to nine year old children have more body fat than children from 20 years prior. This study is one of few studies that has analyzed the current status of children's

fitness in a population sample. Valid national data for most health-related fitness items had not been collected before the mid-80's when the NCYFS was implemented. A detailed explanation of the current status of children's fitness levels and physical activity will be included in chapter two--review of the literature.

Children's fitness has become a national health priority. The public health goals for the nation that relate to this health problem include the following:

- **Increase to at least 75 percent**--The proportion of people aged six through 17 who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness three or more days for 20 minutes or more per session.
- **Reduce to no more than 15 percent**--The proportion of people aged six and older who engage in no leisure time physical activity. Baseline data from 1985 found that 24 percent of people 18 or older did not participate in any leisure time physical activity.
- **Increase to at least 30 percent**--The proportion of people aged six and older who engage regularly in light to moderate physical activity for at least 30 minutes per day.

- **Increase to at least 40 percent**--The proportion of people aged six and older who regularly perform physical activities that enhance and maintain muscular strength, muscular endurance, and flexibility (DHHS, 1990).

There is a general assumption in the research that children's fitness will be improved by increasing physical activity (Simons-Morton, O'Hara, Simons-Morton & Parcel, 1987). The NCYFS (Ross & Pate, 1987) found that children's physical activity patterns are significantly related to fitness levels. Improving cardiorespiratory fitness in adults and children through increased physical activity is a national public health objective (Simons-Morton et al., 1987). If the nation is to reach these goals and objectives for improving children's fitness, research is needed to analyze what factors influence children's activity levels and resulting fitness.

Statement of Purpose

The purpose of this study is to determine the relationship between parental exercise, parental support, children's perceptions of parental exercise and fitness levels of fifth grade male and female students.

Rationale

It has been stated in research that there is a need to understand motivating factors that affect children's exercise behaviors because low participation levels in physical activity leads to low fitness levels which can result in several health

consequences (Sallis et al., 1992). Obesity, hypertension, diabetes mellitus, and other chronic diseases can be prevented through exercise (Rowland, 1986).

Sedentary behavior has been found to be a risk factor for coronary heart disease which is a lifelong process with origins during childhood (Sallis et al., 1992).

Research and policy in children's physical activity/fitness is important due to an awareness that physical activity habits are developed during childhood and may continue throughout the adult years. The early adoption of a healthy lifestyle can help prevent several serious health problems (Sallis et al., 1992).

Simons-Morton et al. (1987) also supported the importance of improving childhood physical activity levels, because these exercise habits extend into adulthood where regular exercise patterns have documented health benefits. One specific benefit of exercise which has been well documented is that childhood physical activity can reduce cardiovascular disease risk factors such as high blood pressure, serum lipoproteins, and serum cholesterol (Sallis, 1987). Childhood blood pressures have a direct affect on later adulthood blood pressure. Children with high blood pressure have been found to become hypertensive adults (Sallis, 1987). Several studies cited in Dubbert (1992) also supported the role of physical activity in preventing coronary heart disease. Another benefit from regular exercise is the close association with prevention and treatment of obesity (Dubbert, 1992). According to Morgan (1986) at least

25% of North American children are obese and 80% of obese children become obese adults. Gortmaker, Dietz, and Cheung (1990) also found similar trends. They found percentages of obese children ranging from 24%-28% depending on race, age, and socioeconomic status. They have cited several health risks that could result from childhood obesity. These include: hypertension, emotional disturbances, respiratory disease, diabetes, and increased levels of serum lipoproteins. Increasing childhood activity levels is clearly important because it directly prevents obesity and indirectly prevents the health risks stated above.

Simons-Morton, Parcel, O'Hara, Blair, and Pate (1988) also stated that physical activity and physical fitness are important because they affect outcomes of public health. Encouraging healthy lifestyle habits during childhood, such as regular exercise, was shown to be beneficial for adults (Sallis, 1987). Physical activity helps to prevent several important chronic diseases during adulthood. Several studies reviewed by Simons-Morton et al. (1988) found that sedentary living is a risk factor for coronary heart disease (CHD). Exercise provides a direct protection against CHD. They also described several other health benefits of exercise, that were discovered in various research projects. Studies found direct associations between physical activity and lowered cancer rates and between physical activity and lowered body composition (Simons-Morton et al., 1988). Additional health benefits from exercise have been documented for

adults. Several studies cited in Dubbert (1992) found the following benefits: control of non-insulin dependent diabetes mellitus, prevention of osteoporosis, and improved psychological health in the areas of mood, anxiety, and addictive disorders.

It has been found that motivational factors for children's participation in exercise programs have not been extensively researched (Rowland, 1986; and Perusse, Tremblay, LeBlanc, & Bouchard, 1989). The NCYFS (Ross & Pate, 1987) conducted one of the few studies that determined factors, including exercise habits, which affect measured fitness. This study encouraged additional analysis of the determinants of childhood physical activity. Dishman, Sallis, and Orenstein (1988), and Pate, Dowda, and Ross (1990) also supported the need for more research on the determinants of physical activity. Specifically, these authors recommended that family influence on activity levels should be studied. Dishman et al. (1988) also stated that small experimental or descriptive studies, such as this thesis, need to be done using selected groups (children) to test application of behavioral science theories to the determinants of activity. In additional research, Sallis et al. (1992) stated the need for more research on the determining factors for childhood physical activity. Sallis et al. (1992) along with Dishman et al. (1988), described the importance of this research in terms of the need for data to guide effective activity promotion interventions. Studies such as

this thesis will help to provide insight into how the health and fitness of our young people can be improved. Given the benefits of regular exercise, which is a habit found to be developed during childhood, research on determining factors for children's fitness/exercise is clearly needed. The purpose of this study is to determine the relationship among family influences, children's perceptions, and children's fitness levels.

Hypotheses

The following relationships are expected:

- There will be a statistically significant positive correlation between parental exercise behavior and children's fitness scores.
- There will be a statistically significant positive correlation between children's perceptions of parental exercise and children's fitness scores.
- There will be a statistically significant positive correlation between parental involvement and children's fitness scores.
- There will be a statistically significant positive correlation between parental rewards and children's fitness scores.
- There will be a statistically significant, positive correlation between children's activity levels and children's fitness scores.
- There will be a statistically significant, positive correlation between children's perceptions of parental exercise and actual self-reported parental exercise.

Definition of Terms

Cardiorespiratory Endurance

A health and performance related component of physical fitness relating to the ability of the circulatory and respiratory systems to supply oxygen to functioning muscles. This is sometimes referred to as the capacity to perform activities using large muscle groups over an extended period of time (Cooper Institute for Aerobics Research [CIAR], 1994).

Light to Moderate Physical Activity

Activity that requires sustained, rhythmic muscular movements, is at least equivalent to sustained walking and is performed at less than 60 percent of maximum heart rate for age. Maximum heart rate equals roughly 220 beats per minute minus age (DHHS, 1990).

Maximal Oxygen Consumption (VO₂ max)

The greatest rate of oxygen consumption attained during exercise at sea level. Often referred to as VO₂ max and expressed in liters per minute or milliliters per kilogram body weight per minute (CIAR, 1994).

Norm-Referenced Standard

A measurement basis against which a test result is judged. Norm-referenced health standards are determined from a population distribution of test results

and serve to compare an individual measurement to other results, not an externally determined criterion (CIAR, 1994).

Criterion-Referenced Standard

A measurement basis against which a test result is judged. Criterion-referenced health standards, such as are used in The Prudential FITNESSGRAM, are set in relation to a level of test performance that is associated with health (CIAR, 1994).

The PACER Test

Progressive Aerobic Cardiovascular Endurance Run. A progressive, multistage test of aerobic capacity used in the Prudential FITNESSGRAM test battery (CIAR, 1994).

Vigorous Physical Activity:

Activities that are rhythmic, repetitive physical activities which use large muscle groups at 60 percent or more of maximum heart rate for age. An exercise heart rate of 60 percent of maximum heart rate for age is about 50 percent of maximal cardiorespiratory capacity and is sufficient for cardiorespiratory conditioning (DHSS, 1990). It should be noted that organizations, such as The American College of Sports Medicine and The American Heart Association, agree that it is recommended for children to participate in vigorous physical activity at 70 - 80% of VO_2 max or maximal heart

rate (heart rate greater than 140 beats per minute) at least three days a week to every day for 20 - 30 minutes (Simons-Morton et al., 1988).

Limitations of Study

Due to the use of a non-random sample, caution must be used in generalizing the findings of this study to the general population of pre-adolescent children. Due to the use of self report, there will be potential response bias. Due to non-respondents, the results may represent a selection bias. There may also be a history effect--the activity that will be measured will be during the winter months, and student and parent activity levels may be different during the summer.

This study is also limited to a convenience sample of white, middle-class, suburban students. Findings of this study may not apply to fifth grade students of varied socioeconomic and ethnic backgrounds.

Chapter Two

Review of the Literature

Status of Children's Fitness

There is a lack of research regarding the current status of children's fitness levels across the nation (Simons-Morton et al., 1987). Most studies have focused on intervention and methodology in promoting physical activity and physical fitness in children (Simons-Morton et al., 1987). It is a general assumption in the research on children's fitness that American children are not fit (Raithel, 1988). The American Alliance for Health, Physical Education, Recreation, and Dance stated that "The United States is experiencing a youth fitness crisis" (Raithel, 1988, p. 151). Rowland (1986) stated that there is growing concern that children are adopting increasingly sedentary life styles and there is a definite need for more research to identify factors (such as parent support) that can increase children's interest in lifetime exercise. This interest will help to improve the status of children's fitness.

Simons-Morton et al. (1988) stated that there has been a lack of longitudinal studies on health-related fitness in children. This lack of research has slowed the development of scientific standards to measure fitness versus the traditional norms. Criterion standards need to be developed based on longitudinal research that has found levels of fitness performance that are consistent with

acceptable functional capacity during childhood. These standards also need to be concurrent with levels of fitness in childhood that are associated with the development of lifetime exercise habits (Simons-Morton et al., 1988).

The Prudential FITNESSGRAM PACER test standards are criterion-referenced standards. When a student finishes running, the number of laps completed should fall into a range called *the healthy fitness zone*. This zone contains scores that are the criterion-referenced standards which are directly related to appropriate levels of health (CIAR, 1994). PACER test scores for *the healthy fitness zone* were determined using a regression equation predicting VO_2 max from age and highest speed achieved on the test, and rearranging this to predict speed (stage on test) from age and the criterion (or accepted level for health) VO_2 max. The predicted stage was converted into laps to be used as the standards (CIAR, 1994). In other words, the standard for cardiovascular fitness consists of a certain number of laps that the student must complete to be considered "healthy."

Many studies that have been done in the past have studied motor performance such as speed and agility, while recent tests have measured health related criteria such as cardiovascular endurance and flexibility. Norm based studies have made it difficult to assess fitness trends or changes because recent research cannot be compared to previous scores due to inconsistent standards of

measurement. This is the main reason for the lack of knowledge about the status of children's fitness today (Simons-Morton et al., 1987; Ross & Pate, 1987).

The National Children and Youth Fitness Study II (Ross & Pate, 1987) was conducted in 1986 for six to nine year old children, and the study collected data from 4,678 participants. These children completed a fitness test which evaluated performance in five areas of health-related fitness: cardiovascular endurance, flexibility, muscular strength and endurance (upper body and abdominal), and body composition (degree of fatness). The intention of this study was to produce descriptive statistics about the population, to provide a baseline for tracking changes over time in health-related fitness, and to allow comparisons for individual students against the developed population norms (Ross & Pate, 1987). In terms of cardiovascular endurance, other studies have measured this through a distance run to develop norms (Simons-Morton et al., 1987). However, as in the NCYFS II, a main limitation of this normative information is the question of the relationship between the distance run score and adequate levels of cardiorespiratory fitness. Simons-Morton et al. (1988) stated that criterion-referenced standards need to be developed based on longitudinal research, as previously described, to connect appropriate health outcomes and functional capacities with performances on test items.

The development of FITNESSGRAM is a positive step in this direction.

Normative data alone cannot allow qualitative interpretations of fitness levels in children (Simons-Morton et al., 1988). A national study using criterion-referenced measures is needed to more accurately assess current levels of fitness in American children versus just establishing norms.

In other tests for cardiovascular endurance in children, VO_2 max (oxygen intake maximum) was measured as a score versus a distance run (Simons-Morton et al., 1987). Scores were found to be between 45 - 60 ml/min.kg, which is above the minimum score of 42 ml/min.kg set for adults for adequate cardiorespiratory fitness (Cooper, cited in Simons-Morton et al., 1987). These studies suggest that children are the most fit portion of society because only 38% of 3000 adults tested reached the minimum of 42 ml/min.kg. Also, these studies were voluntary--with a probable selection bias of the most fit children. Population studies using VO_2 max scores have not been conducted, and little is known about the population distribution (Simons-Morton et al., 1987).

Overall, in conducting a literature review of children's fitness, few normative studies have been done for the population. The studies have been inconsistent with what is being tested--which eliminated comparisons--and more longitudinal research is needed for criterion-referenced standards to be developed. Most studies in the research have not focused on fitness levels of children, but instead

have examined children's physical activity patterns. Physical activity levels are a less valid, but perhaps reliable, indicator of fitness levels.

Children's Activity Status

The low prevalence of high activity levels for children in the United States has led to an increased interest in examining the determinants of physical activity habits, however, few studies have been done to research this issue (Perusse, Tremblay, LeBlanc, & Bouchard, 1989; Pate, Dowda, & Ross, 1990). This thesis is intended to lend some additional insight into the patterns and determinants of children's physical activity and fitness.

There have been several studies conducted that have examined levels of children's activity. These studies will be discussed following a brief rationale. Studying activity patterns during childhood is important because there is increasing evidence that physical activity patterns are developed early in life, and if these patterns are continued during adulthood, cardiovascular disease risk can be reduced by lowered fatty deposits in the coronary arteries and by reduced blood pressures from regular exercise (Parcel, Simons-Morton, O'Hara, Baranowski, Kolbe, & Bee, 1987).

Physical activity levels have been found to be highly correlated with improved physical fitness (Pate, Dowda, & Ross, 1990; Ross & Pate, 1987). Physical activity can improve fitness and improvements in fitness have been

found in research to improve health status and play a role in disease prevention (Haskell, Montoye, & Orenstein, 1985). Interventions during childhood are crucial to help children maintain or increase their physical activity levels which will improve their fitness levels along with their chance for a healthy adulthood. Research says that the main purpose for increasing childhood physical activity is not to gain health benefits during childhood, but to begin a lifestyle pattern which has proven health benefits in adulthood (Sallis, 1987).

There have only been a few studies which have evaluated the current status of children's activity levels (Simons-Morton et al., 1987). Among these studies, there is great variety in the methods for assessing activity levels and with the definitions for appropriate physical activity. These variations prevent comparison leading to conclusions regarding children's frequent participation in appropriate moderate-to-vigorous physical activity (Simons-Morton et al., 1987).

The NCYFS II assessed the activity levels of six to nine year old children using parent reports. It was found from a sample of 4,678 students that 84.3% participated in physical activity through at least one community organization, with swimming and playing on a playground being the most popular activities (Ross et al., 1987). Parents in this study rated 50.3 percent of their children as average for physical activity, and 39.7 percent were rated as above average. Only 10.1 percent were given a below-average rating from their parents, whereas,

mathematically, about 50 percent should be below average. Boys were viewed by their parents as being slightly more active than girls, and both boys and girls watched an average of two hours of television on weekdays, and three hours and twenty-six minutes per day on the weekends.

The amount of television that a child watches has been found to be inversely related to the child's activity levels and serves as an important indicator of how physically active children are. According to Gortmaker, Dietz, and Cheung (1990), children in their study were watching television up to 40 hours per week, and they strongly suspected that television viewing, along with computer and video game use, is increasing and that inactivity levels of children have remained high or increased since 1983.

Sallis (1987) stated that children's activity levels are "shockingly" low, and health professionals have an obligation to remedy this situation. The intent of this thesis is to provide more information regarding the determinants (e.g., family influence) of children's physical activity. This information could be used to develop intervention methods to help remedy the problem of children's inactivity. In research by Sallis et al. (1992) a lack of satisfactory instruments for measuring children's physical activity was found, and this explains the limited amounts of conclusive findings about children's habitual activity patterns. According to Sallis et al. (1992) physical activity declines significantly with age

with an almost 50 percent decrease in activity between ages six and 16; males are usually more active than females. Available data from Sallis et al. (1992) suggests that preadolescent children spend 30-40 minutes per day in moderate-to-vigorous physical activity, but little is known about whether this activity is vigorous enough to enhance health. Also, there is little information regarding patterns of children from different ethnic and socioeconomic backgrounds, along with information about changes in activity patterns over time (Sallis et al., 1992).

Other studies have provided some information on children's activity levels, although the methods for measuring activity levels vary. Baranowski, Hooks, Tsong, Cieslik, and Nader (1987) found that 47.9 percent of children participate in moderate to vigorous physical activity (MVPA) each day, and Durant, Lander, and Mahoney (1983) found in a self-report study that 76.8 percent of children engage in MVPA three times per week. In a study by Thorland and Gilliam (1981), average daily minutes of MVPA ranged from 25.4 percent to 67.2 percent as self-reported by male children aged 8 - 11. The National Children and Youth Fitness Study I from 1985 found through a questionnaire administered to fifth and sixth grade students nationwide that 52.7 percent of boys and girls participate in appropriate physical activity three times per week for 20 minutes (Ross & Pate, 1985). This number is much lower than the

government's goal of 90 percent for 10 - 17 year old children in *Healthy People 2000* (DHSS, 1990). Baranowski et al. (1987) stated that the most valid activity measure is direct observation. Baranowski et al. (1987) also found that that there is virtual absence of appropriate aerobic activity among children--which contradicts the common perception that children are very active. Children were found to be active, but only for short durations, rather than longer durations--which are needed for a training or aerobic effect (Baranowski et al., 1987).

Adult Fitness and Activity

In Chapter One there was a detailed rationale of the importance of childhood and adult fitness and activity. For adults, prevention of several diseases was found in most literature to be the primary health benefit. For children, high activity levels can lead to active adult lifestyles which are associated with lowered risk for various diseases during adulthood. To briefly restate, there is substantial evidence to support several health benefits from active, adult lifestyles (CIAR, 1994). Sedentary habits increase the risk of morbidity and mortality from a number of chronic diseases with the strongest evidence for a direct causal link with coronary artery disease, hypertension, colon cancer, functional capability, obesity, and non-insulin-dependent diabetes mellitus (CIAR, 1994). Physically active lifestyles can also increase longevity (CIAR, 1994).

In addition to the well-documented health benefits of adult fitness and activity, active lifestyles are also important from a public health perspective. CIAR (1994) stated that 3 to 5 percent of deaths could be prevented by active lifestyles, and this would be a significant public health achievement. Hahn, Teutsch, Rothenberg, and Marks (1990) found in their research that approximately 250,000 deaths in the United States from nine chronic diseases were a result of sedentary habits.

The following section provides a brief summary of selected research that describes the status of adult fitness/activity. It is beyond the scope of this project to provide an extensive review of the several hundred articles about adult fitness, however, a brief overview will be presented because adults (parents) are included as part of this study about pre-adolescent children's fitness.

At the workshop on Physical Activity and Public Health (cited in The FITNESSGRAM Technical Reference Manual, CIAR, 1994) American adults were recommended to accumulate 30 minutes or more of moderate physical activity on most days. However, findings from this workshop stated that most adult Americans do not presently meet this criteria. The NCYFS II (Ross & Pate, 1987) surveyed 4,678 children under the age of 10 and their parents finding that fewer than 30 percent of mothers and fathers participate in moderate-to-vigorous exercise three days per week. This same study also found

that nearly 50 percent of parents said they never engage in vigorous exercise. This is alarming because home and community exert powerful influences in all phases of a young child's life including physical activity patterns (Ross & Pate, 1987). In another study by Perusse et al. (1989) only 20 percent of adults exercised with the recommended intensity for cardiovascular benefits; only 40 percent were active at a moderate level, and about 40 percent were completely sedentary.

Ross et al. (1987) stated that due to the public health goals that have been set for exercise participation by adults, it is important to estimate activity levels among adults from a public health perspective. There is need to discover if the public health goals are being realized. The researchers point out that some efforts have been made to determine percentages of adults who are participating in MVPA and the results have been varied due to different assessment methods. It was estimated that 7.8 percent of adults participated in MVPA for at least 20 minutes three times per week. In other research, Simons-Morton et al. (1987) described estimates of adults who participated regularly in MVPA to range from 7.6 percent to 21.0 percent with more strict definitions of aerobic physical activity, to 60 percent participating in regular MVPA with a less strict definition. Stephens (1987) also supported the finding that adult activity levels have been difficult to determine due to varied measurement techniques and definitions of

activity. The researcher cited activity ranges from 15 percent of adults participating in MVPA to 78 percent, and concluded that despite the several problems and variations in most research on adult fitness, it is possible to conclude that there has been a definite increase in leisure-time physical activity among American adults. Other conclusions made by Stephens, Jacobs, and White (1985) included: 1) physically active lifestyles were positively related to income levels, education and occupation, and 2) it was suspected that approximately 20 percent of the population exercises at an appropriate level for cardiovascular benefits--40 percent are active at lower levels--and 40 percent are completely sedentary.

Social Learning Theory

Social Learning Theory (SLT) is briefly explained in this section and shown to be relevant to the problem of children's fitness. This theory forms the basis for the hypotheses that relate children's activity and fitness to parental activity.

Studies about children's health have described intervention methods that were family based due to the application of SLT, and these studies are reviewed in this section. Other research, which is reviewed later, demonstrates the relevance of SLT to this thesis because these studies examined parental influence on children's fitness (similar to the purpose of this thesis). These studies used SLT as a theoretical basis.

Social Learning Theory relates to the common belief among health educators that what people do about their health is more important than what they know about health. SLT focuses on health behavior instead of health knowledge (Parcel & Baranowski, 1981).

Social Learning Theory postulates that the environment can reinforce or reward certain behaviors and behaviors that are reinforced are likely to be repeated (Parcel & Baranowski, 1981). In addition, SLT postulates that children who observe their parents' participating in, or talking about physical activity can influence the children toward learning to value and enjoy physical activity and as a result to become more active (Bandura, 1977).

In SLT, behavior can be changed directly by reinforcing a particular behavior with a reward or praise, and behavior can be changed vicariously by observing others engaged in and reinforced for appropriate behavior (social modeling; Bandura, 1977). This observation provides knowledge of what to do as well as a concrete model of how to do it, and this enhances the learner's behavioral capability which is needed for behavior change (Parcel & Baranowski, 1981).

The effects of parental modeling of exercise and reinforcement of children's exercise are two variables to be studied in this thesis. These variables were chosen as relevant to children's fitness because of their role in the learning of

health behaviors as described in SLT. Rosenstock, Strecher, and Becker (1988) stated that SLT can explain changes in health-related behaviors based on the influence of reinforcement and observational learning through modeling the behavior of others.

Social Learning Theory was the theoretical foundation for The San Diego Family Health Project (Nader, Sallis, Rupp, Atkins, Patterson, & Abramson, 1986). The rationale for this project stated that the family is a basic social unit and, in accordance with SLT, it is largely through family influences that children can gain attitudes, knowledge, and early health behaviors. Results from the San Diego Family Health Project demonstrated that the family did have substantial impact on health habits of children. The San Diego Family Health Project supported the hypothesis that SLT is relevant to children's fitness. Techniques derived from SLT such as modeling and reinforcement have been used in effective behavioral interventions to promote healthful habits, such as exercise.

As stated in the rationale and theoretical background for The San Diego Family Health Project (Nader et al., 1989) in accordance with SLT, the family provides the primary social learning environment for a child, and parental health behavior and reinforcements can influence the health practices in children. The family can provide many opportunities for behavioral influence and social support for health behavior which has been well documented (Nader et al.,

1989). One primary base of social support is referent power. A person with referent power is someone whose signs of approval and acceptance are rewarding, and this person is able to create changes in a person's attitudes and decisions (Janis, 1983). A parent is someone who could have referent power over a child. Examining parental influence over children's fitness, through variables such as reinforcement and modeling from SLT, constitute the purpose of this thesis.

In addition to the San Diego Family Health Project (Nader et al., 1989), SLT has been the basis for other research that has examined family-based interventions to promote changes in health behaviors. Parcel, Simons-Morton, O'Hara, Baranowski, Kolbe, and Bee (1987) designed the Go For Health Project which was developed to reduce cardiovascular disease risk factors in elementary school children. This program utilized SLT principles of modeling, self-monitoring, and reinforcement in promoting behavior changes in diet and exercise.

The Heart Healthy Program (Coates, Jeffery, & Slinkard, 1981) was a health education program for elementary school students which used SLT techniques to facilitate health behavior changes in school and at home. SLT strategies that were found to be essential for success of the program were behavioral commitment, feedback, reinforcements, and family involvement. Family

modeling of desired health behaviors and reinforcements/incentives for appropriate health behaviors facilitated behavioral changes (Coates, Jeffery, & Slinkard, 1981).

In other research, variables suggested by SLT (Bandura, 1977) such as self-efficacy (the belief that one is capable of change), activity attitudes, knowledge and self-control, along with suggested interventions including feedback, reinforcement, and support from the social environment have influenced exercise adherence among children and adults (Dubbart, 1992). In a study to develop social support measurement scales (Sallis et al., 1987), social support behaviors were described as important determinants in the success of changing health habits. Diet and exercise-related social support behaviors were found to strongly influence actual diet and exercise habits (Sallis et al., 1987).

Epstein, Valoski, Wing, and McCurley (1994) reported the 10-year outcomes of behavioral family-based treatments for obese children. The findings from this research indicated that long-term changes in obese children's eating and physical activity habits depended strongly on family support. Variables reflecting family influences/support were found over the 10-year follow-up to be significantly related to exercise and diet behavior changes in 4 treatment studies. The results of these studies (Epstein et al., 1994) provided

support for family-based behavioral treatment of childhood obesity and demonstrated the importance of the family as an influential social environment.

In summary, the studies reviewed in this section have developed interventions, or have examined children's health using SLT principles. It is clear from the research that SLT is relevant to the issue of children's fitness and can help provide a theoretical basis for developing effective treatments and interventions for improving children's overall health.

Parental Influence on Children's Fitness/Activity

Social Learning Theory has been described as a relevant basis and rationale for the study of parental influences on children's fitness and activity levels. This thesis is based on SLT, because as previously described, social modeling and support/reinforcement from the child's environment (parents) can influence children's learning of a health behavior. Due to the fact that few studies have been conducted to examine the determinants of children's physical activity habits (Perusse et al., 1989; Pate, Dowda, & Ross, 1990) only a few related studies will be reviewed that have analyzed the effect of family influences on children's exercise behaviors and fitness levels. Sallis et al. (1992) has recommended that mechanisms of parental influence such as modeling, reinforcement and prompts need to be investigated. The present thesis

responds to this need. As previously mentioned, the majority of these studies to be reviewed have been based on Social Learning Theory.

There have been studies that have found associations between parental influences and children's activity patterns and fitness levels. The knowledge presented by this research will be described in the following section.

Moore, Lombardi, White, Campbell, Oliveria, and Ellison (1991) examined the influence of parents' physical activity levels on activity levels of one hundred four to seven year old children. They found that the parents who are more physically active were more likely to have children who were physically active. Specifically, if both parents were active, children were five to eight times more likely to be active as compared to children with two inactive parents. Mechanisms of parental influence that were found to be significant were the parents' modeling behavior, sharing of activities by the family, support and encouragement by active parents of their child's participation in physical activity, and genetic factors that predispose the child to higher levels of physical activity (Moore et al., 1991).

In a study of 1,610 subjects (Perusse et al., 1989), evidence was also found that genetic factors could be involved in a person's intrinsic drive to be physically active. The researchers found that children's physical activity levels were influenced by a significant genetic effect. Genetic transmission accounts

for higher levels of observed habitual physical activity. Cultural transmission was found to influence activity levels as well. Cultural transmission of exercise participation indicated that children can obtain certain customs and behavior toward exercise from their parents.

Pate, Dowda, and Ross (1990) found a significant association between parental vigorous activity and children's fitness. This finding suggests that more active parents encourage--directly or as models--higher levels of physical activity in their children. In addition, these children develop higher levels of fitness (Pate, Dowda, & Ross, 1990).

Another study by Sallis, Patterson, Buono, Atkins, and Nader (1988) found that physical activity habits among 95 Anglo families and 111 Mexican-American families were moderately correlated among family members. Family influences were found to be important determinants of physical activity in children, with more influence found within the Mexican-American families (Sallis et al., 1988).

The NCYFS II (Ross et al., 1987) found a strong correlation between the exercise habits of parents and those of their children. The researchers stated that how often parents exercise with their children may communicate how much the parents value exercise. This communicated value could contribute to the child's current activity levels and long-term adherence to exercise. In the NCYFS II, 58.1 percent of mothers and 61.7 percent of fathers reported that

they do not exercise at all with their child during a typical week. On average, based on the 4,435 parents surveyed, parents exercise less than once per week with their children. In terms of fitness levels, body composition (degree of body fat) was taken as one of two fitness variables in The NCYFS II (Ross & Pate, 1987). Children's fitness levels were found to be highly correlated with children's activity levels, and parental physical activity was found to be associated with the children's body composition. The researchers also reported that the children who had less body fat had parents who were more active and who exercised more frequently with them.

Studies by Taggart, Taggart, and Siedentop (1986) and Epstein, Valoski, Wing, and McCurley (1994) both concluded that health behavior change in children can be successful if the parents are involved in treatments and interventions. Taggart, Taggart, and Siedentop (1986) found that family contracting, parent training, and parent praise/participation was effective in increasing the physical activity levels of low health fitness children. Epstein et al. (1994) reported 10-year treatment outcomes for obese children, and the evidence demonstrated the importance of family support for activity changes in these children.

In a study that compared the compliance rates in two exercise programs for children, one program was found to be more successful due to parent support

and involvement (Rowland, 1986). Bar-Or, Lombardo, and Rowland (1988) also found that parents were a key influence in motivating a child to exercise.

Meaningful parental support through 1) modeling healthy behavior, 2) encouraging children's activity by attending games or giving verbal support, and 3) participation in physical activity with their children was crucial to the development of a child's attitude toward exercise and lifelong activity patterns. In addition, Morgan (1986) stated that family involvement and parental role-modeling is important in the development of children's exercise habits because these habits are created and reinforced within the family environment.

Another study with a sample size of only thirty preschool children found a positive correlation between parental encouragement to be active and observed children's motor activity (Klesges, Malott, Boschee, & Weber, 1986). However, in addition to a very small sample, this study seems limited because the children's activity levels were observed once for one hour using the FATS (Fargo Activity Timesampling Survey) system.

In a study by Butcher (1983), 661 girls in grades 6 to 10 were surveyed to determine variables that influence participation in physical activity. Parental influence and significant other's encouragement was found to be one of five variables that was most related to participation in physical activity (Butcher, 1985). In a study by Lewko and Ewing (1980), 370 children were given a

questionnaire to determine the influence of mothers and fathers on sport participation of males and females. They found that both males and females needed support and encouragement from parents to be highly involved in sports, but females needed this influence more. Highly active girls were found to have received more influence and encouragement from their families than highly active boys, and mothers and sisters were found to provide more influence to the girls than to the boys (Lewko & Ewing, 1980).

A few other small studies have evaluated the effects of parental influences on children's physical activity. Research that utilized the FATS observational instrument to assess children's physical activity and related parent behavior, provided additional knowledge regarding parental determinants for children's exercise (Klesges et al., 1984). The researchers found that parental modeling of physical activity and encouragement/discouragement for their children's activity correlated with their child's activity level. A causal relationship was noted from parent to child, because a change in the child's behavior (122 children were observed) was brought about by a parental encouragement to be active, 82 percent of the time. This research is limited, however, due to small sample size, restricted ages, socioeconomic status and ethnic backgrounds of the children (Klesges et al, 1984).

In other research, Godin and Shepard (1984) examined perceived social norms toward exercise in 698 children in grades 7 to 9. The researchers found that learning a health habit results from psychological and social factors, and among the various external influences on behavior, the perception of "significant others" was the most potent influence. In terms of physical activity, the involvement of children was found to be related to parental encouragement with adolescents being additionally influenced by perceived standards of peers, teachers and the media. The only gender difference was that girls did not believe as strongly as the boys that their parents would like them to exercise. In addition, the more active children perceived parents and friends as having more positive beliefs about exercise than did the sedentary children (Godin & Shepard, 1984).

In a similar study, (Godin, Shephard, & Calentionio, 1986) subjects of both sexes in grades seven to nine along with other parents were given a questionnaire to assess their perceptions of their parent's physical activity along with their personal activity levels. In this study, no significant association was found between the children's activity habits and their perceptions of parental activity levels. This was explained due to the decrease in parental influence within this age group, low motivation to comply with parental expectations,

increase in rebelling against authority, and the rising influence of teachers, peers, and figures in the media (Godin & Shephard, 1986).

Godin and Shephard (1984) summarized their findings by stating that it would be incorrect to imply that parents, friends (mainly during adolescence), and teachers are completely responsible for children's exercise behavior. This study, along with the other research which was previously discussed, has only examined correlations between parental influences, children's fitness and physical activity. More research is needed to examine causal relationships among these variables.

Assessment Techniques

Several methods of measuring physical activity were found among published research studies. These varied assessment techniques fall into four main categories: questionnaires, observation, activity monitors, and biochemical analysis (Ward & Evans, 1994). Questionnaires, which are typically used in large-scale studies, consist of four general types: short term diary (less than 24 hours), one to seven day recalls, history of the past one to five years, or a general survey with no time frame. The use of questionnaires with the child population is limited, and there are few valid reports using physical activity surveys for children under twelve (Saris, 1986). Ross et al. (1987) found that children's responses were not as reliable as a parent recall of children's activity, and Saris

(1986) also stated that children below the age of 12 can only give limited information about their activity habits.

This thesis used a questionnaire from a widely recognized national study on children's fitness which was shown to be valid by Pate, Dowda, and Ross (1990). This questionnaire was administered to parents to assess parental physical activity and to obtain parental report of their children's activity levels. Parental estimates of children's activity is more accurate than obtaining this information from the young children (Saris, 1986; Ross et al., 1987). In this thesis, parents were also given an additional survey to assess their physical activity habits. This survey was chosen due to its brevity, and its reliability and validity found by Godin and Shephard (1985).

Children in this project were also given a short questionnaire due to the low cost, ease in administration for large groups, and low time requirement needed for questionnaires. This survey measured perceived social support by parents for the child's exercise and included SLT variables of parental encouragement/involvement and rewards/punishments. This questionnaire also included a question regarding the children's perceptions of parental exercise habits. The validity and reliability of the children's survey along with the parents survey is thoroughly explained in chapter three of this thesis.

Other techniques typically used in children's physical activity assessment include observation, monitors, and biochemical analysis. These methods were not chosen for this thesis due to high cost and large time requirements. Observations of children's activity patterns can be performed in a child's natural setting or through a videotape (Ward & Evans, 1994). The San Diego Family Health Project (Patterson et al., 1988) observed children's physical activity habits during a trip to The San Diego Zoo. Three measures were taken when observing physical activity and these included: total distance traveled in the zoo during the one hour observation, percentage of intervals physically active, and use of escalators (Patterson et al., 1988).

In another study, physical activity was assessed using a highly reliable and valid method which was also used (in addition to observation) in The San Diego Family Health Project. This method is the seven-day Physical Activity Recall (PAR; Sallis, Patterson, Buono, Atkins, & Nader, 1986). This assessment technique (PAR) was found to be reliable and valid among many studies. Due to the need for interviewing and the time requirement needed for this technique, it was not used in this thesis.

A common observational technique is the Fargo Activity Timesampling Survey (FATS) observational instrument (Klesges et al., 1984). Significant reliability and validity has been noted in the FATS instrument. Briefly, the

FATS instrument uses interval time sampling to record activity. Children and parents are observed for ten seconds and then both are observed for the following ten seconds. Observations are recorded for: children's behaviors, activity, and responses, along with parents' interactions (encouragement or discouragement).

Another observational method noted in the research is the Children's Activity Rating Scale (CARS; Freedson, 1989). This instrument, used for young children, has a five-point scale to classify the intensity of physical activities using direct measures of oxygen consumption. The five levels range from stationary with no movement to translocation with very fast/strenuous movement (Freedson, 1989). This technique could be used to validate the use of motion sensors and long-term heart rate monitoring (Ward & Evans, 1994).

Monitors are another common way to assess physical activity in children, and they had been validated in many studies reviewed by Ward and Evans (1994). Two types are common including: motion sensors and heart rate monitors (Ward & Evans, 1994). The Large Scale Integrated Moving Counter (LSI) is a common frequently used monitor that is worn on the hip to assess motion changes. This device is used to measure total quantity of movement (Freedson, 1989).

An accelerometer is sometimes used to measure frequency of movement and to measure intensity (Ward & Evans, 1994). The accelerometer reflects intensity of activity more so than does the LSI, and has been validated among preschoolers over the age of 2.6 years (Freedson, 1989).

In a study to determine the relationship between activity levels of parents and those of their young children, the accelerometer was used to monitor physical activity of one hundred, four to seven year old children, and 99 of their mothers, and 92 of their fathers (Moore, Lombardi, White, Campbell, Oliveria, & Ellison, 1991). The use of an electronic motion sensor was chosen for the potential advantage it would have over self reports that could be biased by similar response biases within families (Moore et al., 1991). This study, *The Framingham Children's Study*, stated that the accelerometer is highly valid with a significant, positive correlation between the accelerometer counts and measures of oxygen consumption. The subjects in this study, children aged four to seven years and their parents, wore the accelerometer for two periods of five consecutive days about six months apart (Moore et al., 1991). This method would have been too costly and time consuming for the purpose of this thesis.

Ward and Evans (1994) stated that heart rate monitoring has also been used to measure physical activity. Heart rate is useful because it is related to oxygen

consumption and actual heart rates can be recorded using small equipment (Saris, 1986).

Biochemical analysis is a final method for assessing physical activity. The Doubly Labeled Water Technique is the most promising field measure for children (Saris, 1986). This technique measures energy expenditure using water that has been labeled with stable isotopes. The subject drinks this water and then several days later provides a urine sample from which energy turnover can be calculated. This method is highly accurate, but extremely expensive (Ward & Evans, 1994).

For the assessment of children's physical fitness the most reliable and valid fitness test available was chosen for this thesis. The Prudential FITNESSGRAM Health Related Fitness Test is a criterion-referenced test which measures five areas of health-related fitness including cardiorespiratory endurance, low-back/hamstring flexibility, body composition (body fat), muscular strength, and muscular endurance. Extensive validity and reliability of the test items have been reported (CIAR, 1994).

Other fitness tests that are currently available include: Physical Best, The President's Challenge, The Amateur Athletic Union Test (AAU), and Fit Youth Today (CIAR, 1994). These tests have been developed by various organizations including The American Alliance for Health, Physical Education, Recreation,

and Dance (AAHPERD) and The President's Council on Physical Fitness and Sports (CIAR, 1994). A detailed explanation of the use of FITNESSGRAM in this thesis and specific reliability and validity information is included in chapter three.

Chapter Three

Methodology

Sample

The sample used in this thesis was a convenience sample of one hundred fifty, fifth grade students from The Hilton Central Village Elementary School and their parents. This sample is limited to white middle class male and female students from Hilton, New York. This sample of children aged 9 to 10 years was chosen due to research that has shown parental influence over children's exercise behavior to be strongest in children under 10 years of age (Ross, Pate, Caspersen, Damberg, & Svilar, 1987). It was found that adolescents were not significantly influenced by their parents for exercise behavior (Godin, Shephard, & Colantonio, 1986; Ross & Gilbert, 1985).

Instruments

The parent and child questionnaires (see Appendices A and B, respectively) used in this study were a combination of four distinct instruments, and they measured the following four variables: student perception of parents' exercise, student perception of family support for exercise, parents' exercise behavior, and parent perception of student exercise behavior.

Student Perception of Parents' Exercise. Within the students' survey, a question regarding perceptions of their parents exercise behavior was included.

This question was included in an instrument developed by Godin and was described further in Godin, Shepard, and Colantonio (1986). Two-week test-retest reliability was described as .85 (Godin, Shepard, & Colantonio, 1986). This question was given a five point scale rating from +2 to -2. Students were to agree or disagree in regards to how much they believe their mother/father does vigorous physical activity.

Student Perception of Family Support for Exercise. The Family Support for Exercise Habits Scale (Sallis, Grossman, Pinski, Patterson, & Nader, 1987) was also in the student questionnaire. The Family Support for Exercise Scale is a questionnaire with 12 questions concerning the participation and involvement of family in exercise (Factor 1) and 3 questions regarding rewards and punishment for exercise (Factor 2). Each question rates the frequency of the item with a 5-point scale ranging from 1 (never) to 5 (very often) (Sallis et al., 1987). Specifically for the Family Support for Exercise Scale, the coefficient alpha score for internal consistency was .91 for Factor 1: Family Participation and Involvement. Alpha for Factor 2: Rewards and Punishment was found to be .61. The factors in the scales had test-retest reliabilities ranging from .55 to .86 and internal consistencies were high, alpha = .61 to .91. Specific test-retest reliability for the factor of Family Participation and Involvement (factor 1) was .77. For the factor of Rewards and Punishments (Factor 2) test-retest reliability

was .55. The scales developed, including the Exercise Habits Scale, also demonstrated criterion--related and construct validity (Sallis et al., 1987). Concurrent criterion-related validity was assessed by correlating the social support factor scores with reports of vigorous exercise habits. Both factors included in the Family Support for Exercise Scale were significantly correlated with self-reports of vigorous exercise (Sallis et al., 1987).

The questions from this instrument, along with the question from Godin, Shephard, and Colantonio (1986) were expected to provide data regarding the hypotheses of parental influence. The questions included in the children's survey were chosen because they reflected SLT variables of family support that were hypothesized to be correlated with the children's fitness levels.

Parents' Exercise Behavior. Within the adult survey is the third instrument used in this study. The Leisure Time Exercise Questionnaire is a simple two-question survey developed by Godin and Shephard (1985). These authors stated that this survey was derived because most existing activity questionnaires are lengthy and difficult to use. The first question asks participants to record frequency of strenuous "heart beats rapidly," moderate "not exhausting," and mild exercise "minimal effort" during a typical seven-day period. The second question asks how often the participant engages in any activity during a seven-day period that produces a sweat (Godin & Shephard,

1985). The reliability and concurrent validity of this 2-question instrument is extensively described in Godin and Shephard (1985), and summarized in the following paragraph.

For concurrent validity, a group of 306 self-selected healthy adult volunteers completed the questionnaire and were given a fitness test to measure skinfold thickness and predicted percentage of body fat. Another fitness test was given to measure maximum oxygen intake ($\text{VO}_2 \text{ max}$). Based on the fitness scores, the participants were divided into a *fit* or *unfit* group, and *thin* or *fat* group.

Discriminant function analyses indicate that the questionnaire items were able to discriminate the majority of *fit* from *unfit*, and the *thin* from *fat*. $\text{VO}_2 \text{ max}$ scores were significantly correlated with reported strenuous exercise ($r=.38$), and body fat percentile was correlated with reported sweat-inducing exercise ($r = -.21$). In terms of reliability, the test-retest coefficients ranged from .46 to .94 for all test items (Godin & Shephard, 1985).

Parent Perceptions of Student Exercise Behavior. The fourth instrument that was used in this study was the parent survey administered in The National Children and Youth Fitness Study (Ross & Pate, 1987). This instrument consists of eight questions which assessed exercise type and frequency. Parents were asked to assess activity levels of their children, and to describe the frequency of their own exercise behavior. The questions regarding

parental assessment of children's activity (1-4) were used in this study to determine children's activity levels because the age of the children is the same for this thesis and reliable reports of children's activity levels using parent recall vs. children's self-report were found in The NCYFS II (Ross et al., 1987). In addition, parents were asked how many days in a week they exercise with their child for 20 minutes or more. This question provided additional analysis for the family participation and involvement variable. This entire questionnaire was added to the parent survey that also included the two-question Godin and Shephard (1985) instrument.

In the NCYFS II (Ross, Delpy, Christenson, Gold, & Damberg, 1987), the parent survey was adjusted for increased reliability based on pilot testing. Parents were determined by the panelists of the study to be persons from whom accurate reports of a child's physical activity habits could be collected. The young children in the study could not recall with sufficient reliability their activity habits, and as a result, the student survey initially included was dropped from the NCYFS II (Ross et al., 1987).

Predictive validity has been determined for the parent survey from the NCYFS II by Pate, Dowda, and Ross (1989). Their study found significant correlations between measures of children's physical fitness and the physical activity variables within the parent survey used in the NCYFS II. Especially

significant was the global rating (Question I on the parent survey) of the children's activity level by the parent. This item correlated with both fitness measures used (the 1.6 km run/walk, and the sum of skinfolds) with a coefficient of $r = .17$ and $r = .33$ respectively (Pate et al., 1987). The parent survey in this thesis assessed adult and children's exercise behaviors. These data were applied in the analysis of the hypotheses regarding parent and children's exercise behaviors.

Procedure

Permission was obtained from Hilton Central School to conduct this study (see Appendix C). A letter of informed consent was sent home to parents along with a student consent form and the parent survey. The students who brought these materials back to their physical education teacher could participate in this study (see Appendix A). According to Portney and Watkins (1993) a return rate of 60- 80% is needed for correlational analyses and a 61% return rate was attained with the return of 92 parent surveys and consent forms. Within the letter, and during physical education class, parents and students were informed of the purpose of this study and the variables that were measured. Variables included were: parental exercise behavior in terms of frequency, intensity and duration of actual exercise, children's perceptions of parental exercise, and children's fitness levels in the health-related area of cardiovascular endurance.

Additional variables that were measured include: parents' perception of children's activity levels, reinforcement for exercise by the family, and participation and/or involvement in exercise by the family (children's perceived social support).

The consent forms and parent survey were mailed during late January, 1996. Upon return of the consent forms, the children's survey was administered to children with parent permission during physical education class. Questions on this survey addressed the variables of children's perceptions of parental exercise, and family support for exercise. The fitness test was given during physical education class and was administered by two trained physical education teachers (including the investigator) to reduce errors. Children's survey questions were read to the classes to allow for optimum understanding and to further reduce errors in the study.

Fitness

To measure the variable of student fitness, the PACER test score from the FITNESSGRAM health-related fitness test was used. The PACER test component measures cardiorespiratory fitness (CIAR, 1994). The score from this test was used as the indicator for the student's general fitness level.

In a 1990 study, timed endurance run test scores that measured cardiorespiratory endurance were used as a general measure of children's fitness

(Pate et al., 1990). Children's distance run scores were used as the variable for fitness when relationships were examined between children's fitness levels and reported activity levels. Pate et al, (1990) stated that cardiorespiratory endurance is a commonly accepted measure for fitness.

The FITNESSGRAM PACER test contains high content validity (CIAR, 1994). The concurrent validity of the PACER test was established by correlating VO_2 attained at the completion of the test with VO_2 scores from a treadmill test. Validity coefficients have ranged from .54 to .85 in tests done with children and adolescents. Among adults, validity ranges were from .83 to .93 (CIAR, 1994).

In terms of reliability, the PACER test has been found in several studies to be highly reliable with coefficients above .84 with no significant mean differences from test to test (CIAR, 1994).

The following is a brief description of how the PACER test was administered (CIAR, 1994). An area of 20 meters in length was marked in the gymnasium. The PACER cassette tape was used which included background music, instructions to students, and timed beeps. The students selected a partner, and one partner lined up behind the start line, and the other partner was the counter. When the tape instructed the students to begin, they had to run across the area and touch the wall by the time the beep sounded. At the sound of the next beep they turned around and ran back across to the other end.

If the students made it across before the beep, they would continue in this manner until they could no longer reach the line before the beep. If students did not reach the line before the beep two times, then they had to stop the test. The counters had to count how many laps their partners were able to complete and record the score on a scoresheet provided by the teacher. The students were given a practice test during the previous physical education class to become familiar with the timing of the beeps and to practice counting laps and recording scores.

Statistical Analysis

Sample characteristics will be described using frequency analyses, cross tabulations, and measures of central tendency (mean, modes median) and dispersion (standard deviation). Each of the six hypotheses will be evaluated using zero-order correlation coefficients.

Pilot Test

A pilot test for the student and parent surveys was administered to six adults and five children aged eight to eleven. As a result, some changes in the surveys were made. The parent survey was adjusted to ensure that all mother responses were first (letter a), and all father responses were second (letter b). Also, in the directions for the parent survey, it was suggested that a statement explaining that only one parent needed to answer questions one to five. For the children's

survey, one question was rewritten to enhance understanding, and the word vigorous was identified as a term that needed to be explained when the survey was administered.

Chapter Four

Results

Sample

A total of 92 parent surveys were returned. A total of 92 student surveys were completed during a physical education class period. Only the students that returned their parent's survey were asked to complete the student survey. Fifty of the 92 (54%) students were male and 42 (46%) were female.

Frequency Analyses - Parent Survey

Table 1 contains the response frequencies for the item measuring parent perception of children's physical activity level. The number in parentheses following each item refers to the item number on the parent survey (Appendix A).

Table 1. Frequency Analysis of Parent Report of Children's Activity Level

Compared to other children of the same age/sex is your child: (#1)		
Response	<u>N</u>	%
A lot more physically active than most?	23	25.0
A little more physically active than most?	16	17.4
Average - Same as most?	14	15.2
A little less physically active than most?	30	32.6
A lot less physically active than most?	9	9.8

The data from Table 1 indicate that the greatest proportion of parents (32.6%) rated their children as a little less physically active than most children of the same age/sex. Only 9.8% of parents viewed their children as having low levels of physical activity, and an encouraging 25% of parents perceived their children as being a lot more physically active than children of the same age/sex. There appears to be a bimodal distribution with most parents perceiving their child to be a lot more active or a little less active.

Table 2 contains the response frequencies for the two items which measured parent report of children's television viewing habits.

Table 2. Frequency Analysis of Parent Report of Children's Television-watching Habits.

How much television does your child usually watch on a typical school day? (#2).

Response (hours)	<u>N</u>	%
none at all	2	2.2
1 or less	14	15.2
2	55	59.8
3	9	9.8
4	5	5.4
5	7	7.6
6	0	0

Table 2 (continued)

How much television does your child usually watch on the typical weekend day? (#3)

Response (hours)	<u>N</u>	%
none at all	1	1.1
1 or less	4	4.3
2	17	18.5
3	21	22.8
4	28	30.4
5	12	13.0
6	9	9.8

The data from Table 2 indicate that most children (59.8%) watched television for 2 hours on a typical school day, and most children (30.4%) watched television for 4 hours on each weekend day. The mean number of hours for a school day was 2.40 (SD = 1.25). The mean number of hours watching television on a weekend day was 3.60 (SD = 1.40).

Table 3 contains the response frequencies for the items from the National Children and Youth Fitness Study II Survey (Ross, Delpy, Christenson, Gold, & Dambert, 1987) that measure parent activity.

**Table 3. Frequency Analyses of Parent Report
of Parent Exercise (NCYFS II Ross et al., 1987)**

In a typical week, on how many days do you get exercise that causes rapid breathing and a fast heart beat for 30 continuous minutes or more?

(Mother response, #6a) (Father response, #6b)

Response (day/week)	<u>N</u>	%
Mother		
0	33	35.9
1	9	9.8
2	14	15.2
3	17	18.5
4	2	2.2
5	11	12.0
7	3	3.3
No Response	3	3.3
Father		
0	27	29.3
1	9	9.8
2	14	15.2
3	14	15.2
4	1	1.1
5	3	3.3
6	2	2.2
7	4	4.3
No Response	18	19.6

Table 3 (continued)

Compared to other adults of the same age and sex, how physically active are you? (Mother response #7a) (Father response #7b)

Response	<u>N</u>	%
Mother		
A lot more	11	12.0
A little more	25	27.2
Average	25	27.2
A little less	16	17.4
A lot less	13	14.1
Missing score	9	2.2
Father		
A lot more	18	19.6
A little more	16	17.4
Average	24	26.1
A little less	9	9.8
A lot less	7	7.6
Missing Score	18	19.6

From the data presented in Table 3 it appears that the majority of parents did not engage in strenuous exercise at all (0 times per week reported) during a typical week (35.9% of mothers and 29.3% of fathers). Exercising strenuously 3 times per week was the second most common response for both mothers and fathers (18.5% of mothers and 15.2% of fathers). The average (mean) number

of days per week for vigorous exercise was 1.93 days for mothers (\underline{SD} = 1.96), and the average was 1.87 days per week for fathers (\underline{SD} = 2.00).

In addition, the modal response for mothers was average and a little more, whereas the response for fathers was average when asked to report how active they perceived themselves to be in comparison to their peers. These two questions (#6 a, b and #7 a, b) regarding parent physical activity were joined into a composite to be used in the correlational analyses in order to improve the reliability of measurement. A reliability assessment was conducted to determine internal consistency using Cronbach's alpha. The coefficient alpha for this composite of parent physical activity was .10. The mean score for this composite was 10.89 (\underline{SD} = 4.15). Because of the low internal consistency of this composite, the individual items were included in subsequent analyses.

Table 4 contains the response frequencies for the item measuring days per week that parents exercise with their child/children.

**Table 4. Frequency Analyses of Parent Report
of Parent and Child Exercise**

In a typical week, on how many days do you exercise with your child for 20 minutes or more? (Mother response, #8a) (Father response, #8b)

Response		<u>N</u>	%
Mother	0	48	52.2
	1	20	21.7
	2	11	12.0
	3	8	8.7
	4	1	1.1
	5	1	1.1
	7	1	1.1
	No Response	2	2.2
Father	0	39	42.4
	1	12	13.0
	2	10	10.9
	3	8	8.7
	4	6	6.5
	5	1	1.1
	7	1	1.1
	No Response	15	16.3

Table 4 data indicate that most mothers exercised with their child 0 times per week (52.2%) and the modal response for fathers was also 0 times per week (42.4%). The average number of days per week for mothers was 0.91 (SD = 1.30), and the average for fathers was 1.12 (SD = 1.56).

Table 5 contains the response frequencies for the items from the Leisure Time Exercise Questionnaire (Godin & Shephard, 1985) that measure parent report of parent physical activity.

Table 5. Frequency Analyses of Parent Exercise Behaviors

(Godin & Shephard, 1985).

Considering a seven-day period, how many times on the average do you do strenuous exercise for more than 15 minutes during your free time.

(Mother response #9a) (Father response #9b)

Response		<u>N</u>	%
Mother	0	48	52.2
	1	13	14.1
	2	4	4.3
	3	7	7.6
	4	7	7.6
	5	7	7.6
	7	3	3.3
No Response		3	3.3

Table 5 (continued)

Father	0	38	41.3
	1	14	15.2
	2	4	4.3
	3	10	10.9
	4	3	3.3
	5	2	2.2
	7	6	6.5
	No response	15	16.3

Considering a 7-day period, how many times on average, do you do moderate exercise for more than 15 minutes during your free time.

(Mother response, #10a) (Father response, #10b)

Response		<u>N</u>	%
Mother	0	26	28.3
	1	13	14.1
	2	17	18.5
	3	12	13.0
	4	10	10.9
	5	9	9.8
	6	2	2.2
	No Response	3	3.3

Table 5 (continued)

Father			
	0	25	27.2
	1	14	15.2
	2	12	13.0
	3	10	10.9
	4	6	6.5
	5	5	5.4
	6	3	3.3
	7	2	2.2
	No response	15	16.3

Considering a 7-day period, how many times on average do you do mild exercise for more than 15 minutes during your free time.

(Mother response, #11a) (Father response, #11b)

Response		<u>N</u>	<u>%</u>
Mother	0	13	14.1
	1	23	25.0
	2	9	9.8
	3	13	14.1
	4	6	6.5
	5	14	15.2
	7	11	12.0
	No Response	3	3.3

Table 5 (continued)

Father	0	9	9.8
	1	13	14.1
	2	8	8.7
	3	19	20.7
	4	5	5.4
	5	10	10.9
	6	2	2.2
	7	11	12.0
	No response	15	16.3

Considering a 7-day period during your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly).

(Mother response, #12a) (Father response, #12b)

Response	<u>N</u>	%
Mother		
Often	19	20.7
Sometimes	38	41.3
Never/Rarely	33	35.9
No response	2	2.2
Father		
Often	21	22.8
Sometimes	33	35.9
Never/Rarely	21	22.8
No response	17	18.5

According to Table 5 the modal response of mothers and fathers for

participating in strenuous exercise was 0 times per week (52.2% and 41.3%,

respectively). The average response was very similar for mothers and fathers-- with mothers participating in strenuous exercise on average of 1.4 times per week ($SD = 1.98$), and the average for fathers was 1.5 times per week ($SD = 2.10$).

In terms of moderate exercise, the modal response again for both mothers and fathers was 0 times per week (28.3% and 27.2%, respectively). The average response for mothers participating in moderate exercise was 2.02 times per week ($SD = 1.79$). Fathers were found to participate in moderate exercise 1.93 times per week ($SD = 1.96$).

For mild exercise, the modal response was different for mothers and fathers. The majority of mothers were found to participate in mild exercise one time per week (25.0%) and most fathers (20.7%) participate three times per week. The mean response for mothers was 2.82 ($SD = 2.27$), and the mean response for fathers was 3.18 times per week ($SD = 2.23$). A post hoc paired t test revealed that this was not a statistically significant difference ($d = -0.22$, $SD = 1.84$, $t = -1.01$, $df = 73$, $p = 0.315$).

In terms of how often parents feel that they participate in vigorous exercise, the most common response for mothers and fathers was sometimes.

These 4 questions (#9a, b - #12 a, b) were combined into a composite of parent activity which was used in the correlational analyses. A reliability

assessment was conducted to determine internal consistency using Cronbach's alpha. The coefficient alpha for this composite of parent physical activity was .77. The mean for this composite was 16.90 ($SD = 9.04$).

Frequency Analyses - Children's Survey

Table 6 contains the response frequencies for the 12 questions which were included in the composite measuring children's report of parental involvement/support for children's exercise. (Appendix B)

Table 6 **Frequency Analyses of Questions Measuring
Children's Report of Parental Involvement/Support.**

How often have your parent(s) or guardian(s) done or said the following?:

Question	Never		Almost Never		Sometimes		Often		Very Often	
	N	%	N	%	N	%	N	%	N	%
1. Exercise with me.	23	25.0	16	17.4	30	32.6	9	9.8	14	15.2
2. Give me encouragement.	27	29.7	13	14.3	21	23.1	11	12.1	19	20.9
3. Changed their schedule.	35	38.0	21	22.8	19	20.7	12	13.0	4	4.3
4. Offered to exercise.	22	23.9	15	16.3	30	32.6	11	12.0	14	15.2
5. Gave reminders.	19	20.7	18	19.6	20	21.7	20	21.7	15	16.3
6. Planned for exercise.	20	21.7	20	21.7	16	17.4	20	21.7	16	17.4
7. Discussed exercise	28	30.4	18	19.6	18	19.6	13	14.1	15	16.3
8. Talked about liking.	29	31.5	29	31.5	15	16.3	13	14.1	6	6.5
9. Planned around my exercise.	20	21.7	25	27.2	17	18.5	15	16.3	15	16.3
10. Asked me for ideas.	44	47.8	22	23.9	10	10.9	10	10.9	6	6.5
11. Took over chores.	55	59.8	19	20.7	10	10.9	6	6.5	2	2.2
12. Made positive comments.	15	16.3	17	18.5	25	27.2	11	12.0	24	26.1

This table demonstrates that for most questions regarding parent involvement and support, the modal response was never or almost never. This indicates that most of the children surveyed perceived low levels of parental involvement/support.

Table 7 contains the response frequencies for the 3 questions included in the composite measuring parental rewards/reinforcement.

Table 7 **Frequency Analyses of Questions Measuring
Children's Report of Parent Rewards.**

Question	Never		Almost Never		Sometimes		Often		Very Often	
	N	%	N	%	N	%	N	%	N	%
13. Got angry	88	95.7	2	2.2	1	1.1	0	0	1	1.1
14. Criticized me	85	92.4	4	4.3	1	1.1	1	1.1	1	1.1
15. Rewards for exercise	40	43.5	16	17.4	22	23.9	6	6.5	8	8.7

Table 7 data indicate that most children surveyed did not get punished, criticized, or receive rewards for participating in physical activity. Less than half indicated that they have received any rewards for exercising from their parents.

Table 8 contains the response frequencies for the questions measuring children's perceptions of parental exercise behavior.

Table 8. Frequency Analyses of the Questions Measuring Children's Perceptions of Parental Exercise.

I think that my mother does vigorous physical activity during her free time

(#16a)

Response	<u>N</u>	%
Strongly Disagree	15	16.3
Disagree	7	7.6
Somewhat Agree	28	30.4
Agree	20	21.7
Strongly Agree	21	22.8
No Response	1	1.1

I think that my father does vigorous physical activity during his free time (#16b)

Response	<u>N</u>	%
Strongly Disagree	15	16.3
Disagree	2	6.5
Somewhat Agree	22	23.9
Agree	17	18.5
Strongly Agree	29	31.5
No Response	3	3.3

Data from Table 8 indicate that the modal response regarding children's perceptions of mother's vigorous exercise participation was somewhat agree (30.4%). The modal response for perception of father's vigorous exercise

participation was strongly agree (31.5%). It appears that fathers were perceived as more physically active than mothers ($\bar{X} = 79.00$, $df = 16$, $p < .0001$).

However, statistical analyses must be interpreted with caution due to a large number of cells with an expected frequency below 5.

Children's Survey Composites

Two composites were made from the children's survey. The first composite was comprised of questions 1-12 which measured parental involvement and support (Sallis, 1984). Internal consistency was assessed using the coefficient alpha ($\alpha = .88$). The range of scores was 46.0 with a minimum of 12.0 and maximum of 58.0. (12 = low parental involvement/support, 58 = high parental involvement/support) The mean score was 31.10 ($SD = 10.49$).

The second composite was comprised of questions 13-15 which measured parental rewards (Sallis, 1992). Questions 13 and 14 were recoded so that higher scores indicated more rewards and less discouragement of exercise. The coefficient alpha for this composite was .28. This may be a function of a small number of items, however, this composite must be interpreted with caution based on this low level of internal consistency. The range for scores on this composite was 9.0 with a minimum of 3.0 (low parental rewards) and a maximum of 12.0 (high parental rewards). The mean score was 4.42 ($SD = 1.67$).

PACER Analysis

The range of scores for the PACER test was 57.0 laps. The minimum score was 5.0 laps and the maximum score was 62.0 laps. The average (mean) score was 22.60 ($SD = 11.91$). The modal score was 10.0 laps.

The Healthy Fitness Zone for the PACER test is 7-35 laps for girls aged ten years, and for ten-year old boys the zone is 17-55 laps (CIAR, 1994). The Healthy Fitness Zone for boys or girls was achieved or exceeded by 99 % of the sample.

Correlation Analyses

Hypothesis 1 stated that there would be a statistically significant, positive correlation between parental exercise behavior and fitness scores of their children. Due to the low alpha coefficients for each composite, the PACER scores (children's fitness variable) were correlated with each individual question measuring parent self-report of physical activity, along with each composite of parent physical activity. Pearson correlation analyses were conducted and are shown in Table 9. Included are separate columns for boys/girls to illustrate gender differences. These relationships are discussed in the post hoc analyses section at the end of this chapter.

**Table 9. Correlation Between PACER and
Parent Report of Parent Exercise.**

Question/ Composite	PACER Total	Boy	Girl
6a Mother strenuous exercise	.13	.02	.43**
6b Father Strenuous exercise	.30**	.20	.58***
7a Mother - how active?	.07	.12	.15
7b Father - how active?	-.09	-.25	.09
9a Mother strenuous exercise	.12	.10	-.06
9b Father strenuous exercise	.31**	.26*	.44**
10a Mother moderate exercise	-.04	-.04	-.13
10b Father moderate exercise	.23	.22	.33*
11a Mother mild exercise	-.17*	-.35**	-.01
11b Father mild exercise	-.02	-.07	-.01
12a How often? Mother	.03	.04	-.03
12b How often? Father	-.23*	-.28*	-.36*
PARACT	.09	-.03	.13
PARACTNC	.13	.00	.26*

Note: Questions 6a-7b and 9a-12b are from The Parent Survey (see Appendix A)

PARACT = composite of Questions 9a-12b from The Leisure Time Exercise
Questionnaire.

PARACTNC = composite of Questions 6a-7b from the NCYFS.

* = $p < .05$

** = $p < .01$

*** = $p < .001$

As shown in Table 9 the correlations that were statistically significant were between father's report of physical activity and children's fitness. Specifically, father reports of strenuous exercise had the highest significant correlation (Question 6b, $p=.005$ and Question 9b, $p=.003$). Of mother's exercise, only mild exercise was related to the total sample PACER score, however in the opposite direction. Also, as expected, father's report of sweat producing activity was significantly related to children's fitness. The composites showed no significant correlations between parent exercise and children's fitness.

Hypotheses 2 stated that there would be a statistically significant, positive correlation between children's perceptions of parental exercise and children's fitness scores (PACER). Pearson correlation analyses were conducted between Questions 16a and 16b from the children's survey (which measured children's perceptions of parental exercise) and the PACER scores. The correlation coefficient between children's perceptions of their mother's participation in exercise (#16a) and their own fitness (PACER score) was .14 ($p = .09$) which was not statistically significant. The correlation between children's perception of their father's exercise behavior (#16b) and the children's fitness level (PACER score) was statistically significant with a correlation coefficient of .31 ($p = .001$). Children's gender differences are discussed in the post hoc analyses.

Hypotheses 3 stated that there would be a statistically significant, positive correlation between parental involvement and fitness scores of their children. Parental involvement was measured with Question 8a and 8b from the parent survey (Appendix A) and with the parent involvement composite which included Questions 1-12 on the children's survey. Pearson correlation analyses were conducted between questions 8a, 8b, the parent involvement/support composite, and the PACER scores. These correlations are shown in Table 10.

Table 10 **Correlation Matrix of Parent Involvement
and Children's Fitness (PACER).**

Question/Composite	PACER	Boy	Girl
	TOTAL		
8a	.03	-.08	.16
8b	.27**	.12	.51***
Involve	.02	-.10	.29*

Note: Question 8a = Mother and child exercise together

Question 8b = Father and child exercise together

Involve = Composite of questions 1-12 on the children's survey

* = $p < .05$

** = $p < .01$

*** = $p < .001$

According to Table 10, there is not a significant correlation between parent involvement and children's fitness. However, when father's involvement (question 8b) was correlated with children's fitness (PACER) there was a significant correlation ($r = .27$) for this small sample ($N = 92$). This indicated that father's exercising with their children is associated with their children's fitness levels.

Hypothesis 4 stated that there would be a statistically significant, positive correlation between parental rewards and fitness scores of the children. A Pearson correlation analysis was run between the children's PACER scores and the parental Reward composite (questions 13-15 on the children's survey). The correlation coefficient between children's fitness (PACER) and parental rewards was $-.03$ ($p = .38$). This finding represented a correlation which is not statistically significant and the hypothesis is not supported. Gender differences between boys and girls will be discussed in the post hoc analyses.

Hypothesis 5 stated that there would be a statistically significant, positive correlation between children's activity levels and their fitness scores. Questions 1-3 on the parent survey measured parent report of children's activity levels. Pearson correlation analyses were conducted between questions 1-3 and PACER score (children's fitness variable). Table 11 shows the correlation coefficients that were found.

Table 11 **Correlation Matrix of Children's Activity Levels and Children's Fitness.**

<u>Question</u>	<u>PACER</u>
1	-.25**
2	-.004
3	.13

Note: Question 1 = Parent rating of child's overall activity level

Question 2 = Children's television viewing - weekday

Question 3 = Children's television viewing - weekend

* $p = < .05$ ** $p = < .01$ *** $p = < .001$

There was a significant correlation between parental report of the child's activity level and the child's PACER score. This finding supported the hypothesis that children's activity levels would be correlated with their fitness level. Television viewing was not associated with the child's fitness level (PACER score) in this sample .

Hypothesis 6 in this study stated that there would be a statistically significant, positive correlation between children's perceptions of parental exercise (questions 16a and b from the children's survey) and actual self-reported parental exercise. Parental exercise was measured with questions 6a-7b, and questions 9a-12b on the parent survey. These questions were also

combined into two composites. Due to low alpha coefficients, Pearson correlations were conducted between children's perceptions of parental exercise and each measure of parental self-report of exercise, in addition to the composites. Table 12 shows the correlation coefficients for hypothesis 6.

Table 12 **Correlation Matrix of Children's Perceptions of Parent Exercise and Parent Self-Report of Exercise.**

Parent Exercise Question/Composite	Children's Perceptions	
	16a Mother	16b Father
6a Mother strenuous exercise	.32***	-
6b Father Strenuous exercise	-	.29**
7a Mother - how active?	-.27**	-
7b Father - how active?	-	-.30**
9a Mother strenuous exercise	.43***	-
9b Father strenuous exercise	-	.40***
10a Mother moderate exercise	.43***	-
10b Father moderate exercise	-	.38***
11a Mother mild exercise	.27**	-
11b Father mild exercise	-	.07
12a How often? Mother	-.40***	-
12b How often? Father	-	-.58***
PARACTNC	.06	-.14
PARACT	.34***	.24*

.Note: A = mother responses, B = father responses
 PARACTNC = composite of #6a-7b from NCYFS II
 PARACT = composite of #9a-12b from Leisure Time Exercise Questionnaire

The data from Table 12 indicated that hypothesis six was supported. There appeared to be a correlation between children's perceptions of parent exercise and actual self-report of parental exercise. Most individual questions had statistically significant correlations for this small sample size and the more reliable composite of parent exercise was significantly correlated with children's perception. Overall, the data demonstrated that the children surveyed had accurate perceptions of how active their parents really were, or thought they were. This finding supported hypothesis 2 which examined the association between children's perceptions of parental exercise and the children's fitness scores. The correlations in Table 12 indicated that children's perceptions were accurate which supported the validity of these measures and findings based on them (e.g., hypotheses 2).

Post Hoc Analyses

The findings from this study indicate an absence of a strong relationship between parental influences and children's fitness. The only significant relationships found were for paternal exercise behavior and paternal involvement with children's fitness.

In light of these findings, the question was raised about whether or not these relationships were different for boys and girls. Perhaps combining the genders of the children obscured existing relationships. Chi-squared and t-tests were

performed to evaluate gender differences on variables relevant to the hypotheses (e.g., Rewards, PACER). In order to determine if the hypothesized relationships were obscured by collapsing across gender, correlational analyses were computed separately for boys and girls. These gender differences are discussed in the following section.

The chi-square analysis indicated that there was no significant difference between boys/girls activity levels as reported by their parents ($\chi^2 = 6.09$, $df = 4$, $p = .19$). The t -tests also reveal a lack of gender difference for other variables. For the composite of parent involvement there was no difference between the involvement/support of parents for boys and for girls ($t = 0.71$, $df = 90$, $p = .48$). Questions 8a and 8b from the parent survey which also measured parent involvement (days per week that mother/father exercise with their child) had no difference between involvement of the parent and the gender of the child ($t = -0.87$, $df = 88$, $p = .39$; $t = -1.10$, $df = 75$, $p = .28$, respectively).

A t -test was also computed to analyze differences among gender in television viewing. Television viewing on a school day ($t = -0.07$, $df = 90$, $p = .94$) indicated no difference between boys and girls. Weekend television viewing ($t = -1.10$, $df = 90$, $p = .27$) also indicated no difference between boys and girls.

The PACER test was analyzed and it was found that there was a significant difference between boys and girls fitness scores ($t = -3.76$, $df = 90$, $p < .001$),

such that boys had higher scores (mean = 26.80, $SD = 12.80$) than girls (mean = 18.07, $SD = 8.62$). The variable of parent rewards was found to have no significant difference between boys and girls ($t = -1.62$, $df = 90$, $p = .11$). Parents appeared to offer as many rewards to boys as they do to girls.

Correlational analyses were computed separately for boys and girls to determine if the hypothesized relationships were obscured by collapsing across gender.

Hypotheses 1 examined the relationship between parental exercise and children's fitness. In the previous analyses there were no significant associations found except between father's exercise and children's fitness. The post hoc analysis indicated a significant relationship between father's exercise behavior and their daughters' fitness (see Table 9).

Hypothesis 2 examined the relationship between children's perceptions of their parent's exercise behavior and the children's PACER scores. Post hoc analyses found a significant relationship between girls' perceptions of their father's exercise and the girls' fitness ($r = .35$, $p = .01$).

Hypothesis 3 indicated a possible relationship between parental involvement and children's fitness. Overall, there was not a significant relationship found between parental involvement and children's fitness. However, paternal reports of exercising with their child was significantly related to children's fitness, and

the post hoc analysis found that girls' fitness was related to father's involvement, whereas this relationship was not significant for boys (see Table 10).

Hypothesis 4 indicated a possible relationship between parental rewards and children's fitness. In previous analysis, there was not a significant relationship found. In this analysis there was also no significant difference between rewards for boys' fitness ($r = .13$, $p = .18$) and parental rewards for girls' fitness ($r = .19$, $p = .12$).

The relationships indicated in hypothesis 5 and 6 do not need to be discussed in terms of children's gender differences for the purpose of this thesis.

Summary of Data

Several important statistics were found within the frequency analyses. Most parents reported low levels of children's activity and moderate to high levels of television viewing. In addition, low levels of parent exercise were also reported. Also interesting was that most children perceived low to average parent involvement/support for their exercise, and most parents reported that they do not exercise at all with their child. In terms of children's perceptions of parental exercise behavior, it was found that children perceived their fathers as being more physically active than their mothers. Finally, the PACER analysis indicated that most of the children were within The Healthy Fitness Zone (CIAR, 1990) and the boys had higher scores than the girls.

Overall, there was varied support found for each hypothesis, and important gender differences were discovered. There was no support found for a general relationship between parental activity levels and children's fitness, but there was a significant relationship found between father activity levels and children's fitness--especially daughters' fitness.

There were also non-significant correlations found for the hypothesized relationships between children's perceptions of parental exercise, parental involvement and children's fitness. However, for both relationships, significant correlations were found between fathers and children, and especially between fathers and daughters.

In terms of parental rewards and children's fitness, there was no significant relationship found. Significant correlations were found when analyzing the relationship between children's activity levels and children's fitness. The findings indicate that children's activity levels are significantly related to their fitness levels, as hypothesized. Significant correlations were also found between children's perceptions of parent activity levels and the actual self-report of the parents. The validity of these measurements was supported by these findings.

Chapter Five

Discussion

Introduction

The findings of this study have added to the limited knowledge regarding determinants of exercise and fitness in children, as discussed in Chapter Two-- Review of the Literature. There have been few studies that have researched the determinants of children's physical activity habits. The prevalence of low activity levels among children in the United States has led to an increased interest in this issue, and the results of this study can be used to further understand the determinants of children's activity and fitness. As the findings of this study indicate, activity levels are related to fitness levels. It appears that what influences children to exercise also influences their fitness, and as discussed in Chapter One, exercise and high fitness can lead to significant health benefits starting in childhood, and extending into adulthood. The findings of this study help to answer the question: "To what extent do parents influence their children's fitness?" A discussion will follow on how these findings relate to SLT and to the findings of previous empirical studies regarding determinants of children's activity and fitness.

Implications

According to Social Learning Theory, observing parents participate in physical activity can influence children to be more active (Bandura, 1977). The results of this study support this aspect of SLT because, as mentioned previously, there was a significant correlation between the children's fitness (especially females) and perceived/actual activity levels of their fathers. In addition, SLT states that behaviors can be changed through rewards or praise. This aspect of the theory was not supported by the findings of this study. There was not a significant correlation found between parental rewards and children's fitness.

Support and involvement was another variable examined in this study which has important implications for SLT. According to SLT, support/involvement from the social environment (parents) can influence behavior (Bandura, 1977). The findings of this study indicate the importance of parental involvement on children's exercise behavior and resulting fitness. A significant correlation was found between paternal involvement and children's fitness--particularly among female children. A similar result was found in a study by Sallis et al. (1987) where diet and exercise-related social support was strongly correlated with actual diet and exercise habits.

The findings of this study were found to be similar to other empirical studies, in addition to providing new insights into children's fitness. Moorè et al. (1991) found a correlation between activity levels of parents and activity levels of their children. This study found a significant correlation between fathers' activity levels and fitness levels of their children (the most significant correlation being female children).

Pate et al. (1990) and Ross and Pate (1987) found that children's fitness and activity levels were correlated with parent activity and parent involvement with the child during exercise. The findings of this thesis indicated that only the activity and involvement of fathers was significantly related to children's fitness. Similar to a study by Ross et al. (1987) most parents in this thesis sample exercise with their child less than once per week, and most participate in low levels of physical activity.

In a study examining gender differences among parents and children, female children were found to be influenced more than males for physical activity, and females received more influence from mothers (Lewko & Ewing, 1980). This thesis also found significant correlations between parental factors and girls' fitness, but the significant influences for girls came from fathers' activity and involvement.

In terms of children's perceptions of parent physical activity, this study found a significant correlation between children's (especially daughters') fitness and perceptions of fathers' exercise behavior. Godin and Shephard (1984) found no relationship between children's activity levels and perceived parental activity levels. That study did not examine fitness or gender differences, and the sample contained older children, which can possibly explain the lack of parental influence (Godin & Shephard, 1984).

The findings of this thesis provided support for the need for family-based health promotion interventions. Results from the reviewed empirical studies provide further evidence that the family is an important socializing factor regarding physical activity. Intervention programs need to be designed to utilize these family influences for the development and maintenance of physical activity habits and health-related fitness in children.

Recommendations

From the findings of this study, it appears imperative that fathers need to be involved when interventions are being designed. Female students especially need to be given primary consideration when teachers are planning family-based programs. In the practice of education, physical educators and health educators should team together with parents to provide programs for students with low levels of fitness. The findings from this study and related studies have been

previously described as similar in their support for family (especially paternal) influence on children's activity levels and fitness. Taggart, Taggart, and Siedentop (1986) also recommended that teachers, parents, and students need to work cooperatively, and physical education teachers should enlist support from parents to help alleviate student fitness problems. As the results of this thesis indicate, fathers need to be involved. Fathers should be encouraged by teachers to exercise with their children (especially daughters) and fathers need to be aware of how important it is to model exercise behavior, and be involved and support their children's exercise. Perhaps the fathers of daughters with low fitness levels should conference with physical education/health teachers and be educated about their important role in supporting and modeling exercise behaviors.

In addition to parent conferences or group meetings to raise awareness, intervention programs using Social Learning principles of reinforcement, parent modeling, and parent involvement could be designed by teachers and fathers to help improve student fitness and physical activity habits. Community recreation/fitness leaders should also become aware of the important influence family--fathers in particular--have on children's fitness. Their programs could become more family-orientated, emphasizing special father-daughter activities and programs.

In terms of recommendations for further research, there are several related areas that need further investigation. According to Sallis et al. (1992) more research is needed in general for determinants of children's physical activity and in the area of designing family-based interventions. New strategies involving families in programs are needed. These family-based interventions need to be low-cost, low-intensity, and should be integrated with community, school, and health-care based programs (Sallis et al., 1992). In addition, this thesis was one of very few studies that investigated gender differences among parents and children. More research seems indicated to determine any differences in parental influence across gender, and if boy's/girl's fitness and activity are affected differently. Socioeconomic status and racial variables should also be investigated. Parental influence may differ among lower or higher socioeconomic levels and among different races.

Summary/Limitations/Conclusions

The data from this study were collected by mailing questionnaires to 150 families. Parental self report, child self report, and objective PACER scores served as data. Ninety-two parent surveys were returned, and children's questionnaires were given to the fifth grade child of those parents. These 92 children were also given the PACER test.

There are several limitations to this study. The data collected from this study relied on self-reports which could have created a response bias. Also, the response rate was low, which could have caused a selection bias. The sample used was limited to a homogeneous group of white, suburban, middle class students and parents which could have affected external validity. Caution must be used when generalizing these findings to the general population of pre-adolescent children and their parents. Further, this study used correlational data and causal relationships cannot be inferred from the findings of this study.

The purpose of this study was to explore the associations between family factors such as parent involvement, rewards, and modeling of exercise behaviors, and their children's fitness. SLT has stated that these types of family factors can influence children's learning of health behaviors.

It was found that father's behavior was associated with children's fitness, with significant correlations found with female children. Fathers' modeling of exercise behavior, exercising with their daughters, and supporting daughter's exercise was found to be significantly correlated with girls' fitness scores. Girls' perceptions of their father's exercise behavior also appears to be associated with girls' fitness. Boys do not seem to be as similar as the girls to parent's exercise or involvement. There were few significant correlations found between boys' fitness and the parental variables. Mothers appear to have significantly less

association with children's fitness as compared to fathers. Only one significant correlation was found for mothers which was between mothers' report of mild exercise and children's fitness (including boys only). Finally, parental rewards for exercise did not appear to be associated with children's fitness either. No significant correlations were found to support this hypothesis.

The principal descriptive findings were generally discouraging. Most parents reported low levels of personal physical activity, rated their children as a little less active than most, and exercise on average less than once per week with their children. In addition, most children perceived low levels of parental involvement/support and rewards for their exercise behavior. Children generally perceived their parents somewhat active, and fathers are considered more active by their children as compared to mothers. An encouraging finding from this study in terms of descriptive statistics was that almost all students tested were within the healthy fitness zone (CIAR, 1994) when they completed the PACER test. Using the PACER score as a general indicator for health-related fitness, it appears that the children of this sample are on target for health-related fitness. With the encouragement of their families--especially fathers--these children will continue healthy habits such as exercise to grow into healthy adults.

REFERENCES

- Bandura, A. (1977). Social Learning Theory. Englewood Cliffs, N. J. : Prentice-Hall.
- Baronowski, T. , Hooks, P. , Tsong, Y. , Cieslik, C. , & Nader, P. R. (1987). Aerobic physical activity among third - sixth grade children. Journal of Developmental Behavioral Pediatrics, 8, 203 - 206.
- Bar-Or, O. , Lombardo, J. A. , & Rowland, T. W. (1988). Prepubertal exercise: How much, when? Patient Care, 59 - 70.
- Butcher, J. (1983). Socialization of adolescent girls into physical activity. Adolescence, 72, 753 - 765.
- Cooper Institute for Aerobics Research. (1994). The Prudential FITNESSGRAM Technical Reference Manual. Dallas, Texas: Author.
- Cooper Institute for Aerobics Research. (1994). The Prudential FITNESSGRAM Test Administration Manual. Dallas, Texas: Author.
- Coates, T. J. Jeffery, R. W. , & Slinkard, L. E. (1981). Heart healthy eating and exercise: Introducing and maintaining changes in health behaviors. American Journal of Public Health, 71, 15 - 22.
- Dishman, R. K. , Sallis, J. F. , & Orenstein, D. R. (1985). The determinants of physical activity and exercise. Public Health Reports, 100, 158 - 170.

Dubbert, P. M. (1992). Exercise in behavioral medicine. Journal of Consulting and Clinical Psychology, 60, 613 - 617.

Duncan, B. W. , Boyce, T. , Itami, R. , & Puffenberger, N. (1983). A controlled trial of a physical fitness program for fifth grade students. Journal of School Health, 53, 467 - 471.

Durant, R. H. , Lander, C. W. , & Mohoney, O. M. (1983). Relationship between habitual physical activity and serum lipoproteins in white male adolescents. Journal of Adolescent Health Care, 4, 235 - 239.

Epstein, L. H. , Valoski, A. , Wing, R. R. , & McClurey, J. (1994). Ten-year outcomes of behavioral family-based treatment for childhood obesity. Health Psychology, 13, 373 - 381.

Freedson, P. S. (1989). Field monitoring of physical activity in children. Pediatric Exercise Science, 1, 8 - 18.

Godin, G. , & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. Canadian Journal of Applied Sport Science, 10, 141 - 146.

Godin, G. , & Shephard, R. J. (1986). Psychosocial factors influencing intentions to exercise of young students from grades 7 to 9. Research Quarterly for Exercise and Sport, 57, 41 - 52.

Godin, G. , Shephard, R. J. , & Colantonio, A. (1986). Children's perception of parental exercise: Influence of sex and age. Perceptual and Motor Skills, 62, 511- 516.

Gortmaker, S. L. , Dietz, W. H. , & Cheung, W. Y. (1990). Inactivity, diet and the fattening of America. Journal of the American Dietetic Association, 90, 1247-1252.

Hahn, R. A. , Teutsch, S. M. , Rothenberg, R. B. , & Marks, J. S. (1990). Excess deaths from nine chronic diseases in The United States, 1986. Journal of The American Medical Association, 264, 2654 - 2659.

Haskell, W. L. , Montoye, H. J. , & Orenstein, D. (1985). Physical activity and exercise to achieve health-related physical fitness components. Public Health Reports, 100, 202 - 210.

Janis, I. L. (1983). The role of social support in adherence to stressful decisions. American Psychologist, 143 - 159.

Klesges, R. C. , Coates, T. J. , Moldenhauer-Klesges, L. M. , Holzer, B. , Oustavson, J. , & Barnes, J. (1984). The FATS: An observational system for assessing physical activity in children and associated parent behavior. Behavioral Assessment, 6, 333 - 345.

Klesges, R. C. , Malott, J. M. , Boschee, P. F. , & Weber, J. M. (1986). The effects of parental influences on children's food intake, physical activity, and relative weight. International Journal of Eating Disorders, 5, 335 - 346.

Leuko, J. H. , & Ewing, M. E. (1980). Sex differences and parental influence in sport involvement in children. Journal of Sport Psychology, 2, 62 - 68.

Morgan, J. (1986). Prevention of childhood obesity. Issues in Comprehensive Pediatric Nursing, 9, 33 - 38.

Moore, L. L. , Lombardi, D. A. , White, M. J. , Campbell, J. L. , Oliveria, S. A. , & Ellison, R. C. (1991). Influence of parent's physical activity levels on activity levels of young children. Journal of Pediatrics, 118, 215 - 219.

Nader, P. R. , Sallis, J. F. , Patterson, T. L. , Abramson, I. S. , Rupp, J. W. , Senn, K. L. , Atkins, C. J. , Roppe, B. E. , Morris, J. A. , Wallace, J. P. , & Vega, W. A. (1989). A family approach to cardiovascular risk reduction: Results from The San Diego Family Health Project. Health Education Quarterly, 16, 229 - 244.

Nader, P. R. , Sallis, J. F. , Rupp, J. , Atkins, C. , Patterson, T. , & Abramson, I. (1986). San Diego Family Health Project: Reaching families through the schools. Journal of School Health, 56, 227 - 231.

Parcel, G. S. , & Baranowski, T. (1981). Social learning theory and health education. Health Education, 6, 14 - 18.

Parcel, G. S. , Simons-Morton, B. G. , O'Hara, N. M. , Baranowski, T. , Kolbe, L. J. , & Bee, D. E. (1987). School promotion of healthful diet and exercise behavior: An integration of organizational change and social learning theory interventions. Journal of School Health, 57, 150 - 156.

Pate, R. R. , Dowda, M. , & Ross, J. G. (1990). Associations between physical activity and physical fitness in American children. American Journal of Diseases in Children, 144, 1123 - 1129.

Patterson, T. L. , Sallis, J. F. , Nader, P. R. , Rupp, J. W. , McKenzie, T. L. , Roppe, B. , & Bartok, P. W. (1988). Direct observation of physical activity and dietary behaviors in a structured environment: Effects of a family-based health promotion program. Journal of Behavioral Medicine, 11, 447 - 457.

Perusse, L. , Tremblay, A. , LeBlanc, C. , & Bouchard, C. (1989). Genetic and environmental influences on level of habitual physical activity and exercise participation. American Journal of Epidemiology, 129, 1012 - 1022.

Portney, L. G. , & Watkins, M. P. (1993). Foundations of clinical research: Applications to practice. East Norwalk, Connecticut: Appleton, & Lang.

- Raithel, K. S. (1988). Are American children really unfit? (part 1 of 2). The Physician and Sportsmedicine, 16, 146 - 153.
- Rosenstock, I. M. , Stecher, V. J. , & Becker, M. H. (1988). Social learning theory and the health belief model. Health Education Quarterly, 15, 175 - 183.
- Ross, J. G. , Delpy, L. A. , Christenson, G. M. , Gold, R. S. , & Damberg C. L. (1987). The national children and youth fitness study II: Study procedures and quality control. Journal of Physical Education, Recreation and Dance, 58, 57 - 62.
- Ross, J. G. , & Pate, R. R. (1987). The national children and youth fitness study II. A summary of findings. Journal of Physical Education Recreation and Dance, 58, 51 - 56.
- Ross, J. G. , Pate, R. R. Caspersen, C. J. , Damberg, C. L. , & Svilar, M. (1987). The national children and youth fitness study II: Home and community in children's exercise habits. Journal of Physical Education, Recreation and Dance, 58, 85 - 92.
- Rowland, T. W. (1986). Motivational factors in exercise training programs for children. The Physician and Sportsmedicine, 14, 122 - 128.
- Sallis, J. F. (1987). A commentary on children and fitness: A public health perspective. Research Quarterly for Exercise and Sport, 58, 326 - 329.

Sallis, J. F. , Grossman, R. M. , Pinski, R. B. , Patterson, T. L. , & Nader, P. R. (1987). The development of scales to measure social support for diet and exercise behaviors. Preventive Medicine, *16*, 825 - 836.

Sallis, J. F. , Patterson, T. L. , Buono, M. J. , Atkins, C. J. , & Nader, P. R. (1988). Aggregation of physical activity habits in Mexican-American and Anglo families. Journal of Behavioral Medicine, *11*, 31 - 41.

Sallis, J. F. , Simons-Morton, B. G. , Stone, E. J. , Corbin, C. B. , Epstein, L. H. , Faucette, N. , Iannotti, R. J. , Killen, J. D. , Klesges, R. C. , Petray, C. K. , Rowland, T. W. , & Taylor, W. C. (1992). Determinants of physical activity and interventions in youth. Medicine and Science in Sports and Exercise, *24*, 5248 - 5255.

Saris, W. H. M. (1986). Habitual physical activity in children: Methodology and findings in health and disease. Medicine and Science in Sports and Exercise, *3*, 253 - 263.

Simons-Morton, B. G. , O'Hara, N. M. , Simons-Morton, D. G. , & Parcel, G. S. (1987). Children and fitness: A public health perspective. Research Quarterly, *58*, 295 - 302.

Simons-Morton, B. G. , Parcel, G. S. , O'Hara, N. M. , Blair, S. N. , & Pate, R. R. (1988). Health-related physical fitness in childhood: Status and recommendations. Annual Review of Public Health, *9*, 403 - 425.

Stephens, T. (1987). Secular trends in adult physical activity: Exercise boom or bust? Research Quarterly for Exercise and Sport, 58, 94 - 105.

Stephens, T. , Jacobs, D. R. , & White, C. C. (1985). A descriptive epidemiology of leisure-time physical activity. Public Health Reports, 100, 147 - 157.

Taggart, A. C. , Taggart, J. , & Siedentop, D. (1986). Effects of a home-based activity program. Behavior Modification, 10, 487 - 507.

Thorland, W. G. , & Gilliam, T. B. (1981). Comparison of serum lipids between habitually high and low active pre-adolescents. Medicine and Science and Sports and Exercise, 13, 316 - 321.

United States Department of Health and Human Services. (1990). Healthy people 2000: National health promotion and disease prevention objectives. Washington, D. C. Author.

Ward, D. S. , & Evans, R. (1995). Physical activity, aerobic fitness, and obesity in children. Medicine and Exercise in Nutritional Health, 4, 3 - 16.

Appendix A

PARENT SURVEY

To assist in understanding the physical fitness of your child, we would appreciate your taking a few minutes to answer several questions about your child. You are not required to complete the survey, but doing so will provide more complete information.

Questions 1-5 can be answered by only one parent/guardian in household.

Questions 6-12 should be answered by both parents/guardians in household.

Answers will be kept strictly confidential.

Please answer on the corresponding line next to the question number.

1. _____ Compared to other children of the same age/sex, is your child:

- 1) A lot more physically active than most?
- 2) A little more physically active than most?
- 3) A little less physically active than most?
- 4) A lot less physically active than most?
- 5) Average--same as most?

2. _____ How much television does your child usually watch on the typical school day?

- | | |
|---------------------|----------------|
| 1) One hour or less | 5) Five hours |
| 2) Two hours | 6) Six hours |
| 3) Three hours | 7) None at all |
| 4) Four hours | |

3. _____ How much television does your child usually watch on the typical weekend day?

- | | |
|---------------------|----------------|
| 1) One hour or less | 5) Five hours |
| 2) Two hours | 6) Six hours |
| 3) Three hours | 7) None at all |
| 4) Four hours | |

4. In the **past 12 months** did your child get exercise or physical activity at least three times through any of the following organizations?

- | | |
|-------|---|
| _____ | 1) Public park or recreation center |
| _____ | 2) Church or other place of worship |
| _____ | 3) Sports teams or leagues |
| _____ | 4) YMCA, YWCA, or similar organization |
| _____ | 5) Health club, private spa, or private lessons |
| _____ | 6) Cub scouts, brownies or other scouts |
| _____ | 7) 4-H or other farm club |

(List all that apply)

Appendix A

5. What types of exercise or physical activity did your child receive through the places you noted in question 4?

1. _____ 2. _____

3. _____ 4. _____

5. _____

6. In the typical week, on how many days do you get exercise that causes rapid breathing and a fast heart beat for 30 continuous minutes or more? **List number of days per week for each parent. Put NA if child does not live with this parent.**

_____ Mother or female adult

_____ Father or male adult

7. Compared to other adults of the same age and sex, how physically active are you?

_____ **Mother or female adult answer below**

1. ___ A lot more physically active than most
2. ___ A little more physically active than most
3. ___ A little less physically active than most
4. ___ A lot less physically active than most
5. ___ Average--same as most
6. ___ NA

_____ **Father or male adult answer below**

1. ___ A lot more physically active than most
2. ___ A little more physically active than most
3. ___ A little less physically active than most
4. ___ A lot less physically active than most
5. ___ Average--same as most
6. ___ NA

8. In the typical week, on how many days do you exercise with your child for 20 minutes or more? **List number of days per week for each parent.**

_____ Mother or female adult

_____ Father or male adult

Appendix A

LEISURE TIME EXERCISE QUESTIONNAIRE (Godin & Shepherd, 1983)

Considering a seven-day period, how many times on the average, do you do the following kinds of exercise for more than 15 minutes during your free time?

9a. ___ times per week
Mother

9b. ___ times per week
Father

Strenuous Exercise

(heart beats rapidly) i.e. running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller/ice-skating, vigorous swimming/long-distance biking, etc.

10a. ___ times per week
Mother

10b. ___ times per week
Father

Moderate Exercise

(not exhausting) i.e. fast-walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing, etc.

11a. ___ times per week
Mother

11b. ___ times per week
Father

Mild Exercise

(minimal effort) i.e. yoga, archery, fishing, bowling, horseshoes, golf, snowmobiling, easy walking, etc.

12. Considering a seven-day period during your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

Mother ___ Father ___

(Place number of choice on line above)

1) Often 2) Sometimes 3) Never/rarely

APPENDIX A

STATEMENT OF CONSENT*(Parent for Student)*

Your son/daughter is being asked to make a decision whether or not to participate in a research project. The purpose of this research is to attempt to identify how parental support for children's fitness affects children's exercise habits. As a participant, your son/daughter will be asked to complete a survey that measures your son/daughter's perceived parental support for their own fitness habits and information about their own fitness habits. Your son/daughter's PACER test score will also be used in this study. The PACER test is a section of the Fitnessgram Health-Related Fitness Test that has been a regular part of your child's physical education program. Participation in this project will be strictly voluntary and confidential. Only the primary researcher (Mrs. Bellnier) will have access to the questionnaires and fitness test scores. Questionnaires will be kept in a sealed envelope and will be destroyed upon project completion. There will be absolutely no penalty of any kind if your son/daughter does not participate in this study.

If you wish to allow your son/daughter to participate and you agree with the statement below, please sign in the space provided. Remember, your son/daughter may change their mind at any time and withdraw from the study.

I, _____, having read the above, understand the information
Name of parent
 provided in this form and agree to allow my son/daughter, _____, to
Name of student
 participate as a subject in this project.

Signature of parent or guardian

Date

*(Please return completed form to Kim Bellnier, physical education instructor,
 on or before February 28, 1996)*

APPENDIX A

STATEMENT OF CONSENT*(Parent for Self)*

You are being asked to make a decision whether or not to participate in a research project. The purpose of this research is to attempt to identify how parental support for children's exercise affects children's exercise habits and fitness levels. As a participant, you will be asked to complete a survey that measures support for exercise habits and information about your own exercise habits. Participation in this project will be strictly voluntary and confidential. Only the primary researcher (Mrs. Bellnier) will have access to the questionnaires and fitness test scores. Questionnaires will be kept in a sealed envelope and will be destroyed upon project completion. There will be absolutely no penalty of any kind if you do not participate in this study.

If you wish to participate and you agree with the statement below, please sign in the space provided. Remember, you may change your mind at any time and withdraw from the study.

I, _____, having read the above, understand the information
Name
provided in this form, and agree to participate as a subject in this project.

Signature

Date

*(Please return completed form to Kim Bellnier, physical education instructor,
on or before February 28, 1996).*

Appendix B

CHILDREN'S SURVEY

Family Support For Exercise Habits Scale

(Sallis, Grossman, Pinski, Patterson, & Nader, 1987)

How often have your parent(s) or guardian(s) done or said the following:

Please put the number of your answer on the line to the left of the statement.

1) Never 2) Almost never 3) Sometimes 4) Often 5) Very often

- _____ 1. "Exercise with me!"
- _____ 2. Gave me encouragement to stick with my exercise program.
- _____ 3. Changed their schedule so we, or I, could exercise.
- _____ 4. Offered to exercise with me.
- _____ 5. Gave me helpful reminders to exercise.
- _____ 6. Planned for exercise on recreational outings.
- _____ 7. Discussed exercise with me.
- _____ 8. Talked about how much they like to exercise.
- _____ 9. Helped plan activities around my exercise.
- _____ 10. Asked me for ideas on how they can get more exercise.
- _____ 11. Took over chores so I had more time to exercise.
- _____ 12. Made positive comments about my physical appearance.
- _____ 13. Got angry at me for exercising.
- _____ 14. Criticized me or made fun of me for exercising.
- _____ 15. Gave me rewards for exercising.

Please put the number to your answer on the line to the left of the statement.

5) Strongly agree 4) Agree 3) Somewhat agree 2) Disagree 1) Strongly disagree

- _____ 16 a. I think that my mother (or female guardian) does vigorous physical activity during her free time.
- _____ 16 b. I think that my father (or male guardian) does vigorous physical activity during his free time.

Kim Bellnier


Appendix C

January 10, 1996

Dr. Judith H. Howard
Assistant Superintendent for Instruction
Hilton Central School District
100 West Avenue
Hilton, NY 14465

Dear Dr. Howard:

I am writing to request permission to conduct a research project in the Hilton Central School District. This project will serve as a thesis for my Master's Degree in Health Education. The purpose of this project is to identify how parental support for children's fitness affects children's fitness. This project will be carried out under the supervision of Dr. Douglas Scheidt who is an assistant professor in the Department of Health Science at SUNY Brockport.

To complete this project I will be administering a survey and scale to students in grade five, together with their parents. Students in the Village Elementary School will be asked to participate. Participation in this project will be strictly voluntary and anonymous. There will be no way to connect students and/or parents to their responses because they will not include their names on the survey. Parental consent will be gained actively through a letter which the parents must sign to give their own permission as well as permission for their son/daughter to participate. The survey will be administered during physical education classes. This survey may give insight to the fitness/activity status of elementary school age children and may provide information that could be used in developing school and community fitness programs, along with improved fitness education for parents and children.

I would like to use the students in the Hilton Central School District because I teach physical education classes at the Village School and have access to the student population and am familiar with them.

Upon completion of the thesis, I would be more than happy to share the findings of the research with you and members of the school board. A sample of the survey and the parental consent letter is enclosed for your perusal. I would appreciate a response from you as soon as possible and thank you for your time and consideration.

Sincerely,



Kim Bellnier

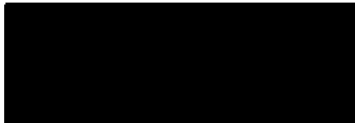
Enclosures

cc: Dr. Douglas Scheidt

HILTON
CENTRAL
SCHOOLS

Bellnier 103

January 18, 1996



Dear Kim,

I would like this letter to serve as an approval for your proposed research project. Your research protocol looks sound.

Best wishes as you work toward the completion of your master's degree.

Sincerely,

A handwritten signature in black ink, appearing to be 'Judith H. Howard', written over a horizontal line.

Judith H. Howard

JH:bg

State University of New York
College at Brockport
350 New Campus Drive
Brockport, New York 14420-2919

Appendix C

Grants Development Director

(716) 395-2523/5118

FAX: (716) 395-5602

Date February 2, 1996

To: Kim Bellnier

From: Colleen Donaldson for
Institutional Review Board

Re: **Project IRB #96-4**

Your proposal entitled ASSOCIATIONS BETWEEN FAMILY FACTORS AND PRE-ADOLESCENT CHILDREN'S FITNESS has been approved. Accordingly, you may proceed with the work as proposed and approved.

If this project continues beyond one year, federal guidelines require that the information below (items 1-6) will need to be provided to the IRB before the project can be approved for a second year. Please note also that if the project initially required a full meeting of the IRB (Category III proposal) for the first review, then continuation of the project after one year will again require full IRB review.

Information required by the IRB for continuation of the project past the first year includes the following:

1. number of subjects involved in year one
2. a description of any: adverse events or unanticipated problems involving risks to subjects or other, withdrawal of subjects from the research or complaints about the research during the previous year
3. a summary of any recent literature, findings, or new information about any risks associated with the research
4. a copy of the current informed consent document
5. a general summary of research findings from year one
6. reason why project needs to be continued into a second year.

Please contact Colleen Donaldson, Office of Academic Affairs, immediately if:

- the project changes substantially,
- a subject is injured,
- the level of risk changes.

A final report is due **May 31, 1996.**

TO: Institutional Review Board

Appendix C

FROM: Kim Bellnier

RE: Proposal Entitled: *Associations between Family Factors and Pre-adolescent Children's Fitness*

- 1) In this research project, confidential questionnaires will be administered to parents/guardians and fifth grade students at The Village Elementary School in Hilton, New York. Parents and students will answer questions regarding exercise habits. In addition, student scores from a fitness test measuring cardiorespiratory endurance (The PACER test from Fitnessgram) will be included in this study. This fitness test is administered to the students every year as a regular part of the physical education curriculum. A detailed description of the test administration for the Pacer test is attached.
- 2) The sample will consist of approximately 150 fifth grade students enrolled at the village elementary school in Hilton, New York, and their parents or guardians. It is anticipated that between 90 and 100 students will be included in the data analysis. Only students with completed parent surveys will be included.
- 3) This is a sample of convenience. Students will be selected as a result of their enrollment in the fifth grade.
- 4) Research assistants will not be used.
- 5) The primary researcher will incur the cost for photocopying the questionnaire.
- 6) The project will begin in February, 1996 and end in May, 1996.
- 7) The questionnaires, along with the procedures for the PACER test are attached. Also, the consent forms for the parent/guardian and the approval letter from the school district are included.
- 8) The questionnaires will be kept in an envelope at the primary researcher's house. Once the data is loaded onto disks, the questionnaires will be destroyed.

Appendix C

- 9) A consent form will be sent which will contain the basic elements of informed consent.
Statement made prior to questionnaire administration to the students:

This is a study of exercise behavior and possible family influences on your exercise habits and fitness. Your participation in this research project is entirely voluntary. You will not be penalized in any way for refusing to complete this questionnaire. If you agree to participate, I encourage you to answer all of the questions. However, if there is a question that you don't like for any reason, leave it blank. Please put your name on the top. Your answers will remain strictly confidential. Please be as honest as you can be when answering the questions. It is important that you write all your answer choices on the line to the left of each question. This questionnaire will take about 10 - 15 minutes to complete.

10. Letter of approval from The Hilton Central School District is attached.
11. The subjects will not come in contact with any mechanical, electrical or electronic equipment during their participation in the project.