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**DETERMINANTS OF DIET AND PHYSICAL ACTIVITY OF FIFTH-GRADE
CHILDREN**

**A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville**

**Carolyn H. Robinson
December, 1998**

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DEDICATION

This dissertation is dedicated to my husband,

Dr. Kevin Robinson,

for his love and understanding of me

and to my children,

Neal and Eileen Robinson,

for the joy they've brought to my life.

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I express my appreciation to my parents - James and Hazel Huff - for teaching me the inherent value of education for its own sake, and to my late Uncle John Huff who set me on a path of "learning for the fun of it."

I give much credit and appreciation to my husband, Dr. Kevin Robinson, who believes that any pursuit undertaken should be done to the best of one's ability, and who has made many sacrifices so that I could finish this Ph.D. degree. I am also

thankful to my children, Neal and Eileen Robinson, who have so greatly enriched my life, and have helped me to maintain my perspective on all that's important to me.

ABSTRACT

It is widely accepted that health is influenced by one's behavior and lifestyle. The development of health attitudes and behaviors begins at an early age. During childhood the individual develops self-perceptions, health beliefs, a sense of control over health, and health behaviors. Habits established in childhood are enduring, and a health-enhancing lifestyle acquired during childhood can influence later health behaviors.

In an effort to incorporate each client's individual differences into a systematic and comprehensive structure which examines the multiple determinants of health behaviors, the Interaction Model of Client Health Behavior (IMCHB) was developed by Cox (1982). The IMCHB refocuses nursing's attention away from traditional disease models toward a model of multidimensional health. It is based on a multidisciplinary perspective and was proposed as a prescriptive nursing framework. The framework emphasizes the process by which the singular position of the client (on many variables) is translated into health outcomes. The IMCHB incorporates an extensive set of variables that address psychological, sociological, and environmental determinants of health behavior, as well as short-term behavioral determinants that arise during the client-professional interaction.

The purpose of this study was to identify those variables that influence the school-age child's enactment of diet and physical activity. Specific objectives were: (1) to use the IMCHB as a conceptual guide in explaining the correlates of children's diet and physical activity, (2) to determine the relative and cumulative contributions

of socio-demographic variables, health experiences, family influence, intrinsic motivation, cognitive appraisal and affective response to children's diet and physical activity, and (3) to use the empirical base developed to propose nursing interventions that may potentially optimize the performance and retention of preventive diet and physical activity behaviors in school-age children.

The research question was: What elements of client singularity (uniqueness) are related to the diet and physical activity of the school-age child? Gender was the single most contributory background variable to health behavior in the only previous study of children based on the IMCHB. Therefore, a subsidiary question addressed was: What is the relationship of gender to diet and physical activity of the school-age child? A sample of fifth-graders ($N = 371$) and their parents ($N = 371$) participated in the study. There were 176 boys and 195 girls. Information on the family's demographics, health experience, social influence and environmental resources was collected. Data on the children's intrinsic motivation, cognitive appraisal, and affective response to food/physical activity were gathered. Finally, the children's self-reports on diet and physical activity were collected, as were parents' self-reports on health habits.

A descriptive correlational study was conducted on these 371 fifth-grade students and their parents to identify those variables that influence the child's enactment of diet and physical activity. Significant differences were observed between girls and boys on several major study variables. Girls scored higher (healthier) on food preferences and diet self-efficacy than did boys, but no difference was detected in their actual diet behavior. Girls also participated in more low-intensity physical

activity, but boys participated in more high-intensity physical activity than did girls. No statistically significant gender differences were observed on the child's perceived health status, feelings toward exercise, and/or physical activity self-efficacy.

Significant relationships were observed among most of the variables. Food preferences and diet self-efficacy explained the most variance in diet behavior for both girls and boys. A parent's self-rated health was significant in explaining the boy's participation in low-intensity physical activity; the lower a parent rated his/her health, the more likely that the boy participated in low-intensity physical activities. However, the boy's self-rated health status contributed the most to his high-intensity physical activity participation; boys who perceived themselves in better health were more likely to participate. For a girl, her feelings toward exercise and her parent's marital status were important in explaining her high-intensity physical activity participation; the more positive her feelings toward exercise, and if she lived in a single-parent home, the greater the likelihood of the girl's participation.

The findings of this study provide strong support for the use of the IMCHB to explain children's diet, but weak support for the explanation of children's physical activity. Regression analysis revealed that 46.2% of the variance in diet was explained. Although only 10.2% of the variance in physical activity was explained, this is comparable to the amount of explained variance found in many other children's exercise studies. Clearly, further study exploring additional factors predictive of exercise is indicated.

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CHAPTER ONE

INTRODUCTION

"The health of the people is really the foundation upon which all their happiness and all their powers depend." Disraeli, 1877.

There is increasing evidence that health is influenced by one's behavior and lifestyle (Pender, 1996). The development of health attitudes and behaviors begins at an early age (Williams, 1992). During childhood the individual develops self-perceptions, health beliefs, a sense of control over health, and health behaviors. Habits established in childhood are enduring, and a health-enhancing lifestyle acquired during childhood can influence later health behaviors (Allensworth, 1993; Baranowski & Simons-Morton, 1991; Singer, Moore, Garrahe, & Ellison, 1995).

Patterns of diet and physical activity affect physiologic risk factors for cardiovascular disease (Shea, Basch, & Irigoyen, 1991), which kills more Americans than any other disease (American Heart Association, 1991). An increasing emphasis has been placed on the development of positive health habits early in life, because physiological risk factors for cardiovascular disease (CVD) remain stable over time from childhood into adulthood (Kelder, Perry, Klepp, & Lytle, 1994; Thomas, Groer, & Droppelman, 1993). The development of physiological risk factors depends largely on the initiation of health-compromising behaviors such as poor diet and lack of physical activity, (Perry, Stone, & Parcel, 1990). The positive relationship between

poor dietary intake, lack of physical activity, and CVD for adults is well-known and documented (Neaton & Wentworth, 1992).

Results from a recent study corroborate evidence of early consolidation and stability of food preference and physical activity (Kelder et al., 1994). Beginning in sixth grade, seven annual waves of behavioral measurements were taken from students. In nearly all the follow-up periods, the students identified at baseline as measuring high remained high, and those measuring low remained low. The research suggests that interventions to promote a healthy lifestyle should begin prior to sixth grade, before behavioral patterns are resistant to change (Kelder et al., 1994; Perry, Klepp, & Sillers, 1989; Perry et al., 1990).

There is much evidence of stability of food choices from childhood into adulthood and of poor dietary choices among children. Investigations tracking risk factors for CVD have indicated that total, low-density, and high-density lipoprotein cholesterol measurements in childhood are predictive of adult values (American Health Foundation, 1989; Porkka, Viikari, & Akerblom, 1991). A high fat and cholesterol diet is a risk factor that has been identified in population-based studies of children (Resnicow, Orlandi, & Wynder, 1989).

The National Health and Nutrition Examination Study (NHANES II) is a major source of dietary data on children. The NHANES II researchers found that diets of children in the United States were high in fat and cholesterol content (Kimm, Gergen, Malloy, Dresserm & Carroll, 1990). Confirming those results, Thompson & Dennison

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(1994) found that more than 80% of children in the United States consume an excess of total fat, saturated fat, and cholesterol than is recommended.

Poor eating habits in childhood can lead to obesity, as well as high cholesterol levels (Harrell & Frauman, 1994). Recent reports confirm that obesity in school-aged children has increased significantly during the last 20 years (Gortmaker, Dietz, and Cheung, 1990). Indeed, it is estimated that 27% of school-age children (Haddock, Shadish, Klesges et al., 1994) and 15% of adolescents (U.S. Dept. of Health & Human Services, 1991) are overweight.

Disturbingly low levels of physical activity in children have also been documented (Pender, 1996). Recent reports have estimated that only 20% of children who exercise do so at energy levels that are beneficial to health (U.S. Dept. of Health and Human Services, 1991). Physical activity declines almost 50% during the childhood and adolescent years, with girls becoming increasingly more sedentary than boys (Rowland, 1990).

In summary, American children today are fatter, less fit, and more sedentary than their 1960s counterparts (Gabbard, 1993). They are also less healthy than their parents were at the same age (National Association of State Boards of Education, 1989). If current trends continue, children will maintain their diet and exercise behavior into adulthood. As noted before, a poor diet and inactivity are strongly correlated with heart disease. Therefore, it is imperative that we study children's health behaviors so that health-promoting interventions can be implemented for them.

Unfortunately, there is a paucity of research which explores children's health conceptions and their role in maintaining health. The majority of studies, especially the earlier investigations, examine illness perceptions (knowledge and understanding of diseases), rather than health perceptions (Bibace & Walsh, 1980; Brewster, 1982; Hergenrather & Rabinowitz, 1991; Lau & Klepper, 1988; Perrin & Gerrity, 1981; Redpath & Rogers, 1984). The few studies which explored children's health conceptions were conducted with preschoolers (Flaherty, 1986; Logsdon, 1991; Robinson, 1987). It has been postulated that variables which influence illness orientations also influence children's health conceptions, but support for this assumption is limited.

Scrutiny of extant research about children's health reveals that variables are seldom derived systematically from carefully constructed theoretical concepts (Farrand, 1991). Conceptual clarity would be strengthened by the linkage of children's health behavior research with broad conceptual frameworks. The use of well-defined health behavior models could help advance knowledge in the domain of children's diet and physical activity. The development and strengthening of explicit conceptual linkages in the models is also necessary to improve understanding of the phenomena, as is research to test the validity of the models.

More conceptual work and empirical research are needed to analyze and understand the relative amount of influence of variables which explain children's health behavior. For example, it is important to compare the strength of different types of

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influences on children's diet and physical activity. Are psychological variables typically stronger than social and/or environmental variables? How does the strength of variables vary by age, gender, and socioeconomic status (Tinsley, 1992)?

Behavioral research on children's diet and physical activity is at an early stage of development. The sparse literature represents a number of disciplines, including nutrition, health education, physical education, exercise physiology, pediatrics, psychology, and sociology. A nursing emphasis in the research on children's diet and physical activity is very limited. Only a few nursing studies (Farrand, 1991; Frauman, 1991) have directly addressed issues relevant to improving the health of all children. A major concern is that non-nursing models have been used to frame nursing research and practice (Cox, 1982). The non-nursing models, such as the Health Belief Model (HBM) and the Protection Motivation Theory (PMT), reflect the traditional disease-prevention approach and not contemporary health concerns. The HBM and the PMT are oriented to the avoidance of specific diseases rather than the behaviors of individuals directed toward health promotion. Indeed, after reviewing 10 years of study related to the model, Janz and Becker (1984) concluded that the HBM is applicable as a paradigm for health-protecting or disease-preventing behavior, but is clearly inappropriate as a model for health-promoting behavior. For nurses to make a contribution, a strong conceptual basis for testing, refining, and expanding knowledge development in health promotion is essential.

Theoretical Framework

The major research to date on the development of children's understanding of health and illness has been based on Piaget's (1969) theory of cognitive development (Farrand, 1991; Frauman, 1991). This cognitive-structural tradition focuses on age-related normative changes in children's knowledge and attitudes.

As Piagetian developmental stages would predict, the critical period of change in children's health attitudes and behaviors begins at approximately age 7-8. This period corresponds to the concrete operational stage, during which the child develops the reasoning and cognitive skills to make decisions about health behaviors. Concrete operational children (ages 7-11) begin to distinguish between the internal and the external world. They are less egocentric than younger children, and they begin to realize that disease is reversible--that a healthy person can become sick, and that a sick person can be cured. Likewise, they can begin to understand that disease is preventable (Lau & Klepper, 1988). Further, children 8 years and older typically have the cognitive capacity to rate their own health status (Eisen & Ware, 1980).

Recently, the Piagetian fixed-stage perspective to understanding children's cognitions of health and illness has been challenged (Hergenrather, & Rabinowitz, 1991; Tinsley, 1992). Much of the work derived from Piaget's model has been generated from clinical interviews, mostly with sick or hospitalized children. Little consideration has been given to healthy children and their health/illness perceptions. Unfortunately, the research has also been limited by the lack of attention to instrument

reliability and validity, and the development of standardized instruments that could be used comparatively across studies (Tinsley, 1992).

Eiser (1989) has suggested that other non-Piagetian models may be more appropriate for understanding children's health and illness concepts. In particular, she believes that Nelson's (1986) script theory and Carey's (1985) conceptual change theory are alternative models which help explain children's cognitions about health and illness. Nelson's theory proposes that children develop script-like sequential representations of everyday events such as eating breakfast. Children may mentally organize health events, such as going to the doctor, in such a manner and be able to order specific consequences that occur within these events (Eiser, 1989).

Carey's (1985) model of conceptual change suggests that although children's knowledge increases as they age, their understanding is not restricted to specific developmental cognitive structures. Children's concepts of health can be traced from preschoolers' explanations of human body functioning in terms of wants and beliefs to preadolescents' biological understanding of the importance of human body functioning for the maintenance of life (Eiser, 1989; Hergenrather & Rabinowitz, 1991).

Indeed it appears that children's understanding of health and illness concepts evolves in a systematic and predictable sequence, perhaps congruent with Piaget's theory of cognitive development. However, individual differences also exist in children's understanding of health (Tinsley, 1992), perhaps inconsistent with Piaget's fixed-stage perspective.

Interaction Model of Client Health Behavior

In an effort to incorporate each client's individual differences into a systematic and comprehensive structure which examines the multiple determinants of health behaviors, the Interaction Model of Client Health Behavior (IMCHB) was developed by Cox (1982). The IMCHB refocuses nursing's attention away from traditional disease models toward a multidimensional health model. It is based on a multidisciplinary perspective and was proposed as a prescriptive nursing framework (Cox, 1982). The framework emphasizes the process by which the singular position of the client (on many variables) is translated into health outcomes. Further, the IMCHB allows for definitive predictions about health behavior because it incorporates an extensive set of variables that address psychological, sociological, and environmental determinants of health behavior, as well as short-term behavioral determinants that arise during the client-professional interaction (Cox, 1982).

The model is organized by three major elements: Client Singularity (individual characteristics), Client-Professional Interaction, and Health Outcome (Figure 1). Client Singularity consists of background variables (e.g., demographic characteristics, social influence, health experience, environmental resources), intrinsic motivation, cognitive appraisal, and affective response. The background factors are interrelated; they influence how one cognitively appraises a health concern or health status and how one affectively responds to the health event or stimuli (such as diet or physical

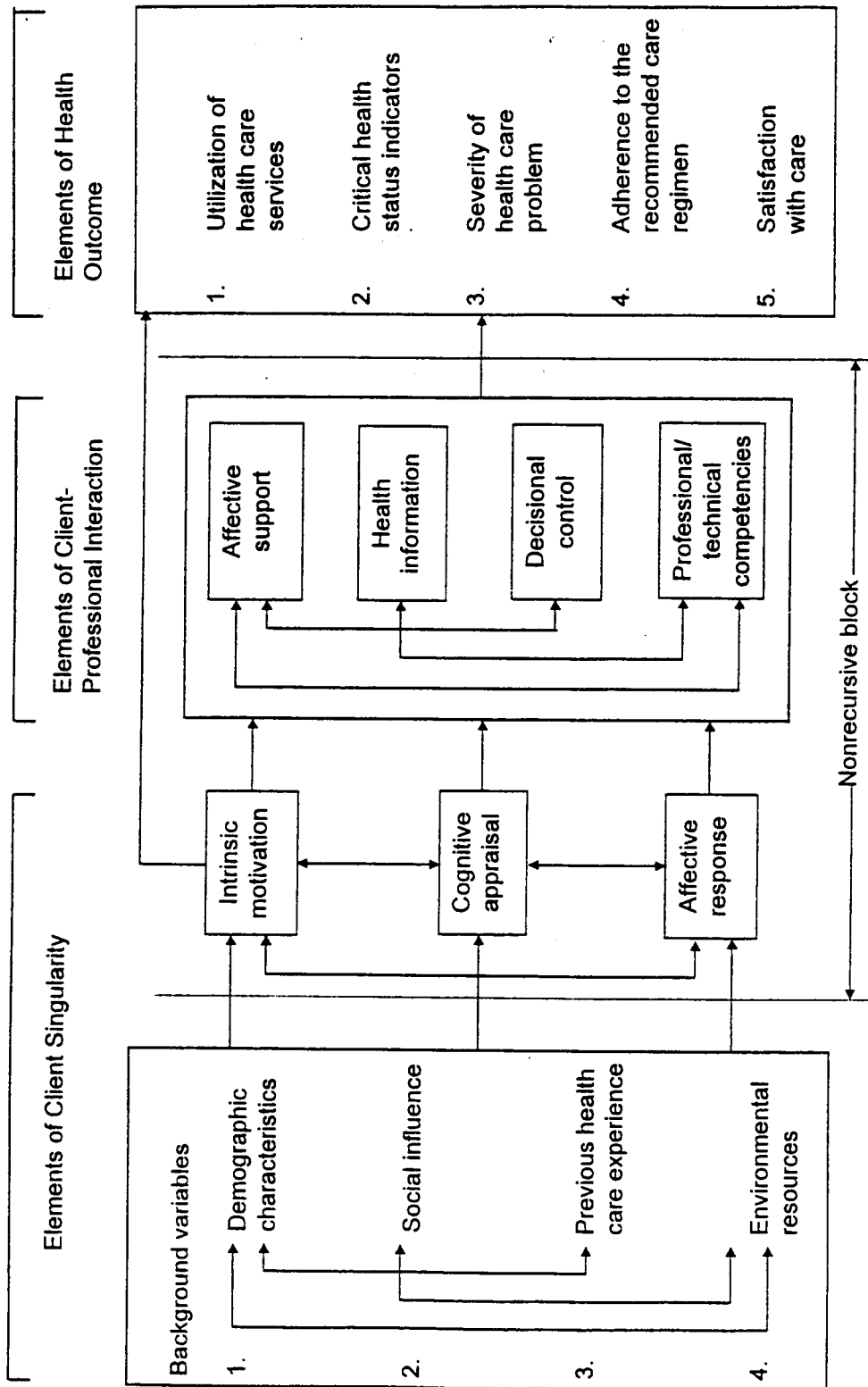


Figure 1. Interaction Model of Client Health Behavior (IMCHB).

activity)). The motivation to engage in certain behaviors is impacted upon by both personal and environmental characteristics, as well as by emotional arousal and cognitive appraisal (Cox, 1982).

The IMCHB recognizes the importance of the affective response component in determining one's health behaviors, and ultimately, nursing interventions that will positively impact those behaviors. Other researchers have determined that health behavior has strong affective as well as cognitive components (Baranowski, 1996, personal communication; Birch & Sullivan, 1991; Fisher & Birch, 1995; Garrard & Brumby, 1990; Kunes, Hasbrook, & Lewthwaite, 1992). Previous health behavior frameworks, such as the Health Belief Model, have subsumed the client's affective response under the cognitive appraisal construct. Consequently, the conceptual base may be misleading with regard to developing interventions for problems that require more attention to the client's affect, rather than simply providing more health information (Cox, 1982).

Cox (1982) stresses the relevance of individual client characteristics (client singularity) to health behavior. Clients respond differently according to past experiences, amount and consistency of social influence, demographic characteristics, cognitive representation of the health event or health state, and the affective response to the health event. The IMCHB assists the nurse to identify how these multiple factors are cumulatively contributing to health behavior. Through this process, the conceptual basis for interaction and intervention approaches is developed (Cox, 1982).

Diet and Physical Activity

The element of Health Outcome in the IMCHB includes five components: utilization of health care services, clinical health status indicators, severity of health care problem, adherence to the recommended care regimen, and satisfaction with care.

In the present study, children's health behaviors were selected as the clinical health status indicators, as Cox (personal communication, 1995) suggested. Specifically, diet and physical activity were the behaviors which were addressed.

Therefore, the investigation of children's diet and physical activity included two of the three elements in the IMCHB, Client Singularity and Health Outcome (Figure 2). All aspects of Client Singularity (background variables, intrinsic motivation, cognitive appraisal and affective response) were included in this study. Additionally, the child's health behaviors were the indicators of the element of Health Outcome, as suggested by Cox (personal communication, 1995).

The outcome of the IMCHB is health behavior or a health state resultant from that behavior. Positive health behavior within the IMCHB refers to conditions which maintain or promote the health state of the client, and negative health behaviors are those which place the client at risk and decrease his or her potential for self-actualization in the areas of physical and psychological well-being (Cox, 1982).

The model acknowledges that health behavior is multidimensional and dynamic, not unidimensional and static. Health behavior is subject to many influences which must be considered. For example, other health behavior models assume that if the cognitive conditions are met, behavior will automatically follow. Similarly, others

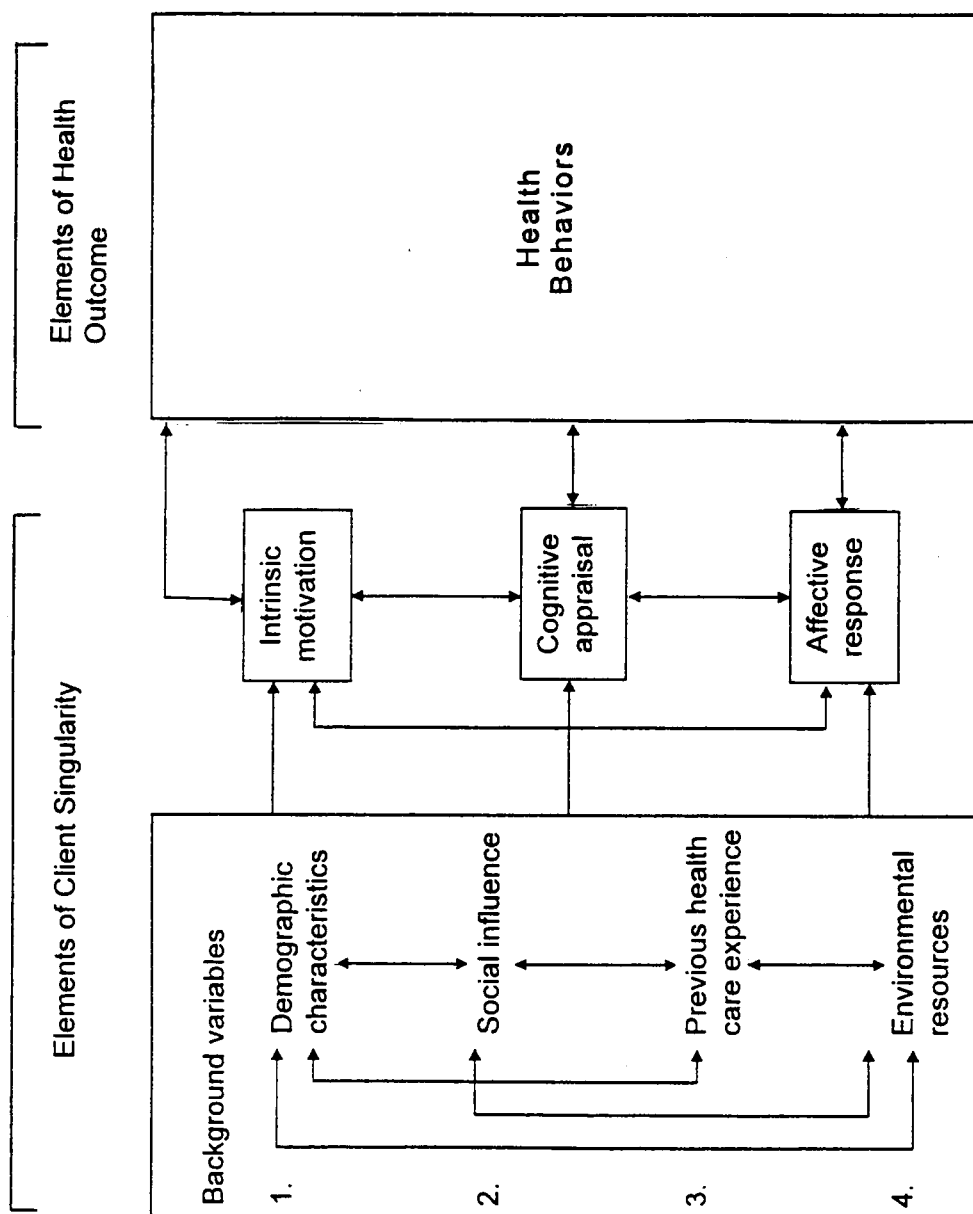


Figure 2. Determinants of Health Behaviors in School-Age Children.

conclude that if certain social and environmental conditions are met, positive behaviors will result. According to Cox (1982), the degree and relationship of emotional arousal in combination with the cognitive and social aspects of a health behavior are insufficiently depicted in such models. An individual's likes and preferences are strong mediators of diet and physical activity, even when the cognitive representation of a health state is well-developed, and when there is social support for a specific health behavior.

Elements of Client-Professional Interaction were not examined in this study because healthy children do not commonly have much interaction with health care providers. Therefore, this component of Cox's model is not extensively discussed in this paper. As Cox stated, "The IMCHB can be operationalized and applied using only one, two, or all three of the major elements. Depending upon the extent of research developed in a given area or the scope and depth of any one study, only a few or all of the concepts, constructs, factors, and variables within the element or elements can be operationalized" (p. 42, 1986).

In the only previous study which utilized the IMCHB to predict determinants of children's health behaviors, Farrand (1991) examined two of the three major elements, Client Singularity and Health Outcome. The researcher included the modifiable factors of child's affective response, intrinsic motivation, and cognitive appraisal as potential contributors to health behaviors (hygiene, nutrition, safety, unhealthy ("junk") food, assertive behavior, and activity). Other factors considered

to be fixed and non-modifiable, such as demographic characteristics, were also examined in the study (Farrand & Cox, 1993). The framework proved to be very useful in explaining variables that influence child (9 and 10 year-old) health behaviors as defined by the investigators. The model accounted for 53% of the variance in girls' self-reported behavior and 63% of the variance in boys' self-reported behavior. This research has contributed to our understanding of children's health behaviors. However, the study was flawed by the poor design and measurement of several variables. For example, the research did not include a measure of the parent's health behaviors; a variable strongly supported by data in the literature as an influence on child health behaviors (Brown, 1990; Tinsley, 1992). The operationalization of "affective response" as self-esteem in the Farrand study was also faulty. This did not fit with Cox's definition for affective response which is a "range of positive and negative emotional states on a continuum" (Cox, personal communication, 1996) or the "degree of fear or anxiety associated with a health concern" (Cox, 1982, p. 73).

Other measurement tools used in the Farrand study were problematic. A global self-worth scale, the Self-Perception Profile for Children, was used to measure the child's self-esteem. The structured alternative format of the questionnaire presents a forced choice between two alternative descriptions of kids. The child must first decide which kind of person is most like him or her, and then whether the statement is only "sort of true" or "really true" for him or her. It is a very confusing format

for a children's self-report tool. Similarly, an inadequate instrument, the Health Self-Determinism Index-Child (HSDI-C), was used to measure the child's intrinsic motivation. The questionnaire is extremely ambiguous and also uses the structured alternative format, which may cause indecision and difficulty with interpretation.

In addition, the Family Environment Scale (FES) was used to measure family function, an important variable in the element of social influence. However, recent scholars have raised serious questions about its psychometric properties (Loveland-Cherry, Youngblut, & Kline-Leidy, 1989; Munet-Vilaro & Egan, 1990; Roosa & Beals, 1990a, 1990b; Sawin & Harrigan, 1995). For example, Loveland-Cherry et al., (1989) found a reliability of .13 for the independence subscale; other researchers have also reported low reliabilities for the independence subscale (Horton & Retzlaff, 1991; Margalit & Eysenck, 1990; Stuifbergen, 1990). Roosa and Beals (1990) also found that five subscales had low reliabilities in one or more of their samples. Similarly, two other subscales had low reliabilities across studies (Bloom, 1985; Loveland-Cherry et al., 1989; Moos, 1990). Additionally, the proposed three-domains structure has not been supported by other factor analyses (Sawin & Harrigan, 1995). Lastly, the FES takes 20-40 minutes to complete (Sawin & Harrigan, 1995), which is a large block of time for administration of one instrument to children. Likewise, the "How Often Do You?" scale used to measure health behaviors has demonstrated low internal consistency estimates (Kieckhefer, 1987) and poor construct validity (Stember, Swanson-Kaufman, Goodwin, Rodgers, & Matthews, 1984).

However, another problem with the Farrand study was that the researcher measured six different healthy and risky behaviors as a single dependent variable. The summative score was used to represent an index of total health promotion behaviors for the child. However, one study of school children determined that there may not be a “globally healthy lifestyle” (Terre, Drabman, Meydrech, & Hsu, 1990). The children were determined to be at risk for some unhealthy behaviors, but not for others. For example, those who participated in regular exercise ranked high in terms of physical activity, but low in the area of nutrition. This finding suggests that children’s health behaviors may be domain-specific. Additionally, scientific inquiry was needed to overcome the shortcomings of the previous work, such that data-based interventions could be developed to promote healthy behaviors and prevent the development of cardiac risk factors in children.

Purpose

The purpose of this study was to identify those variables that influence the school-age child’s enactment of diet and physical activity. Specific objectives were: (1) to use the Interaction Model of Client Health Behavior as a conceptual guide in explaining the correlates of children’s diet and physical activity, (2) to determine the relative and cumulative contributions of socio-demographic variables, health experiences, family influence, intrinsic motivation, cognitive appraisal and affective response to children’s diet and physical activity, and (3) to use the empirical base

developed to propose nursing interventions that may potentially optimize performance and retention of preventive diet and physical activity behaviors in school-age children.

The study explored two of the model's major elements, Client Singularity and Health Outcome, in order to describe variables that influence diet and physical activity in children. Table 1 represents the major elements and sets of variables that defined the elements for the study. Client Singularity, as operationalized for this study, included four background variables: demographic characteristics, social influence, health experience, and environmental resources. It also included three potentially modifiable factors: intrinsic motivation, cognitive appraisal, and affective response. The variables were assumed to be heavily influenced by one another. The second major element which was studied, Health Outcome, was defined as adherence to positive health practices of diet and physical activity which were used as the dependent measures.

Research Question

The research question addressed was: What elements of Client Singularity (uniqueness) are related to the diet and physical activity of the school-age child? Gender was the single most contributory background variable to health behavior in the Farrand study, the only previous study of children based on the IMCHB. Therefore, a subsidiary question addressed was: What is the relationship of gender to diet and physical activity of the school-age child? A sample of 10-12 year-olds and their

Table 1. Elements of IMCHB for Children's Diet and Physical Activity.

Elements of Client Singularity	Variables
Demographic characteristics	Child's gender Child's age
Social influence	Child's family function and environment Parent's health habits
Health experience	Current health status of parent and child
Environmental resources	Family's financial difficulty Parent's educational level
Intrinsic Motivation	Diet self-efficacy Physical activity self-efficacy
Cognitive Appraisal	Child's self-perception of health status
Affective Response	Food preferences Feelings toward exercise
Elements of Health Outcome	Variables
Clinical health status indicators	Diet Physical Activity

parents participated in the study. Information on the family's demographics, health experience, social influence and environmental resources was collected from the parents.

Data on the children's intrinsic motivation, cognitive appraisal, and affective response to diet and physical activity were collected from the children, as were self-reports on diet and physical activity. The data were analyzed to determine which aspects of the child's uniqueness—sociocultural and intrapersonal—contributed to the enactment of his/her diet and physical activity. Given this information, nurses could provide health-promoting experiences which would help children formulate positive diet and physical activity behaviors. It is hoped that these behaviors would endure and contribute to positive behaviors in adulthood.

Theoretical Definitions

Affective response. Range of positive and negative emotional states on a continuum; motivational process that helps govern health behavior (Cox, personal communication, 1996).

Background variables. The client's demographic characteristics, influence of the client's family and social group, current health of family members, and environmental resources (Cox, 1982).

Client singularity. The configuration of the client's background variables, expression of motivation, appraisal of the health state, and affective response to the health care event (Cox, 1982).

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Cognitive appraisal. Client's cognitive interpretation of an existing health state (Cox, Cowell, Marion, & Miller, 1990).

Demographic characteristics. Age, child's gender, and parent's marital status (Farrand & Cox, 1993).

Diet. The usual food and drink of a person.

Environmental resources. Financial resources and parent's educational level (Cox, 1982).

Physical activity. Any bodily movement produced by muscles that causes increases in resting energy expenditure (Caspersen, Powell, & Christenson, 1985).

Health behavior. There are multiple influences on health behavior: these influences combine and interact uniquely within each individual to produce a specific health behavior. The roles of choice and desire are causal factors in health behavior (Cox, 1982).

Health experience. Health environment of the child which may potentially contribute to the child's health perceptions and behaviors (Farrand, 1991).

Health outcome. Client's health behavior (Cox, 1982).

Intrinsic motivation. Client's reinforcement of his or her own sense of competency and self-determination through the process of choosing and accomplishing positive health behaviors (Deci, 1975, 1980; Cox et al., 1990).

Social influence. Influence of client's family function and environment (Farrand & Cox, 1993).

Limitations

Voluntary participation by parents and children was necessary for this research. In addition, the respondents' subjectivity in self-report of health behaviors may have been limiting. The findings of this study may not be generalizable to children who are younger or older than the sample, or who differ in other demographic characteristics. Likewise, there was a predominantly Caucasian sample, thus limiting generalizability to other racial groups.

Delimitations

This study was designed to explore a multiplicity of factors that relate to the health behaviors of the school-age child. The sample was delimited to 10-12 year-olds because this group has particular characteristics which are of unique interest. The 10-12 year-olds should have cognitively passed the preoperational stage according to Piagetian theory (1969). The period corresponds to Piaget's concrete operational stage, during which the child develops the cognitive skills which permit him or her to identify and manipulate health states and resources.

Significance of the Study

The research study has much relevance for the discipline of nursing. A recognition of the variables which influence health behaviors in children can lead to empirically-based nursing interventions which foster healthy living among this age group, and help prevent the development of heart disease.

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Specifically, the study is significant in the following areas: (1) tests a nursing model of client health behavior (Cox's Interaction Model of Client Health Behavior) with children for only the second time, (2) contributes knowledge which can address the leading causes of morbidity and mortality in the U.S.A., and (3) focuses on an age group which is in danger of the development of risk factors for heart disease. A healthy lifestyle is generally accepted as the way for one to achieve optimal health and prevent disease. An enhanced understanding of the factors which explain diet and physical activity in children can facilitate future health promotion efforts by nurses.

CHAPTER TWO

REVIEW OF THE LITERATURE

The purpose of this study was to identify those variables that influence the school-age child in the enactment of diet and physical activity so that effective nursing interventions could be planned to help the child develop and maintain healthy behaviors. The research used the Interaction Model of Client Health Behavior as a conceptual guide in explaining the enactment of children's diet and physical activity. Therefore, the literature review was organized according to the model: Interaction Model of Client Health Behavior, background variables of demographic characteristics, social influence, health care experience, and environmental resources; dynamic variables of intrinsic motivation, cognitive appraisal, and affective response; and the clinical health status indicators of diet and physical activity.

Interaction Model of Client Health Behavior

To briefly review, the IMCHB is composed of three elements: Client Singularity (individual differences), Client-Professional Interaction, and Health Outcome. The element of Client Singularity is divided into client background variables, (sociodemographics, social influence, health care experience, and environmental resources) and dynamic variables (intrinsic health motivation, cognitive appraisal and affective response). The background variables are generally unchanging, but the dynamic variables are amenable to change during a client-professional

encounter. The element of Client-Professional Interaction contains four factors (health education, decisional control, affective support, and professional-technical competencies) which need to be tailored to the client's singularity (individuality). The element of Health Outcome represents five categories of physical, behavioral, and attitudinal variables specific to individual client health outcomes (Marion & Cox, 1996). The IMCHB was developed by Cox (1982) to refocus nursing's attention away from traditional disease models toward a model of multidimensional health. It is based on a multidisciplinary perspective and was proposed as a prescriptive nursing framework (Cox, 1982).

Most studies which have used the IMCHB have explained a substantial amount of variance in the dependent variables. For example, a study which used the IMCHB to guide research with school-age children was conducted by Farrand (1991). The investigation provides much support for the usefulness of the model in explaining children's health behavior. The study accounted for 53% of the variance in girls' health behavior and 63% of the variance in boys' health behavior. Other support for the IMCHB is evidenced by an inquiry of community-based elderly persons which explained 54% of the variance in their health status and 47% of the variance in their well-being (Cox, 1986). Lastly, a study of military personnel found that 25% of the variance in health risk and 47% of the variance in health status was explained by the model (Troumbley & Lenz, 1992). Kenny (1979) contends that accounting for 50% of the variance in studies of human behavior explains as much as can be explained with

scientific methods. He asserts that human behavior is fundamentally unpredictable, and that the error term represents human freedom.

Most of the samples selected for testing of the model have been from adult populations, although the studies which have investigated children's health behaviors also confirm the usefulness of the IMCHB for health-related research (Cox et al., 1990; Farrand & Cox, 1993). The model was recently validated for an adolescent population with an investigation of sexual decision-making among rural adolescent females (Locke & Vincent, 1995). Demographics, social influence, environmental resources, and cognitive appraisal explained 31 % of the variance in premarital intercourse. However, the researchers did not include the variable of affective response, which is the role of emotional arousal in determining behavior. Certainly, an adolescent's affect is associated with her sexual behavior.

Another study that used the IMCHB as a framework explored the effects of fertility on condom use (Marion & Cox, 1996). A convenience sample (N = 254) of women who were mostly educated, white, and in their 30s was studied relative to condom use and individual and social context characteristics. The model explained 49% of the condom use variance among the fertile subsample, and 21% of the variance among the infertile subsample. Women who were fertile used more condoms and used them more often than infertile women.

The most recently published study that used the IMCHB as a framework was a community-based continence project for rural elderly women (Dougherty et al., 1998).

The model guided the conceptualization of variables and corresponding instruments, the process of the intervention, and the health outcomes evaluation. The emphasis on community-based health care has increased the importance of implementing and evaluating nursing practice models that address specific health problems of rural, elderly women living at home. The researchers reported that the IMCHB enabled the project team to keep the overall plan in view while addressing issues specific to the women in the study.

A recent review of 24 studies by Carter & Kulbok (1995), which spanned the period 1983 to April 1994, determined that the model's variables are consistent with those cited in the literature as predictors of health behaviors. In addition, most studies have confirmed the proposed linkages among the model's variables. However, Carter & Kulbok (1995) made the following recommendations: (1) investigators need to explore the possibility of cognitive appraisal as being more than perceived health status, (2) the effect of age on cognitive appraisal needs to be studied, (3) clearer definitions for cognitive appraisal and affective response are needed, and (4) health behaviors should be clarified as a health outcome measure (assuming that prediction of specific behaviors is the goal of the model), and the relationship between health outcome categories should be further explored.

In sum, the IMCHB is a conceptual model which can guide research in nursing. Although a recently-developed model (relative to other health behavior frameworks), the literature supports its relevance in studying health behaviors.

Background Variables

Demographics

Gender. There is evidence in the literature which suggests that gender differences affect one's perceptions of health and health behaviors (Campbell, 1978; Cohen, Brownell, & Felix, 1990; Farrand & Cox, 1992; Mechanic, 1964; Perry, Griffin, & Murray, 1985; Thomas, Groer, & Droppleman, 1993; Tinsley, Holtgrave, Reise, Erdley, & Cupp, 1995). In one study assessing health habits of children across ages (grades 4 - 11), girls had healthier food patterns than boys, and elementary school children had healthier food patterns than older children. Boys exercised more than girls, but exercise of both boys and girls decreased with age (Perry et al., 1985).

In a frequently cited recent study, Cohen et al. (1990) surveyed boys and girls in grades 3 through 12 (N = 3,933) about health habits and beliefs, including eating habits and perceptions of exercise. Among older children (grades 6-12), girls perceived themselves to be significantly less healthy than did boys. The investigators also found gender differences in food choices and habits. Girls reported better food habits than boys at all ages. They snacked less frequently, ate fast food less often, and chose healthier foods. Boys consistently reported higher levels of exercise than girls. By grade 8, the gap between girls and boys had widened as girls reported engaging in even less exercise than in earlier grades. However, the data collected on the levels of exercise is questionable. The children were asked to rate their perception of the amount of exercise relative to their peers, not the absolute amount of exercise they

performed. Similarly, the researchers combined several instruments that were used in previous studies and used some of the items from each survey. The reliability of the surveys was not computed and the validity of the items was not confirmed. Even the investigators (Cohen et al., 1990) reported that better measures of specific behaviors are necessary. They measured one's food habits by asking questions such as: "How often do you have snacks between meals?" The more one snacked, the more negative score one received - but the subjects were not asked about the content of their snacks (which could have been very healthy).

A recent dissertation study, which was discussed earlier in the text, found gender to be a significant determinant of children's health behaviors (Farrand, 1991). In fact, gender was the strongest contributory background variable to health behaviors ($b = 0.324$, $p = < 0.001$). Boys and girls differed in their reported health habits, with summative health behavior scores in the study significantly higher for girls. The author concluded that the strong gender influence on the child's health behaviors offered preliminary evidence for targeting school-age boys for wellness interventions.

Conversely, another dissertation study did not detect any gender differences on factors influencing children's health behaviors (Frauman, 1991). The mother's health behavior and the child's health value best predicted the child's health behavior score in her study. However, the author concluded that Bruhn and Parcel's Development of Positive Health Behavior Model was inadequate to explain the complex influences on the development of children's health behavior (Frauman, 1991). The model is very

narrow in scope, and posits only family influences and the child's developmental and psychological characteristics as influential in the factors impacting children's health behaviors. Further, family influence was narrowed to maternal influence in Frauman's (1991) study. A series of regression models yielded a range of explained variance from 3% to 11%, which offered minimal support for the relationships specified in the model. The researcher also suggested that the instruments used were problematic. One of the tools, The Children's Health Locus of Control Scale (CHLC) was determined to have little relationship to health behavior in a 1984 study by Dielman et al. Similarly, Hearne and Klockers (1988) reported findings which indicated that the CHLC was problematic as a measure for studying health locus of control. Responses to the CHLC from two groups of sixth grade students were collected to consider fit of the items to Levenson's model (the underlying theoretical framework) and invariance of the findings from different populations. Factor structures from the two groups did not match one another or Levenson's model. Several items did not have any major loadings. Lack of fit and lack of variance of the results created doubts regarding the construction and application of the CHLC (Hearne and Klockers, 1988). Additionally, the children's responses to questions on the modified form of the Health Habits Survey indicated a bias toward social desirability (Frauman 1991). Children chose health rather than being famous (66%) or having lots of things to play with, but chose good grades (66%) rather than health. The author concluded that the measures used may have failed to detect differences that did exist.

Significant gender effects are also reported in the most recently published studies on diet and physical activity. In fact, gender differences on five of seven variables related to diet, and four of eight variables related to physical activity were noted by Nader et al. (1995). Their data were derived from intensive study of 351 children (ages 4 to 7) recruited from preschools in Southern California. Children were observed at home and at school, and at times of the day when dietary and activity behaviors would likely occur. The authors did not detect a difference in the number of calories consumed for girls and boys, which contrasts with Bogalusa Heart Study findings that boys consume more calories than girls (Nicklas et al., 1995). The study also found that the percentage of calories from fat decreases over time, and that girls decrease the percentage of calories from fat more than boys (Nader et al., 1995). This finding confirms reports that boys consume more high fat foods (Robinson & Killen, 1995), and make less healthy food choices than girls (Baranowski et al., 1995; Kelder et al., 1994). During the period of observation (ages 4 to 7), both boys and girls decreased their physical activity at home (Nader et al., 1995). However, a different pattern emerged for physical activity during recess. As the children moved from preschool to kindergarten to elementary school, they became more active during recess. The researchers suggest that this pattern may reflect a natural trend that should be reinforced. Additionally, boys were more physically active than girls, supporting other studies in the literature (Groer et al., 1991; Kelder et al., 1995; Robinson & Killen, 1995; & Sallis, 1993). Only one investigation reported no differences between

girls and boys in overall physical activity, although boys reported more higher intensity activities than did girls in a study by Faucette et al. (1995).

In sum, gender differences in diet and physical activity have been reported in the literature. In general, girls tend to have healthier diets, while boys exercise more frequently and more intensively. The physical activity of girls dramatically worsens during the high school years. However, when researchers report data on summative health behaviors, girls score higher than boys.

Age. A review of the literature indicates that many researchers have discussed age and cognitive development interchangeably as a single variable. Other investigators have discussed their age-related findings in the context of gender differences in diet and physical activity. Therefore, the literature on age-related influences on children's health behaviors is discussed in those sections.

Social Influence

The major social influences on the school-age child are family-based (Farrand, 1991). Accordingly, the family has been defined as a social system, which means that families are more than the sum of their individual parts (Copeland & White, 1991; Daly, 1992; Stuart, 1991; Sawin & Harrigan, 1995). There are no simple relationships where one or more family members relate to each other through a single line of influence (Fisher, Terry, & Ransom, 1990; Stewart, 1990). Families are embedded in larger social systems, and there are reciprocal influences of the

environment, the family, and the individual on each other (Clarke, 1995).

The functioning of the family as a unit and the interaction of individuals within the family are the focus of this construct. Family functioning has been defined as a set of attributes about the family system that characterizes how a family typically appraises, operates, and behaves (McCubbin, 1991). Interaction occurs continuously among family members as they respond to one another's actions and reactions. Behaviors within the family result from beliefs, attitudes, and social experiences that are intergenerationally transmitted and reconstructed in the present familial patterns (Denham, 1995). Indeed, health behaviors are learned within the family context (Bleckle, 1990).

In fact, one study determined that a pattern of gradually increasing parental influence on children's health behaviors persists through the college years (Lau, Quadrel, & Hartman, 1990). A longitudinal data set of 947 voluntary parent-child pairs from a very competitive and elite university was used to explore young adults' health behaviors, including diet and physical activity. Parents were found to be much more important than peers as sources of influence over these behaviors, and the direct modeling of behavior was the most important avenue of influence for both parents and peers. However, the researchers pointed out that 80% of the parental respondents were mothers, although 86% of the parent respondents were married. Data from more fathers would have enriched the study, since 69% of the student respondents were male. Likewise, the data and results could not be interpreted as representative of a

general population.

Another recent investigation, which explored the health-promoting lifestyles of adolescent females, required an intact mother-father dyad as a criterion for participation in the study (Gillis, 1994). The author's objective was to determine both maternal and paternal influences on the daughter's health-promoting lifestyle. A significant correlation coefficient (.28) between the daughters' and mothers' lifestyle was noted, while the correlation coefficient between daughters' and fathers' lifestyle was significant (.16), but weak. Neither maternal nor paternal health-promoting lifestyle helped predict the daughter's health-promoting lifestyle.

Other studies have included maternal and paternal variables as potential sources of influence on their children's activity patterns. Purath et al. (1995) evaluated cardiac risk factors for children ($N = 357$) in grades one through five. The students were tested on selected components of health and fitness while their parents completed a questionnaire related to family health history and health habits. Pearson correlational coefficients revealed a significant relationship between the reported physical activity pattern of the student and his/her mother ($r = .25$, $p = .003$). No significant relationship was found between student and father's physical activity pattern ($r = .16$).

In an attempt to better understand the influence of parents' level of physical activity on younger children, Moore et al. (1991) conducted a longitudinal study of factors related to the development of dietary habits and physical activity patterns during childhood (the Framingham Children's Study). The Caltrac accelerometer, an

electronic motion sensor, was used to obtain objective measures of activity in four to seven year-old children and their parents. Data were obtained for 100 children, 99 of their mothers, and 92 of their fathers. Results show that children of active mothers were 2.0 times more likely to be active as children of inactive mothers, and children of active fathers were 3.5 times more likely to be active as children of inactive fathers. When both parents were active, the children were 5.8 times more likely to be active as children of two inactive parents!

Other studies have included mothers, but not fathers, in exploring factors that influence a child's level of physical activity. Stucky and DiLorenzo (1993) interviewed 242 fifth- and sixth- grade children and their mothers. Regression analysis results indicate that salient predictor variables for boys include enjoyment of physical activity, friend and family support for physical activity, mother's perceived barriers to exercise, and mother's perceived family support for exercise. For girls, the salient predictor variables include enjoyment of physical activity, number of exercise-related items at home, mother's perceived barriers to exercise, and direct parental modeling of physical activity.

Additional studies have expanded the scope of influence on one's physical activity patterns to include his/her peers and siblings. For example, a survey of health behavior (focusing on sport and physical activity) was conducted in ten European countries (N = 39,086) during 1985-1986 (Wold & Anderssen, 1992). Three grades were sampled, with mean ages of 11.5, 13.5, and 15.5 years. The results indicate that

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pre-adolescents and adolescents whose parents, siblings, and best friends participate in sports are much more likely to participate themselves than those whose significant others are not involved in sports. The investigators also found that the sport participation of adolescents' best friends is more strongly associated with their sport activity than is the sport participation of family members. The results must be interpreted with caution, though. The students were asked only one question about their frequency of exercise. The response categories were: every day, 4-6 times/week, 2-3 times/week, once/week, once/month, less than once/month, and never. The student had to exercise twice/week or more frequently to be counted as active. The students reported on significant others' activity patterns and the responses were dichotomized. One category represented that significant others exercised once/weekly or less frequently, while the other category denoted one of three possibilities: (1) never exercised, (2) respondent didn't know, or (3) respondent didn't have significant others. Significant others who exercised once weekly or less often were counted as active. The authors erred in their categorization of students as active only if they exercised twice/weekly or more frequently, but evaluated significant others as active if they exercised once/weekly or less frequently.

With regards to peer influence, the following question has been raised by Lau et al. (1990). If one observes a strong correlation between the health behaviors of two peers, is that correlation present because one of the peers influenced the other, or because the two peers became friends on the basis of their shared beliefs and behavior?

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It is plausible that many people make friendships based on shared interests in certain health behaviors, such as physical activity. Thus, it may be inappropriate to attribute any correlation between friends' performance of those behaviors to peer influence. A longitudinal analysis may be the only way to discern peer selection from peer influence (Lau et al., 1990).

Another approach was utilized to study the sources of influence on children's health behaviors (Tinsley et al., 1995). Decision-making theory was used to analyze the developmental changes associated with children's (N = 199) and adolescent's (N = 87) behaviors, including diet and physical activity. Influence Factor 2 (habit and enjoyment) predicted children's health behavior better than Influence Factor 1 (parents, friends, teachers, and media) and Influence Factor 3 (health value and worry). The researchers suggested that the wording of the question may have tapped into a cognitive response set which was focused more on positive reasons to engage in the behavior than social influences (Factor 1) or personal negative influences (Factor 3). The high school students, compared to elementary students, were significantly more likely to report being influenced by Factors 1, 2, and 3 when deciding whether to exercise, but this developmental difference was not detected relative to dietary choices. Even so, there may be age differences in children's ability to recognize the influences on their behavior, or cognitive shifts in decision-making style (Tinsley et al., 1995).

In sum, the child's social influences are important in describing the child's diet and physical activity. The family serves as an important socializing agent to the child,

as do his/her peers. The school may also help clarify the social process by which children develop and practice health-promoting behaviors, but studies have focused on the family and peer influences.

Previous Health Care Experience

Children's direct or indirect contact with health and illness is a source of knowledge through which learning takes place. Acute and chronic illnesses of the child, and/or other family members, may affect the child's health beliefs. As with the perception of health, the concept of illness and its personal meaning for the child is a complex and slowly evolving process that incorporates many aspects of the child's experiential background (Farrand, 1991).

Early contacts with illness and the health care system shape attitudes toward different aspects of health care. That is, experience with poor health or a chronic/major illness might provide children with a great deal of experience with many aspects of health care. These experiences, as well as preventive health care experiences, can have a significant influence on children's attitudes toward concrete health care entities (Hackworth & McMahon, 1991).

Even a brief hospital experience can greatly affect a child. Separation anxiety, fear of bodily harm, and a loss of control can precipitate a range of behavioral responses (Whaley & Wong, 1991). Irritability, extreme restlessness, and inconsolable crying are all signs of distress in young children (Lynch, 1994). Surgery and

hospitalization disrupt a child's routine and can leave the child confused and vulnerable. An unfamiliar environment threatens the child's security, making his/her world less predictable. This loss of control may increase stress and anxiety and alter the child's coping ability. The medical procedure may also be painful, adding to the stress of the situation (Manion, 1990).

Each child reacts to surgery and hospitalization in a unique manner, and the intensity of the reaction depends on the interaction of several variables. Two of these variables are the coping ability of the child as well as the presence or absence of support systems (Bates & Broome, 1986). In addition, children's past healthcare experiences and developmental needs strongly influence the child's response to the new experience (Lynch, 1994). For example, a poor reaction to prior surgery was discovered to be a very good predictor of distress in children undergoing present ear, nose, or throat surgery (Lumley, Melamed, & Abeles, 1993).

A child consciously or unconsciously determines if a situation is harmful, potentially harmful, or challenging (Holt & Maxwell, 1991). Heightened anxiety is likely to interfere with the cognitive functioning required for appraisal of the situation and makes it more difficult for a child to cope (Nyamathi, & Kashiwabara, 1988). When children are anxious and coping with unfamiliar situations, they may regress cognitively (Heaman, 1994). Thinking will fluctuate between reality and fantasy, and the child may resort to fantasy as an explanation for health-related events (Mott, 1990).

The literature is replete with studies addressing anxiety and coping in the

hospitalized child (Alex & Ritchie, 1992; Heiney, 1991; Vessey & Mahon, 1990). For example, previous hospitalizations were negatively correlated with children's medical fears (Aho & Erickson, 1985). Likewise, previous negative hospitalizations resulted in more anxiety and less cooperation during a medical examination (Dahlquist et al., 1986). However, there is a paucity of literature that describes a well child's degree of anxiety associated with a health concern.

Three recent investigations have incorporated one's previous health care experience into studies addressing children's distress and coping. One researcher attempted to measure the effect of a preoperative teaching program on children's emotional distress during day surgery. A test identified significant differences between the control group and the experimental group who received the intervention. However, the results of the study must be interpreted with caution. There was less than a 1/3 response rate for the self-selected sample of 15 control subjects and 15 experimental subjects. They responded that they had no previous hospitalizations (one of the selection criteria). After all the data had been collected, it was found that only 1 of 15 children in the experimental group had previously visited the emergency room for treatment, but 4 of the 15 children in the control group had sought treatment in the emergency room. Interestingly, the two groups' means on anxiety levels were much closer when the children self-ranked their anxiety versus when the investigator ranked their anxiety. Lastly, all but 1 of the 30 parents admitted that they had discussed the impending hospitalization with their children and there was no control

for that factor by the researcher. In fact, a major factor that has been shown to influence the distress of children undergoing medical procedures is the behavior of the parents (Blount, Davis, Powers, & Roberts, 1991; Frank, Blount, Smith, Manimala, & Martin, 1995).

The second related investigation examined the association between the child's ($N = 77$) previous medical experience and behavior during present routine immunizations (Frank et al., 1995). Medical experience was indexed using both the number of previous medical procedures and the child's reactions during those procedures. The effects of parental and staff in-session behaviors, child's previous medical experience, and maternal anxiety on child distress and coping was examined using hierarchical multiple regression procedures. Child coping was predicted by parent and staff behavior, whereas child distress was predicted by parental behavior and by the level of the child's distress during previous medical experiences. The combination of parental and staff in-session behaviors and child's previous medical experience accounted for approximately 40% of the variance in child coping, and approximately 60% of the variance in child distress (Frank et al., 1995).

Another recent study addressed coping and anxiety in school-age children ($N = 43$) anticipating an elective tonsillectomy and/or adenoidectomy (Thompson, 1994). The investigator used Lazarus and Folkman's (1984) theoretical framework of stress and coping to study information-seeking and information-limiting coping behaviors and their relation to preoperative anxiety. Children who use information-

limiting behaviors do not seek detailed information regarding the stressful event and have more uncertainty regarding the event. Thus, it was predicted that those children would experience greater anxiety than the children who utilized information-seeking coping. However, the results indicated that children who used primarily information-seeking or information-limiting behaviors had the lowest pre-operative anxiety.

Children who used information-seeking strategies for some, but not all aspects of the anticipated experience reported the greatest anxiety. The theoretical model was inadequate in explaining preoperative anxiety as coping behavior accounted for only 14% of the variance. Further, the data was collected by phone interviews so there was no opportunity for observational data collection. Moreover, 16 of the 43 children had been previously hospitalized, but the study did not control for that fact.

Children's attitudes toward health care have been hypothesized to play a significant role in determining how children (well and ill) approach and experience medical events (Gochman, 1985; Jay, 1988). However, few attempts have been made to determine what factors influence children's attitudes toward health care (Gochman, 1988).

One recent attempt examined school-age children's ($N = 95$) attitudes toward health care and their responses to a stressful medical procedure (finger-prick blood test) during an out-patient well-child exam (Bachanas & Roberts, 1995). The children completed the Children's Health Care Attitudes Questionnaire (CHCAQ; Bush & Holmbeck, 1987) which taps the attitudinal dimensions of like-dislike, ineffectiveness-

effectiveness, and approach-avoidance toward eight targets: doctors, dentists, nurses, hospitals, surgery, shots, blood tests, and medicine. The Health Care Attitudes Questionnaire (HCAQ; Hackworth & McMahon, 1991), a modified version of the CHCAQ, was completed by the mothers of the children. The children were observed undergoing a finger-prick blood test by the investigator or research assistant who then completed a behavior rating scale which measured distress behaviors. Results indicated a significant relationship between children's and parents' attitudes toward health care. Additionally, children who displayed higher levels of distress had more negative attitudes toward health care. The researchers (Bachanas & Roberts, 1995) emphasize this finding because of the lack of documentation in the literature that children's attitudes toward health care predict their behavioral response during a medical procedure.

In an early study, Brodie (1974) examined the relationship between anxiety and illness perceptions in a sample of first-, third-, and fifth-grade students. Two anxiety scales, used to measure illness perceptions, showed a difference in perceptions of illness in healthy versus ill children.

To date, research findings have revealed that previous illnesses and hospitalizations influence the child's conceptualizations of health and illness. It has even been shown that a chronically ill child in a family affects siblings directly in the area of body image and self-concept (Breslau, Weitzman, & Messenger, 1981; Cairns, Clark, Smith, & Lansky, 1979; Gayton, Friedman, Tavormina, & Tucker, 1977).

In sum, the literature supports the premise that a child's previous health care experience which, most likely, involves a degree of anxiety and coping, may help explain his/her health perceptions. These health perceptions have been found to be strong determinants of health behavior in school-age children (Farrand, 1991).

Environmental Resources

The construct of environmental resources includes indicators of socioeconomic status (SES) such as educational level of the parents and household income. Generally, these indicators reflect the total effect of social, environmental, educational, and financial resources in the personal world of the child. Resource availability affects one's health perceptions and health-related behaviors (Long & Weinert, 1992).

Numerous studies have demonstrated a relationship between socioeconomic status and family health-promoting behaviors. The literature suggests that education is probably the most important predictor of health behavior among socioeconomic indicators. Mechanic (1980) suggested that education is an important predictor of health and health behavior because it is associated with other variables such as living habits, effective use of medical care, information acquisition and retention, self-esteem, parental interest and nurturance, and coping. Indeed, education has consistently been found to be associated with health status and health practices (Duffy, 1994; Farrand, 1991; Frauman, 1991; Lusk, Kerr, & Ronis, 1995; Mechanic, 1979; Pratt, 1971; Suchman, 1966).

Similarly, Mechanic (1980) initially explored hypotheses suggesting links among education, intervening variables believed to be associated with education, health and health behavior. Most of the data depended on retrospective reports of childhood given by respondents in 1977. Thus, they may have reflected response bias characteristic of such reports. He found that the effect of education on various health behaviors remained, even when various intervening variables such as parental interest and child's self-esteem were taken into account.

However, data regarding educational level and job category are not consistently reported in articles disseminating results of health behavior studies. One recent questionnaire study did examine the health-promoting lifestyles of blue-collar, skilled trade, and white-collar workers in an automotive components plant (Lusk, Kerr, & Ronis, 1995). The response rate on the Health-Promotion Lifestyle Profile (HPLP) was 10% of blue-collar workers, $N = 314$; 23% of skilled trade workers, $N = 209$; and 26% of white-collar workers, $N = 115$. It should be noted that the content of the HPLP is heavily laden with middle-class values. Each of the three educational groups was significantly different on mean HPLP scores and its subscales. Not surprisingly, higher education consistently predicted higher scores, $F = 4.53$ to 15.88 , $p = 0.01$ to 0.0001 . Post-hoc tests revealed that those with high school diplomas or less scored lower than the other groups on self-actualization, interpersonal support, and health-promoting lifestyle. Those with college degrees scored higher on health responsibility, exercise, nutrition, and stress management. Although the variables of worker category

(ethnicity, age, gender, and marital status) were included, the greatest differences in a healthy lifestyle corresponded to educational level (Lusk, Kerr, & Ronis, 1995).

Another recent study tested the Theory of Transcending Options on Health Behaviors of single parents (Duffy, 1994). Data on demographics, psychological variables, and social support were collected from 148 women at three points in time over 2 years. Statistically significant independent variables for health behaviors were education, number of years single, depression level, self-esteem, and social support. Education contributed positively to the number of health behaviors practiced.

Two recent studies which included the influence of the family's socioeconomic status on the child's health behaviors were discussed earlier in this text (Farrand, 1991; Frauman, 1991). One investigation reported that even though the children and their mothers were in a narrow middle range of socioeconomic status, the stepwise regression analysis revealed socioeconomic status as a significant predictor of the child's health behavior (Frauman, 1991). However, it is not clear to the reader exactly which of the following variables (mother's age, occupation, educational level, marital status and family income) were used to determine the family's socioeconomic status.

In the Farrand (1991) study, a child's socioeconomic status was operationalized as education level attained by mother and father and household income. Each item was treated as an independent variable to measure its relative contribution to health behavior. Parents' educational level, family size, and child's gender were the significant background determinants in the model which accounted for 67% of the

variance in children's health behavior.

Family income has been demonstrated as an indicator of health behavior among children (Chen, 1986; Flaherty, 1986). Flaherty (1986) explored health-related behaviors of forty-one 4-and 5-year-olds, using a picture interview guide. Although not statistically significant, there was variation in the total scores in relation to the variable of economic status. The mean, median, and mode of health-related behaviors of the subjects in the lower economic group were lower than those of the children in the other two economic groups. In her study, economic status was defined as the total annual family income. However, in Weitzel's (1989) study of 179 blue-collar workers with an annual salary between \$10,000 and \$19,000, there was not enough variability to detect a significant correlation between income and health-promoting behaviors.

In sum, the research has demonstrated that socioeconomic status is an important influence on one's health behavior. The majority of the investigations have revealed that more affluent socioeconomic status relates positively to health behaviors. Finally, the educational level of the parents appears to be the most single important contributory factor to the child's health behavior--i.e. the higher the educational level, the more positive the behaviors.

Intrinsic Motivation

The IMCHB posits that intrinsic motivation is a primary element which helps to explain one's health behavior. Cox (1982) developed her ideas from Deci (1975,

1980), whose view of the development of intrinsic motivation in children is based on the classic developmental theories of Freud, Erikson, White, and Piaget. Deci (1975, 1980) described intrinsic motivation as a need to be competent and self-determining with relation to the environment.

Furthermore, infants are born with undifferentiated intrinsic motivation. They respond immediately to stimuli and later learn to prolong stimuli which they find pleasurable. The development of those behaviors are the rudiments of self-determinism and competence. As children grow, their interactions with the environment add to or subtract from this evolving sense of competency and self-determination (Deci, 1980; Deci & Ryan, 1985).

Perceived competence in a child is positively related to the child's intrinsic motivational orientation to prefer challenge, to be curious, and to engage in independent mastery attempts (Harter, 1982). Pender's Health Promotion Model and research suggest that cognitive variables such as perceived control of health, personal competence, definition of health, and health status influence a healthy lifestyle. She has concluded that the desire for well-being may be a more effective source of motivation for healthy behaviors among children than fear arousal based on the future threat of illness (Pender, Walker, Sechrist, & Frank-Stromborg, 1990).

Some suggest that children's adoption of healthy behaviors is the result of a variety of internal and external motivational factors (Igoe, 1991). Others suggest that motives are internal; they denote important priorities and hoped-for outcomes

(Gochman, 1982). While behaviors can be reinforced, rewards are incentives and not motives. One must distinguish health, or having good health, from other motives that might be equally, if not more, health-promoting. These include the desires of the child to be socially involved, physically active, and academically successful (Gochman, 1982).

Research attempting to understand children's healthy behaviors has focused on children's knowledge to the exclusion of their motivation. However, motivation is a particularly important variable in the prediction of children's health-promoting behaviors (Cox, Cowell, Marion, & Miller, 1990). Behaviors such as what snacks to eat, and whether or not to exercise are mostly a matter of choice for the school-age child. These behaviors require self-determinism and competency in judgement.

Indeed, an early study by Swann and Pittman (1977) found that children who were given an actual choice in play activity demonstrated greater intrinsic motivation for the target activity than did children who were denied a choice. A recent study found that adults who were given a perceived choice of music exhibited greater intrinsic motivation to aerobically exercise (Dwyer, 1995). Research also indicates that perceived success and self-efficacy predict intrinsic motivation among adult exercisers (McAuley, Wraith, & Duncan, 1991).

To date, research has focused on children's knowledge, rather than motivation, as influential in predicting health behavior. There is recent evidence that the intrinsic motivation of a child is a primary determinant of the child's positive health behaviors.

Cognitive Appraisal

The element of cognitive appraisal represents one's perception of the health concern or the existing health state, and it is closely associated with the child's age. Cognitive appraisal influences the child's perceptions of reality and his/her understanding of health. The IMCHB assumes that each client has unique characteristics that affect one's health behavior choices via cognitive appraisal.

Not much is known about the health perceptions of school-age boys and girls (6-12 years). Several factors may be responsible for this gap in knowledge. First, the health status of children in that age group is generally better than in other childhood groups - infancy, preschool, and adolescence (U.S. Dept. of Health and Human Services, 1991). This has contributed to a tendency by health care professionals and researchers to overlook the health perceptions of school-age children. A second probable reason is the change in utilization patterns of health resources that occurs during these years. School-age children usually seek care for specific illnesses rather than for health-maintenance purposes. Acute illness visits may not offer a conducive setting for assessment of health perceptions by health care professionals (Graham & Uphold, 1992).

Much of the research has focused on children's knowledge and conceptions of illness, rather than health (Blos, 1956; Gellert, 1961; Hergenrather & Rabinowitz, 1991; Lau & Klepper, 1988; Myers-Vando, Steward, & Folkins, 1979; Nagy, 1951;

Neuhauser, Amsterdam, Hines, & Steward, 1978; Redpath & Rogers, 1984). Even so, investigators have used the terms 'health' and 'illness' interchangeably. For example, a study by Lau & Klepper (1988) purported to explore determinants of health-related attitudes in school-age children by examining the development of child illness orientations in a representative sample of children and their parents. The researchers defined illness orientations as the child's attitudes toward doctors and the acceptance of "correct" guidelines when feeling ill. They proposed that a child's illness orientations were related to the parents' health beliefs, the child's past experience with illness, the child's intelligence, and the child's self-esteem. They found that the most important direct influence on a child's illness orientation was his/her self-esteem. The most prominent background factors relating to the child's self-esteem were: (1) the parents' intellectual ability (positive relationship) and (2) living in a one-parent family for the younger child (negative relationship). The researchers posit that self-esteem can influence a child's future health through its relationship with the child's illness orientation. Unfortunately, several of the variables were not operationalized well. For example, an indicator of bad health was the number of days the child was absent from school. However, there are other reasons for school absences such as vacation travel, out-of town family visits, and illness/death of family members. In addition, two indicators for the child's intellectual ability were: (1) parental rating of how good a student the child is, and (2) parental rating of how well the child does in reading, spelling, and math. Ratings of their children's school achievement are highly

subjective and likely relative to parental levels of educational achievement. Lastly, one indicator for "correct beliefs" about illness is for the child to choose a very happy face to describe how he or she feels about going to see a doctor. It could be argued, though, that a child with positive health attitudes wouldn't be extremely happy to visit a doctor, and that perhaps the child who is a hypochondriac would be most happy to see a doctor.

Other studies have investigated the structure of illness knowledge in children. The development of illness knowledge among healthy children in three age groups (6-7, 9-10, and 13-14 year-olds) was examined by Hergenrather & Rabinowitz (1991). They found that younger children used non-illness-related concepts when sorting illness-related stimuli more often than did the older children. Younger children believe that changes in behavior, rather than the symptoms, are indicative of illness. The older children believe that symptoms are indicative of illness and they also have a broader understanding about the many factors that cause illness. The authors suggest that the behaviors associated with illness form a primary conceptual and explanatory framework for young children. With increased illness knowledge, children rely more on internal, physiological cues as signs of illness, rather than behavioral cues.

Additionally, investigators have found that a child's age influences the content and nature of his/her conceptions of health (Bibace & Walsh, 1980; Natapoff, 1982; Spitzer, 1992; Watkins, 1992). Regarding conceptual and cognitive development, younger children rely heavily on physical cues to determine health status (Logsdon,

1991). For example, Watkins (1992) tested the extent to which youth in grades 3, 6, 9, and 12 believed that frequent activity resulted in various physical and psychological outcomes. Each of the student groups evaluated believed that frequent activity resulted in beneficial physical outcomes. Younger respondents were more likely to affirm external physical outcomes than either internal physiological or psychological outcomes.

Furthermore, beliefs and concepts about health develop early in life (Tinsley, 1992). Flaherty (1986) explored the health conceptions and health-related behaviors of 41 four- and five-year-olds, using a picture-interview guide. She found that preschool children (ages 4-6 years) were able to associate a pleasant feeling state with being healthy and an unpleasant feeling state with not being healthy. They were able to identify whether a depicted child was healthy or not, and able to use physical cues in their assessment. Approximately a third of the children tested comprehended the words healthy or not healthy.

Building upon this work, Logsdon (1991) administered a modified version of Flaherty's (1986) Preschool Health Picture Interview to study conceptions of health and health behaviors among 30 preschool children. Her research demonstrated that the children's conceptions of health were composed of several components which included a positive feeling state and the ability to participate in activities such as playing and going to school. Similar results were reported by Robinson's (1987) study in which preschool children viewed health as a positive feeling state associated with the ability

to play. They differentiated between healthy and unhealthy people based on activity level, facial expression, and feeling state. Lastly, the children in Logsdon's (1991) study conceptualized health in terms of specific health behaviors such as eating "good" foods. A good diet also has been identified by children as the most important activity for promoting health in other studies (Eiser, Patterson, & Eiser, 1983; Flaherty, 1986; Lasky & Eichelberger, 1985; Natapoff, 1978; & Palmer & Lewis, 1976).

Although children perceive a healthy diet as an essential component of good health, they lack knowledge regarding some aspects of nutrition. A study by Resnicow & Reinhardt (1991) found that 49% of third grade students knew that fiber is good for one's health, but only 18% knew that beans and whole wheat contain fiber. Similarly 54% knew that high blood pressure contributes to heart disease, but only 22% knew that a low-fat diet reduces the risk of heart disease.

There may also be incongruence in how children perceive themselves, and their actual behavior which impacts upon their health. A study which described and compared the health perceptions and behaviors of 83 school-age children, found mixed results (Graham & Uphold, 1992). While 90% of the boys and girls perceived themselves as healthy, the majority (58%) reported eating empty-calorie snacks in a 24-hour period. The authors reported that those children did not list fruits or vegetables in their dietary recall of snacks. Surprisingly, 100% of the children conveyed that they participated in three different types of exercise daily. However, these findings must be interpreted carefully. The researchers stated that a review of

previous health behavior instruments enabled the generation of questions for their age-appropriate interview format. There was no reliability or validity reported for their instrument.

In sum, cognitive appraisal contributes to a child's understanding of health and illness. Factual knowledge, attitudes and beliefs, and cognitive development are components of the child's cognitive appraisal. The association of cognitions with children's health behaviors remains ambiguous, as evidenced by the literature.

Affective Response

The amount and quality of research on affective experience and expression has increased in the last decade (Garber & Dodge, 1991), but there remains ambiguity about what "affective response" is and how to define it (Blechman, 1990). Many definitions of affective response exist, depending on the theoretical orientation and methodology of the researcher (Blechman, 1990; Palmer, 1994). The lack of theoretical consistency has contributed to researchers employing multiple operational definitions in their studies, which has hindered attempts to integrate findings across disciplines (Flannery, Torquati, & Lindemeier, 1994).

Significant influences on affective response are the attributions, motivations, and expectancies of the individual (Garber, Braafladt, & Zeman, 1991). One's "affective response" is also influenced by biological factors and social experiences and contexts (Garber & Dodge, 1990). Indeed, one's social context and cognitive

appraisals are important elicitors of emotion across the life span (Flannery et al., 1994). However, affective development has frequently been placed in dichotomy with cognitive development. This reflects an age-old concern with mind-body dualism, thinking versus feeling (Palmer, 1994). Rather, the effects of cognitive and affective characteristics are mutual and reciprocal, rather than unidirectional. Either can influence the manifestation and development of the other (Anastasi, 1994; Cox 1982).

Affective responses can be conceptualized as both proactive and reactive. Emotional responses are proactive in that they add selectivity to perception and focus to cognition. They organize and motivate behavior (Izard, 1993). Emotions are also reactive, as in a response to stimuli (Lazarus, 1991).

Cognitive processes such as appraisal and causal attribution frequently activate affective responses. Cognitive processes are but one of several types of phenomena that can activate emotional responses. Spontaneous activity of the nervous system, feedback from expressive behavior, and affective states like pain or sexual pleasure can also activate an emotional response. Once activated, emotions influence subsequent perception, cognition, and action (Izard & Eisenberger, 1994).

A particularly troublesome trend has been researchers' tendency to focus on negative affective response at the expense of positivity. Even though a few recent studies have examined positive affective response (Blechman & Culhane, 1993; Flannery et al., 1993), the literature is still dominated by investigations of negative affective response in the prediction of one's behavior. However, affective response

and its role in predicting a client's health behavior is characterized by a continuum of positive and negative emotional states (Cox, personal communication, 1996).

The literature reports numerous determinants of individual differences (client singularity) in affective responding. Zola (1966), for example, described certain socio-cultural differences in the affective representation of body symptomatology. Clients of Italian descent respond with a highly dramatic and increased affect to symptoms, whereas Irish clients are less expressive and often stoic in their affective response.

Individuals are frequently faced with the choice between what they would like to eat as opposed to what they should eat. In addition to information regarding the negative longterm consequences of overconsumption of preferred foods, other very powerful forces, such as food preferences, determine one's diet (Birch, 1981; Coates, 1977; Hall and Hall 1974).

The failure of information-providing strategies to produce health behavior change is not limited to the domain of eating. Similar to diet behavior, physical activity involvement is very resistant to change. It is characterized by a powerful affective, noncognitive component that is not influenced by information, even about contingencies or consequences (Birch, 1981; Wankel, 1985).

To date, much of the research on affective response has been conducted with hospitalized children and their experiences with health care events and/or providers. Most studies examining healthy children have focused on their affective response to a

stressful medical procedure. Certainly, one could expect that any child in such a situation might exhibit anxiety as an affective response. However, for many children making choices about diet and physical activity, they choose what they like. And most of the time, their decisions are not made on the basis of anxiety about health states.

The other manifestation of "affective response" that has most often been reported in the literature is the fear associated with a health concern. Fear can be a major part of an individual's experience of health and one's decisions in health behavior. Most likely, there are differences in the processing of message content and context cues on health behavior by children and adults. The degree of fear/anxiety associated with a health state or concern is one appropriate operationalization of affective response when studying adult behavior. Indeed, the degree of fear/anxiety associated with a health concern has been confirmed as a predictor of adult health behavior (Cox, personal communication, 1996).

It is understandable that the affective response of "fear" plays a definitive role in health and wellness perceptions for adult populations. As with anxiety, however, fear does not effectively operationalize the notion of affective response in studies of children's diet and physical activity. Fear of potential health problems in adulthood is not likely to be a prominent factor in children's choice of diet and physical activity.

The research provides evidence that children's preferences are important determinants of their food consumption patterns. A recent study examined differences in preferences for high-fat foods, dietary fat intake, and children's anthropometric

measurements. Although all children were offered the same daily menu, their dietary fat intakes ranged from 25% to 42% (Fisher & Birch, 1995). Children indicating strong preferences for high-fat foods had high total fat intakes ($r = .54$, $p < .05$). The children's fat preferences were also related to their triceps skinfold measurements ($r = .61$, $p < .01$). This research suggests that individual differences in children's food selection patterns are mediated, in part, by food preferences. Another investigation by Calfas, Sallis, and Nader (1991) found 66% agreement between stated preferences and food choices from pairs of photographed foods among children. Recent research provides strong evidence that a child's preference for foods predicts his actual diet much better than his knowledge of healthy foods (Baranowski, personal communication, 1996; Birch, personal communication, 1996).

Regarding physical activity, children are more likely to be enthusiastic about participating in physical activities when they find the activities enjoyable and absorbing (Duda, Fox, Biddle, and Armstrong, 1992). Studies indicate that, in general, participation in physical activity is a positive experience for children. Physical activity (informal, organized, and physical education class) is associated with arousal, positive affect, and motivation among children (Chalip, Csiksentmihalyi, Klerber, and Larson, 1984; Kirschnit et al., 1989; Kunesch, Hasbrook, and Lewthwaite, 1992). Positive affect is defined as pleasurable engagement with the environment (Watson, Clark, & Tellegen, 1984). Likewise, higher satisfaction for an exercise program and less attrition in continued exercise involvement is associated with positive affect among

adults (Noland et al., 1990).

In sum, the concept of affective response to a health state has frequently been operationalized from a negative perspective. However, this is not the most relevant operationalization for studying children's diet and physical activity. Children do not worry about the long-term health consequences of their behavior choices! Whenever possible, they will eat their favorite foods (Birch & Sullivan, 1991; Perry, personal communication, 1996) and participate in physical activities perceived as fun (Kunesh et al., 1992; Lewthwaite, personal communication, 1996). Therefore, a positive affective perspective best operationalizes the concept when studying children's behavior.

Health Outcome

Clinical Health Status Indicators

The implied outcome measure of the IMCHB is health behavior or a health state resultant from that behavior. The model posits health outcome to include five distinctive variables (Cox, 1982). The variable of clinical health status indicators has been selected for the purposes of the proposed study. Clinical health status indicators will be operationalized with measures of the child's diet and the child's physical activity. Positive health behavior within the IMCHB refers to conditions which maintain or promote the health state of the client, and negative health behaviors are those which place the client at risk and decrease his or her potential for self-actualization in the areas of physical and psychosocial well-being.

Diet. Diet has been correlated with cardiovascular disease (CVD) through its impact on risk factors, including high blood cholesterol, high blood pressure, obesity, and diabetes mellitus (Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure, 1993). These risk factors affect one-eighth to one-half of American adults (Sempos, Cleeman, & Carroll, 1993). A proper diet can help prevent disease and decrease its severity over the long term (McGinnis & Folge, 1993).

National guidelines for cardiovascular nutrition have become possible through scientific consensus during the past decade (Nestle, 1992). The American Heart Association and the National Cholesterol Education Program recommend limiting total dietary fat consumption to 30% or less of total calories and consuming no more than 10% of calories from saturated fat. Prevention guidelines also include limiting cholesterol to 300 mg or less per day (National Institute of Health, 1990). However, many children do not adhere to recommended guidelines of the American Heart Association. Approximately 76% exceed total fat guidelines, 77% exceed saturated fat guidelines, and 57% exceed dietary cholesterol guidelines (Nicklas, Webber, Johnson, Srinivasan, & Berenson, 1995).

Data from the Bogalusa Heart Study help provide the rationale for primary prevention of adult cardiovascular diseases beginning early in life. Since 1973, the community population of children and young adults living in Bogalusa, Louisiana has been examined through repeated cross-sectional surveys and longitudinal cohorts

(Webber, Srinivasan, & Berenson, 1993). At baseline in 1973, children ages five to 14 years ($N = 3524$) and preschool-age children ($N = 714$) participated. The sample has been examined extensively, with the oldest subject now 31 years-old. Strong evidence is available that tracking of cardiovascular risk factors exist, i.e. children at risk remain at risk over time (Webber, Srinivasan, Wattingney, & Berenson, 1991). For example, the correlation of total cholesterol levels measured 12 years apart remains statistically significant.

Public awareness concerning the impact of diet on CVD, particularly the role of fats and the risks associated with elevated blood cholesterol, has increased significantly in the past ten years (Food Marketing Institute, 1992). However, this increased awareness has not consistently translated into healthy eating patterns (Schucker, Wittes, & Santanello, 1991). A recent Gallup study concluded that, by the age of nine years, many children had developed notable nutritional misconceptions which may interfere with healthful eating (Borra, Schwartz, Spain, & Natchipolsky, 1995). Two of three children (65%) reported that they occasionally skip breakfast, and 37% indicated that they sometimes skip supper. However, most children felt positively about their dietary habits and two-thirds rated their eating habits as good to excellent.

However, the results of the survey must be interpreted with caution. There was no information provided on whether the sample ($N = 410$) of children 9-15 years old was representative of the national population. Likewise, no reliability and validity statistics were reported for the instruments. Questions such as, "To eat healthfully,

you should avoid all high-fat foods," with the possible responses of " (1) agree with a lot, (2) agree with some, (3) don't agree and (4) don't know", are confusing.

According to the investigators, if children chose the first or second response, they answered the question incorrectly. From the perspective of a well-informed health professional, the first and second responses are the only correct answers. Certainly a child would be perplexed and not know how to respond to a statement with such ambiguous answers. Lastly, the researchers erroneously assumed that if 52% of those surveyed reported an awareness of the Food Guide Pyramid, and if most were able to name one food group, then they understand many basic principles of healthful eating.

In sum, poor diet is a risk factor for cardiovascular disease in adulthood. The research suggests that many children are consuming an unhealthy diet. One's dietary patterns are learned in childhood and are difficult to alter later in life. A review of the literature indicates that CVD risk factors track into adulthood, so it is important to reduce them early in life.

Physical activity. Regular physical activity can help prevent a variety of chronic diseases and help reduce mortality associated with them (Bouchard, Shephard, Stephens, Sutton, & McPherson, 1990). The relationship between physical inactivity and CVD is well-documented. The median relative risk for CVD among sedentary persons is similar to that for other CVD risk factors such as smoking, high cholesterol and fat, and elevated systolic blood pressure (McBride, Einerson, Hanson, Heindel, 1992). Indeed, the American Heart Association Committee on Exercise and Cardiac

Diet and Physical Activity

Rehabilitation of the Council on Cardiology named physical inactivity as a risk factor with the same status as cholesterol, smoking, and hypertension (Fletcher et al., 1992). Despite heightened awareness of the importance of exercise to health and disease prevention, we remain a nation of sedentary people. Almost 60% of adults participate in either no leisure-time exercise or participate so infrequently that they receive few health benefits (Caspersen, Merritt, & Stephens, 1994). The lack of physical activity is higher among women, minorities, elderly, and those with lower socioeconomic status (U.S. Centers for Disease Control and Prevention, 1993; Caspersen & Merritt, 1995).

Physical inactivity among children is startling, with more than one-third of children aged 10-17 years not active enough to enhance cardiorespiratory fitness (U.S. Department of Health and Human Services, 1990). Recent indicators are that only 4 of the 11 physical activity objectives for the year 1990 included in *Promoting Health/Preventing Disease: Objectives for the Nation*, were accomplished (McGinnis, 1992). Current recommendations call for 75% of children aged 6 through 17 years to participate in 20 minutes or more of vigorous activity at least three days a week (U.S. Department of Health and Human Services, 1994). Additionally, objectives state that at least 30% of children aged six- years and older participate in at least 30 minutes of light to moderate physical activity daily.

As previously discussed, the Gallup Organization surveyed children on their diet and exercise attitudes and behaviors (Borra et al., 1995). Most children related

that they had participated in physical activities during the previous six months. Two-thirds of those reported playing outdoors whereas more than half had walked, jogged, ridden a bicycle or played basketball, football, or soccer. Approximately 60% of respondents said that they played outdoors with friends daily, and 55% reported walking almost every day. The researchers concluded that 28% of children met the moderate physical activity criteria, and 66% met the vigorous physical activity criteria for the Healthy People 2000 objectives. As with the dietary data (Borra et al., 1995), these results must also be considered very carefully. There are problems with asking children to recall their behavior for the previous six months. No one, including adults, can accurately recollect their actions for such an extensive period of time! Again, no reliability or validity statistics were provided for the instruments. Because of these limitations, the data collected and the analysis of that data was problematic. There was no way to discern how many activities, and how frequently, each child performed them. If the child answered affirmatively to "walking," he/she was considered to be physically active. Unless a child is physically handicapped, walking is a necessary activity of daily living. The act of "walking," by itself, does not qualify a child to be considered as physically active. However, an important finding of this survey was that the majority of children stated that the most important reason for being physically active was because it's fun and they enjoy it. Fewer respondents cited health benefits as the most important reason. This may be an important implication for planning interventions for positive physical activity patterns.

In sum, physical activity has been shown to be an important preventive behavior for cardiovascular disease in adulthood. There is evidence that many children and adults are not physically active enough to reduce their risk factors for heart disease. The literature indicates that there is tracking of exercise behaviors from childhood into adulthood. Further, research by Kelder et al. (1994) suggests that consolidation of these behaviors begin prior to sixth grade and that interventions in elementary school are indicated.

The evidence indicates that many school-age children consume poor diets and fail to engage in adequate physical activity. However, no study reported in the literature has sufficiently addressed the multiple influences (socio-demographic characteristics, environmental resources, previous health experiences, expressed motivation, and cognitive/affective responses) on diet and physical activity. These influences, though common to each of us, combine and interact uniquely within each child to produce specific health behaviors (Cox, 1982).

Therefore, the Interaction Model of Client Health Behavior (Cox, 1982) was selected to guide this study of children's diet and physical activity. Unfortunately, the only previous study (Farrand, 1991) of children's health behaviors which utilized the IMCHB was flawed by the poor design and measurement of several variables. This study is better designed to measure the key correlates of children's diet and physical activity. The research will contribute to the development of conceptually-based intervention strategies for promotion of positive health practices for this age group.

CHAPTER THREE

METHODOLOGY

In this chapter, the purpose of the study and the research question will be discussed. The research design will be presented and the target population sampling procedures will be outlined. Steps for assurance of the protection of human subjects will be explained. Study variables will be identified and their operational definitions will be provided. The choice of data collection instruments will be presented. Finally, data analysis techniques will be explained.

The purpose of this study was to identify those variables that influence the school-age child's enactment of diet and physical activity. Specific objectives were: (1) to use the Interaction Model of Client Health Behavior as a conceptual guide in explaining the correlates of children's diet and physical activity, (2) to determine the relative and cumulative contributions of socio-demographic variables, health experiences, family influence, intrinsic motivation, cognitive appraisal and affective response to children's diet and physical activity, and (3) to use the empirical base developed for proposed nursing interventions to potentially optimize the performance and retention of preventive diet and physical activity behaviors in school-age children.

The research question addressed was: What elements of client singularity (uniqueness) are related to the diet and physical activity of the school-age child? Gender was the single most salient background variable to health behavior in the

Farrand study, the only previous study of children based on the IMCHB. Therefore, a subsidiary question addressed was: What is the relationship of gender to diet and physical activity of the school-age child? A sample of fifth-graders and their parents participated in the study. Information on the family's demographics, health experience, social influence and environmental resources was collected. Data on the children's intrinsic motivation, cognitive appraisal, and affective response to food/physical activity were gathered. Finally, the children's self-reports on diet and physical activity were collected, as were parent's self-reports on health habits.

Design

The research was a descriptive correlational study of the diet and physical activity of the school-age child. A cross-sectional design (the collection of data at one point in time) was used for the investigation. Variables were identified and relationships explored among those variables which influence one's health outcome, as proposed in the Interaction Model of Client Health Behavior (IMCHB).

Sample

Children enrolled in the fifth grade of three separate school districts in East Tennessee and one school district in Eastern Kentucky, and their parents, were the target population for the study. The four districts were selected to ensure a more diverse sample and to provide a cross-section of gender, socioeconomic status, and health experiences. In general, the age level of children in the fifth grade is 10-12

years. This age group was chosen as an example of children presumed to be in the Piagetian stage of concrete operations. Those students who agreed to participate and met the following criteria were included: (1) between 10-12 years of age inclusively, (2) able to complete a questionnaire in English, and (3) in mainstream education classes. Those parents who agreed to participate and were able to complete a questionnaire in English were also included. A convenience sample was used for the study. Data was collected and analyzed on 371 children and 371 matched parents.

Protection of Human Subjects

Permission to select potential subjects through the public schools was obtained from the school administration. Prior to contacting potential participants, approval was obtained through the College of Nursing's Human Subjects Review Committee, and subsequently by The University of Tennessee Institutional Review Board.

The Department of Health and Human Services (1983) has defined informed consent as the knowing consent of an individual or his legally authorized representative to exercise free power of choice without undue indictment or element of force, fraud, deceit, duress, or other forms of constraint or coercion. It is generally accepted that children cannot give informed consent because of immaturity and inability to understand research (Polit & Hungler, 1995). Therefore, assent - a moral requirement to acquire the closest approximation of consent within the child's capacity to understand (Mitchell, 1984) was obtained from each child. The child was given an

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understandable explanation of the risks and benefits of the research. The act of assent was voluntary. Verbal or nonverbal dissent excluded the child from the study.

The proxy consent of the parents was also obtained before research was undertaken. The guidelines for proxy consent include: (1) the child must give assent, along with written informed consent from the parent participants, (2) both child and parent must be provided with an understandable explanation of the risks and benefits of the research, and (3) research cannot be conducted if there are objections by either party (DHHS, 1983).

Children and parents were informed that the data collected for the study would be kept strictly confidential. Only the investigator would have access to named data files, and names would not be stored on the analysis files. All raw data materials would be kept in locked file cabinets and no information would be released to anyone outside the project. Children and their families would not be identified by name. Child-parent pairs were informed that a brief summary of results (group data) would be provided to those families requesting it at the conclusion of the study.

Procedure

Data Collection

Fifth-grade students in four school districts (five schools) were sampled for the study. The research was approved by the local school administration. In each case, presentation of the study was given by the investigator to the elementary principals. A

written abstract of the study, as well as copies of the measurement instruments, were circulated before the presentation. With approval of the principals, the individual teachers were advised of the study and appointment for presentation to the fifth grade classrooms was arranged.

As stated previously, the data for this study was derived from fifth-grade children and their parents. A letter inviting participation, along with parental consent forms, was given out by the classroom teachers and sent home with the children. The modified Family Profile and the Health Habits Scale were also sent in the packet with the letter and consent form. For those families who agreed to participate, one parent completed a modified Family Profile, and a Health Habits Scale in the home.

Assent of the children was obtained in the classroom after their parents had agreed. The child surveys were administered on a group basis in the classrooms. Verbal and nonverbal cues were used to identify misunderstanding, and to provide clarification and encouragement. Students who chose not to participate were teacher-occupied during the test administration.

All data collected for the study has been kept strictly confidential. Once collected, the student data were matched with the parent data and the family was coded by school and classroom. Each school that participated in the study was informed that the school would be supplied a written report of the findings, and that the option of a seminar presentation for the teachers and principal on group data for the individual school would also be available.

Operationalization of the IMCHB

The operationalization of the IMCHB was done specifically with the Client Singularity and Health Outcome elements (see Table 2). The demographic characteristics of the model included the child's age and gender. Social influence of the fifth-grade children was operationalized as family function and as parental health habits. Health experience was operationalized as current health of the child and parent as perceived by the parent. Environmental resources were operationalized as the educational level of the parents and the family's financial difficulty.

The final three Client Singularity elements were operationalized to help explain children's health behaviors. Intrinsic motivation was analyzed by the child's diet self-efficacy and physical activity self-efficacy, dynamic factors in the motivation of diet and physical activity behaviors. Cognitive appraisal was determined through the self-ratings of children's general health. Affective response was explored by questionnaires on food preference and feelings toward exercise. The Health Outcome element of clinical health status indicators (dependent variables) was measured by the self-reports of children's diet, very low to low intensity physical activity, and moderate to vigorous physical activity.

Measurement

Measures were selected on the basis of relevance to the research question and psychometric strength. Each will be discussed within the context of the IMCHB model.

Table 2. IMCHB Elements Measurement Approach.

IMCHB Elements	Study Variables	Measures
<u>Client Singularity</u>		
Demographic Characteristics	Child's Age Child's Gender Parental Marital Status Parent Education	Modified Family Profile
Social Influence	Family Function Parental Health Habits	Family APGAR Child Form Health Habits Scale
Health Experience	Family Health Child Parent	Modified Family Profile
Environmental Resources	Financial Difficulty Parental Educational Level	Modified Family Profile
Intrinsic Motivation	Child's Diet Self-Efficacy Child's Physical Activity Self-Efficacy	CATCH HBQ Children's Dietary Self-Efficacy Scale CATCH HBQ Children's Physical Activity Self-Efficacy Scale
Cognitive Appraisal	Child's Health Perception	Child's Self-Rating of Health Status
Affective Response	Food Preferences Feelings Toward Exercise	Hearty Heart Food Preference Questionnaire CHIC II Attitudes Toward Exercise-Self Scale of the YHS
<u>Health Outcome</u>		
Clinical Health Status Indicators	Child's Diet Child's Physical Activity	CATCH HBQ Food Behavior Scale CHIC II Physical Activity Checklist of the YHS

Operational Definitions

Demographic Characteristics. Child's age and gender, and marital status of parents as measured by the parent's responses on a modified Family Profile (Farrand, 1991).

Social Influence. Family function as measured by the child's responses on the (child) form of the Family APGAR (Austin & Huberty, 1989). Parental health habits as measured by the parent's score on the Health Habits Scale (Williams, Thomas, Young, Jozwiak, and Hector, 1991).

Health Experience. Family health (child's health, parent's health) as measured by the parent's responses on the modified Family Profile (Farrand, 1991).

Environmental Resources. Parent's educational level, family's financial difficulty as measured by the parent's responses on the modified Family Profile (Farrand, 1991).

Intrinsic Motivation. Health motivation as measured by the child's scores on the Children's Dietary Self-Efficacy Scale and the Children's Physical Activity Self-Efficacy Scale of the CATCH Health Behavior Questionnaire.

Cognitive Appraisal. Self-rating of general health as measured by the child's perceived health status.

Affective Response. Preference for food as measured by the child's scores on the Hearty Heart Food Preference Questionnaire and feelings toward exercise as measured by the Attitudes toward Exercise-Self Scale of the Youth Health Survey.

Diet and Physical Activity

Clinical Health Status Indicators. Self-reports of diet and physical activity.

Diet. Diet as measured by the child's scores on the Food Behavior Scale of the CATCH Health Behavior Questionnaire.

Physical Activity. Physical activity as measured by the child's scores on the Physical Activity Checklist of the Youth Health Survey.

Instruments

Modified Family Profile. This questionnaire of family characteristics was developed by Farrand (1991). It was modified by the researcher for the purposes of this study. A parent respondent completed the survey in his/her home. The form measured the demographic characteristics, health experiences and environmental resources of the child for the study. The child's current health status (as evaluated by the parent) and the parent's self-rated health status were also assessed. This allowed for a brief overview of the health environment for the child, which might have contributed to the child's health perception and behaviors. The child's environmental resources were operationalized as the educational level attained by the parent respondent, and the family's financial difficulty. Each item was treated as an independent variable to determine its relative contribution to the child's diet and physical activity.

Health Habits Scale. This self-report scale was developed as a brief, psychometrically sound measure of health habits. It was used to measure parental

health habits and operationalized the construct of social influence in the IMCHB for this study. The Health Habits Scale (HHS) consists of five positive health items and five negative items, and is a brief health habits checklist. Two different samples of adults ($N = 1519$, $N = 763$) were used in the development and the determination of psychometric properties of the scale. The scale has strong content validity (.85 interjudge agreement regarding health nature of items and .84 regarding positive versus negative directionality of items). The instrument has shown strong test-retest reliability ($r = .85$ over a 2-to 3-week period), agreement between self-and-other-ratings of health practices, and consistent concurrent and discriminant validity. The tool's main limitation has been low internal consistency (Williams et al., 1991).

Indeed, for the sample of parents in this investigation, the alpha value was .52. However, one would not expect a high internal consistency for this instrument because it is not a psychosocial scale but a measure of behavior and it is not designed to measure just one attribute. Previous studies have shown that enactment of behaviors such as exercise is not highly correlated with other behaviors.

Family APGAR. This brief questionnaire is designed to elicit a data base that will reflect a client's view of the functional state of his/her family. The form features five close-ended questions, and may be given to members of either nuclear or alternative lifestyle families. The questions permit qualitative measurement of the family member's satisfaction with each of five components of family function. The acronym APGAR reflects the functional components of Adaptability, Partnership,

Growth, Affection, and Resolve (Smilkstein, 1978).

Reliability data supported the use of this instrument for the study. Cronbach's alpha (.80) from an early study (Smilkstein et al., 1982), and a more recent study (.90) (Reeb, Graham, Zyzanski, & Kitson, 1987) are consistent. Cronbach's alpha ranged from .83 to .87 in the Gillis, Neuhaus, & Hauck's (1990) investigation. The high coefficients support the conclusion that the instrument is a unidimensional measure of satisfaction with family functioning. Finally, a 2-week test-retest reliability in a sample of students ($N = 100$) was .83 (Smilkstein et al., 1982).

Validity data are also well-established for the Family APGAR. Regarding content validity, item 5 was changed after early studies were conducted. Respondents now respond regarding their satisfaction with the quality, rather than the quantity, of time spent with family members (Sawin & Harrigan, 1995). Studies have also confirmed the construct validity of the instrument. Initial studies were conducted using a 3-choice format with college students. A second college student sample was used for testing the 5-choice format. The larger number of choices increased the standardized mean score, the reliability, and the item/total correlations. Subsequent studies of 133 clinic patients yielded mean scores (8.22) which were very similar to initial validation studies for graduate students, but somewhat higher than mean scores (7.35) for college students (Smilkstein et al., 1982).

The Family APGAR was correlated with other measures of family functioning to determine its concurrent validity. The instrument was highly correlated with

Pless-Satterwhites Family Functioning Index at $r = .80$, and with therapists' estimates at $r = .64$. Correlations between spouses was $.67$ (Smilkstein et al., 1982). Evidence for predictive validity was provided, as low Family APGAR scores predicted postpartum complications in high-risk mothers (Smilkstein, Helsper-Lucas, Ashworth, Montans, & Pagel, 1984). Finally, the original study determined that the instrument discriminated between samples of well-adjusted and maladjusted students, with all five items and the total APGAR significantly different (Sawin, & Harrigan, 1995).

An altered form of the Family APGAR for use by younger children (8 years old) was developed by Austin and Huberty (1989) because the reading level of the original instrument was assumed to be at age 10 or above. The original structure was followed but the items were simplified. For example, the first APGAR item was changed from "I am satisfied that I can turn to my family for help when something is troubling to me" to "when something is bothering me, I can ask my family for help." Two studies have utilized the revised instrument. In the first study ($N = 50$), the original and revised APGAR instruments were both used approximately 2 weeks apart. Explanations were seldom necessary for the revised questionnaire, and the instrument's administration was counterbalanced for order. Another instrument was administered in between the two forms to decrease memory of responses to the first APGAR. The internal consistencies were $.71$ and $.68$. In the second study, 250 children completed the revised APGAR and the Cronbach's alpha was $.70$. The authors concluded that the revised APGAR allows for independent ratings of family functioning by younger

children better than the original APGAR (Sawin, & Harrigan, 1995).

The altered (child) form of the instrument was administered to the sample of fifth-graders in this study. For this sample of students, Cronbach's $\alpha = .74$ (acceptable for a 5-item instrument administered to children). Family function as perceived by the child, and measured by the revised Family APGAR, operationalized the construct of social influence in the IMCHB (along with parental health habits as measured by the Health Habits Scale). These two variables were analyzed independently.

Children's Dietary Self-Efficacy Scale of the Child and Adolescent Trial for Cardiovascular Health (CATCH) Health Behavior Questionnaire (HBQ). The CATCH (Phase 1) was a school-based, longitudinal cardiovascular disease risk factor intervention that was implemented for three years among children in 96 schools, from the beginning of third grade through the fifth grade. The HBQ was collected from over 6,000 students from 96 schools across four states (California, Louisiana, Minnesota, and Texas). The HBQ was developed and piloted during Phase 1 of CATCH (1988-1991) (Edmundson, Parcel, Perry, Feldman, Smyth, Johnson, Layman, Bachman, Perkins, Smith, & Stone, 1996).

For the purposes of this study, the Children's Dietary Self-Efficacy Scale was used to measure the child's intrinsic motivation as a dynamic variable which helps explain one's diet choices. The Health Behavior Questionnaire (HBQ) was developed and piloted to measure several psychosocial constructs including dietary self-efficacy

and usual diet behavior among elementary school children (Parcel et al., 1995). The HBQ was piloted with 1127 third and fourth grade children enrolled in public schools at each of four sites across the United States. The children's dietary self-efficacy scale (CDSS) assessed children's self-efficacy to eat foods lower in fat and sodium. Food items for CDSS were selected from research that investigated food frequencies among children in this age group (Simons-Morton, Baranowski, Parcel, O'Hara, and Matteson, 1990).

The CDSS measured children's self-confidence in their ability to choose lower fat, lower sodium foods rather than high fat or high sodium alternative foods. Self-efficacy items represented common food choices that could potentially lower fat and sodium intake among the third and fourth-graders. The item stems began with "How sure are you...?" The response format was a three-point, Likert-type scale with the options of not sure, a little sure, or very sure. For example, students were asked, "How sure are you that you could eat fresh fruit instead of a candy bar?" The food choices presented in the items incorporated several food groups and various sources and types of fat and sodium (Parcel et al., 1995).

For purposes of content validity, CDSS items were reviewed by experts (nutritionists and behavioral scientists). Third and fourth-grade school teachers reviewed the items and provided feedback on readability for this age group. Also, focus groups of third and fourth-graders were used for initial field-testing of the self-efficacy response stem.

Items on the CDSS were scored and summed for a total score. Of the original sample of 1127, 958 completed questionnaires with no missing answers, and were included in the analyses. The distribution of CDSS was skewed to the right, indicating more children scored on the high end of the scale, suggesting a greater tendency for children to mark the “very sure” response to the scale items, rather than the “not sure” response.

Results from the data analysis to determine psychometric properties of the CDSS indicated a high level of internal consistency (standardized coefficient alpha = .84) and an acceptable level of test-retest reliability ($r = .63$). This estimate is somewhat lower than the traditional estimate of an acceptable value for test-retest coefficients. However, the overall reliability results were particularly encouraging for this age group. Self-reports of children in the elementary grades are not as consistent as those of older children, adolescents and adults (Parcel et al., 1995).

The results from the validity analyses offer support for the scale’s construct validity. The principal factor analysis for CDSS was computed, and results indicated only one factor that met the eigenvalue greater-than-one rule. The eigenvalue for the first factor was 5.137 and accounted for 97% of the variance in the CDSS. Values for the factor loadings ranged from .51 to .65, which provided empirical evidence for a single factor scale supporting use of a total scale score without subscores (Parcel et al., 1995).

The outcome of a multiple regression analysis provided support for the

concurrent form of criterion-related validity. The model included three statistically significant variables: self-efficacy, gender, and grade. The multiple correlation estimate (Multiple R) for the model was .61, and the model R-Square was .38. Self-efficacy was the strongest predictor of usual food choices (self-efficacy partial $r = .34$); the variables of gender and grade accounted for less than 4% of the total variance in usual food choices. Thus, adequate evidence of convergent validity between dietary self-efficacy and usual food choices was demonstrated.

For the sample of students ($N = 371$) in the current study, Cronbach's alpha was .82. This coefficient provided evidence of high internal consistency for the instrument.

CATCH HBQ Physical Activity Self-Efficacy Scale. As discussed previously in this paper, the Health Behavior Questionnaire (HBQ) was developed as part of the school-based cardiovascular health promotion program entitled the Child and Adolescent Trail for Cardiovascular Health (CATCH). The Physical Activity Self-Efficacy Scale is a subscale of the HBQ, and was administered to third graders in 96 public school in four states ($N = 2410$) during 1991-1992 as part of the CATCH baseline assessment. Participating and nonparticipating students had similar gender and ethnicity, except that whites and blacks were more likely to provide consent than Hispanics.

The Physical Activity Self-Efficacy Scale includes five items in which students are asked if they are "not sure," "a little sure," or "very sure" that they can do such

things as “keep up a steady pace without stopping for 15-20 minutes.” Items run in a positive direction, responses are summed, and higher scores indicate higher self-efficacy. Internal consistency was acceptable for third-grade children ($\alpha = .67$), and construct validity was evidenced by the finding that physical activity self-efficacy is associated with children’s participation in physical activity (Simons-Morton et al., 1997).

For the sample of students in this investigation, Cronbach’s alpha was .71. This coefficient provided evidence of acceptable internal consistency for a 5-item instrument with this age group of children.

Child's Self-Rated Health. The child's cognitive appraisal of the existing health state involves the child's perception of personal health. Self-ratings of health enable children to combine the objective information they have regarding their health with a personal evaluation of the information (Maylath, 1990). The principal investigators in Rand Corporation's Health Insurance Experiment concluded that children eight years and older may be capable of providing a more valid rating of their own health than their parents (Eisen & Ware, 1980).

For the purposes of the present study, the child was asked to respond to the statement, “I believe that my health is” by choosing the answer that most closely described him/her (excellent, good, fair, or poor). The distribution of responses was skewed to the right, suggesting a greater tendency for children to mark “excellent” or “good” to the statement.

Hearty Heart Food Preference Questionnaire. This instrument was used in the study to measure the child's affective response to food. The assessment of the affective domain has recently (in the last 12 or 13 years) been recognized as necessary to understand one's eating behaviors. Food preferences are, indeed, determinants of consumption (Birch & Sullivan, 1991; Contento, 1991). Preference involves affect or liking for specific food items and/or choosing one over the other (Domel, Baranowski, T., Davis, Leonard, Riley, & Baranowski, J. 1993). Measures of children's food preferences can help predict which foods will be eaten (Birch & Sullivan, 1991).

Unfortunately, there is a lack of validated instruments for measuring one's affective response to food. One psychometrically sound instrument used for this purpose is the Hearty Heart Food Preference Questionnaire. The food preference questionnaire was developed following focus group discussions with third and fourth grade students, and classroom piloted for content validity (Perry, Mullis, and Maile, 1985).

The questionnaire consists of two groups of 18 food pair pictures. For the group of pictures, the students identify which food in each pair they like most. The food pairs are designed to test food preferences for fat (10 items), salt (three items), and complex carbohydrates (five items). Previous reliability testing indicated strong internal consistency. The test-retest correlation was 0.85 for food preferences, determined with third and fourth-graders (N=371) in four elementary schools (Perry, et al., 1985).

For the sample of fifth-grade students in the current study, the Cronbach's alpha was .69. However, the coefficient was computed on 330 students, even though 371 students were in the study. If a student left an item blank on the instrument, he/she was not included in the reliability analysis.

Attitudes Toward Exercise-Self Scale of the Youth Health Survey. A child's affect (positive or negative) toward physical activity will help explain whether one is physically active. The Youth Health Survey (YHS) was developed for the Cardiovascular Health in Children and Youth (CHIC II) study, a school-based longitudinal study to assess and track cardiovascular risk factors in children and adolescents. The YHS includes a variety of subscales to collect data related to cardiovascular disease risk factors which can be administered during one class period. The subscales may be used individually to assess the variable of interest (Gilmer, Speck, Bradley, Harrell, & Belyea, 1996). The Attitudes Toward Exercise-Self Scale, a subscale of the YHS, assesses how students feel about exercise (Gilmer et al., 1996).

The instrument was developed from information collected on health perceptions related to sports participation (Thorlindsson, Vilhjalmsson, & Valgeirsson, 1990), and on adult's perceptions of exercise (Sechrist, Walker, & Pender, 1987). Students choose a response to each statement from a four-point Likert scale ranging from "strongly agree" to "strongly disagree" which are coded 1-4 respectively. Examples of statements include, "Exercise takes too much of my time," and "I like to exercise." Several items are reverse scored so that all items run in a positive direction.

Responses are summed, and higher scores indicate more positive attitudes toward exercise (Gilmer et al., 1996).

In the pilot study ($N = 205$), Cronbach's alpha was .80, and the test-retest reliability of the subscale was .73. The instrument had good construct validity; factor analysis produced one factor with loadings above .40, suggesting a unidimensional scale. The investigators reported that the Attitudes Toward Exercise-Self Scale was very promising with strong psychometrics for a new instrument. It was determined that students had positive attitudes toward exercise, even though their participation in vigorous activity was relatively infrequent.

A few items on the original instrument were deleted for the current research study. However, the alpha for this sample of students was .74, which provided evidence of acceptable internal consistency for a 6-item scale with fifth-grade students.

Child and Adolescent Trial for Cardiovascular Health (CATCH) Health Behavior Questionnaire (HBQ) diet behavior scale. The construct measured by the HBQ diet behavior scale is usual food consumption. The 14-item scale specifically asks about usual food choices (behavior) in a forced-choice format, focusing on lower fat or lower sodium food options (third grade alpha = 0.76; fifth grade alpha = 0.76). In each item students are asked which of the two foods presented they eat more often, i.e., "What foods do you eat most of the time, cookies or apples?" Comparable foods are presented across a variety of binary choices, with one of the two foods more heart healthy than the other. The scale was designed to measure usual food selections, rather

than serve as a daily record of consumption. Therefore, the scale measures what a child eats most of the time (behavior). The items within the scale are summed to produce a score, and divided by the number of items answered to produce an average of healthy food choices (Edmundson et al., 1996).

The child's clinical health status indicator of diet behaviors can accurately be assessed by this dietary instrument. Food items are included based on the frequency of consumption and nutrient content of foods from diet recalls previously collected from a similar population of children. Artwork depicting food choices provides a reference for the students and maintains their attention to the task.

Food frequency questionnaires favorably compare to other methods of assessing diet behavior. In a survey which focused on foods frequently consumed (particularly those high in fat and sodium), a food frequency questionnaire was administered to third through fifth grade students ($N = 943$). Comparison of foods reported on the food frequency instrument with 24-hour diet interviews conducted by trained interviewers following a standardized protocol yielded a percent agreement of 83.3%. The child was interviewed in the presence of a parent the same day the child completed the report which covered the same time period. The parent validated the self-report's accuracy for meals shared by the parent (Simons-Morton et al., 1990).

In the present study, the protocol for survey administration helped ensure the integrity of the data collection process and protect against a positive response bias. The diet behavior scale was measured prior to other scales. This arrangement

minimized the potential for students to base their behavioral responses on what they thought was healthy for them. Even though 371 students participated in the study, not all children answered every item on the questionnaire. Therefore, the reliability analysis was computed on 311 students; Cronbach's $\alpha = .63$ for this sample of fifth-graders.

Physical Activity Checklist of the Youth Health Survey. As discussed previously in this paper, the Youth Health Survey (YHS) was developed for the Cardiovascular Health in Children and Youth (CHIC II) study in North Carolina. The Physical Activity Checklist is a subscale of the YHS, and is a frequency checklist of 32 activities (sedentary and nonsedentary) based on the Minnesota Leisure Time Activity Questionnaire. It is similar to the Weekly Activity Checklist validated with fourth-grade students (Sallis, Condon, Groggin, Roby, Kolody, & Alcarez, 1993).

For the Physical Activities Checklist, each activity was independently coded by two exercise physiologists with a metabolic equivalent (MET) level of 2, 3, 5, or 8. The METs were used to establish the relative intensity of activities. For example, television or VCR movies was assigned a MET of 2 (very low), video games were assigned a MET of 3 (low), baseball was assigned a MRT of 5 (moderate), and basketball was assigned a MET of 8 (vigorous). Activity level is examined by asking how many times each activity was done for more than 15 minutes the past week. The frequency choices are "not at all", "1 or 2 times", "3 to 5 times," and "6 or more times" the past week.

The Physical Activity Checklist was piloted with 205 students at two schools in North Carolina. The mean student age was 12.4 years. Cronbach's alpha was .74 for the subscale and the test-retest correlation was .70. The investigators stated that further work was needed to refine the instrument though, as construct validity was weak (Gilmer et al., 1996).

For the purposes of this study, two scores for the Physical Activity Checklist were computed for each child. Those activities assigned METs of 2 (very low) and 3 (low) were designed as the dependent measure, Very Low to Low Intensity Physical Activity and scored as such. Similarly, those activities assigned METs of 5 (moderate) and 8 (vigorous) were designated as another dependent variable, Moderate to Vigorous Physical Activity and scored as such.

For this sample of students, Cronbach's alpha was equal to .65 for the Very Low to Low Intensity Physical Activity Checklist (composed of 14 items). Polit & Hungler (1995) contend that if a researcher is interested in only group-level comparisons, then coefficients higher than .60 are sufficient; thus, this is an acceptable alpha value. The coefficient (alpha = .77) for the Moderate to Vigorous Physical Activity (composed of 18 items) provides evidence of acceptable internal consistency for the subscale.

Data Analysis

A pilot test of all instruments was conducted to ensure that the procedures were clear and that the items on each instrument were understandable. The measurement

tools were piloted with a group of 12 fifth-grade children in a simulated classroom environment. Instructions were clarified and the time needed for instruction and completion of the instruments was determined from the pilot procedure. In addition, the sequencing of the instruments was determined based on the pilot samples' verbal assessment of the tools. The instruments were printed in different colors to clarify instruction and to add visual appeal. Piloting was also conducted with eight adults to determine clarity of instruction and the useability of the Family Profile and the Health Habits Scale. The Family Profile was revised based on questions encountered and the general reaction of the sample to the questions.

Descriptive analysis was conducted on the total sample for all major study variables. This included measures of central tendency and variance to determine the distribution of responses on the variables. The data were examined to assure that the statistical assumptions of linearity, homogeneity of variance, independence, and normal distribution were met. The independent samples t-test and the Mann-Whitney test (when indicated) were performed to compare the means of boys and girls on the self-report measures of intrinsic motivation, cognitive appraisal, affective response, diet, low-intensity physical activity, and high-intensity physical activity.

The relationships proposed in the IMCHB were systematically explored within the data set obtained. Bivariate correlations between the independent variables and the dependent measures, as well as the intercorrelations of the independent variables, were examined. The standard errors of regression coefficients were also studied to explore

potential collinear relationships, but no problem was detected.

Variance partitioning was performed, using multiple regression to explore the importance of variables in the explanation of diet and physical activity. The Health Outcome variables were regressed on the Client Singularity variables to determine the effects of those variables on the school-age child's diet and physical activity. In addition, separate regression models were produced for girls and boys to explore the relationship of gender to diet and physical activity.

CHAPTER FOUR

RESULTS

After data were collected, analysis was undertaken to identify those variables that influence the fifth-grade child's enactment of diet and physical activity. Analysis of the data was completed using the SPSS statistical package.

A total number of 371 student-parent pairs, from four school districts, participated in the study. An additional 24 pairs had chosen to participate, but because of student absence on the day of data collection, information from their parents was not used. Data collected from two student-parent pairs were removed from analysis due to the students' inability to understand instructions for completing the questionnaires.

Demographic Information

The age of the students participating was within a narrow range of 10-12 years old because all were in the fifth grade. Table 3 depicts the demographic characteristics of the children participating in the study. The majority of the children (68.2%; $N = 253$) were 11 years old. Another 27% ($N = 100$) were 10 years old, while only 3.5% ($N = 13$) were 12 years old. Only 1.3% ($N = 5$) did not report their ages. Both genders were well represented in the sample as 47.4% ($N = 176$) student participants were boys, and 52.6% ($N = 195$) were girls.

The parents provided information on marital status (Table 4). A majority (75.2%, $N = 279$) reported that they were married; however 12.9% ($N = 48$) were

Table 3. Demographic Characteristics of Children.

Age	N (%)
10	100 (27.0)
11	253 (68.2)
12	13 (3.5)
Not Reported	5 (1.3)
Gender	N (%)
Girl	195 (52.6)
Boy	176 (47.4)

Table 4. Demographic Characteristics of Parents.

Marital Status	N (%)
Married	279 (75.2)
Divorced	48 (12.9)
Single	16 (4.3)
Separated	8 (2.2)
Widowed	1 (0.3)
Not Reported	19 (5.1)
Financial Difficulty	N (%)
Little	211 (56.9)
Moderate	116 (31.3)
Great	23 (6.2)
Not Reported	21 (5.6)

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divorced, 4.3% (N = 16) were single, 2.2% (N = 8) were separated, and 0.3% (N = 1) was widowed. For the purpose of meaningful statistical analysis, the categories of divorced, separated, and single were collapsed into one marital group (single-parent home), and the widow's response was not analyzed.

Social Influence

The social influence on a child's enactment of diet and physical activity was operationalized as two variables, family functioning and parental health habits. The first was measured by the Family Apgar and reported by the child. Scores can range from 0-10, with 10 representing the most positive family functioning as perceived by the child. A score of 7-10 suggests good family functioning. For this sample (N = 349), the mean score was 7.5129, with a standard deviation of 2.2788 (skewness = -0.988, kurtosis = 0.600).

The second variable, parental health habits, was measured by the Health Habits Scale and reported by the parent. Scores can range from 0-36 with the higher score representing a greater frequency of healthy habits. For this sample of parents, scores ranged from 10-32 with a mean of 22.7335, and a standard deviation of 4.1036 (skewness = -0.355, kurtosis = -0.018).

Health Experience

The influence of health experience on a child's enactment of diet and physical activity was operationalized as two variables, the parent's perception of his/her health

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status, and the parent's perception of his/her child's health status. Possible scores on the parent's health status form can range from 1-4, with 1 representing poor health and 4 representing excellent health. The group mean for parent health status was 3.1396, with a standard deviation of 0.7094 (skewness = -0.545, kurtosis = 0.234).

The scores on the child's health status form (as rated by their parents) can range from 1-4, with 1 representing poor health and 4 representing excellent health. The group mean for child health status was 3.5812, with a standard deviation of 0.5643 (skewness = 1.043, kurtosis = 0.635). For the purpose of meaningful statistical analysis, the lower categories of 1 and 2, representing poor and fair health, were collapsed into a single group for both parent health status and child health status.

Environmental Resources

The influence of environmental resources on a child's enactment of diet and physical activity was operationalized as two variables, years of schooling completed by the parent, and the parent's estimate of the family's financial difficulty (Table 4). Possible responses for years of schooling completed could range from 0-18 years. One parent reported just 2 years of schooling and was removed from analysis because all other parents ($N = 351$) reported at least 9 years of schooling. The responses ranged from 9-18 years for the group, with a mean of 14.7721 years and a standard deviation of 2.4141 (skewness = 0.097, kurtosis = -1.199).

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The parents were also asked to describe the amount of financial difficulty that the family was currently experiencing as little, moderate, or great. Over half of the parents (56.9%, $N = 211$) reported that their family was presently experiencing little financial difficulty. However, 31.3% ($N = 116$) described moderate difficulty, and 6.2% ($N = 23$) reported the family's financial difficulty as great.

Intrinsic Motivation

The dynamic variable of intrinsic motivation for a child's enactment of diet and physical activity was operationalized as diet self-efficacy and as physical activity self-efficacy. The students ($N = 371$) self-reported on the CATCH diet self-efficacy scale, and on the CATCH physical activity self-efficacy scale.

For the diet self-efficacy scale, scores can range from 0-30, with 0 indicating that the child is not sure that he/she can make healthy diet choices, and 30 representing that he/she is very sure of being able to make diet choices. The scores for this sample ranged from 0-28, with a group mean of 18.5633, and a standard deviation of 6.1335 (skewness = -0.562, kurtosis = -0.255).

The scores for the physical activity self-efficacy scale can range from 0-10, with 0 representing that the child is not sure that he/she can be physically active, and 10 indicating that the child is very sure of his/her ability to be physically active. The scores for this sample ranged from 0-10, with a group mean of 8.1779, and a standard deviation of 2.0069 (skewness = -1.305, kurtosis = 1.504).

Cognitive Appraisal

The child's self-perception of his/her health status was used in this study as a measure of cognitive appraisal of one's existing health state. On a scale of 1-4, with 1 representing poor health and 4 indicative of excellent health, the self-reported scores ranged from 1-4 on the instrument. The group mean was 3.3612, with a standard deviation of 0.6690 (skewness = -0.789, kurtosis = 0.426). For the purpose of meaningful statistical analysis, the two lower categories (poor and fair) were collapsed into a single group.

Affective Response

The dynamic variable of affective response to food was operationalized as food preferences and measured by the Hearty Heart food preference scale, while the affective response to physical activity was operationalized as feelings toward physical activity, and measured by the CHIC II Attitudes toward Exercise scale. These two measures were completed by all of the student participants (N = 371).

The scores on the food preference scale were computed as the percentage of healthy food preferences of the total food preferences for each child. The scores can range from 0%-100%. The scores for this sample ranged from 0%-100% healthy food preferences. The mean score for this sample was 35.99% healthy preferences with a standard deviation of 0.1899 (skewness = 0.515, kurtosis = -0.187).

The score on the exercise feelings scale can range from 6-24, with 24

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representing the most positive feelings toward exercise. The scores for this sample ranged from 9-24, with a mean of 19.8706 and a standard deviation of 2.9791 (skewness = -0.743, kurtosis = 0.608).

Clinical Health Status Indicators

For this study, the clinical health status indicators were represented by diet and physical activity. The fifth-graders completed two measures, the CATCH food behavior survey and the CHIC II physical activity checklist.

The score for the student's food behavior scale was generated by computing the percentage of healthy food choices of the total food choices for each child. The scores can range from 0%-100%; the scores for this sample ranged from 0%-100% healthy food choices. The group mean was 42.29% healthy choices, with a standard deviation of 0.2120 (skewness = 0.25, kurtosis = -0.501).

Two scores for the activity survey were generated: very low-to-low physical activity participation and moderate-to-high physical activity participation. The scores for the very low-low physical activity scale can range from 0-204; the scores for this group ranged from 14-171. The mean for the sample ($N = 371$) was 77.7291, with a standard deviation of 27.6339 (skewness = 0.632, kurtosis = 0.836).

The scores for moderate-high physical activity participation can range from 0-684; the scores for this group ranged from 15-501. The sample ($N = 371$) mean was 166.3625, with a standard deviation of 97.9355 (skewness = 1.229, kurtosis = 1.459).

Temporal Ordering of Independent Variables and Indices

The independent variables have been divided into three different levels. Figures 3 and 4 illustrate the correspondence of these levels to the model and study variables. The first level of independent variables are those which are largely fixed and cannot be modified by the health care provider (such as gender and parental marital status). The IMCHB suggests that these variables are determinants of life experiences for the child, and are temporally prior to the Level II and Level III independent variables in the course of life events (Cox, 1982).

Level II contains objective variables related to the client; their measurement is based on relatively objective indices. They represent specific life experiences and environmental resources which are directly relevant to the dependent variable (Cox, 1982).

Level III variables are perhaps the most interesting and pertinent to this theoretical framework. They represent the child's subjective state, and are more proximal to the dependent measure than are Level I and Level II and their impact is predicted to be cumulatively greater, according to Cox (1982). Because health behavior is such a complex phenomenon, a combination of fixed background variables together with predisposing life events and subsequent psychosocial behavioral characteristics will address this complexity more completely than any one or two of these categories considered in isolation (Cox, 1982).

BACKGROUND PROFILE

- | | |
|-------------------------------------|---------------------------|
| • Demographic Characteristics | • Environmental Resources |
| Gender (I) | Financial Difficulty (II) |
| Parental Marital Status | Parent Education (II) |
| • Health Experience | • Social Influence |
| Parent's self-rating of health (II) | Parent Health Habits (II) |
| Parent's rating child's health (II) | Family Function (II) |

INTRINSIC MOTIVATION

Diet self-efficacy (III)

COGNITIVE APPRAISAL

Child's self-rating of health (III)

AFFECTIVE RESPONSE

Food preferences (III)

HEALTH OUTCOME

- Clinical Health Status Indicator
Diet

Figure 3. Correspondence of the elements of the Interaction Model of Client Health Behavior with the independent variables and dependent variable, Diet.

BACKGROUND PROFILE

- Demographic Characteristics (I)
 - Gender
 - Parental Marital Status
- Environmental Resources (II)
 - Financial Difficulty (II)
 - Parent Education (II)
- Health Experience (II)
 - Parent's self-rating of health (II)
 - Parent's rating child's health (II)
- Social Influence (II)
 - Parent Health Habits (II)
 - Family Function (II)

INTRINSIC MOTIVATION

Physical Activity self-efficacy (III)

COGNITIVE APPRAISAL

Child's self-rating of health (III)

AFFECTIVE RESPONSE

Exercise feelings (III)

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Physical Activity

Figure 4. Correspondence of the elements of the Interaction Model of Client Health Behavior with the independent variables and dependent variable, Physical Activity (Very Low-Low or Mod-High).

Zero-order Correlation of the Independent Variables with the Dependent Variable Diet

Figure 5 depicts the zero-order correlation of each independent variable included in the test of the IMCHB with the dependent measure Diet. These variables are placed in Levels II or III in accordance with the conceptualized temporal ordering discussed earlier in this paper.

Of the six Level II variables, five (parent schooling, financial difficulty, family function, parent's self-rating of health, and parent health habits) were statistically significant ($p < .01$). Positive parental health habits are related to a child eating a healthy diet. The number of years of education a parent has, and the better the parent rates his/her health, the more likely it is that the child eats a higher percentage of healthy foods. There is an inverse relationship with financial difficulty- i.e. the less the family's financial difficulty, the greater the likelihood of the child eating a higher percentage of healthy foods.

Of the three Level III variables, all (food preferences, diet self-efficacy, and child's self-rating of health) were statistically significant ($p < .01$). A child's food preferences and diet self-efficacy are highly correlated with eating a higher percentage of healthy foods. A weak association exists with a child's positive self-rating of health. These findings support Cox's prediction that the impact of Level III variables on the dependent measure is cumulatively greater than are the Level II variables.

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) .140**
 - Parent's rating child's health (II) .061
- Social Influence
 - Parent Health Habits (II) .202**
 - Family Function (II) .135**
- Environmental Resources
 - Financial Difficulty (II) -.169**
 - Parent Education (II) .172**

INTRINSIC MOTIVATION

Diet self-efficacy (III) 0.470**

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.168**

AFFECTIVE RESPONSE

Food preferences (III) 0.623**

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Diet

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Figure 5. Correlation of levels II and III of the independent variables with the dependent variable, Diet (N = 371).

Zero-order Correlation of the Independent Variables with the Dependent Variable Very Low-to-Low Physical Activity

Figure 6 depicts the zero-order correlation of each independent variable included in the test of the IMCHB with the dependent measure Very Low-to-Low Physical Activity. These variables are placed in Levels II or III in accordance with the conceptualized temporal ordering discussed earlier in the text.

Only one of the four Level II variables reached statistical significance – parent's self-rating of health ($p < .01$), which is inversely related to a child's participation in very low-to-low-intensity physical activities. The worse a parent rates his/her health, the greater the likelihood of child participation in very low-to-low-intensity physical activities.

Three of the five Level III variables reached statistical significance – child's self-rating of health ($p < .01$), physical activity self-efficacy ($p < .05$), and exercise feelings ($p < .05$). A child's positive self-rating of health is weakly associated with participation in very low-to-low-intensity physical activities; physical activity self-efficacy and exercise feelings are very weakly correlated with participation in these activities.

Zero-order Correlation of the Independent Variables with the Dependent Variable Mod-High Physical Activity

Figure 7 depicts the zero-order correlation of each independent variable included in the test of the IMCHB with the dependent measure Mod-High Physical

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) $-.198^{**}$
 - Parent's rating child's health (II) $-.054$
- Social Influence
 - Parent Health Habits (II) $-.056$
 - Family Function (II) $-.022$
- Environmental Resources
 - Financial Difficulty (II) $.074$
 - Parent Education (II) $-.015$

INTRINSIC MOTIVATION

Physical Activity self-efficacy (III) 0.117^*

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.169^{**}

AFFECTIVE RESPONSE

Exercise feelings (III) 0.108^*

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Very Low-Low Physical Activity

****** Correlation is significant at the 0.01 level

***** Correlation is significant at the 0.05 level

Figure 6. Correlation of levels II and III of the independent variables with the dependent variable, Very Low-Low Physical Activity (N = 371).

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) $-.109^*$
 - Parent's rating child's health (II) $-.021$
- Social Influence
 - Parent Health Habits (II) $-.013$
 - Family Function (II) $.010$
- Environmental Resources
 - Financial Difficulty (II) $.019$
 - Parent Education (II) $-.066$

INTRINSIC MOTIVATION

Physical Activity self-efficacy (III) 0.139^{**}

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.188^{**}

AFFECTIVE RESPONSE

Exercise feelings (III) 0.174^{**}

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Mod-High Physical Activity

****** Correlation is significant at the 0.01 level

***** Correlation is significant at the 0.05 level

Figure 7. Correlation of levels II and III of the independent variables with the dependent variable, Mod-High Physical Activity (N = 371).

Activity. These variables are placed in Levels II or III in accordance with the conceptualized temporal ordering discussed earlier in the text.

Only one of the four Level II variables reached statistical significance – parent's self-rating of health ($p < .05$), which is inversely related to a child's participation in moderate-to-high-intensity physical activities. However, this is a very weak association ($r = -.109$).

Of the five Level III variables, three (child's self-rating of health, exercise feelings, and physical activity self-efficacy) were statistically significant ($p < .01$). A child's positive self-rating of health and positive exercise feelings are related to participation in moderate to high-intensity physical activities; a weaker relationship exists with physical activity self-efficacy.

Interrelationships Among the Independent Variables

A major premise of the IMCHB is that interrelationships exist among the independent variables and have possible indirect effects on health behavior. The independent variables are conceptualized as interdependent and often simultaneous in their effects (Cox, 1982). Therefore, bivariate correlations were computed among variables within levels and between levels.

According to Cox, a greater understanding of the potential indirect contributions of the independent variables to the dependent variables is as revealing and insightful, in terms of understanding the complexity of health behavior and

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planning interventions, as is information about their direct effects (Cox, 1982). Tables 5 through 7 demonstrate the relationships within and between the levels of independent variables.

As anticipated, there are a number of statistically and substantively significant relationships among the independent variables. The impact of environmental resource variables is noted in terms of their relationship with each other and their relationship with the health experience and social influence variables. For example, a lower level of financial difficulty was related to the parent having more education ($r = -.346$), better parent health status ($r = -.350$), and better parent health habits ($r = -.328$).

Parent educational level was positively related to better parent health status ($r = .304$), while better parent health status was positively associated with better parent health habits ($r = .355$). Not surprisingly, if parents rated their health status positively, they also rated their child's health status positively ($r = .416$).

The more subjective independent variables (Level III) were significantly correlated with one another and with several Level II variables. For example, a child who rated his/her health positively had healthier family functioning ($r = .261$), and healthier family functioning was related to the child's physical activity self-efficacy ($r = .258$).

The child's physical activity self-efficacy was strongly associated with his/her self-reported health status ($r = .415$), and with his/her feelings toward exercise ($r = .502$). His/her feelings toward exercise were associated with self-reported health

Table 5. Correlations Among the Level II Independent Variables.

	Parent Education	Parent Health	Child Health	Parent Habits	Family Function
Financial Difficulty	-.346**	-.350**	-.237**	-.328**	-.181**
Parent Education		.304**	.225**	.273**	.073
Parent's Self-Rating of Health			.416**	.355**	.126*
Parent's Rating of Child's Health				.227**	.132*
Parent Health Habits					.159**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Table 6. Correlations Among the Level III Independent Variables.

	Child Self-Rated Health	Food Preference
Diet Self-Efficacy	.219**	.470**
Child Self-Rated Health		.112*

	Child Self-Rated Health	Exercise Feelings
Physical Activity Self-Efficacy	.415**	.502**
Child Self-Rated Health		.321**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Table 7. Correlations of Level II Independent Variables with Level III Independent Variables.

	Diet Self- Efficacy	Child Self- Rate Health	Food Preferences	Physical Activity Self- Efficacy	Exercise Feelings
Financial Difficulty	-.188**	-.158**	-.103	-.161**	-.104
Parent Education	.169**	.136*	.098	.243**	.214**
Parent's Self-Rated Health	.135*	.179**	.077	.096	.064
Parent's Rate Child's Health	.020	.240**	.087	.135*	.083
Parent Health Habits	.149**	.154**	.145**	.142**	.136*
Family Function	.111	.261**	.078	.258**	.231**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

status ($r = .321$). Healthier food preferences were highly related to the child's diet self-efficacy ($r = .470$).

Table 8 demonstrates the contributions of the 11 independent variables to Diet on the basis of their standardized partial regression coefficients. The amount of variance in Diet explained by the variables taken together is 46.2%. Consistent with the zero-order correlations, food preferences and diet self-efficacy contribute the most to the total variance in the dependent variable. Relative to the independent variables some notable changes have occurred. Parental health habits, parental educational level, financial difficulty, and child's self-rating of health maintained strong positions in the bivariate correlations with the dependent variable. However, none could compete in terms of direct effects on Diet when considered simultaneously with all other variables.

Table 9 demonstrates the contributions of the 11 independent variables to Very Low-to-Low Intensity Physical Activity on the basis of their standardized partial regression coefficients. The amount of variance in Very Low-to-Low Intensity Physical Activity explained by the variables taken together is 10.2%. Consistent with the zero-order correlations, parent's self-rating of health and child's self-rating of health contribute the most to the total variance in the dependent variable. Gender also maintained a substantial beta weight in the regression.

Table 10 demonstrates the contribution of the 11 independent variables to Mod-High Intensity Physical Activity on the basis of their standardized partial regression

Table 8. Contributions of Level I, II, and III of the Independent Variables to Diet.

Level	Model	Beta	t	Sig.
(III)	Food Preferences	.518	11.059	.000**
(III)	Diet Self-Efficacy	.203	4.230	.000**
(III)	Child's Self-Rating of Health	.016	.373	.709
(II)	Family Function	.071	1.672	.096
(II)	Parental Health Habits	.058	1.280	.201
(II)	Parent Education	.057	1.279	.202
(II)	Financial Difficulty	-.033	-.667	.505
(II)	Parent's Self-Rated Health	.021	.440	.660
(II)	Parent's Rate Child's Health	-.042	-.919	.359
(I)	Parental Marital Status	.000	-.010	.992
(I)	Gender	.038	.892	.373

Dependent Variable: Diet ($F = 25.879$, $df = (11, 332)$, $p < .001$, $R^2 = .462$)

** significant at the .01 level

* significant at the .05 level

(for gender: 0 = girl, 1 = boy; for marital status: 0 = not married, 1 = married)

Table 9. Contributions of Level I, II, and III of the Independent Variables to Very Low-Low Intensity Physical Activity.

Level	Model	Beta	t	Sig.
(III)	Physical Activity Self-Efficacy	.023	.356	.722
(III)	Exercise Feelings	.024	.399	.690
(III)	Child's Self-Rating of Health	.198	3.328	.001**
(II)	Parental Health Habits	.008	.129	.897
(II)	Family Function	-.052	-.921	.358
(II)	Parent's Rate Child's Health	-.018	-.305	.761
(II)	Financial Difficulty	.002	.027	.978
(II)	Parent Education	.036	.611	.542
(II)	Parent's Self-Rated Health	-.202	-3.217	.001**
(I)	Gender	-.143	-2.676	.008**
(I)	Parental Marital Status	-.080	-1.395	.164

Dependent Variable: Very Low-Low Intensity Physical Activity ($F = 3.411$, $df = (11,332)$, $p < .001$, $R^2 = .102$)

** significant at the .01 level

* significant at the .05 level

(for gender: 0 = girl, 1 = boy; for marital status: 0 = not married, 1 = married)

Table 10. Contributions of Level I, II, and III of the Independent Variables to Mod-High Intensity Physical Activity.

Level	Model	Beta	t	Sig.
(III)	Physical Activity Self-Efficacy	.038	.590	.556
(III)	Exercise Feelings	.172	2.833	.005**
(III)	Child's Self-Rating of Health	.172	2.881	.004**
(II)	Parental Health Habits	.014	.245	.806
(II)	Family Function	-.058	-1.027	.305
(II)	Parent's Rate Child's Health	-.005	-.091	.927
(II)	Financial Difficulty	-.025	-.391	.696
(II)	Parent Education	-.092	-1.552	.122
(II)	Parent's Self-Rated Health	-.148	-2.368	.018*
(I)	Gender	.110	2.051	.041*
(I)	Parental Marital Status	-.019	-.338	.736

Dependent Variable: Mod-High Intensity Physical Activity ($F = 3.443$, $df = (11, 332)$, $p < .001$, $R^2 = .102$)

** significant at the .01 level

* significant at the .05 level

(for gender: 0 = girl, 1 = boy; for marital status: 0 = not married, 1 = married)

coefficients. The amount of variance in Mod-High Intensity Physical Activity explained by the variables taken together is 10.2%. Consistent with the zero-order correlations, exercise feelings and a child's self-rating of health contributed more to the total variance in the dependent variable than do any of the other independent variables. Parent's self-rating of health and gender also maintained substantial beta weights in the regression.

SUBSIDIARY QUESTION: *What is the relationship of gender to diet and physical activity of the school-age child?*

For purposes of exploring potential gender differences, a t-test for equality of means on the diet behavior scale was performed. The mean for girls on the diet behavior scale was 43.38% healthy choices with a standard deviation of 0.2133. The mean for boys on the diet behavior scale was 40.75% healthy choices with a standard deviation of 0.2121. There was no significant difference between the means of girls and boys ($t = -1.191$, $p = .234$), although girls' scores were slightly higher.

A t-test for equality of means between boys and girls was performed to determine if there were gender differences on low physical activity participation. The mean for girls on the very low-to-low physical activity scale was 80.7564, with a standard deviation of 27.3250. The mean for boys on the low physical activity scale was 74.3750, with a standard deviation of 27.6628. There was a significant difference between the means of boys and girls ($t = 2.233$, $p = .026$) with girls reporting more low intensity physical activities than boys.

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In order to examine potential gender differences, a t-test for equality of means on the moderate-to-high physical activity scale was also performed. The mean for girls was 154.6179, with a standard deviation of 91.5314. The mean for boys on the moderate-high physical activity scale was 179.3750, with a standard deviation of 103.2825. There was a significant difference in the means of boys and girls ($t = -2.448$, $p = .015$), with boys reporting more moderate-high physical activities.

The responses for the variables of food preferences and diet self-efficacy were normally distributed for boys and girls. Therefore, a t-test for independent samples was performed to investigate possible differences between the mean scores on these variables grouped by gender.

The mean score for boys ($N = 176$) was 32.04% healthy food preferences, with a standard deviation of 0.1849. The mean score for girls ($N = 195$) was 39.55% healthy food preferences, with a standard deviation of 0.1879. The analysis indicated that there was a significant difference ($t = -3.872$, $p < .001$) between the food preference scores of boys and girls, with girls reporting healthier food preferences.

The mean score for boys ($N = 176$) on diet self-efficacy was 17.6193 with a standard deviation of 6.2872. The mean score for girls ($N = 195$) on the diet self-efficacy scale was 19.4154, with a standard deviation of 5.8782. The t-test for independent samples indicated that there was a significant difference ($t = -2.843$, $p < .005$) between the diet self-efficacy scores of boys and girls, with girls more sure that they could eat healthy foods.

The responses for the variables of the child's self-rating of health status, feelings toward exercise, and physical activity self-efficacy were non-normally distributed. Therefore, the Mann-Whitney test was performed to investigate possible gender differences on each of the three variables. No significant differences were found between the means of boys and girls on these variables.

Zero-order Correlation of the Independent Variables with the Dependent Variables

Figures 8 through 13 depict the zero-order correlation of each independent variable studied in the test of the IMCHB with the dependent measures. These variables are placed in Levels II or III in accordance with the conceptualized temporal ordering discussed earlier in this paper. The Level I variables, gender and marital status, have not been included in these correlations because they are dichotomous variables.

Relationships within and between the levels of independent variables for girls and for boys were also investigated. The zero-order correlations among the Level II variables yielded many significant relationships for both genders, but more for girls than for boys. An interesting profile for the girls emerged. The environmental resource variable, financial difficulty, showed moderate correlations with parent educational level ($r = -.352$), parent's health status ($r = -.360$), parent's rating of child's health status ($r = -.296$), parent health habits ($r = -.338$), and family function ($r = -.251$) (Table 11).

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) .077
 - Parent's rating child's health (II) .109
- Social Influence
 - Parent Health Habits (III) .255**
 - Family Function (III) .175*
- Environmental Resources
 - Financial Difficulty (II) -.181*
 - Parent Education (II) .205**

INTRINSIC MOTIVATION

Diet self-efficacy (III) 0.429**

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.274**

AFFECTIVE RESPONSE

Food preferences (III) 0.604**

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Diet

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Figure 8. Correlation of levels II and III of the independent variables with the dependent variable, Diet (N = 195), for girls.

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) .241**
 - Parent's rating child's health (II) .011
- Social Influence
 - Parent Health Habits (II) .161*
 - Family Function (II) .085
- Environmental Resources
 - Financial Difficulty (II) -.165*
 - Parent Education (II) .140

INTRINSIC MOTIVATION

Diet self-efficacy (III) 0.507**

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.054

AFFECTIVE RESPONSE

Food preferences (III) 0.647**

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Diet

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Figure 9. Correlation of levels II and III of the independent variables with the dependent variable, Diet (N = 176), for boys.

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) $-.083$
 - Parent's rating child's health (II) $.000$
- Social Influence
 - Parent Health Habits (III) $.026$
 - Family Function (III) $-.007$

- Environmental Resources
 - Financial Difficulty (II) $.072$
 - Parent Education (II) $.029$

INTRINSIC MOTIVATION

Physical Activity self-efficacy (III) 0.098

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.190^{**}

AFFECTIVE RESPONSE

Exercise feelings (III) 0.131

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Very Low-Low Physical Activity

****** Correlation is significant at the 0.01 level

***** Correlation is significant at the 0.05 level

Figure 10. Correlation of levels II and III of the independent variables with the dependent variable, Very Low-to-Low Physical Activity (N = 195), for girls.

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) $-.289^{**}$
 - Parent's rating child's health (II) $-.112$
- Social Influence
 - Parent Health Habits (III) $-.122$
 - Family Function (III) $-.046$
- Environmental Resources
 - Financial Difficulty (II) $.062$
 - Parent Education (II) $-.059$

INTRINSIC MOTIVATION

Physical Activity self-efficacy (III) 0.146

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.167^*

AFFECTIVE RESPONSE

Exercise feelings (III) 0.067

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Very Low-Low Physical Activity

****** Correlation is significant at the 0.01 level

***** Correlation is significant at the 0.05 level

Figure 11. Correlation of levels II and III of the independent variables with the dependent variable, Very Low-to-Low Physical Activity (N = 176), for boys.

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) -.079
 - Parent's rating child's health (II) .000
- Social Influence
 - Parent Health Habits (III) .016
 - Family Function (III) .070
- Environmental Resources
 - Financial Difficulty (II) .028
 - Parent Education (II) -.045

INTRINSIC MOTIVATION

Physical Activity self-efficacy (III) 0.171*

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.187**

AFFECTIVE RESPONSE

Exercise feelings (III) 0.302**

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Mod-High Physical Activity

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Figure 12. Correlation of levels II and III of the independent variables with the dependent variable, Mod-High Physical Activity (N = 195), for girls.

BACKGROUND PROFILE

- Health Experience
 - Parent's self-rating of health (II) $-.174^*$
 - Parent's rating child's health (II) $-.044$
- Social Influence
 - Parent Health Habits (III) $-.054$
 - Family Function (III) $-.048$
- Environmental Resources
 - Financial Difficulty (II) $.021$
 - Parent Education (II) $-.091$

INTRINSIC MOTIVATION

Physical Activity self-efficacy (III) 0.104

COGNITIVE APPRAISAL

Child's self-rating of health (III) 0.176^*

AFFECTIVE RESPONSE

Exercise feelings (III) 0.096

HEALTH OUTCOME

- Clinical Health Status Indicator
 - Mod-High Physical Activity

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Figure 13. Correlation of levels II and III of the independent variables with the dependent variable, Mod-High Physical Activity (N = 176), for boys.

Table 11. Correlations Among the Level II Independent Variables for Girls.

	Parent Education	Parent Health	Child Health	Parent Habits	Family Function
Financial Difficulty	-.352**	-.360**	-.296**	-.338**	-.251**
Parent Education		.278**	.231**	.276**	.081
Parent's Self-Rating of Health			.410**	.323**	.149*
Parent's Rating of Child's Health				.159*	.171*
Parent Health Habits					.194**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

For boys, there was no significant relationship between financial difficulty and family function ($r = -.094$) (Table 12). However, the health experience variables demonstrated strong relationships with each other, and with the social influence variable of parent health habits. For example, the correlation between parent's rating of child's health and parent health habits was stronger for boys ($r = .296$), than for girls ($r = .159$). Similarly, the parent's self-rated health status corresponded moderately to parent health habits ($r = .379$) for boys, but a somewhat weaker correspondence was observed for girls ($r = .323$).

The zero-order correlations of Level II variables with Level III variables demonstrated significant associations for both genders; more so for girls than for boys (Tables 13 and 14). For girls, the social influence variables and the affective response variables revealed strong correlations with each other, and with other variables. For example, the association between family function and self-reported health status was $r = .322$ for girls, but only $r = .190$ for boys. Similarly, parent health habits and feelings toward exercise were significantly related ($r = .261$) for girls, but not statistically or substantively significant ($r = .037$) for boys. Conversely, the health experience variable, parent's self-reported health status, represented a moderate association with the intrinsic motivation variable, diet self-efficacy ($r = .257$) for boys. This relationship was not significant for girls ($r = .073$).

Table 12. Correlations Among the Level II Independent Variables for Boys.

	Parent Education	Parent Health	Child Health	Parent Habits	Family Function
Financial Difficulty	-.341**	-.331**	-.169*	-.314**	-.094
Parent Education		.334**	.220**	.270**	.065
Parent's Self-Rating of Health			.431**	.379**	.125
Parent's Rating of Child's Health				.296**	.087
Parent Health Habits					.125

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

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Table 13. Correlations of Level II Independent Variables with Level III Independent Variables for Girls.

	Diet Self- Efficacy	Child Self- Rate Health	Food Preferences	Physical Activity Self- Efficacy	Exercise Feelings
Financial Difficulty	-.181*	-.229**	-.098	-.177*	-.180*
Parent Education	.133	.207**	.075	.272**	.225**
Parent's Self-Rating of Health	.073	.229**	.022	.143	.101
Parent's Rating of Child's Health	-.009	.217**	.081	.130	
Parent Health Habits	.094	.175*	.226**	.097	.261**
Family Function	.095	.322**	.111	.268**	.253**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

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Table 14. Correlations of Level II Independent Variables with Level III Independent Variables for Boys.

	Diet Self-Efficacy	Child Self-Rate Health	Food Preferences	Physical Activity Self-Efficacy	Exercise Feelings
Financial Difficulty	-.219**	-.057	-.139	-.139	-.038
Parent Education	.213**	.054	.133	.211**	.210**
Parent's Self-Rating of Health	.257**	.097	.217**	.036	.060
Parent's Rating of Child's Health	.051	.269**	.101	.140	.138
Parent Health Habits	.226**	.121	.093	.190*	.037
Family Function	.124	.190*	.029	.248**	.210**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

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In keeping with the postulated relationships of the IMCHB, the self-reported Level III variables of intrinsic motivation, cognitive appraisal, and affective response demonstrated moderate correlations with each other for the girls (Table 15). All but two variables (food preference and child's health status) corresponded significantly to each other for the boys (Table 16).

There were notable differences in the strength of the relationships for the two genders, however. For girls, the relationship between their self-reported health status and feelings toward exercise ($r = .383$) was much stronger than for boys ($r = .284$). Similarly, for girls, their health status and diet self-efficacy were more closely associated with each other ($r = .274$) than for boys ($r = .208$). For girls, there was a stronger positive correlation between physical activity self-efficacy and feelings toward exercise ($r = .541$) than for boys ($r = .480$). For boys, their physical activity self-efficacy significantly corresponded to their self-rated health status ($r = .444$); more so than for girls ($r = .389$).

Table 17 demonstrates the contributions of the independent variables to Diet for girls on the basis of their standardized partial regression coefficients. The amount of variance in Diet for girls explained by the variables taken together is 45.5%. Consistent with the zero-order correlations, food preferences and diet self-efficacy contribute the most to the total variance in the dependent variable. Relative to the independent variables some notable changes have occurred. Child's self-rating of health, parental health habits, parental educational level, financial difficulty, and family function maintained strong

Table 15. Correlations Among the Level III Independent Variables for Girls.

	Child Self-Rated Health	Food Preference
Diet Self-Efficacy	.275**	.444**
Child Self-Rated Health		.209**

	Child Self-Rated Health	Exercise Feelings
Physical Activity Self-Efficacy	.389**	.541**
Child Self-Rated Health		.383**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Table 16. Correlations Among the Level III Independent Variables for Boys.

	Child Self-Rated Health	Food Preference
Diet Self-Efficacy	.208**	.468**
Child Self-Rated Health		.035

	Child Self-Rated Health	Exercise Feelings
Physical Activity Self-Efficacy	.444**	.480**
Child Self-Rated Health		.284**

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Table 17. Contributions of Level I, II, and III of the Independent Variables to Diet for Girls.

Level	Model	Beta	t	Sig.
(III)	Food Preferences	.456	6.816	.000**
(III)	Diet Self-Efficacy	.195	2.893	.004**
(III)	Child's Self-Rating of Health	.101	1.566	.119
(II)	Family Function	.077	1.243	.215
(II)	Parental Health Habits	.090	1.372	.172
(II)	Parent Education	.104	1.631	.105
(II)	Financial Difficulty	-.045	-.627	.532
(II)	Parent's Self-Rating of Health	-.059	-.866	.388
(II)	Parent's Rating of Child's Health	.028	.419	.675
(I)	Parental Marital Status	-.049	-.749	.455

Dependent Variable: Diet; Gender = Girl ($F = 13.885$, $df = (10, 166)$, $p < .001$, $R^2 = .455$)

** significant at the .01 level

* significant at the .05 level

(for marital status: 0 = not married, 1 = married)

positions in the bivariate correlations with the dependent variable. However, none could compete in terms of direct effects on Diet for girls when considered simultaneously with all other variables.

Table 18 demonstrates the contributions of the independent variables to Diet for boys on the basis of their standardized partial regression coefficients. The amount of variance in Diet for boys explained by the variables taken together is 49.6%.

Consistent with the zero-order correlations, food preferences and diet self-efficacy contributed the most to the total variance in the dependent variable. Whereas parent's self-rating of health, financial difficulty, and parent health habits were strong variables in the bivariate correlations with the dependent variable, they emerge as having weak explanatory power relative to Diet for boys when considered simultaneously with all variables.

Table 19 demonstrates the contributions of the independent variables to Very Low-to-Low Physical Activity for girls on the basis of the standardized partial regression coefficients. The amount of variance explained by the variables taken together is 8.1%. The regression model is not statistically significant ($p = .156$); therefore, no further results will be discussed.

Table 20 profiles the contributions of the independent variables to Very Low-to-Low Physical Activity for boys on the basis of their standardized partial regression coefficients. The amount of variance in Very Low-to-Low Physical Activity for boys

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Table 18. Contributions of Level I, II, and III of the Independent Variables to Diet for Boys.

Level	Model	Beta	t	Sig.
(III)	Food Preferences	.538	8.199	.000**
(III)	Diet Self-Efficacy	.219	3.169	.002**
(III)	Child's Self-Rating of Health	-.060	-.964	.337
(II)	Family Function	.062	1.045	.298
(II)	Parental Health Habits	.055	.847	.398
(II)	Parent Education	-.004	-.066	.948
(II)	Financial Difficulty	-.009	-.124	.902
(II)	Parent's Self-Rating of Health	.086	1.230	.221
(II)	Parent's Rating of Child's Health	-.097	-1.455	.148
(I)	Parental Marital Status	.008	.131	.896

Dependent Variable: Diet; Gender = Boy ($F = 15.343$, $df = (10, 156)$, $p < .001$, $R^2 = .496$)

** significant at the .01 level

* significant at the .05 level

(for marital status: 0 = not married, 1 = married)

Table 19. Contributions of Level I, II, and III of the Independent Variables to Very Low-to-Low Physical Activity for Girls.

Level	Model	Beta	t	Sig.
(III)	Physical Activity Self-Efficacy	-.010	-.103	.918
(III)	Exercise Feelings	.056	.602	.548
(III)	Child's Self-Rating of Health	.208	2.403	.017*
(II)	Parental Health Habits	.063	.747	.456
(II)	Family Function	-.011	-.138	.891
(II)	Parent's Rating of Child's Health	.037	.434	.665
(II)	Financial Difficulty	.055	.596	.552
(II)	Parent Education	.060	.713	.477
(II)	Parent's Self-Rating of Health	-.123	-1.408	.161
(I)	Parental Marital Status	-.174	-2.042	.043*

Dependent Variable: Very Low-Low Intensity Physical Activity; Gender = Girl
(F = 1.467, df = (10, 166), p = .156, R² = .081)

** significant at the .01 level

* significant at the .05 level

(for marital status: 0 = not married, 1 = married)

Table 20. Contributions of Level I, II, and III of the Independent Variables to Very Low-to-Low Physical Activity for Boys.

Level	Model	Beta	t	Sig.
(III)	Physical Activity Self-Efficacy	.061	.649	.517
(III)	Exercise Feelings	.000	-.001	.999
(III)	Child's Self-Rating of Health	.182	2.119	.036*
(II)	Parental Health Habits	-.043	-.506	.614
(II)	Family Function	-.080	-1.001	.318
(II)	Parent's Rating of Child's Health	-.038	-.440	.661
(II)	Financial Difficulty	-.039	-.423	.673
(II)	Parent Education	.028	.324	.746
(II)	Parent's Self-Rating of Health	-.287	-3.141	.002**
(I)	Parental Marital Status	-.017	-.203	.840

Dependent Variable: Very Low-Low Intensity Physical Activity; Gender = Boy
 (F = 2.277, df = (10, 156), p = .016, R² = .127)

** significant at the .01 level

* significant at the .05 level

(for marital status: 0 = not married, 1 = married)

explained by the variables taken together is 12.7%. Consistent with the zero-order correlations, parent's self-rating of health (with a negative beta weight) and child's self-rating of health (with a positive beta weight) contribute the most to the total variance in the dependent variable, the fifth-grade boy's participation in Very Low-to-Low Physical Activity.

Table 21 demonstrates the contributions of the independent variables to Mod-High Intensity Physical Activity for girls on the basis of their standardized partial regression coefficients. The amount of variance in Mod-High Intensity Physical Activity for girls explained by the variables taken together is 16.2%. Consistent with the zero-order correlations, exercise feelings contribute the most to the total variance in the dependent variable. Relative to the independent variables some notable changes have occurred. Child's self-rating of health and physical activity self-efficacy maintained strong positions in the bivariate correlations with the dependent variable.

However, those variables could not compete in terms of their direct effects on Mod-High Intensity Physical Activity for girls when considered simultaneously with all other variables. By contrast, parental marital status was not a strong variable in the bivariate correlation, yet emerged as having moderate explanatory power relative to girls' participation in Mod-High Intensity Physical Activity when considered simultaneously with all variables. Fifth-grade girls from single-parent homes who have positive feelings toward exercise are more likely to participate in moderate-to-

Table 21. Contributions of Level I, II, and III of the Independent Variables to Mod-High Intensity Physical Activity for Girls.

Level	Model	Beta	t	Sig.
(III)	Physical Activity Self-Efficacy	.016	.181	.856
(III)	Exercise Feelings	.291	3.281	.001**
(III)	Child's Self-Rating of Health	.141	1.709	.089
(II)	Parental Health Habits	.023	.284	.777
(II)	Family Function	.022	.275	.784
(II)	Parent's Rating of Child's Health	.054	.671	.503
(II)	Financial Difficulty	-.028	-.318	.751
(II)	Parent Education	-.085	-1.048	.296
(II)	Parent's Self-Rating of Health	-.123	-1.471	.143
(I)	Parental Marital Status	-.207	-2.540	.012*

Dependent Variable: Mod-High Intensity Physical Activity; Gender = Girl
(F = 3.219, df = (10, 166), p = .001, R² = .162)

** significant at the .01 level

* significant at the .05 level

(for marital status: 0 = not married, 1 = married)

high intensity physical activity than are girls from two-parent homes.

Table 22 illustrates the contributions of the independent variables to boys Mod-High Intensity Physical Activity based on standardized partial regression coefficients. The amount of variance in Mod-High Intensity Physical Activity for boys explained by the variables taken together is 10.9%. Consistent with a zero-order correlation, child's self-rating of health contributes more total variance in the dependent variable than do any of the other independent variables. Whereas parent's self-rating of health was a strong variable in the bivariate correlation with the dependent variable, it would not compete in terms of direct effects on Mod-High Intensity Physical Activity for boys.

Summary

The sample consisted of fifth-grade students ($N = 371$) and their parents ($N = 371$). The majority (75.2%) of the children were from two-parent homes. The parents and the children were generally of good health. A majority of the parents (56.9%) reported little financial difficulty; however 31.3% described moderate difficulty, and 6.2% reported great difficulty.

The descriptive correlational study of children's diet and physical activity was completed using the IMCHB as a conceptual framework to determine potential linkages within the model. The findings support the postulate that, indeed, health behavior is a complex phenomenon which consists of more than the influence of selected independent variables on the dependent measure; rather, there are numerous

Table 22. Contributions of Level I, II, and III of the Independent Variables to Mod-High Intensity Physical Activity for Boys.

Level	Model	Beta	t	Sig.
(III)	Physical Activity Self-Efficacy	.051	.537	.592
(III)	Exercise Feelings	.094	1.091	.277
(III)	Child's Self-Rating of Health	.202	2.329	.021*
(II)	Parental Health Habits	-.004	-.051	.959
(II)	Family Function	-.103	-1.278	.203
(II)	Parent's Rating of Child's Health	-.025	-.280	.780
(II)	Financial Difficulty	-.004	-.045	.964
(II)	Parent Education	-.072	-.829	.409
(II)	Parent's Self-Rating of Health	-.167	-1.811	.072
(I)	Parental Marital Status	.123	1.465	.145

Dependent Variable: Mod-High Intensity Physical Activity; Gender = Boy
(F = 1.899, df = (10, 156), p = .049, R² = .109)

** significant at the .01 level

* significant at the .05 level

(for marital status: 0 = not married, 1 = married)

independent indicators which are powerful influences on the variables which more directly effect the behavioral outcome. For example, parental health habits were positively correlated with, and financial difficulty was inversely correlated with, the parent's perceived health status, which helped explain a child's participation in low-intensity physical activity. The worse a parent rated his/her health, the more likely it is that the child participates in low-intensity activity. Physical activity self-efficacy was positively correlated with a child's perceived health status and feelings toward exercise, which both helped explain a child's participation in high-intensity physical activity. The better a child rated his/her health and the more positive one's feelings toward exercise, the greater the likelihood that the child participates in high-intensity activity.

The investigation revealed a strong influence of food preferences ($b = .518$, $p < .001$), and a moderate influence of diet self-efficacy ($b = .203$, $p < .001$) on the health outcome of diet behavior. The study determined a moderate influence of parent's self-rated health ($b = -.202$, $p = .001$), and child's self-rated health ($b = .198$, $p = .001$) on low-intensity physical activity participation, and a moderate influence of child's self-rated health ($b = .172$, $p = .004$), and feelings toward exercise ($b = .172$, $p = .005$) on high-intensity physical activity participation.

The IMCHB has been a useful tool to advance an explanation of specific health behavior, particularly a child's diet. A child's affective response to food, and intrinsic motivation to eat a healthy diet are important in explaining his/her diet behavior. The

child's health experience and cognitive appraisal of his/her health status help explain low-intensity physical activity participation, while the cognitive appraisal of health status and affective response to physical activity help explain high-intensity physical activity participation.

The findings of this study provide strong support for the use of the IMCHB to explain children's diet, but weak support for the explanation of children's physical activity. Regression analysis revealed that 46.2% of the variance in diet was explained. Although only 10.2% of the variance in physical activity was explained, this is comparable to the amount of explained variance found in many other children's exercise studies.

CHAPTER FIVE

DISCUSSION OF FINDINGS

The Interaction Model of Client Health Behavior (IMCHB) stresses the relevance of individual client characteristics (client singularity) to health behavior (Cox, 1982). Clients will respond differently according to their demographic characteristics, social influences, health experiences, environmental resources, intrinsic motivation, cognitive appraisal of their health state, and affective response to the health behavior. The IMCHB assists the nurse to identify how these multiple factors are cumulatively contributing to health behavior. Through this process, the theoretical basis for interaction and intervention approaches is developed (Cox, 1982). Most investigators using the IMCHB as a conceptual frame for their work have focused their attention on the health behaviors of adults. A review of the literature indicates that only one other researcher (Farrand, 1991) has used the Cox model to study determinants of children's health behaviors. The IMCHB has proven to be an excellent framework for the study of children's diet behavior in the present investigation; it explained 45.5% of the variance in diet behavior for girls and 49.6% of the variance in diet behavior for boys. The model offered weaker support, however, for explaining a child's physical activity.

This descriptive correlational study was conducted on 371 fifth-grade students and their parents to identify those variables that influence the child's enactment of diet

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and physical activity. Significant differences were observed between girls and boys on several major study variables. Girls scored higher (healthier) on food preferences and diet self-efficacy than did boys, but no difference was detected in their actual diet behavior. It is possible that the girls may have answered the food preference and diet self-efficacy instruments with a social desirability response set bias. Girls also participated in more low-intensity physical activity, but boys participated in more high-intensity physical activity than did girls. No statistically significant gender differences were observed on the child's perceived health status, feelings toward exercise, and/or physical activity self-efficacy.

Significant relationships were observed among most of the proposed variables. Food preferences and diet self-efficacy explained the most variance in diet behavior for both girls and boys. A parent's self-rated health was significant in explaining the boy's participation in low-intensity physical activity; the lower a parent rated his/her health, the more likely that the boy participated in low-intensity physical activities. However, the boy's self-rated health status contributed the most to his high-intensity physical activity participation; boys who perceived themselves in better health were more likely to participate. For a girl, her feelings toward exercise and her parent's marital status were important in explaining her high-intensity physical activity participation; the more positive her feelings toward exercise, and if she lived in a single-parent home, the greater the likelihood of the girl's participation.

In the present study, there were statistically and substantively significant

relationships between many of the environmental resource, health experience, and psychosocial variables for both boys and girls. For example, greater financial difficulty was related to poorer perceived parental health status, poorer parental health habits, and lower parental educational level. Similarly, poorer perceived parental health status was related to poorer parental health habits, and to poorer perceived health status of child by the parent. Finally, strong associations were demonstrated between diet self-efficacy and food preferences ($r = .470, p < .01$), physical activity self-efficacy and feelings toward exercise ($r = .502, p < .01$), and between physical activity self-efficacy and child's perceived health status ($r = .415, p < .01$), for both genders.

This research corroborated previous study findings that most children do not have healthy eating habits (Graham and Uphold, 1992; Krebs-Smith et al., 1996; Lewis et al., 1994; Nicklas et al., 1995). In fact, the scores for this sample ranged from 0% - 100% healthy food choices, with a group mean of 42.29% healthy choices. It is deplorable that this sample of fifth-grade children eat such a high percentage of unhealthy foods.

This study suggested that a child's diet choices are greatly influenced by diet preferences and whether the child believes that he/she can eat a healthy diet (diet self-efficacy). Self-efficacy, as defined by Bandura (1986), is the judgement of one's capability to execute a particular course of action. Indeed, this inquiry determined that the affective response to food (food preferences) was the single most salient contributor

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to the variance in diet behavior for girls ($b = .456$, $p < .001$), and in diet behavior for boys ($b = .538$, $p < .001$). Similarly, the intrinsic motivation to eat a healthy diet (diet self-efficacy) was the second most important contributor to the variance in diet behavior for girls ($b = .195$, $p = .004$) and in diet behavior for boys ($b = .219$, $p = .002$). This finding validates other research which found a strong relationship between diet self-efficacy and diet behavior (Edmundsen et al., 1996; Parcel et al., 1995), and between diet self-efficacy and food preferences (Domel et al., 1996).

This inquiry confirmed what other investigators have found in studies which included food preferences as an independent variable in examining diet behavior. Their research provided strong evidence that food preferences explain much of diet behavior for children (Birch & Sullivan, 1991; Calfas et al., 1991; Domel et al., 1996; Fisher et al., 1995; Lytle, personal communication, 1998; Resnicow, et al., 1996). For example, preferences were the only significant predictor of fruit and total fruit and vegetable consumption, as well as the main predictor of vegetable consumption in a recent study by Domel et al., 1996. Most studies have not examined food preferences or diet self-efficacy as they relate to gender. However, this research concluded that girls prefer healthier foods. Similarly, a previous study found that girls prefer fruit as a snack choice (Baranowski et al., 1995).

The data from this study corroborated Graham and Uphold's (1992) research on school-age children that there were no significant gender differences in diet behavior. However, several inquiries found that girls consumed healthier diets than boys (Cohen

et al., 1990; Kelder et al., 1995; Parcel et al., 1995), and one study reported that high-school boys consumed more high-fat foods than high-school girls (Robinson et al., 1995).

Other investigations determined that girls ate more fruits and vegetables than boys (Baranowski et al., 1995), and that girls ate vegetables daily, while boys did not (Telljohann et al., 1996). Likewise, girls were reported to eat nutritional snack foods more than boys (Cohen et al., 1990; Perry et al., 1985; Striegel-Moore et al., 1985).

It should be noted that most of the research which found significant gender differences in food consumption was conducted on children older than fifth-graders. It is probable that with fifth-grade students (examined in this study), the actions of their parents largely determined the child's diet. The parents decided what foods were present in the home, and were able to guide the child's behavior (content of food eaten). They had control over the amount of money and time the child spent at fast-food restaurants. Indeed, older children have reported more frequent consumption of fast food than younger children (Cohen et al., 1990).

The data from this study are consistent with that from other research (Centers for Disease Control, 1996; Crocker et al., 1997; Garcia et al., 1995; Kelder et al., 1995; McMurray et al., 1994; Morrow, 1989; Pate et al., 1994; Robinson et al., 1995; Sallis et al., 1990; Sallis et al., 1992; Sallis et al., 1993; Zakarran et al., 1994) which reported that girls are less active than boys. This investigation also confirmed that girls perform more low-intensity physical activity than boys (Aaron et al., 1993;

Harrell et al., 1997; Kann et al., 1995; Myers et al., 1996; Rekers et al., 1989; Rowland, 1990), and that boys perform more high-intensity activity than girls (Centers for Disease Control, 1996; Trost et al., 1996). In a multiethnic sample of third-graders, Simons-Morton and colleagues (1997) found that boys performed more high-intensity physical activity than girls, but also more low-intensity activity than girls. More time was spent playing video games and watching television by boys, while more time on homework was spent by girls.

In the present study, the social influence background variables of family function and parental health habits appeared to be particularly salient in the process of physical activity participation for girls. Family function was significantly correlated with the girl's perceived health status, physical activity self-efficacy, and feelings toward exercise. Parental health habits were significantly related to the girl's feelings toward exercise, and feelings toward exercise were positively correlated ($r = .302$, $p = .01$) with participation in moderate-to-vigorous physical activity. Finally, feelings toward exercise explained the most variance ($b = .291$, $p = .001$) in the dependent variable, moderate-to-vigorous physical activity participation, for girls.

A surprising finding of this study was that girls were inclined to participate in physical activity of any intensity, but particularly in moderate-high intensity activity, if their responding parent reported being single, divorced, or separated. After their feelings toward exercise, a single-parent home was the biggest contributor to the variance in girls' moderate-vigorous physical activity participation ($b = -.207$,

$p = .012$). It is speculative at this point, but perhaps a single parent must work outside the home for financial reasons, and consequently enrolls the fifth-grade daughter in after-school programs such as the YMCA. Although the after-school care may be the primary reason that the daughter is enrolled and takes part in these activities, it may help facilitate a girl's physical activity participation. It could also be a spurious finding; for example, girls from single-parent homes may actually have more positive feelings toward exercise which is the true reason that they participate in more moderate-high intensity physical activity, or there may be another explanatory variable which was not examined in this study. Interestingly this study did not detect an influence of a single-parent home on diet behavior of girls or boys, as might have been expected. Another inquiry determined more negative health outcomes for children from single-parent homes (Guidubaldi, Cleminshaw, & Perry, 1985).

Not surprisingly, this research confirmed that most fifth-grade students (girls and boys) viewed themselves as healthy. Other studies have found similar results (Farrand, 1991; Frauman, 1990; Graham & Uphold, 1992) with only one report of school-age girls having less favorable perceptions of their health status (Lewis & Lewis, 1989). Certainly, the school age period is a time of relatively good physical health with injuries being the leading cause of morbidity and mortality (Clemen-Stone et al., 1996; Guyer & Ellers, 1990; National Center for Health Statistics, 1993).

As noted before, this study provided strong support for the IMCHB to help explain the enactment of diet behavior for both girls and boys. Although there were

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significant correlates for the enactment of physical activity by both genders, it appears that there may be a missing link in the model regarding the health behavior of physical activity. Both groups felt positively toward physical activity and were very sure that they could be physically active, but those variables did not explain much of the physical activity actually performed by these fifth-graders. It is possible that there may be a “barriers to exercise” and/or a “facilitator of exercise” component that is influential in whether or not a child actually engages in frequent physical activity. For example, this investigation found that fifth-grade girls from single-parent homes participated in more moderate-vigorous physical activity. As mentioned before, it may be that these girls are enrolled in after-school programs which give them automatic access to physical facilities and organized sports, and enables them to be active with their peers. This may “facilitate” physical activity for this group of girls. It may also be that barriers to exercise (fatigue, poor weather, time constraints, homework obligations) for fifth-graders exist, as Trost and colleagues (1996) have suggested. More research on children’s health behaviors utilizing the IMCHB as a theoretical framework will help determine if additional constructs need to be added to the model. In addition, the construct of social influence should be operationalized as more than just family influence. It is probable that, for a preadolescent child, peer and media influences are important variables in explaining health behavior.

In summary, statistical analysis of these data confirmed factors which are related to a fifth-grader’s enactment of diet and physical activity. Further, the data

support the IMCHB as a conceptual framework in explaining the determinants of health behaviors in fifth-graders. Taken as a whole, the research offers very strong support for the use of the IMCHB in explaining a child's diet behaviors, but weaker support for explaining a child's physical activity behaviors.

IMPLICATIONS FOR FURTHER STUDY

Although the research on children's diet and physical activity is expanding as the year 2000 approaches, the degree to which this expansion of knowledge will actually advance the implementation of successful interventions is partially dependent upon the measurement tools available. Instruments that accurately evaluate children's diet and physical activity, including the dynamic variables that influence those health behaviors, are needed. Further research and development of better instruments to measure enactment of the diet and physical activity are imperative. Other scholars have noted that research has been impeded by the lack of valid measures for assessment of health behaviors of the preadolescent child (Sallis, 1993; Simons-Morton et al., 1997).

Much difficulty was experienced by this researcher in locating measurement instruments, appropriate for children, that adequately captured the true meaning of the concepts proposed by the IMCHB to be related to the clinical health status indicators of diet and physical activity. If the IMCHB is to continue to be extended to the study of children's health behaviors, further work is needed in development of tools that

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accurately measure the concepts of the model. For example, the food preference and food behavior instruments used in this study are forced-choice questionnaires. If a child doesn't like or eat one of the two foods presented for each item, he/she may feel pressured to choose an item rather than leave it blank. Several students in this investigation noted that they were allergic to a few of the foods (most often, dairy products) or that they were vegetarians and did not eat either choice presented.

Similarly, the activity behavior survey used in this study incorporates a relative weighting scoring system which makes it difficult to interpret the meaningfulness of the results. The child is asked to check how many times he/she spent more than 15 minutes doing an activity the past week. If a child plays basketball 1 or 2 times per week, he/she is given credit for playing 1.5 times, and this is multiplied by the 8 METs assigned to basketball (so he/she accumulates 12 points). However, if another child plays video games 3 times per week, he/she is given credit for playing 4 times per week and this is multiplied by the 3 METs assigned to video games (so he/she accumulates 12 points). Theoretically, a child could play approximately 30 minutes of basketball in a week and accumulate the same number of points as another child who played video games for 45 minutes in a week. Without question, further work is needed to refine the instrument so that it adequately meets the purpose of measuring physical activity of different intensities.

As discussed in the previous section, much evidence supports the role of food preferences in actual diet behavior. In addition, several investigators have confirmed

that preference is increased with exposure; tasting or ingestion of food is necessary to learn to accept food (Birch et al., 1995; Birch & Fisher, 1995; Fisher & Birch, 1995; Sullivan & Birch, 1990). In other words, the affective response to food can be shaped by experience. More longitudinal studies on repeated exposures and acceptance patterns among children need to be designed and implemented to determine which interventions are most successful for both genders.

A systematic examination of the similarities and differences between the genders regarding the influences on their diet and physical activity behaviors is needed so that nurses can plan successful interventions with this population. It may be necessary to use different strategies for boys and girls. For example, this study suggested that affective response to food (food preferences) and intrinsic motivation toward a healthy diet (diet self-efficacy) contributed the most to the variance in diet behavior for both boys and girls. However, affective response to exercise (feelings toward exercise) was most important in explaining the variance in moderate-vigorous physical activity participation for girls, whereas child's perceived health status contributed the most to the variance in moderate-vigorous physical activity participation for boys. In another recent study of elementary school students, the girls reported more individual activities (such as gymnastics and dance), whereas boys reported more team activities such as basketball and football (Faucette et al., 1995). More research is needed to determine if girls participate in these activities because they enjoy them and feel positively toward them, or if they happen to be more accessible to

girls than team sports. Likewise, additional research is needed to clarify the role of perceived health status in a boy's participation in moderate-vigorous physical activity.

Finally, more longitudinal studies are needed to explore any changing patterns and influences on diet and physical activity across childhood and adolescence. To date, most studies conducted have been cross-sectional, identifying correlates or influences on diet and physical activity at one point in time.

It is evident that psychological variables are related to the fifth-grade student's participation in physical activity, but are these variables consistent across time? For example, in one investigation of sixth to twelfth graders, the girls reported that their most important reasons for physical activity participation were weight control and to become more attractive, while boys reported that building muscles and improving endurance were the most important reasons for their participation (Kelder et al., 1995).

Thus, do physical reasons become more influential in physical activity participation for boys and girls as they move into middle and high schools?

PRACTICE IMPLICATIONS

This study has advanced the knowledge of the determinants of diet and physical activity in fifth-grade children. Theoretical and empirical results have significant implications for nursing practice in order to promote health for this population. These findings point to definitive directions to be taken by health care professionals.

Recent research (Domel et al., 1993) has indicated that a child's food

preferences are established early in life, and strongly correlate with his/her food exposures. In other words, if children are exposed to healthy foods (such as fruits and vegetables) at an early age, they will be more likely to eat those foods (when given a choice). As nurses, we need to teach parents to buy and cook a variety of healthy foods, and to encourage their children to try healthy alternatives to the high-fat, high-salt diet that is commercially advertised.

As health professionals, we also need to advocate for the purchase and preparation of healthier school meals. Many lower-income children eat two meals (breakfast and lunch) each day at their school, and most children eat at least one meal/day at their school. We must convince administrators that it is the school's responsibility to promote healthy growth and development of its students. Teachers also need to be discouraged from using candy and other nutritionless foods as incentives to good behavior in the classroom. Children have grown accustomed to the widespread practice of receiving "junk food" as a reward for good behavior.

Health care professionals need to encourage schools to include physical education as an integral component of the curriculum. The majority of fifth-grade students in this investigation responded that they only had physical education in school once per week. Schools have a responsibility to promote healthy growth and development of children, including their physical growth and development.

One recently published study demonstrated success in a school-based intervention to improve cardiovascular health (Harrell et al., 1998). The classroom-

based (population) instruction included information about selecting heart-healthy foods and the importance of getting regular physical exercise. It was taught twice per week for 8 weeks by regular teachers in the 3rd and 4th grades. An aerobically-oriented physical activity program was taught three times per week by physical educators. These interventions improved the CVD risk profile of children with multiple risk factors, were easy to implement, and used few resources (Harrell et al., 1998).

This research has suggested that different approaches may need to be used with boys and girls. It has been suggested that physical educators need to modify existing school programs to accommodate the needs and interests of young girls. Opportunities need to be provided for girls to participate in noncompetitive lifetime activities (Trost et al., 1996). Indeed, this study determined that affective response to exercise (feelings toward exercise) was the single most contributor to the variance in moderate-vigorous physical activity participation for girls ($b = .291$, $p = .001$). Enjoyment of the activity for its own sake rather than solely for competition may be one way of encouraging involvement. If children adopt physical activity as a satisfying and rewarding aspect of their lifestyle, then they would, hopefully, maintain this behavior into adulthood.

In a review of nine published studies, Sallis (1993) reported that males are about 15 - 25% more active than females. A consistent decline in physical activity is observed throughout the school years, with males decreasing approximately 2.7% annually, and females decreasing approximately 7.4% annually. He suggested that the

gender gap in activity widens with age, and that females may be at higher risk of health problems that are related to their more sedentary lifestyle. His conclusions emphasize the need for public health professionals to intervene early with children (during the lower school-age years) to foster a positive affective response to exercise. This research confirmed that client singularity (individual differences), as proposed in the IMCHB, are important to assess and incorporate when planning interventions for the school-age child.

In summary, the data indicate the need for nurses to provide early intervention programs that comprehensively address multiple factors that influence a child's enactment of diet and physical activity. The target audience includes children, parents, teachers, and school administrators, as well as pediatricians. Parents have historically consulted pediatricians for guidance on their child's diet. In addition, children model parental behaviors. The IMCHB proposes that social influence is related to one's health behavior. In fact, this research showed a significant relationship between parental health habits and children's diet behaviors. Children need to see that their parents eat healthy diets and participate in frequent physical activity. Similarly, nurses need to include the children's families in health interventions in order to successfully promote and maintain positive health outcomes with the school-age population.

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