AN EVALUATION OF THE EFFECTS OF HEALTH ORIENTATIONS ON NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR

by

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(ABSTRACT)

The purposes of this study were: (1) to determine the relationship between participants' health orientations and their nutrition knowledge, beliefs, and behavior before participation in the Red Cross nutrition course, Better Eating for Better Health, (2) to determine whether the differences between participants' pretest and posttest scores for nutrition knowledge, beliefs, and behavior were significant and positive, (3) to determine whether participants pretest scores for nutrition knowledge, beliefs, and behavior were significantly and negatively related to their respective change scores, and, (4) to determine whether participants' nutrition knowledge, beliefs, and behavior change scores can be predicted on the basis of their health orientations. A pretest-posttest design was used.

A health orientations instrument consisted of three scales: health behavior, health locus of control, and health incentives. Participants' health orientations were assessed

before participation in the course. Pre- and posttest measures were taken of the nutrition knowledge, beliefs, and behavior of the participants. The age, level of household income, and number of years of education of participants were used as control variables.

Results indicated that health locus of control and income were was positively and significantly related to pretest nutrition knowledge. All three health orientations variables were significantly and positively associated to pretest nutrition beliefs. Positive health behavior, positive health incentives and age were significantly and positively c wth pretest nutrition behavior.

Significant and positive differences were observed between the pre- and posttest scores for nutrition knowledge, beliefs, and behavior. Pretest scores for nutrition knowledge, beliefs, and behavior were significantly and negatively related to the respective change scores.

Health locus of control, age, and income were significant predictors of nutrition beliefs change scores. Collectively, the predictor and control variables accounted for 52 percent of the variation in nutrition beliefs change scores. Health behavior and income were significant pedictors of nutrition behavior change scores. The joint effect of the predictor and conrol variables accounted for 53 pecent of the variation in nutrition behavior change scores.

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INTRODUCTION

With the current climate of concern about inflationary pressures in the health care sector, nutrition education programs are facing financial resource constraints. As a result, administrators of these programs are finding it imperative to justify the existence of nutrition education programs by producing data supporting the effectiveness of their programs.

The ultimate goal of any nutrition education intervention is to maximize the health status of learners by altering nutrition behavior in a manner that will complement their life styles. Success in achieving this broad goal has been far from praiseworthy.

The correlation between nutrition knowledge and positive nutrition behavior has been weak. Frank and associates (1) reported a lack of correlation between dietitians' knowledge of nutrition-related cardiovascular risk factors and the integration of this knowledge into their own life style. Schwartz (2) found high school graduates did not apply their nutrition knowledge when making food decisions. Poolton (3) also reported a lack of correlation between nutrition knowledge of students and their ability to apply this new knowledge outside of the classroom.

To what can nutrition educators attribute this program failure? Reasons for this failure may be the inadequacy of the evaluation methodologies utilized and the limited understanding of nutrition behavior. Evaluation methodologies have been weak, if not nonexistent, in determining the effectiveness of programs in maximizing nutrition behavior of participants.

When employed, these evaluation strategies have entailed merely the quantification of a change in the participant's nutrition knowledge and nutrition attitudes. As a result of these types of studies, nutrition educators have assumed that appropriate nutrition behavior changes will automatically follow and be sustained over time.

Another deterrent to nutrition education programs achieving desired outcomes may be the limited amount of attention paid to the dependent variable, nutrition behavior. The failure of research studies to account for variation in desired program outcomes may be attributed to poor conceptualization of nutrition behavior, and therefore, the inappropriate measurement of the dependent variable. In addition, inadequacies may exist in the theoretical framework for explaining nutrition behavior.

Nutrition behavior is as varied and complex as any human behavior. Jointly, nutrition and nonnutrition factors exert

powerful and strong influences on the learners' readiness to receive and to comply with the nutrition behavior recommendations pesented in the nutrition education program. These influences include both personal attributes, such as motivations and values, as well as environmental forces which the learner brings to the learning environment. Each learner possesses a unique profile of these characteristics.

Nutrition educators need to recognize that these factors, together with the nutrition education program activities, will determine the learner's propensity to change his nutrition behavior. Preassessment of these factors could assist nutrition educators in developing a profile of the learner who has the propensity to alter his nutrition behavior. In this way the number of participants in a nutrition education program who will achieve desired program outcomes can be predicted with some degree of certainty.

The Nursing and Health Services staff of the American Red Cross (ARC), in conjunction with the Dietary Guidance and Nutrition Education Research staff of the U.S. Department of Agriculture (USDA), have developed a nutrition course, Better Eating For Better Health, for adults from 20 to 55 years of age. This course will become part of a series of consumer education programs available to consumers through their Red Cross chapter.

The purpose of the nutrition course is to enable the consumer to maximize his potential for nutritional health and well-being by applying the principals of nutrition to making personal food choices (4). Course content has been based on a survey of consumer nutrition interests and concerns. The course content includes affective and cognitive domains of learning.

The evaluation of the Red Cross nutrition course outcomes will encompass program process and program theory measures. The program process measure includes: (a) the immediate ability of the program to produce a change in nutrition knowledge and nutrition beliefs, and (b) the effectiveness of the structural components of the program such as the course manual, teaching methods, and teaching learning environment and the teacher evaluation by the participants. Program theory measures include determining (a) if nutrition knowledge, beliefs and behavior can change due to program intervention, and (b) if precondition factors can be conceptualized as predictors of program outcomes.

This particular research study is a component of this comprehensive evaluation plan. As a component of the evaluation plan, this study is designed only to determine the relationship between health orientations and entry-level nutrition knowledge, beliefs and behavior, to determine

whether the participants in the nutrition course can change their nutrition knowledge, beliefs, and behavior, to determine whether the participants pretest scores for nutrition knowledge, beliefs, and behavior are significantly related to their respective change scores, and to determine whether health orientations can explain the propensity of the participants to change their nutrition knowledge, beliefs, and behavior. These research findings along with the other evaluation results compiled by ARC and USDA will be utilized collectively to improve the effectiveness of the nutrition course in achieving desired program outcomes.

I. STATEMENT OF PROBLEM

Nutrition education endeavors have met with limited success in achieving optimal changes in nutrition knowledge, beliefs, and behavior. Evaluation strategies have generally consisted of comparing pre- and post-assessment of nutrition knowledge, beliefs, and behavior. These are factors a nutrition education program can directly influence. However, there are other factors -- factors the learner brings to the learning enviroment -- which are not the result of the education program but may directly influence the learning process. These factors are nonnutrition related. It is the combination of all these factors, ie., the preprogram fac-

tors as well as the program factors, which influence the learner's propensity to adopt or change his nutrition knowledge, beliefs, and behavior.

The purpose of this study was to test the effects of specific factors, which will be referred to as health orientations, on participants' nutrition knowledge, beliefs, and behavior before and after exposure to the Red Cross nutrition course, Better Eating For Better Health. A new instrument, health orientations index, was developed to assess specific health behavior, health locus of control, and health incentives unique to the participant. The implications drawn for this study will assist the field of nutrition education by enhancing the understanding of forces which influence the adult learner's propensity to change his nutrition knowledge, beliefs, and behavior, and, thus, will guide nutrition educators in predicting successful nutrition outocmes.

II. SPECIFIC OBJECTIVES

Specifically this study attempted to achieve the following objectives:

(1) To determine whether participants with positive health orientations possessed valid nutrition

knowledge and beliefs, and engaged in positive nutrition behavior before their participation in the Red Cross nutrition course.

(a) To determine whether participants with more positive health orientations possessed valid nutrition knowledge before their participation in the Red Cross nutrition course.

(b) To determine whether participants with positive health orientations possessed positive nutrition beliefs before their participation in the Red Cross nutrition course.

(c) To determine whether participants with positive health orientations will engaged in positive nutrition behavior before their participation in the Red Cross nutrition course.

(2) To determine whether there were positive and significant differences between the nutrition knowledge, beliefs, and behaviors of participants before and after their participation in the Red Cross nutrition course.

(a) To determine whether there was a positive and significant difference between participants' nutrition knowledge before and after their

participation in the Red Cross nutrition course.

(b) To determine whether there was a positive and significant difference between participants' nutrition beliefs before and after their participation in the Red Cross nutrition course.

(c) To determine whether there was a positive and significant difference between participants' nutrition behavior before and after their participation in the Red Cross nutrition course.

(3) To determine whether participants' nutrition knowledge, beliefs, and behavior pretest scores were significantly and negatively related to their nutrition knowledge, beliefs, and behavior change scores.

(a) To determine whether participants' nutrition knowledge pretest scores were positively and significantly related to their nutrition knowledge change scores.

(b) To determine whether participants' pretest beliefs pretest scores were positively and significantly related to their nutrition beliefs change scores.

(c) To determine whether participants' nutrition behavior pretest scores were positively and significantly related to their nutrition behavior change scores.

(4) To determine whether low change scores for nutrition knowledge, beliefs, and behavior of participants can be predicted on the basis of positive health orientations as measured prior to their participation in the Red Cross nutrition course.

(a) To determine whether low change scores for nutrition knowledge of participants can be predicted on the basis of positive health orientations as measured prior to their participation in the Red Cross nutrition course.

(b) To determine whether low change scores for nutrition beliefs of participants can be predicted on the basis of positive health orientations as measured prior to their participation in the Red Cross nutrition course.

(c) To determine whether low change scores for nutrition behavior of participants can be

predicted on the basis of positive health orientations as measured prior to their participation in the Red Cross nutrition course.

III. HYPOTHESIS

The research hypotheses for this study were:

(1) Before participation in the Red Cross nutrition course, participants with positive health orientations would exhibit statistically significant positive pretest scores for nutrition knowledge, beliefs, and behavior.

(a) Before participation in the Red Cross nutrition course, participants with positive health orientations would exhibit statistically significant positive pretest scores for nutrition knowledge.

(b) Before participation in the Red Cross nutrition course, participants with positive health orientations would exhibit statistically significant positive pretest scores for nutrition beliefs.

(c) Before participation in the Red Cross nutrition course, participants with positive health orientations would exhibit statistically significant positive pretest scores for nutrition behavior.

(2) There would be a statistically significant improvement in participants' nutrition knowledge, beliefs, and behavior after praticipation in the Red Cross nutrition course.

(a) There would be a statistically significant improvement in participants' nutrition knowledge after participation in the Red Cross nutrition course.

(b) There would be a statistically significant improvement in participants' nutrition beliefs after participation in the Red Cross nutrition course.

(c) There would be a statistically significant improvement in participants' nutrition behavior after participation in the Red Cross nutrition course.

(3) Participants with high pretest scores for nutrition knowledge, beliefs, and behavior would exhibit less change in nutrition knowledge, beliefs, and behavior after participation in the Red Cross nutrition course.

(a) Participants with high pretest scores for nutrition knowledge would exhibit less change in nutrition knowledge after participation in the Red Cross nutrition course.

(b) Participants with high pretest scores for nutrition beliefs would exhibit less change in nutrition beliefs after participation in the Red Cross nutrition course.

(c) Participants with high pretest scores for nutrition behavior would exhibit less change in nutrition behavior after participation in the Red Cross nutrition course.

(4) After participation in the Red Cross nutrition course, there would be a statistically significant negative relationship between participants' health orientations and change scores in nutrition knowledge, beliefs, and behavior.

(a) After participation in the Red Cross nutrition course, there would be a statistically significant negative relationship between participants' health orientations and change scores in nutrition knowledge.

(b) After participation in the Red Cross nutrition course, there would be a statistically significant negative relationship between participants' health orientations and change scores in nutrition beliefs.

(c) After participation in the Red Cross nutrition course, there would be a statistically significant negative relationship between participants' health orientations and change scores in nutrition behavior.

IV. DELIMITATIONS

(1) This Red Cross nutrition course, Better Eating for Better Health, is delimited to adults.

(2) In this study program effectiveness measures were delimited to assessing participants' nutrition knowledge, beliefs, and behavior before and after participation in the course.

(3) This study was delimited to Red Cross chapters who volunteered to participate in Pilot Test III of the evaluation of the nutrition course.

V. LIMITATIONS

(1) Validity and reliability may have been sacrificed by studying a large number of variables simultaneously.

(2) The diversity in teaching effectiveness of the teachers conducting the program may have confound the results.

(3) This research did not evaluate the influence of all program process measures.

(4) There was no control group.

(5) Conditions under which the evaluation was conducted may have been a source of invalidity (Administrative validity), e.g., use of different sites, different teachers, different geographical regions, etc.

(6) Evaluation instruments may not have adequately assessed the variables being measured.

VI. BASIC ASSUMPTIONS

This study was planned and conducted on the basis of the following underlying assumptions:

(1) There are a multiplicity of factors which influence nutrition knowledge, beliefs, and behavior which are both nutrition and nonnutrition related factors.

(2) The identification of variables influencing nutrition knowledge, beliefs, and behavior can assist nutrition educators in designing and evaluating nutrition education programs. Therefore, it will serve to improve the effectiveness of nutrition education programming.

(3) The goal of nutrition education is to positively change nutrition behavior for the purpose of improving nutritional health and well-being by applying current concepts of nutrition to personal decisions about food and health in a manner that complements the learner's lifestyle, health needs and food habits.

(4) Nutrition behavior can be improved, maintained or changed throughout an individual's life span.

(5) Nutrition behavior is additive, sequential, and repetitive.

(6) Nutrition knowledge alone is inadequate to change nutrition behavior.

(7) Nutrition information provided through the Red Cross nutrition course is relevant and applicable to the learner and is delivered in an interesting and meaningful manner to facilitate learning.

(8) There is some standardization in the educational process and the environment of the Red Cross nutrition course.

VII. DEFINITION OF TERMS

Nutrition Behavior. This refers to all conscious and subconscious food actions voluntarily undertaken by the individual for the purpose of meeting biological, social, and emotional goals. It is not innate but formed and learned from interactions with one's environment throughout the life span.

Nutrition Beliefs. This refers to specific beliefs about nutrition. In this study beliefs are operationalized as the cognitive elements of the affective component of the learner's perception of a concept or relation between concepts. Beliefs vary along a probability dimension whereas attitudes vary along an evaluation dimension of good or bad. Thus beliefs refer to the "belief in" the existence of an object or event or "belief about" the manner in which it exists (5). For the purpose of this study the term beliefs will be used instead of attitudes.

Nutrition Knowledge. This refers to the cognitive domain of learning, and includes recall, comprehension, application, analysis, synthesis and evaluation of nutrition information.

Health Orientations. Health orientations refer to the endogenous and exogenous characteristics unique to the individual learner which he brings to the learning enviroment. In this study health orientations include health behavior, health locus of control, and health incentives.

American Red Cross. A quasi-governmental agency, which operates under a special federal charter with the responsibility for relief and communication between the American people and their armed forces, and for national and international disaster relief. Educational services are adapted to

meet the ever-changing needs and lifestyles of Americans (6).

Chapter II

LITERATURE REVIEW

This chapter provides a theoretical framework for this study by assessing and integrating current research with previous studies. Major theories and approaches in behavior will be reviewed to lay the foundation for the discussion on nutrition behavior. This review will include the following topic areas:

Human Behavior, Education and Change

Health Behavior Research: Implications for Nutrition Education

Profile of the Adult Learner

High-level Wellness and Health Promotion: The Role of Nutrition Education

Following this discussion, research specifically related to this study will be reviewed. This will be accomplished under the following topics:

Nutrition Behavior: A Definition

Factors Influencing Nutrition Behavior

Nutrition Education and Behavior Change

I. HUMAN BEHAVIOR, EDUCATION AND CHANGE

Changing or influencing behavior is the primary focus of the learning situation in any nutrition education program. Learning implies in a broad sense knowing something better than before (7). The nutrition educator's goal is to bring about some "new and desired" learner behavior. Vadium and associates (8) define the role of the educator as one involving the design and implementation of a learning situation that allows the learner to gain a new behavior, practice it, and learn when to use it in a real life situation.

In order to influence or change behavior the nutrition educator must understand the concept of behavior and what factors influence behavior. Behavior is defined as "any action of the individual that involves a response to some stimulus situation and that may be observed or measured either directly or indirectly"(9).

Man's behavior is holistic in nature. Although for purposes of analysis, researches will dissect behavior into various parts: physiological, psychological, and social. Unfortunately, there is seldom a clear distinction between the various components of behavior. Temporary discord in one area of behavior influences all areas of behavior (10).

Behavior is a complex phenomenon and influenced by many facets. Individuals exposed to the same situation will be-

have differently. These differences reflect each individual's own unique "package" of experience, values, needs, goals, attitudes and motives (8).

In general, almost all behavior has been shaped, modified and /or controlled through learning (11). Learning may take place in a formal setting such as in school or informally, and even unconsciously, through interaction with peers, family or exposure to mass media such as advertising. Behavior changes can include the acquisition of knowledge, skills, and/or attitudes and values. Not all change in behavior occurs due to learning. Some behavioral changes take place as a result of unplanned or unconscious events such as physical growith, illness, boredom, or fatigue. In addition, learning does not necessarily produce desirable or positive behavioral changes (12).

Bloom et al. have divided behavior into three domains: cognitive, psychomotor, and affective (13). Cognitive behavior includes the mental process of knowledge, comprehension, application, analysis, synthesis, and evaluation. These behaviors are hierachical in nature. For example, the actual performance of an activity such as food preparation is referred to as a psychomotor behavior. Thus, an indiyidual may be able to prepare food but not understand why certain cooking procedures are utilized which is the cognitive

domain of the behavior. Finally, the person preparing the food may not care about why certain pocedures are necessary to produce a desirable product. This involves the affective domain which includes attitudes and values.

The thrust of nutrition education has addressed the cognitive and psychomotor domains of behavior. They are easy to define, to measure, and to evaluate a specific change. The affective domain is abstract, thus difficult to measure. It is complex because it addresses the individual's total value system which Verdium et al. (8) refer to as the "philosophy of life." This "philosophy of life" is unique to each individual. It is also a time-consuming process that may go on beyond the time frame allotted for a given learning situation. Successful nutrition education programs must be designed to alter all three domains of behavior because collectively they influence permanent behavior change.

This is a difficult task because behavior is influenced by both external and internal forces. Internal forces include: attitudes, beliefs, values, needs, motivations and self-experience (self-concept). Attitudes are formed and changed throughout life, yet they are very rigid and insensitive to information requiring change. A person's behavior may change before a change in attitude occurs. It has been suggested that modifying overt behavior may be one of the most powerful ways of modifying attitudes (14).

Attitudes are actually packages of particular beliefs, feeling and responses to a particular object (8, 14). Fishbein and Raven (5) operationalize an attitude as varying along an evaluation dimension of good or bad. As one acquires more and more attitudes through life experiences, the individual's behavior becomes stereotyped, predictable and consistent (15).

There are three major components of an attitude: cognitive, affective and behavioral. Beliefs are attitudes and serve as the cognitive elements of attitudes and vary along a probability dimension. However, beliefs are often considered as separate from attitudes. Belief may be further distinguished as "belief in" that an object or event exist, or "belief about" the manner in which it exists (14). Beliefs refer to what in individual believes to be true and are usually based on cultural learning, reasoning, observation, factual information, prejudice or authority of a credible person. Information in conflict with one's beliefs will probably be rejected (16). The affective component of an attitude refers to feelings and emotions about an object such as liked or disliked, or pleasurable or not pleasurable. Feelings are the motivating characteristic of an attitude. Finally, a resultant positive or negative readiness toward an action is the behavioral component of an attitude (17,18).

Attitudes are systems. A change in one component leads to a change in the other two (12,14). In this way attitude systems lead to consistency among beliefs, feelings and actions. Inconsistencies among these components can exist. The stronger the saliency of the object, the stronger the degree of discomfort and, therefore, the greater the chance for attitude change (10).

Changing attitudes is a very complex process. Correcting faulty knowledge is only one step in attitude change because it only addresses the cognitive component of attitude. A change in the knowledge component of an attitude is the least difficult. Attitudes based on social norms or ego defensive mechanisms will be difficult, if not impossible, to change (19). Therefore, changing attitudes in an educational situation by knowledge alone will meet with limited success. Attitudes of powerlessness, conflicting needs, and role transition have been described as markedly affecting the abiilty of the individual to learn and change his behavior (20-24).

Values differ from attitudes because values guide or limit an action. They tell an individual what he feels he "should do, ought to do or must do". They give meaning and significance to one's efforts and are usually unconscious driving forces. In comparison to attitudes and beliefs,

values are basic, more general, more enduring and less specific. Thus man's behavior is governed by his value system. Value's are usually not verbalized but rather are inferred from behavior (10).

Even though values are highly personal, they are learned through socialization and will change in accordance with life experiences (10). Gifft et al. (25) stress that "in a world where there is so much uncertainty about values, people need help in claifying their own values, to sort out what they are "for" or "against" and why. Value-clarification is a technique being used in education to assist the learner in seeing and applying his own values within a factual learning framework. In this process the educator acts as a facilitator by guiding the learner through a series of steps which confront, clarify and challenge the student to apply what he has learned while focusing on his personal values (26).

An individual's propensity to change his attitudes, beliefs and values is dependent on a motivational base. Motives energize and direct a person to act. Differences between people in response to the same stimuli arise from their motives (27). Needs and interest, according to Boshier and Peters (28), in combination determine the motives of an individual. They are the root of all forces which moti-

vate the adult to learn. Unless the learning situation addresses these individual needs and interests, it is unlikely that the information will be accepted and incorporated into the individual's life situation. Boshier and Peters (28) define needs as gaps "that exist between the current state of the learner and some desired condition, whereas interests are expressions of preference among alternative experiences".

The most classical analysis of the individual's motivational system has been described by Maslow (29). He identifies the learner as "a perpetually wanting animal" because rarely does an individual reach a state of complete satisfaction. Once a desire is satisfied, another emerges to take its place. He postulates that man's needs are arranged in a hierarchy of five steps:

1. gratification of bodily needs;

2. safety insurance against pain and danger;

3. love, affection, warmth, acceptance, a place in the group;

4. self-esteem, self-respect, self-confidence, feelings of strength and adequacy; and,

5. self-actualization, self-fulfillment, self-expression, use of one's capacities to be the most one is capable of being.

He further states that one's needs must be met to some degree before the need at the next level emerges. Although no research has proven the notion of hierarchial progression among needs, the value of the theory lies in the emphasis placed on motivating behavior by recognizing individual needs (30).

Behavior, therefore, represents multiple motivations which exist due to unfilled desires which become needs if they are not gratified. As a result, an individual is vascilating through several levels of needs simultaneously and this may continue throughout an individual's life span (31).

Another motiviational theory proposed by Locke (32) states that an individual's goals are the primary determinates of task motivation. The more difficult the goal is to attain, the harder the individual will work to attain it. The level of difficulty must be realistic and not discourage the learner. But easy goals will result in minimal effort being expended. In designing educational programs, clearly stated and specific goals will assist in motivating the learner and they should be at a difficulty level that will challenge the learner.

Another theory, the Expectancy/Valence Theory of Motivation, assumes that movitvation involves three sequential steps:

1. An effort ----> performance (E---> P) expectancy -- which refers to the individual's perceptions that increased effort will lead to good performance;
2. A performance ---> outcome (P ---> O) which refers to the individual's perception of the chances that good performance will lead to certain outcomes; and
3. Valence which refers to the value the individual places on the outcome.

A person's motivation level to learn can be impeded at any one of the steps in the model (30,33).

No one theory can adequately explain motivation. However, the above theories of motivation point out that any motivational attempt by the nutrition educator must begin by focusing on the individual's needs and interests. The educational process should be based on outcomes that are based on these needs and interest. This assures that these outcomes are considered "valent" by the learner. Finally, goals should be clearly defined and relate to the needs and interest of the learner as well as be of a level of difficulty to be challenging (30).

Researchers have attempted to classify motives based on the origin of the motive. Sherif & Sherif (34) have classified motives as either biogenic which refers to unlearned

motives originating within the individual such as hunger or thirst, or sociogenic which are learned motives. Others have simply classified these motives as external or internal, or primary or secondary motives (31).

This discussion leads into the concept of self-experience or self-concept which is also an important source of motivation. Verdium and associates (8) describe self-concept as:

> "How people see themselves, how they feel about being that person, how they think others see them, how they see other people, and how they feel about these, and their ideal role concepts."

The significance of self-concept is the most pervasive of all aspects of personality previously discussed and is the central determinant of man's behavior. Learning potential is influenced by one's self-concept (31). An individual with a positive self-concept will spend his energies in further developing or growing whereas an individual with negative self-concept will gravitate around maintenance or defense of self (35).

The above discussion has addressed the internal forces or determinants that direct an individual's behavior: attitudes, beliefs, values, needs, interests, motives and self-concept. External forces are those forces outside the individual. They provide stimulus to react to a given situation. This is the environment that an individual lives within and includes social, cultural, situational and eco-

nomic influences. Because the individual is enmeshed in his environment, it is difficult to study only those internal forces which influence behavior. As man ages, forces in his environment are constantly influencing his behavior. His own life experiences increase and he is more capable of sorting or clarifying these environmental influences as they relate to his behavior.

These external forces can support or impede a desired behavior. Sherif and Sherif (34) have developed a model called Central Psychological Process. Jointly, internal and external forces are internalized, involving the sorting out of irrelevant external and internal stimuli and focusing on only the relevant ones. This process is called psychological structuring or processing.

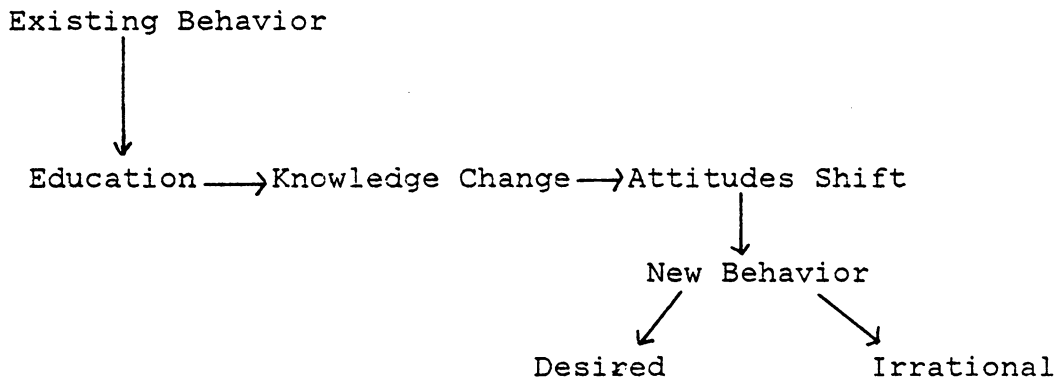
Behavior cannot be explained adequately by addressing only external or internal factors which guide behavior. Adequate analysis of a given behavior requries studying the relationship of all of these factors as a system.

Factors influencing behavior have been outlined. Often in nutrition educational settings, the thrust is to change or modify behavior. Several theories have been proposed to explain the processes involved in behavior change. Combs and Snygg (36) have suggested that behavior is influenced by an individual's perceptions of people, objects, and events

in his environment. In order to change behavior the individual's perceptions (beliefs, values, needs, attitudes and self-concept) must be modified.

Hockbaum (37) refers to this process as selective perception. An individual's response to "messages from the environment" is psychologically determined. The mind functions as a screen by only selecting information that is meaningful to the individual. Thus, an individual's desire to change behavior will be based on messages that are consistent with what he wants to learn and what he wants to use.

A three step model called the Consistency Theory (38) addresses the relationship between knowledge, attitudes and behavior change. It simply states that inconsistency between knowledge and attitudes results in behavior change. Thus, the role of nutrition education would be to provide a "push" to initiate the information gathering process leading to changes in attitudes to induce behavior change. Perhaps in reality the model illustrating this process is the following:



In a five step model Rogers (39) suggests that individual's progress through a series of five stages in the acceptance of new ideas which leads to behavior change. This adoption process progresses through the following five stages:

1. Awareness: at this stage one learns of the existence of anew idea or practice for the first time, but has limited knowledge about it.

2. Interest: at this stage one is stimulated to learn more about the idea and seek additional information.

3. Persuasion: at this stage attitudes are being formed and modified because the individual is receptive to learning.

4. Trial: at this stage the individual applies the new idea or practice to his daily life.

5. Evaluation: at this final stage the individual decides to accept or reject the idea or practice based on his personal values.

Similar models have been proposed by Lippitt, Watson, and Westly (40) and Maccoby and Alexander (41). Unlike Roger's

model (39), these two models stress the need for reinforcement and maintenance of behavior.

Research has indicated that people may change behavior prior to adjusting attitudes (42). Festinger's Theory of Cognitive Dissonance (43) has been formulated to address this point. Individuals are constantly attempting to establish internal harmony between attitudes and behavior. The greater the dissonance between them the greater the potential for inducing change in either behavior or attitudes. Also successful behavior change is dependent on the type of behavior to be changed. Simple behavior, which is not deeply ingrained and for which there exists an easy substitute, is not as difficult to change as more complex behaviors. Habits are complex behaviors deeply ingrained in the subconsious. Communication research has shown mass media as effective in producing simple behavior change. Complex behavior requires mass media along with support from the external environment to provide incentives and reinforcement for behavior change (44,45).

In summary the above models show behavior change as more complex than the Consistency Model (38) using the terms information, attitude formation and behavior change. All illustrate that information alone is an ineffective inducement to change behavior. Mager (46) provides closure to this

discussion by stating, "If telling was the same as teaching, we'd all be so smart we could hardly stand it".

II. HEALTH BEHAVIOR RESEARCH: IMPLICATIONS FOR NUTRITION EDUCATION

A considerable amount of research has been conducted attempting to explain individual health-related behavior. In a classical article Kasl and Cobb (47) define health behavior as "any activity undertaken by a person believing himself to be healthy, for purposes of preventing disease or detecting it in a symptomatic stage." This term is synonomous with preventive health behavior such as health promotion and maintenance activities commonly used in the literature. The authors further delineate illness and sick role behaviors from health behavior as an activity undertaken to reduce a condition's symptoms, and an act only undertaken to get well by one who is ill, respectively.

A model of compliance, termed the Health Belief Model, was formulated by Hochbaum and associates (54) to explain preventive health behavior. They adopted well-established theories of decision making by utilizing sociopsychological variables to explain health behavior (48-53). These various theories, their similarities, differences and underlying assumptions that parallel with the Health Belief Model (54) are discussed in great depth by Maiman and Becker (54).

The Health Belief Model assesses "an individual's motivation to act as a function of the expectancy of goal attainment in areas of health behavior". The model's origination was based on the need to predict compliance and noncompliance with medical recommendations such as taking prescribed medications, keeping medical appointments, losing weight, and smoking cessation (54).

The original model proposed that an individual must move through the following decision making steps before he will take a specific health action or engage in a health behavior change.

1. Perceive himself susceptible or vulnerable to a condition.
2. Perceive the condition as serious.
3. Perceive benefit in taking the health action as outweighing the barriers to taking action.
4. Stimulated to act due to some external or internal cue.
5. All of the former being modified by set of demographic, structure and sociopsychological factors (55).

Rosenstock (56) refers to this as the health decision making process.

The individual must believe he is susceptible or vulnerable to the risk of developing a specific condition. Next, the individual must perceive the consequences of developing

the condition as serious, including both physical severity (i.e., sickness, crippling or death) and social security (i.e., loss of job). If he perceives himself as susceptible to the condition as well as the condition being serious, he must evaluate or weigh the benefits and/or barriers to seeking care or following a specific medical regime. Benefits refer to beliefs on the efficiency of the treatment and barriers are the physical, financial, and psychological costs of engaging in the health behavior. A stimulus which can be either internal (i.e., perception of physical health status) or external (i.e., interactions with friends, family, mass media, observations of others who have the condition or have prevented the development of the condition) must trigger the health behavior. This is called the "cue to action", which means that something has aroused the person to act. These cues to action will differ from one person to the next (55).

Another variable, general health motivation, a necessary component of the model, assumes that motivation is a necessary condition for action. Motivation is operationalized as "the psychological state of readiness to take a specific action and extent to which a particular action is believed to be beneficial in reducing the threat". (54)

The desire to attain or maintain a positive state of health will differ from individual to individual because of

their particular health motives. There can be a conflict between barriers and benefits to taking a health action. Those motives with the highest value will induce specific behavior. Especially in a healthy person or a young person, health motives may be low priority motives in comparison with other motives such as social and economic motives. If an individual is not motivated, it then becomes the responsibility of the health professional to teach new motives, a very difficult task (54).

The original model stressed avoidance of diseases or changing negative health behavior. It did not address the fact that health status is positively valued which motivates the individual towards its attainment or maintenance. Individuals do exhibit positive health motivations. (Although in some instances health activities such as exercise or dieting are performed for reasons that are not health-related but rather self-concept related!) For this reason Becker and associates (57) restructured the model to include a category called "health motivations". Other concepts added included "the feeling of control over health matters" (locus of control), "faith in doctors and medical care", and "intention to comply". Demographic, structural and enabling factors found to be predictive in other studies were added as mediating variables. The primary principles of the orin-

gal model remain and are still the major focus in the application of the model.

Kasl and Cobb (47) have summarized the considerable emperical support available for the Health Belief Model from prospective and retrospective studies of preventive, illness, and sick role behavior. Evidence is cited justifying its utility in predicting compliance with medical regimens (58).

Recently, several studies have been conducted using the Health Belief Model in studying dietary compliance. Becker & associates (57) conducted a prospective study to test the model's ability to predict and explain mothers' adherence to a diet prescribed for their obese children. The authors stressed that dietary adherence is different from and more complex than most health behaviors because the threat posed to health is not tangible or immediate but future-oriented and linked to other conditions. It appears that dietary behaviors are habit behaviors. The individual may engage in appropriate dietary behaviors for non-health reasons such as to improve body image or for social acceptance. Finally, many individuals do not view obesity as an "illness" which is considered life threatening. These factors create a new dimension for testing the Health Belief Model. The dependent variables in the study were changes in child's weight

over a 2-month period and mother's previous appointment-keeping behaviors. The study found the strongest predictor of the child's losing weight and of long-term appointment keeping was the mother's concern about her child getting sick. Other significant correlations were made between each major dimension of the model. The results support the usefulness of the model in explaining and predicting compliance.

Another related study (59) was conducted: (a) to determine the degree to which mothers of young infants followed feeding practices recommended by their physician; (b) to identify those factors that influence compliance with these recommendations such as health, attitudes and beliefs, knowledge about nutrition, and demographic factors; and (c) to determine whether any subgroups within the sample differ in compliance rates. The sample consisted of 131 women who had only one child under 15 months and 9 general practitioners and one pediatrician. Data were collected through questionnaires. In addition to using constructs of the Health Belief Model, the attitude, "nutrition is important", was added based on research by Eppright and associates (60) and refined by Sims (61). A nutrition knowledge instrument was designed containing 35 true-false items concerning infant feeding practices. A compliance score was calculated by de-

termining the number of times the mother's response exactly matched her physician's response. The results showed higher nutrition knowledge scores were associated with lower compliance scores. The attitudes, "nutrition is important" and "concern for health," were more significantly related to compliance than seriousness or susceptibility to disease attitudes. This suggests that mothers are concerned more with their infants' immediate health than with the fear of illness later in adulthood. It could also mean that since the infant is healthy the mother's primary concern is maintaining this level of health.

Lindsey-Reid and Osborn (62) found a similar negative relationship between engaging in regular exercise and susceptibility to heart disease. The authors suggested that those who engage in exercise are both healthy and concerned with establishing and maintaining good health habits. On the other hand, those who felt susceptible to heart disease did not engage in the study's exercise program because they did not believe exercise would reduce the threat of heart disease. These conclusions possibly explain the negative relationship between compliance and susceptibility to disease in the study by Morse and associates (59). Conceivably the mothers did not believe that infant feeding practices could have an effect on the health of their infant later in adulthood.

The study by Morse and associates (59) is the only published report to date which assesses dietary compliance with nonspecific recommendations for normal health. Additional research is needed to measure compliance with recommended actions about normal nutrition with an emphasis on developing "reliable measures with combined both objective and subjective methods to identify the existence and the degree of compliance" (59).

These studies have limited application to the general public because the populations studied were more homogeneous than the general public. But it can be assumed that individuals who have responsibility for a child's health and who have shown a tendancy to enter the health care system are more likely to fit the assumptions upon which the Health Belief Model is based (63).

Many limitations and methodological concerns surround the use of the Health Belief Model. The following have been described in the literature:

1. The Health Belief Model implies that certain levels of readiness are necessary to stimulate health behavior, yet neither theory nor research has identified these levels (56).

2. There is little understanding about the theory of beliefs (56).

3. The information concerning the reliability measures of beliefs is limited. Studies have not used identical questions for determining the presence or absence of a belief. The concept being measured also may vary from study to study (56).

4. Doubt remains concerning the variable, perceived severity, in stimulating preventive health behavior (56).

5. There is limited understanding about the development of beliefs, the condition under which they are acquired, and the manner in which the three health beliefs are related to other nonhealth beliefs the individual holds (56).

6. The Health Belief Model is more applicable to middle-class groups than lower class groups because the model implies "an orientation toward the future, toward deliberate planning and toward deferment of immediate application in the interest of long-range goals" (56).

7. The model cannot explain habitual behaviors which have been developed early in life such as brushing teeth. Also, some behaviors such as food practices are not necessarily motivated by health beliefs but instead are developed through socialization. The area of determinants of health habits needs further investigation (56).

8. There is little consistency in the operational definitions used to measure the constructs of the Health Belief Model (65).

9. The joint influence of all variables in the Health Belief Model has not been thoroughly investigated (64).

Recognizing these limitations, a few studies have attempted to change health behavior. Kegeles (63) in studying why people seek dental care found the best predictor of subsequent health behavior was past health behavior. Weisenberg and associates (65) reached similar conclusions. In testing the Health Belief Model's ability to use premeasured health beliefs to predict acceptance by children of a preventive dentistry program, the researchers found children with low perceived susceptibility took greater action because they had taken greater action in the past.

Haefner and Kirscht (66) were able to modify beliefs and health behavior in a study designed to alter health beliefs in regard to cancer, heart disease, and tuberculosis through a film show. But they also found long-established habits such as dietary habits were not markedly influenced by changes in beliefs induced by the film. The authors suggest these habits are influenced by a cluster of nonhealth motives not just health motives. This is the only study that has shown changes in health behavior as well as changes in health beliefs (65).

Most of the studies that support the model have utilized retrospective survey methodology. Weisenberg and associates

(65) caution that in these studies beliefs could have resulted from the behavior. Prospective studies also support the model but the results have been weak. And despite the amount of correlational data collected over the past 20 years that support the use of the Health Belief Model, the relationship between health beliefs and health behavior still remains uncertain.

In addition to studies utilizing the Health Belief Model, other aspects of health behavior have been examined. Habits are behaviors entrenched in the individual's attitude and belief system. A habit is defined "as a stable behavior pattern marked by automaticity, decreasing awareness, and a partial independence of reinforcement". Hunt and associates (67) state that the goal of any health education program is twofold: the establishment of habits beneficial to health called "healthful habits" and the cessation or nonmaintenance of harmful habits called "unhealthy habits". The elimination of unhealthy habits is difficult and can only occur in preventing their performance. Many techniques have been utilized such as behavior modification with both successes and failures.

A habit whether healthful or unhealthful is maintained through practice and repetition. The cognitive element of a habit can increase the awareness of such an activity as

learning that overeating of high calorie dense foods is causing weight gain. This could be the stimulus to initiate change or reinforce a behavior such a eating is pleasurable. In order to develop healthful habits they must meet the following criteria (67):

1. must be simple in nature;
2. cues for the health habit must be comparible with one's daily routine, i.e., dental floss before or after tooth brushing; and
3. cues for compliance should be related to the habit being developed, i.e., wakening up to a morning alarm as the signal to exercise.

Locus of control is another aspect of behavior which has been the focus of health behavior research. This term describes "the nature of the expectation held by the individual that a particular event will occur as a result of a specific act of behavior." If a person feels that an event is dependent on outside forces such as fate or powerful other and that they themselves cannot exert any effect on the events, he is referred to as having an external locus of control. But if the person believes he has a high level of perceived control over the event then this person has an internal locus of control (68).

This concept has shown some promise in predicting and explaining health behavior. In a review of literature of this construct, studies have shown favorable relationships between locus of control and positive health behaviors, in the areas of smoking, birth control, weight loss, use of seat belts, and preventive dental care (68). All of the studies found similar results. Internals were more likely to engage in behaviors that support well-being and more successful in situations requiring behavior change (68,69).

Wallston and associates (70) in studying differences between externals and internals in a weight control program found subjects in programs matched to their locus of control expressed greater satisfaction with the program. This suggests that in programs designed to change behaviors internals would be more successful in learning situations requiring more independence and self-regulation whereas externals would require support from others.

Scaltzer (71) has stated that health practices of internals could be influenced through an emphasis upon personal health attitudes but with externals the emphasis sould be on influencing health behavior change through social pressure. Most health education programs stress that the individual must accept responsibility for his own health behavior,. Program success may be dependent on training clients to hold

more internal beliefs. Psychological techniques such as behavior modification, operant conditioning and behavioral medicine only reinforce external beliefs (72). Therefore, health locus of control should be considered in designing health education programs.

Parcel and Meyers (73) suggest that the health motivation variable of the Health Belief Model could be operationalized as an individual's locus of control. Locus of control may be a variable that contributes to the understanding, prediction, and change of health behaviors.

In conclusion studies attempting to explain and predict health behavior have restricted their research to only a few of the independent variables identified in the Health Belief Model and have treated the dependent variables, preventive health behavior, as unidimensional. This implies that any health behavior is appropriate as the dependent variable. The comparison of findings among studies has also treated preventive health behavior as unidimensional,. But some studies have demonstrated most preventive health behavior is multi-dimentional (74,75). Langlie has expressed the need for "a better understanding of the interrelationships among health behaviors" (76). Studies are needed to investigate the multidimensional aspects of health behavior because individuals behave in a total society.

III. PROFILE OF THE ADULT LEARNER

Nutrition educators function as behavior change agents. Changing nutrition behavior is a complex process and at present a process not clearly understood. To successfully change nutrition behavior the focus of all educational endeavors should be on the learner. The nutrition education program's goals, educational climate, and educational processes designed to help the adult learn must complement the fundamental characteristics which differentiate the adult learner from the child or youth learner. Recognition of these characteristics is essential to any nutrition education program's success in changing the nutrition behavior of adult learners.

A new field in education has emerged called andragogy, the art and science of teaching adults. The assumption of andragogy is that adults "tend to have a perspective of immediacy of application toward most of their learning" (77). The fundamental process of learning does not differ between adults and youths, but rather there are some characteristics unique to the adult which support or impede his desire to learn. Adults have an organic need to move from dependency in learning as youths to self-directed learning as adults (78). These differences must be recognized if behaviors are being changed or developed in adults.

The profile of the adult learner consists of six categories which describe the unique characteristics of the learner: orientation to learning, physiological and noncognitive factors, motivation to learn, experience, adult condition, and psychological and cognitive factors (Table I).

The adult learning situation must be problem-centered and goal-oriented. McClusky (79) and Knowles (77) state that the adult learner approaches educational activities to solve problems on a day to day basis. A significant part of the adult life consist of solving problems for which there are no standards or habitual solutions. The learning process is problem-centered. The appropriate orientation to every learning experience is based on the problems and concerns adults have as they enter the learning situation. If the information is irrelevant or too remote from the real issues that are happening in the adult learner's life, the information will be rejected.

Other conditions and attitudes are unique to the adult learner. The adult learner has a specific goal to achieve which is inhanced by his learning experiences. Learning is only meaningful if it is relevant to his specific learner goals. Finally, within the learning situation, the adult learner regards the teacher as a partner or co-inquirer in the preparation and structure of his learning experiences.

TABLE I

Profile of the adult learner.

Orientation to Learn	Psychological and Non-cognitive Factors	Motivation to Learn	Experience	The Adult Condition	Psychological/ Cognitive Factors
Problem-centered	Declining Visual Acuity	Different Developmental Tasks	Education Level	Commitments	Adult Potential for Learning
Student-teacher authority differential	Declining Auditory Acuity	Individual Variance	Prior Learning	Self-concept	
	Speed and Reaction Time Decline	Readiness to Learn	Attitudes Differen-ciation	Time Allocation	
	Poor Health Conditions		Predisposition and Sets		
			Interests		
			Learning Expectations		
			Bias and Values		
			Life Experiences		

This is very different from the pedagogical situation where the teacher authority is established by law and reinforced by parents and community. In adult education, both the learner and teacher are adults. Superiority possessed by the teacher is solely based on his teaching competency. Unlike pedagogy, the adult learner prefers self-evaluation (79).

Motivation to learn is related to developmental tasks and results in variation in the desire to learn among adult learners. "A developmental task is a task which arises at or about a certain period in the life of an individual, successful achievement of which leads to his happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by society, and difficulty with later tasks" (80). Each of these developmental tasks produces a "readiness to learn" which at its peak presents a "teachable moment" (77). Havinhurst (80) divides the adult years into three task periods; early adulthood (16-30 years of age), middle age (30-55 years of age), and later maturity (55 and up years of age). He identifies social roles of adulthood. These roles are rather outdated because of the changing societal roles of women. Nevertheless the process is still applicable. As one moves from one period to the next, a change in role requires the completion of new devel-

opmental task which produces a new readiness to learn. In addition to these developmental tasks, life experiences, attitudes, values, interests, learning expectations, and personal goals, account for variations in learner motivations (81, 82).

The amount of formal education does not impede the adult's ability or willingness to learn as long as motivation is present. Experiential learning is a large part of the adult's past. Learning sources may be work, volunteer activities, readings, informal groups, conversations with experts, homemaking management, and the like. Education of the adult must build on, pull and flair from these experiential learning sources (81, 82).

As one grows older attitudes become more fixed. These attitudes are formed as a result of the adult's exposures and experiences in the past. An adult's attitude toward education can be directy related to his experience with schooling. Interests change and become more diversified with age and preferences are clarified and become set (82).

McClusky (79) observed that given the highly differentiated population of adults, the adult educator is faced with a group of diverse learners who are all predisposed to make "preferential responses". Adults tend to veiw the world in a series of sets, about each of which the adult has already

made a judgement as to its value or usefulness because of his lifelong experiences.

Due to these prior experiences, the adult learner arrives to the learning situation with many preconceived ideas about learning and teaching. He expects to be treated with respect and have consideration given to his opinions and time constraits. He also expects to participate and to learn meaningful and relevant information (79, 81, 82). It is more difficult to change the perceptions of an adult because of the adult's prior experiences. In addition to these perceptions, experiences ad habits may interfer with learning to do a familiar task differently. Therefore, "it is easier for an experienced adult to learn a completely new task than to learn to do a familiar one in a new way." (82)

Self-concept changes when an individual becomes an adult. He acquires a new status in that his personality becomes self-directing. For this reason, an adult learner avoids, resists, and resents situations where he is treated like a child (79).

Adults as learners do not enjoy the freedom of time as does the youthful learner. With respect to educational pursuits, the adult must arrange his personal time between obligations of varied priorities. The amount of time required to learn is important to the adult. The aging adult no

longer sees time as infinite, and this attitude can affect the adult's perception of his ability to learner and/or his interest in learning (79).

The cognitive potential of the adult to learn is often affected by age due to a decrease in psychological and non-cognitive factors. A decline in visual acuity, auditory acuity, speed and reaction time, and health status can affect the ability to learn (82). Stereotyping of the aging adult may impede the adult's learning potential.

The learning ability of the adult does not decrease with age. Rather, physiological factors, motivational level, interest in and attitude about learning affect the ability to learn (81).

One of the goals of nutrition education for adult learners should be the development of the individual's capabilities for perceiving, knowing, thinking, valuing, and doing. Through the development of these capabilities adults can cope more confidently with the complexities of nutrition behavior and its impact on their health and the health of significant others. Knowles (78) states "educators (must) shift the focus of our attention from transmitting content to helping learners develop the skills of inquiry, and providing environments that are rich in resources needed for various kinds of inquiry.

IV. HIGH LEVEL WELLNESS AND HEALTH PROMOTION: THE ROLE OF NUTRITION EDUCATION

Health is often defined by consumers and health professionals as the absence of disease and is usually discussed in the context of illness. The World Health Organization defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease" (88). This definition streses optimal levels of health, and is both confining and utopian (84, 85).

Divore and Kreuter (84) stress that health is a multifactorial phenomenon which cannot be viewed in terms of optimum or complete levels, but rather as irreducible minimal levels of health. These minimal levels include:

1. the abilty to adapt to changing situations
2. the capacity to perform valued tasks
3. varying degrees of positive and negative states
4. multidimensional causality, and
5. a relative state

Wellness is a concept described by Dunn (85) as "an integrated method of functioning which is oriented toward maximizing the potential of which the individual is capable, within the environment where he is functioning. This definition depicts man interacting with his environment. In-

stead of health being peceived as a complete or perfect state, health is viewed as a dynamic and changing process. Characteristics of wellness include (86):

1. process that continues throughout life,
2. action oriented, conscious and dependent on an individual's behavior, decisions, values and development,
3. learned as one grows and develops,
4. more than the absence of disease,
5. composed of six dimensions: intellectual, emotional, physical fitness and nutrition, social, occupational, and spiritual.

Health refers to either a negative or positive state of being at the moment with often good health existing without any conscious effort (87). Educational efforts have stressed the prevention of disease which is a negative approach and usually focuses on one disease at a time. Wellness stresses a positive way to stay healthy or become more healthy. It encompasses all aspects of health both good and bad.

Wellness is dependent on completion of specific developmental tasks, the social environment, and the absence of disease. Bruhn and associates (86) have identified wellness tasks to be accomplished at the different developmental stages defined by Erikson (88). These tasks are integrated measures and indirectly measure states of health. A failure to complete all of the wellness tasks at any developmental stage may result in the individual's falling short of his

potential for wellness. The goal for health professionals is to identify at what level the minimal wellness tasks have been completed and to develop alternative modeling and self-reward standards to allow the individual to "catch up" and have the potential to achieve wellness. It is possible that the failure of nutrition education to change or modify nutrition behavior is due to the inadequate development of nutrition developmental tasks during growth and development. The information and expected outcomes may be too sophisticated because the minimal baseline tasks have not been learned at the appropriate time during the individual's development.

To experience wellness, an individual must recognize the components of wellness and consciously pursue activities to support it. Personal values systems and attitudes toward risk-taking are learned in the developmental process and determine whether individuals and families will engage in wellness behaviors. During early development parental modeling plays a crucial role in the development of health behaviors. By adolescence and adulthood most health related behaviors have been established, with the individual assuming slightly more responsibility for his health than in the younger years. In addition to the achievement of minimum development tasks, self-esteem, perceived internal locus of

control, and adequate information about health and health related activities will increase the chances of individuals' engaging in wellness behavior (86).

At present, society does not encourage or reinforce the development and maintenance of wellness behavior. Changing societal values about wellness can be accomplished through health promotion activities. Health promotion is defined as "the process of advocating health in order to enhance the probability that personal (individual, family and community), private (professional and business), and public (federal, state and local government) support of positive health practices will become a societal norm. The process of advocating health may be conducted by a variety of modalities, including, but not limited to, health education". (84) The key word in this definition is "societal norms". If the social environment in which the individual must function does not support health-oriented lifestyle changes, then the "taking personal responsibility" approach to health will render minimal success. Both personal responsibility and a health promoting environment must exist simultaneously for the establishment and maintenance of positive health practices. Health promotion endeavors should change cultural norms in addition to providing health education as a vehicle to attaining specific program outcomes (84).

Basic to the above discussion, there are two levels of health activities which have been adapted from Blum (89). Health promotion is a macro health approach and individual or personal actions to health are the micro health approach. Neither approach is effective alone. Micro health approaches include all health learning through formal and informal learning situations. Formal health learning situations result in undividuals engaging in behavior change by providing the necessary skills, knowledge, attitudes, and motivations to support change. The macro approach consists of a framework or organized groups or government action to support the micro health approaches. The recognition that either approach can strengthen actions of the other approach is important. Micro health approaches can stimulate macro health approaches and vice versa (84, 89).

At present the barriers to a health promoted society at the micro level includes the inability of the consumer to objectively self-assess his health status, his lack of factual knowledge regarding health status in general and his failure to act upon existing knowledge. At the macro level, the lack of societal support both economically and culturally are the barriers. To assist in combating these barriers, health education program research should include, in addition to disease prevention and health education goals, a goal to change health norms in a given community (87).

At the micro level, the mission of nutrition education is to motivate and educate individuals to pursue and maintain behaviors for life-long wellness. This can be done by supporting the completion of nutrition wellness tasks, by encouraging individuals to recognize the value of nutrition in maintaining health, and by providing positive role models.

This is not a difficult mission in an institutional setting. There the learning process is motivated by the immediacy of the problem, and relevance of learning and changing a specific behavior. But in a community setting individuals are not motivated by such tangible events such as disease symptoms or acute illness. The motivation must come from recognizing the individual's health needs and values and reinforcing the wellness behavior, which help him achieve a level of wellness that is meaningful to him.

At the macro level, the government and nutrition advocates have attempted to provide a climate to upgrade nutrition education as a social priority. This is exemplified by the publication of the Dietary Guidelines for Americans (90) and the persistent demand for a national nutrition policy. Media has had the most pervasive influence on changing nutrition behavior at the macro level. Unfortunately, these influences have not been in the best interest of health as a whole. Rather many negative nutrition behaviors have been learned through mass media.

Griffin and Light (91) have summarized these issues by stating, "Education in nutrition serves society in two ways. Traditionally, it acts as a conserving force, maintaining the viability of culture but it is also an innovative and adaptive force contributing to the adjustment of contemporary problems and conditions." "...however it must be pointed out that the power of nutrition education to effect significant, sustained and constructive changes in nutritional behavior will depend on the value placed by society on these changes and the rewards sanctioned by the community as appropriate recompense for success."

V. NUTRITION BEHAVIOR: A DEFINITION

In the nutrition and health literature the term nutrition behavior is used interchangeably with other terms such as food behavior, food habits, eating habits, dietary habits, eating behavior, and dietary behavior. There appears to be no distinction made among these terms.

For purposes of this reasearch, the term nutrition behavior will be used. It is viewed by this researcher as a more holistic term because it encompasses all habits and conscious decisions made about food and nutritional health. Conversely the term habit is limiting because it implies a static rather than dynamic behavior. Nutrition behavior embraces all responses to a variety of nutrition and nonnutri-

tion stimuli undertaken by the individual for the purpose of meeting biological, social, and emotional goals.

Similar to any other human behavior, nutrition behavior is energized by a multi-motivational base which comprises all nutrition and nonnutrition motives. These motivational forces are unified and integrated. Seldom is there a clear distinction among these motives. For example, rarely does an individual only eat to maintain or improve his nutritional health. For this reason it is conceivable that nutrition behavior is additive, sequential, repetitive, and multidimensional.

In addition nutrition behavior is not innate. But rather it is learned and altered from interactions with one's environment throughout one's life span. Even though it is an enduring state, it can be changed. Significant, constructive, and sustained change will occur with some difficulty just like any other human behavior since it will take time to unlearn certain behaviors in order to engage in newly learned behaviors.

VI. FACTORS INFLUENCING NUTRITION BEHAVIOR

A significant body of literature is available which attempts to identify the wide variety of forces influencing nutrition behavior. Nutrition behavior is the product of cultural, social, personal, and structure factors (93). These factors function as powerful motivational forces which control behavior positively or negatively.

Cultural motivation is transferred from generation to generation (92, 93). Social motivations are similar to cultural motivations and influence individuals to value the opinions of others. Personal motivators include family members, peers, influential people, educational level, age, and physiological and psychological characteristics; with family being one of the strongest influences. The fourth factor, structural motivators, refers to the family situation and is really enmeshed in the other three motivational factors. The situation in which the family is involved in at a given point in time will influence a food decision (93).

Specific factors have been identified as influencing nutrition behavior. These include the family's values, economic goals, and health status (94). The family as a unit is very influential on the behavior of its members (95). Casper and Wakefield (96) reported husbands exerted the

strongest influence on the family to try new foods and women generally were motivated to select a specific food based on personal and family preference. The role of wife and mother motivated women to learn about nutrition and food preparation techniques (97).

Food choices and behavior change are related to values important to the individual. Low income mothers ranked from the highest to lowest the following food related values as important to them: family life, health, convenience, economy, friendship, and education (98).

Age is another important indicator of certain nutrition behaviors. In a study of dieters, health as a motivator grew stronger with increasing age. However, young dieters were motivated by external factors such as pressure to maintain a certain physical appearance as well as the need for approval (99). In another study, older homemakers tended to be more "habit bound" and, therefore, resistant to change (100).

Personality traits have been found to be resistant to behavior change with the more dogmatic individual being the most resistant (101). Individuals with a strong positive self-concept more consistenty sought nutrition information to assist them in making food decisions, and had better quality diets (36). Self-concept has been useful in ex-

plaining food faddist behavior (102). Internal locus of control was found to be positively and significantly related to better quality diets of married and elderly subjects (103). These studies suggest that modification of behavior requires prior personality assessment.

Other factors include education (104), economic factors (105), advertising (96, 106), prime time television programs (107), stages of the lifecycle (108-110), employment status of homemakers (111), and "food choice motives" (112). Food choice motives refer to satiety, tolerance, taste, familiarity, prestige, price, convenience, and health.

Besides these described external factors, researchers have attempted to analyze the impact of personal forces on nutrition behavior such a knowledge (113, 114, 115), attitudes (116), beliefs (116), and goals and values (117).

VI. NUTRITION EDUCATION AND BEHAVIOR

The major thrust of nutrition education since the 1900's has emphasized the dissemination of nutrtion information (118) in a rather prescriptive manner. This narrow definition of nutrition education assumes that increasing the level of nutrition knowledge would automatically lead to the improvement in the learner's behavior resulting from the easy and immediate application of this new knowledge (118, 119).

It has been suggested that the failure to successfully change nutrition behavior on a long-term basis is due to this narrow definition. People do not necessarily change behavior due to the presentation of logic and facts. Few studies have been able to support a unidimensional relationship between nutrition knowledge and the application of the new knowledge in the form of sustained nutrition behavior improvement (1-3, 120, 122). It is evident from the previous discussion that behavior is very complex. Thus nutrition educators have become concerned that information alone is an inadequate motivator to change behavior.

Since nutrition education is a multidisciplinary process, it is composed of many components. The presentation of nutrition facts is an important component; but, its success in affecting behavior is dependent on providing the necessary motivation to learn. In addition, the necessary skills must be developed which allows the individual to integrate, adapt, and then adopt the new knowledge at an appropriate level along with other nonnutrition information to their life style situation. Recognition of these components of nutrition education is critical in the successful education of nutritionally literate decision makers who must be able to make purposeful, informed nutrition decisions in the face of a rapidly changing society (118).

If the ultimate outcome of nutrition education is behavior change, then the challenge to nutrition educators is to determine the mechanisms in which nutrition information is internalized and the factors influencing a change in nutrition behavior. Through this identification and analysis, nutrition educators will better understand the actions that lead to behavior change.

Some studies have shown that nutrition knowledge is positively related to dietary adequacy (113-115). However, the majority of studies to be reviewed have challenged this Knowledge-Behavior paradigm and instead have investigated the relationships among the Knowledge-Attitude-Behavior paradigm. This paradigm illustrates that the resultant behavior is dependent on the acquisition of nutrition knowledge leading to attitude change.

Based on the premise that knowledge and attitudes influence behavior, Grotkowski & Sims (116) conducted a study to determine to what extent do attitudes, beliefs, and knowledge of food and nutrition correlate with the dietary practices of the elderly. Sixty-four persons over sixty-two years of age participated in the study. The authors found nutrition knowledge was positively correlated with socio-economic status and the attitude "that nutrition is important." The other beliefs and attitudes about weight reduc-

tion, and foods and supplements were inversely related to socio-economic level. The relationship between nutrition knowledge and nutrient intakes was not significant at the .05 level.

Overall the results showed that socio-economic level was the predominant independent variable. Socio-economic level and nutrition knowledge were strongly related to each other. Perceived nutrition knowledge and nutrition beliefs and attitudes were classified as intervening variables. The linkage among the independent and intervening variables influenced the dependent variables, which in this study included dietary intake and consumption of health foods and supplements. The authors conclude that the findings supported the model suggesting that knowledge influences attitudes resulting in behavior change (116).

In a study of preschool children, nutrition education of the mother was the variable highly correlated with the nutritional adequacy of her child's diet. Also, attitudes played an important role. The researchers found mothers with positive attitudes about menu planning, their role as homemaker, and the importance of good nutrition for their child, provided higher nutritional quality diets to their children (123).

Another study surveyed the interrelationships of knowledge, attitudes, and practices among nurses. Although a significantly positive relationship was found between nutrition knowledge and attitudes (strongest), knowledge and practices (weakest), and attitudes and practices, it appeared that the source of nutrition education influenced the knowledge, attitudes and practices of the nurses (124).

Stansfield and Fox (125) also found a postive correlation between nutrition knowledge and attitudes of grocers. However, they stressed that this positive correlation offers no evidence as to casualty. Three hypotheses were suggested based on this research:

1. As nutrition knowledge increases, attitudes become more positive because of greater awareness of nutrition.

2. Individuals with favorable attitudes toward nutrition will be more likely to attain greater nutrition knowledge.

3. These two factors reinforce each other with an increase in knowledge leading to an improvement in attitude and vice versa.

Further research is necessary to test these hypotheses.

Schwartz (2) found results similar to Stansfield and Fox (125) in a study designed to investigate the relationship between previous enrollment in home ecnomics courses, and present nutrition knowledge, attitudes, and practices of Ohio high school graduates. Four possible models explaining the interrelationship among knowledge, attitudes, and practices were evaluated (Figure 1). Significant correlations were found between nutrition knowledge and attitudes, and between nutrition attitudes and practices. There was no significant relationship between knowledge and practice. Based on the results, the author accepted the knowledge-attitude-practice model.

The findings of the studies conducted by Schwartz (2) and Stanfield and Fox (125) are further supported by Jalso, Burns and Rivers (104). These investigators studied the relationship between demographic and personal characteristics on nutrition behavior. The variables measured included age, education, socio-economic level, and personalty rigidity as they related to nutrition opinions and practices of "food faddist" and "nonfood faddist". The study concluded that nutritional opinions were reflected in nutrition practices. Education was positively correlated with scores on both practices and opinions, indicating that more educated participants had more valid nutrition opinions and practices.

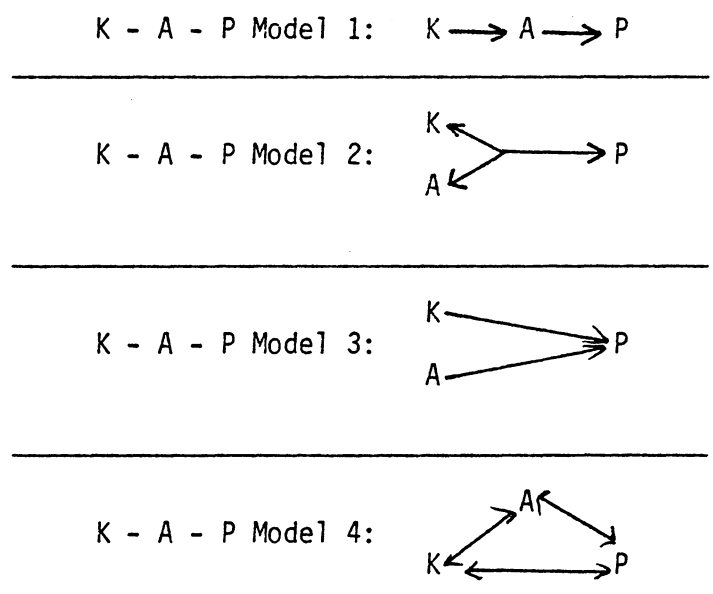


Figure 1. Four possible models of the interrelationship of nutritional knowledge, attitudes, and practices. Model 1: attitudes mediate knowledge and practice; Model 2: knowledge and attitudes interact to influence practices; Model 3: knowledge and attitudes independently influence practices; and Model 4: knowledge influences practices both directly and indirectly as mediated by attitudes, concurrently (2).

A negative correlation existed between age and scores on both opinions and practices. Overall age was found to be the variable with the greatest effect on scores for both opinions and practices rather than education. The food faddist group scored the lowest on the Rehfish Personality Rigidity test, revealing less flexible characteristics. This group had less formal education, was older, and had a lower income than the nonfood faddist. Therefore, increasing age was positively associated with increasig rigidity and decreasing nutrition practice and opinion scores.

Sims (61) on the other hand found the strongest positive correlation between nutrition knowledge and socio-economic status. In studying the interrelationships among nutrition knowledge, demographic variables, and attitudinal variables in a group of mothers of preschool children, this author found the highest level of nutrition knowledge among the mothers of higher socio-economic standing. By performing a multiple regression analysis, the strongest predictor variables of nutrition knowledge were socio-economic level and the "nutrition is important" attitude. The author concluded that mothers who knew the most about nutrition had positive attitudes about the importance of nutrition and were of higher socio-economic status.

A survey conducted by Peterson and Kies (126) did not find a statistically significant relationship between nutrition knowledge and attitudes of early elementary teacher. The authors concluded that nutrition knowledge of teachers is not a predicator of attitudes toward nutrition education.

The traditional Knowledge-Attitude-Behavior paradigm has been challenged as too simplistic. Sims (127) tested the hypothesis that a change in attitudes may precede and alter knowledge acquisition before behavior change. Two alternative models were tested (Figure 2). Again the study supported the theory that nutrition knowledge is related to attitudes. Nutrition knowledge scores were significant and positively correlated with the "nutrition is important" attitude as evidenced in previous studies.

The number of years of education was the variable most significantly correlated with nutrition knowledge at the .001 level. None of the other demographic variables were statistically related to knowledge or attitudes. The associations between attitudes and dietary factors were weak. The path analysis supported the attitude-knowledge-practice model. In other words, knowledge was an intervening variable between attitudes and practice, rather than the direct effect of attitude on practice as seen in previously cited studies (127).

1. Knowledge ⟶ Attitudes ⟶ Behavior

   Attitudes are intervening variables between knowledge and behavior.

2. Attitudes ⟶ Knowledge ⟶ Behavior

   Knowledge acts to intervene between attitudes and behavior.

Figure 2. Two alternative models explaining behavior change (127).

The results of this study are contrary to the other studies concerning the credibility of the Knowledge-Attitude-Behavior model, as explored in Sim's (127) research. The suggestion has been made that the variations found are due to differing degrees of analyses. Sims utilized rigorous analysis to determine the independent variables' construct validity and reliability as well as the relationships between variables. Such procedures are not reported in other studies. Many of the studies did not have dietary practices as the dependent variable. Rather they used "surrogate" measures of dietary intake, which do not reflect time. Few of the studies published correlation coefficients between specific variables measured. It is interesting to note that many of the studies utilized the nutrition knowledge and attitude instrument designed by Eppright et al. (60). This instrument was modified to accommodate the different groups studied (2, 114, 117). For this reason the validity and reliability of these instruments for comparative purposes can be challenged. The initial validation of the instrument is questionable and, therefore, it can not be generalized to any given group.

The previous studies cited dealt with the development of a conceptual framework to explain and possibly to predict nutrition behavior. None of the studies actually tested the

proposed model. Rather, they were ex post facto studies. There was no experimental manipulation or intervention by the researchers. The relationships between the independent and dependent variables, as reflected by the responses to the questionnaire participants brought with them to the studies, were analyzed.

Carruth and associates (128) actually conducted a study to change behavior. In other words, they measured nutrition behavior before and after structured effects provided through a nutrition education program. These researchers studied the importance of attitudes and personality traits on predicting nutrition behavior. This was done by determining whether there was a significant relationship existing among these variables; and whether any or all of these variables were predictors of nutrition behavior. The study consisted of an experimental group, control group, and assessment prior to and after exposure to a nutrition education program for Nutrition Education Assistants (NEAS) in Missouri's Expanded Food and Nutrition Education Program. Nutrition-related behaviors measured in this study included: 1) brochure requests for free literature from both experimentals and control NEAS: 2) verbal affirmations of nutrition practices from experimental NEAS; and 3) observed overt nutrition-related behaviors of experimental NEAS.

The findings from this study were consistent with other research attempting to identify factors to predict nutrition behavior. The training program resulted in a positive gain in nutrition knowledge; but, this gain did not affect nutrition-related behaviors. Age and attitude were found to be the best predicators of behavior. As age increased the composite score of the three behaviors, i.e., verbal, observed, and mail requests, decreased. Conversely a higher attitude score was positively associated with a higher composite behavior score. This research further supports that the Knowledge-Attitude-Behavior paradigm is too simplistic. Behavior change is dependent on more than simply an increase in knowledge leading to a change in attitudes (128).

A more complex model was utilized in research conducted by Yetley and Roderick (117). They used the first phase of the Adaption Model developed by Kronglan & Coward (129), to explain the relationship between nutrition knowledge and food practices of 116 young couples. The model suggests that awareness of the importance of nutrition leads to receptiveness towards nutrition information which is then reviewed against ones health and dietary goals. Acceptance or rejection of the information is dependent on how consistent it is with one's values. Many differences among husbands and wives were found. There was no relationship between

mastery-value orientation and nutrition knowledge observed for husbands. Yet a positive relationship between these variables did exist for the wives. The association between nutrition knowledge and importance placed on health goals was positive for the wives and negative for the husbands. There was a significant correlation for the ratings of health goals by husbands and wives. The authors state that "nutrition facts were probably obtained independently, whereas goals may have been influenced by family interaction patterns (118)". This study concludes that the 3-phase model is too simplistic. Nutrition factors are "emotionally" neutral and are unlikely to be applied unless an affective component in one's life stresses the importance of nutrition. The affective component could be one's health goals which may precede rather than follow nutrition knowledge (117).

Another study was conducted by Sims (130) to determine the influence of values, attitudes, and belief-patterns on food-related behavior of vegetarians. A model developed by Sherif and Sherif (34) and later modified by Schafer and Yetley (102) provided the conceptual framework for this study. The model Sims utilized identifies how food behavior and, ultimately, nutritional status are influenced by the interplay of numerous factors that are external to the indi-

vidual as well as within the individual. The findings supported that attitudes, beliefs, and values did influence food consumption behavior.

The concept of information processing has been further discussed by Olson and Sims (131). They describe an information processing approach that provides a conceptual foundation for explaining the influence of nutrition knowledge on nutrition behavior. The model shows a process in which stored knowledge exerts a critical influence on decision making processes that affect behavior.

Another information model, proposed by Jacaby et al. (132) to explain consumer food purchase decision making, contains three sets of variables: motivation, information processing and behavioral change. Satisfactory types and levels of motivation must be present for either effective processing or behavior change. The information processing is divided into three subgroups:

a. stages of information input (exposure, attention/acquisition, comprehension, retention/storage),

b. intervention and mediating variables (beliefs, attitudes, choice criteria), and

c. predecision information integration (i.e., decision-making processing).

Jacaby concludes that "given proper motivation, consumers must first acquire and then comprehend information before it can be effectively integrated with other material and used in food purchase decision making".

In summary, this review of the literature has revealed a considerable amount of evidence to supports the idea that the Knowledge-Behavior and Knowledge-Attitude-Behavior paradigms are too simplistic. Research conducted has identified a few published conceptual foundations for studying the relationship among nutrition knowledge, attitudes, and behavior. But of all these studies only one study actually attempted to change nutrition behavior (128). Further research needs to be conducted which not only recognizes the mutual influence of environmental and personal factors on nutrition behavior; but, which also goes one step beyond by attempting to change nutrition behavior. Only in this way can those factors supporting the individual's propensity to change his nutrition behavior be identified.

Many implications for nutrition education research are derived from this literature review:

1. Nutrition education programs cannot utilize nutrition facts alone to change, modify or improve behavior.

2. The assumption that people value their health and believe that what they eat will influence their health is unfounded.

3. Changing behavior may be an unrealistic goal for all nutrition education programs.

4. An individual's nutrition behavior is enmeshed in his enviromental, personal, and biological system. This behavior may be influenced by nonnutrition and nonhealth factors.

5. An interdisciplinary approach is needed to study nutrition behavior.

6. Anaysis of nutrition behavior must be holistic. The exclusion of some factors can only lead to a misplaced emphasis of nutrition education endeavors (122).

7. Rigorous statistical analysis should be utilized to determine the construct validity and reliability of the independent variables and to evaluate the results of nutrition education programs.

8. Nutrition behavior as a construct is not clearly defined.

9. Hypothesized conceptual frameworks need to be tested.

10. Experimental research designs need to be utilized in studies of nutrition behavior. Presently the premise exist that nutrition education programs do influence nutrition behavior. Few studies have been designed to challenge this premise.

11. Research on tested factors influencing nutrition behavior change is scarce.

12. There is a need for developing reliable and valid instruments to measure nutrition knowledge, attitudes, and behavior.

13. Problems in the interpretation and comparability of research in nutrition behavior persist. For example, nutrition behavior constructs have been operationalized differently by various investigators attempting to measure nutrition behavior.

14. The joint influence of all factors influencing nutrition behavior has not been evaluated. The Health Belief Model may be useful in this area.

15. Maintenance of changes in nutrition attitudes and behavior have not been evaluated against time.

Resarch designed to explain and predict nutrition behavior is in its infancy. The identification and analysis of the impact of factors influencing nutrition behavior are expected to furnish an understanding of actions that may lead to changing or modifying behavior. Only through a holistic approach to studying nutrition behavior can the goals of nutrition education programs be met successfully.

SUMMARY

Based on the literature reviewed a host of variables have been identified as influencing various forms of behavior --

health and nutrition. The literature consistently reveals that all forms of behavior are complex and not clearly understood.

Since nutrition behavior does not occur in isolation, further research is needed to examine forces other than solely the impact of knowledge and beliefs on behavior. The relationship of these factors on an individual's knowledge, beliefs, and behavior needs to be tested in an educational intervention setting.

From this literature review, three variables have been identified and collectively referred to as health orientations. Health orientations include health behavior, health locus of control, and health incentives. Each serves to condition the learner's perception and interest in nutrition information and beliefs and nutrition behavior recommendations made in a nutrition education intervention setting, and, therefore, influences the learner's propensity to change his nutrition knowledge, beliefs, and behavior.

Rationale For Study

This study will attempt to address the relationship between health orientations and the learner's nutrition knowledge, beliefs, and behavior before and after participation in the Red Cross nutrition course, Better Eating for Better Health.

This review of the nutrition related health behavior literature has demonstrated that nonnutrition-related factors are associated with an individual's health knowledge, beliefs, and behavior. This suggest the hypothesis that participants with positive health orientations would exhibit statistically significant positive pretest scores for nutrition knowledge, beliefs, and behavior.

The Red Cross nutrition course was designed to increase the level of nutrition knowledge to positively influence nutrition beliefs, and to positively alter nutrition behaviors. To ensure the effectiveness of the Red Cross course, participants' nutrition knowledge, beliefs, and behavior were assessed before and after their participation in the course. Thus it was hypothesized that there would be a statistically significant improvement in the participants' nutrition knowledge, beliefs, and behavior after participation in the Red Cross course.

Participants enter the Red Cross course with different levels of nutrition knowledge, beliefs, and behaviors. Those participants who obtain higher scores on the nutrition knowledge, beliefs, and behavior pretest were likely to have less gain in knowledge and less change in beliefs and behaviores as a result of the course than those with low pretest scores for nutrition knowledge, beliefs, ad behavior.

Therefore, it was hypothesized that paticipants with high pretest scores for nutrition knowledge, beliefs, and behavior would exhibit less change in nutrition knowledge, beliefs, and behavior after participationin the Red Cross course.

Studies using the Health Belief Model have shown that health behavior, health locus of control, and health incentives can influence an individual's ability to adopt new health behaviors or modify current health behavior. These variables have shown promise in predicting and explaining health behavior. In addition through this review of the nutrition education literature, it is concluded that research is very sparce in identifying nonnutrition-related variables that can predict and explain an individual's propensity to change his nutrition knowledge, beliefs, and behavior. Therefore, it was hypothesized that a participant's change scores for nutrition knowledge, beliefs, and behavior. can be predicted on the basis of their health orientations. Because it was expected that participants with positive health orientations and high scores on the petest for nutrition knowledge, beliefs, and behavior, it was further hypothesized that positive health orientations can predict low change scores for nutrition knowledge, beliefs, and behavior.

Chapter III

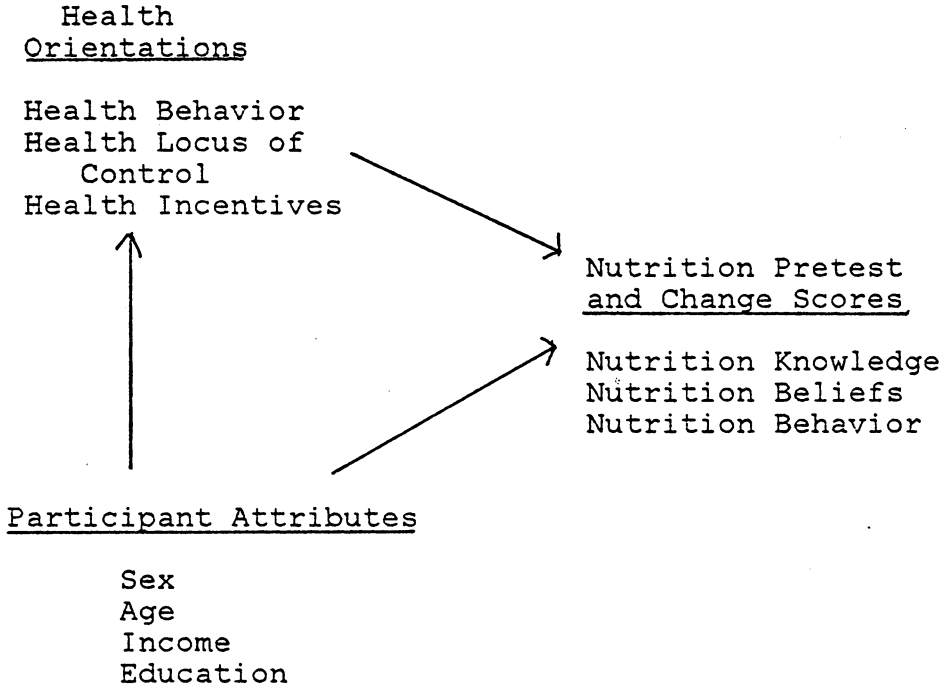
MATERIALS AND METHODS

I. DESIGN

The basic design of this study was a pretest-posttest design to determine the relationship between health orientations and nutrition knowledge, beliefs, and behavior of participants before participation in the Red Cross course, Better Eating for Better Health, and the effects of health orientation on their nutrition knowledge, beliefs, and behavior change scores after their exposure to the course. A control group was not utilized because the course participants were self-selected. The participants' health orientations were assessed only once, at the beginning of the nutrition curse. However, participants' nutrition knowledge, beliefs, and behavior were assessed before participation in the nutrition course and then immediately following completion of the course.

The independent variables in this study were the participants' health orientations which included three dimensions: health behavior, health locus of control, and health incentives. The dependent variables were the participants' nutrition knowledge, beliefs, and behavior. Participant attributes assessed were sex, age, level of household income,

and number of years of formal education. Thus the model being tested was represented as follow:



Three small scale pilot tests were conducted for the purpose of refining the course materials and evaluation instruments for the nationwide field test conducted from January through April of 1983. The evaluation process is briefly described in Appendix A. The first pilot test was conducted to refine course materials. Pilot Test II and III form the basis for this reserach study.

During Pilot Test II, the nutrition course was taught by trained Red Cross instructors for the purpose of doing a preliminary assessment of course materials and evaluation

instruments, which included a Baseline Survey and a Posttest Survey. Based on the data collected, course materials and evaluation instruments were revised.

Through the Baseline Survey (Appendix B), data was collected on the praticipants' health orientations; nutrition knowledge, beliefs, and behavior; and socio-demographic characteristics. This survey was completed by participants before the course began. The Posttest Survey (Appendix C) provided the data on the participants' nutrition knowledge, beliefs, and behavior after completion of the Red Cross nutrition course. This survey was completed by respondents immediately following the end of the course. The remaining information on the two questionnaires was not utilized in this study.

In Pilot Test III trained Red Cross instructors taught the course under the auspices of six Red Cross chapters. These instructors distributed, collected, and returned the Baseline and Posttest Surveys to designated researchers at Virginia Polytechnic Institute and State University.

II. SUBJECTS

The subjects in this study were self-selected participants who attended the Red Cross nutrition course, Better Eating For Better Health. Of the 123 participants who reg-

istered to take the nutrition course at the six Red Cross chapters, 114 completed the Baseline Survey and 74 (65 percent of the 114 course participants) completed the Posttest Survey. The nine participants who did not complete the Baseline Survey were late registrants.

In addition to the low Pecentage of posttests returned, other sampling problems occurred. Of the 74 participants who completed the Posttest Survey, 15 had to be excluded from the analysis of change in nutrition knowledge. Of the 15 exclusions, 7 did not complete the Baseline Survey and 8 participants attended a modified, one day course. An additional 10 respondents were omitted because they were given the answers to the nutrition nowledge questiosn on the Baeline Survey. For these reasons only 49 cases were used in the analysis of change in nutrition knowledge.

In the case of the analysis of change in nutrution beliefs and behavior, only 53 cases were used. Of the 74 who completed the Posttest Survey, 21 were excluded. Of the 21 exclusions 13 participants had not completely filled out the Baseline Survey and 8 participants had attended a modified, one day course.

Eighty-seven percent of the course participants were female. As shown in Table II, the mean age of participants was 42 years. While one-fourth (24.5 percent) of the sample

reported their age as under 30 years, the same proportion indicated that they were 55 years or older (24.5 percent).

Participants were also widely distributed according to household income. The mean income was $15,000 to $19,000, as displayed in Table II.

The mean educational attainment was 12.9 years, suggesting that the participants were fairly well educated (Table II). Twenty-four (24.1) percent had completed high school and 33.4 percent had completed 4 years or more of college.

III. TREATMENT

The course was developed by a project team composed of health educators, nutrition scientists, nutrition educators, and evaluation experts from ARC, USDA, Virginia Polytechnic Institute and State University (VPI & SU), and the Univeristy of Minnesota. The content of the course was based on a survey conducted to determine consumer needs and interests in nutrition prior to course development. A topical outline of the course is presented in Appendix D. The course was then reviewed by a group of 47 technical experts in various areas of nutrition science and nutrition education, and the Nursing Health Services staff at the National Headquarters of ARC.

TABLE II

MEANS AND STANDARD DEVIATIONS FOR AGE, INCOME, AND EDUCATION OF COURSE PARTICIPANTS

Variable	Mean	Standard Deviation
Age	42.009 (N=111)	15.671
Level of Household Income	3.962[1] (N=106)	2.865
Number of Years of Education	12.926 (N=108)	3.731

[1]Codes 3 and 4 represent the income levels of $15,000 to $19,000 and $20,000 to $24,000, respectively.

The course consisted of six two-hour sessions. ARC volunteer and staff, who met specific instructor criteria, which are described in Appendix E, included a background in nutrition, and completion of the ARC Core Curriculum (133) and ARC Nutrition Specialty Course (134).

Instructional materials used for the study were in draft form. They included an Instructor's Guide (135), a Participant's Guide (136), and study papers on nutrition during specific stages of the life cycle (137-142). The Instructor's Guide consisted of objectives, instructional content, learning activities, and work sheets for each session. The Participant's Guide included instructional content, homework assignemnts, and work sheets for each session. A film, Table Talk, was developed for the course to assist the instructor in leading a discussion on personal food habits. (143)

IV. INSTRUMENTATION

Health Orientations Instrument

The health orientations instrument was specifically designed for this study and consisted of three scales: health behavior, health locus of control, and health incentives. Health orientations is a construct developed by the re-

searcher as a result of synthesis of concepts from the literature in the areas of health and nutrition behavior. Health orientations refer to the unique endogenous and exogenous characteristics of the individual learner which he brings to the learning enviroment. A description and measurement of the three scales is as follow as:

Health Behavior Scale

Health behavior refers to participation in health promotion and maintenance activities which may include any nutrition behavior (47). For the purposes of this study nutrition behavior was excluded from the scale because it served as one of the dependent variables. A scale to measure health behaviors was adapted and modified fom previous research conducted by Langlie (76) and from the self-assessment tool, Health Style: A Self Test, developed by the U.S. Department of Health and Human Services (144).

After development, the health behavior scale was reviewed by the project team and the Red Cross Nursing Health Services staff. Items were reviewed for clarity and representativeness of content for the dimension of health behavior. The scale was then revised. A preliminary test of the revised scale was under taken with 61 participants in Pilot Test II for the purpose of determining the reliability of each item within the scale. A third set of revisions was made in order to improve the reliability of the scale.

The revised scale, which consisted of 10 items and used a Likert type format and was administered in Pilot Test III. The Baseline Survey items were questions 1,4,6,8,11,14,16,18,20,23 and were located on pages 1 and 2 (Appendix B). Each participant indicated the frequency with which he engaged in various behaviors. The response options were: never, rarely, sometimes, usually, and always. Response options were recoded in order that the highest score referred to the most positive behavior.

From a maximum score of 45, the total mean score for the health behavior scale was 33.7818 with a standard deviation of 5.3935 (Table III). A mean score and standard deviation for each item is shown in Table IV. The Alpha Coefficient was used to determine reliability of the scale which was α =.62 (145). However, because item 16, "Drink no more than 1 or 2 alcoholic drinks a day," had a very low intercorrelation with the other items, it was deleted. This resulted in raising the scale's reliability to α=.71 as shown in Table V.

Health Locus of Control Scale

The personality variable, health locus of control, refers to the nature of the expectations held by the individual that a particular health event will occur as a result of a specific act of health behavior (69). An individual may

TABLE III

MEANS AND STANDARD DEVIATIONS
OF HEALTH ORIENTATIONS SCALES

Scale	Mean	Standard Deviation
Health Behavior	33.7818 (N=110)	5.3935
Health Locus of Control	24.6055 (N=109)	3.3055
Health Incentives	22.2389 (N=110)	4.0051

TABLE IV

MEANS AND STANDARD DEVIATIONS[1] OF HEALTH BEHAVIOR SCALE ITEMS

Item	Mean	Standard Deviation
Visit a dentist for an annual checkup whether I have a problem or not.	3.823	1.300
Use seat belts while riding in a car.	2.901	1.382
Follow the advice of a doctor or dentist when it is given.	4.352	0.684
Take over-the-counter drugs when I feel sick.	3.470	1.123
Brush my teeth twice a day.	4.235	0.996
Try to maintain or improve my physical fitness.	3.901	0.87
Try to get an adequate amount of sleep each night.	4.078	0.886
Try to allow for leisure activities every week.	3.911	0.923
Floss my teeth daily.	2.88	1.337

[1] N = 102

TABLE V

ALPHA COEFFICIENTS FOR HEALTH ORIENTATIONS SCALES[1]

Scale	Coefficient
Health Behavior	.71
Health Locus of Control	.60
Health Incentives	.65

[1] N = 102

feel one of two ways about health events. He either has control or he lacks control over a health situation. The former is referred to as having an itnernal locus of control and the latter as having an external locus of control. The scale used to measure health locus of control was adapted and modified from research conducted by Scaltzer (71).

The scale was then reviewed by the project team and the ARC Nursing and Health Services staff for clarity and representativeness of content of the dimension of health locus of control. The scale was revised accordingly. A preliminary test of the scale was undertaken with 61 participants in Pilot Test II for the purpose of determining the reliability of each item within the scale. This resulted in a third revision of the scale in order to improve the reliability.

Based on these revisions, a six item scale was finalized and administered in Pilot Test III. These items (items 24,28,30,33,41,48) were located on pages 3 and 4 of the Baseline Survey (Appendix B). A Likert type format was used. Participants were asked to indicate the strength with which they agreed with each statement. The five response options included strongly disagree, disagree, undecided, agree, and strongly agree. Responses were recoded in order that the most positive responses received the highest score. The total mean score for the health locus of control scale

was 24.6055 with a standard deviation of 3.3055 as shown in Table II. From a maximum score of 30, the mean score and standard deviation for each item is identified in Table VI.

As shown in Table V, the reliability coefficient for this scale was α =.60. An attempt was made to improve the scale's reliability by deleting item 30, "If it is meant to be, I will stay healty," becaues of its low intercorrelation with the other five items. Unfortunately, its elimination only resulted in a .03 improvement in the reliability. Because of the small number of items and slight increase in the reliability, item 30 remained in the scale.

Health Incentives Scale

The third variable, health incentives, has a motivational impact on an individual's ability to engage in specific health activities. Health incentives in this study referred to the perceived benefits of engaging in a specific health activity (55). A scale to measure these motivations was developed by the researcher.

After development, the health incentives scale was reviewed by the project team and the ARC Nursing and Health Services staff. Items were reviewed for clarity and representativeness of content of the dimension of health incentives. The scale was then revised. A preliminary test of

TABLE VI

MEANS AND STANDARD DEVIATIONS
OF HEALTH LOCUS OF CONTROL SCALE ITEMS[1]

Item	Mean	Standard Deviation
I can change my health habits.	4.225	0.729
People can't control what happens to their health.	4.323	0.924
If it is meant to be, I will stay healthy.	3.588	1.344
Good health is largely a matter of good fortune.	3.960	0.953
I am directly responsible for my health.	4.156	0.909
My health depends on how well I take care of myself.	4.294	0.851

[1] N = 102

the scale was undertaken with 61 participants in Pilot Test II for the purpose of determining the reliability of each item within the scale. This led to the final revision of the scale which was made to improve the reliability.

Following this preliminary test the revised scale was administered in Pilot Test III. The scale consisted of six items (25,36,38,43,45,47) which were located on pages 3 and 4 of the Baseline Survey (Appendix B). Using a Likert type format, participants choose from five response options: strongly disagree, disagree, undecided, agree and strongly agree. The most positive response was coded to receive the highest score. From a mean score of 30, the total mean score for health incentives was 22.2389 with a standard deviation of 4.0051 (Table III). The mean score and standard deviation of each item is shown in Table VII.

The reliability for the scale was α=.65 (Table V). Item 45, "My health care patterns are influenced by people I know," had a low intercorrelation with the other five items in the scale. However, the item was not deleted because it only improved the reliability of the scale by .01.

Nutrition Pre-and Posttest Instruments

Nutrition pre-and posttest instruments were designed by other researchers to determine the effectiveness of the Red

TABLE VII

MEANS AND STANDARD DEVIATIONS OF HEALTH INCENTIVES SCALE ITEMS[1]

Item	Mean	Standard Deviation
Preventive health care costs too much.	3.588	1.337
I take my health for granted.	3.578	1.238
Practicing good health habits is too complicated.	4.078	0.852
Taking care of my health requires too much time.	4.117	0.824
My health care patterns are influenced by the people I know.	3.205	1.221
Practicing good health habits is not fun.	3.607	1.063

[1] N = 102

Cross nutrition coures (146). Each instrument consisted of three scales: nutrition knowledge, nutrition beliefs, and nutrition behavior. Items chosen for each scale reflected the knowledge, beliefs and behavior emphasized in the course. The same scales were used for both the pre-and posttest instruments. Discussion of the development and evaluation of the scales appears in Appendix F. The reliability of each scale is presented in Table VIII.

Control Variables

Control variables in this study included age, level of household income, and number of years of formal education. Sex was not included as a control variable because the population was predominantly women. The Baseline Survey (Appendix B) provided the data on participants' age, income, and education. Age categories were from 16 to 73 years of age. Income categories included:

Under $10,000
$10,000 to $14,999
$15,000 to $19,999
$20,000 to $24,999
$25,000 to $29,999
$30,000 to $34,999
$35,000 to $39,999
$40,000 to $44,999
Over $45,000

TABLE VIII

ALPHA COEFFICIENTS FOR NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR PRETEST AND POSTTEST SCALES (146)

Scale	Pretest Scale[1] Coefficient	Posttest Scale Coefficient
Nutrition Knowledge	.78	.82[2]
Nutrition Beliefs	.62	.57[3]
Nutrition Behavior	.78	.69[3]

[1] N = 114

[2] N = 56

[3] N = 66

Education categories were from 0 to 20 years of education.

V. DATA ANALYSIS

The Statistical Package for the Social Science (SPSS) was the source of statistical procedures employed to analyze date from the Baseline Survey and Posttest Survey (147). Reliability coefficients were determined for Health Orientation scales on the Baseline Survey. Frequency distribution of responses to scales on the two surveys as well as for the socio-demographic data was determined. Paired t-tests were used to determine the significant differences between pretest responses and posttest responses to nutrition knowledge, beliefs, and behavior items. Correlation coefficients were calculated to determine the degree of association between variables. Multiple regression analysis, a statistical technique which indicates the precise effect of each separate independent variable while controlling for other independent variables, was used to analyze the effect of health orientations, age, income, and education on participants' nutrition knowledge, beliefs, and behavior change scores. The significance level used in this study was 0.05 unless stated otherwise.

Chapter IV

RESULTS

This study was an evaluation of the relationships between the health orientations of participants and their nutrition knowledge, beliefs and behavior before participation in the Red Cross nutrition course and the effects of health orientations on their nutrition knowledge, beliefs, and behavior change scores after their participation in the course.

I. Pretest Analysis

The Pearson product-moment correlation was used to measure the relationships of the control variables, age, level of household income, and number of years of education to the three independent variables, health behavior, health locus of control, and health incentives.

This statistical technique was also used to measure the relationships of the independent and control variables to the dependent variables, pretest nutrition knowledge, beliefs, and behavior. A discussion of these Pearson product-moment correlations will be presented as follows: (1) control variables with the health orientations; (2) independent and control variables with pretest nutrition knowledge; (3) independent and control variables with pretest nutrition be-

liefs; and (4) independent and control variables with pretest nutrition behavior.

Pearson Product-Moment Correlation Between Control Variables And Health Orientations

The correlation coefficients between the three control variables, age, level of household income, and number of years of education, and the three health orientations variables, health behavior, health locus of control and health incentives, are displayed in Table IX. The calculated Pearson r value between income and health behavior was significant and positive at the 0.01 level. The correlation coefficients for age and number of years of education with health behavior were not significant. It was concluded that only income was significantly and positively related to health behavior.

The correlation coefficients for level of household income and number of years of education with health locus of control were significant and positive at the 0.05 and 0.01 level, respectively. Age was not significantly related to health locus of control. Thus, it was concluded that only income and education were significantly and positively related to health locus of control.

TABLE IX

CORRELATION COEFFICIENTS BETWEEN CONTROL VARIABLES AND HEALTH ORIENTATIONS VARIABLES

Variables	Health Orientations		
	Health Behavior	Health Locus of Control	Health Incentives
Age	.12 (N=109)	.00 (N=106)	.09 (N=110)
Level of Household Income	.32[1] (N=102)	.19[2] (N=101)	.23[1] (N=105)
Number of Years of Education	.13 (N=104)	.32[1] (N=103)	.29[1] (N=107)

[1] $P \leq 0.01$

[2] $P \leq 0.05$

The same pattern existed for health incentives. Level of household income and number of years of education were significantly and positively correlated with health incentives at the 0.05 and 0.01 level, respectively. Age was not found to be significantly related to health incentives. Therefore, it was concluded that only level of household income and the number of years of education were significantly and positively related to health incentives.

In summary, the correlation coefficients for level of household income and all three health orientations were significant and positive. Number of years of education was only significantly and positively related to two health orientations variables, health locus of control and health incentives. The correlation coefficients between age and the three health orientations were not significant.

Pearson Product-Moment Correlation Between Health Orientations And Control Variables And Pretest Nutrition Knowledge

Table X presents the correlation coefficients for the health orientations and control variables with pretest nutrition knowledge. The correlation coefficients between health locus of control and pretest nutrition knowledge was significant and positive at the 0.01 level. The correlation coefficients between the remaining two health orientations

TABLE X

CORRELATION COEFFICIENTS BETWEEN HEALTH ORIENTATIONS AND CONTROL VARIABLES AND PRETEST NUTRITION KNOWLEDGE

Variables	Pretest Nutrition Knowledge
Health Behavior	-.04 (N=110)
Health Locus of Control	.35 [1] (N=109)
Health Incentives	.15 (N=113)
Age	.08 (N=111)
Level of Household Income	.24 [1] (N=106)
Number of Years of Education	.08 (N=108)

[1] $P \leq 0.01$

variables, health behavior and health incentives, and pretest nutrition knowledge were not significantly related at the 0.05 level. The calculated Pearson r value between the level of household income and pretest nutrition knowledge was significant and positive at the 0.01 level. Age and number of years of education were not significantly related to pretest nutrition knowledge.

In summary, the research hypothesis regarding the relationship betwen health locus of control and pretest nutrition knowledge was supported in this study. Positive health locus of control was significantly correlated with high scores on the nutrition knowledge pretest. Neither health behavior nor health incentives were significantly correlated with nutrition knowledge pretest scores.

Pearson Product-Moment Correlation Between Health Orientations and Control Variables and Pretest Nutrition Beliefs

As shown in Table XI, the correlation coefficients between the health orientations variables, health behavior, health locus of control, and health incentives, and pretest nutrition beliefs were significant and positive at the 0.01 level. None of the control variables, age, level of household income, and number of years of education, were significantly related to pretest nutrition beliefs. As a result

TABLE XI

CORRELATION COEFFICIENTS BETWEEN HEALTH ORIENTATIONS AND CONTROL VARIABLES AND PRETEST NUTRITION BELIEFS

Variables	Pretest Nutrition Beliefs
Health Behavior	.33[1] (N=102)
Health Locus of Control	.43[1] (N=104)
Health Incentives	.45[1] (N=106)
Age	.10 (N=103)
Level of Income	.14 (N=98)
Number of Years of Education	.12 (N=100)

[1] $P \leq 0.01$

the hypothesis regarding the relationship between all three health orientations and pretest nutrition beliefs was supported in this study. Health behavior, health locus of control, and health incentives were found to be significantly and positively correlated with high scores on the nutrition beliefs pretest.

Pearson Product-Moment Correlations Between Health Orientations and Control Variables and Pretest Nutrition Behavior

As presented in Table XII, the correlation coeficients between the two health orientations variables, health behavior and health incentives, and pretest nutrition behavior were significant and positive at the 0.01 level. The correlation coefficient between health locus of control and pretest nutrition behavior was not significant. The positive relationship between age and pretest nutrition behavior was significant at the 0.001 level. The correlation coefficients between the other two control variables, level of household income and number of years of education, and pretest nutrition behavior were not significant. Therefore, the hypotheses regarding the relationships of health behavior and health incentives to pretest nutrition behavior were supported in this study. Positive health behavior and health incentives were both found to be significantly and

TABLE XII

CORRELATION COEFFICIENTS BETWEEN HEALTH ORIENTATIONS AND CONTROL VARIABLES AND PRETEST NUTRITION BEHAVIOR

Variables	Pretest Nutrition Behavior
Health Behavior	.48[1] (N=105)
Health Locus of Control	.03 (N=104)
Health Incentives	.42[1] (N=108)
Age	.33[2] (N=106)
Level of Household Income	.11 (N=101)
Number of Years of Education	-.03 (N=103)

[1] $P \leq 0.01$

[2] $P \leq 0.001$

positively correlated with high scores on the nutrition behavior pretest.

II. ANALYSIS OF NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR CHANGE SCORES

Paired t-tests were performed on the pretest and posttest scores of nutrition knowledge, beliefs, and behavior to determine whether the difference between the pretest and posttest scores was significant and positive. Each dependent variable, nutrition knowledge, beliefs, and behavior, will be discussed separately.

Out of a total score of 24, the participants' nutrition knowledge changed from a mean total score of 11.18 on the pretest to 15.83 on the posttest (Table XIII). The calculated t value was 3.90, which was significant at the 0.000 level. It was concluded that the change in nutrition knowledge was significant.

Out of a total score of 65, The nutrition beliefs of participants changed from a mean total score of 45.24 on the pretest to 48.71 on the posttest (Table XIII). The calculated t-value was 2.25, which was significant at the 0.000 level. Therefore, it was concluded that the change in nutrition beliefs was significant.

TABLE XIII

Changes in Nutrition Knowledge, Beliefs, and Behavior

Scales	Number of Participants	Mean	Standard Deviation	Mean Difference	Degree of Freedom	1-Tail Probability
Nutrition Knowledge	49					
Pretest		11.1837	4.295	4.6531	48	0.000
Posttest		15.8367	4.205			
Nutrition Beliefs	53					
Pretest		45.2453	6.397	3.4717	52	0.000
Posttest		48.7170	5.645			
Nutrition Behavior	53					
Pretest		42.5849	8.608	3.3585	52	0.000
Posttest		45.9434	6.166			

Out of a total score of 65, nutrition behavior changed from a mean total score of 42.5849 on the pretest to a 45.9434 on the posttest (Table XIII). The calculated t-value was 3.75 which was significant at the 0.000 level. It was concluded that the change in nutrition behavior was significant.

In summary, the hypothesis regarding the difference between pretest and posttest scores for nutrition knowledge, beliefs, and behavior was supported in this study. Participants' nutrition knowledge, beliefs, and behavior did significantly improve after participation in the Red Cross nutrition course.

III. ANALYSIS OF RELATIONSHIP BETWEEN NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR PRETEST SCORES AND RESPECTIVE CHANGE SCORES

The correlation coefficients between the pretest scores for nutrition knowledge, beliefs, and behavior and the respective change scores are exhibited in Table XIV. The negative correlation coefficients for all three relationships were significant at the 0.001 level. Therefore, the hypothesis regarding the relationship between pretest scores and respective change scores for nutrition knowledge, beliefs, and behavior was supported in this study. Partici-

TABLE XIV

CORRELATION COEFFICIENTS BETWEEN NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR PRETEST AND CHANGE SCORES

Variables	Nutrition Knowledge Change Scores	Nutrition Beliefs Change Scores	Nutrition Behavior Change Scores
Nutrition Knowledge Pretest Scores	-.50[1] (N=49)		
Nutrition Beliefs Pretest Scores		-.56[1] (N=53)	
Nutrition Behavior Pretest Scores			-.70[1] (N=53)

[1] $P \leq 0.001$

pants with high pretest scores for nutrition knowledge, beliefs, and behavior did exhibit less change in nutrition knowledge, beliefs, and behavior. These inverse correlations were significant.

IV. ANALYSIS OF PREDICTORS OF NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR CHANGE SCORES

It was hypothesized that participants with positive health orientations would exhibit the least amount of gain in nutrition knowledge, beliefs, and behavior. Thus low change scores for nutrition knowledge, beliefs, and behavior can be predicted on the basis of participant's positive health orientations, when controlling for age, income, and education. Multiple regression analysis was used to test this hypothesis. The independent variables in the regression model were health behavior, health locus of control, health incentives, age, education, and income. The dependent variables were the change scores for nutrition knowledge, beliefs, and behavior. The regression analysis for each dependent variable will be examined separately.

The Beta score identifies the relative weight of each independent variable, while controlling for other independent variables. As shown in Table XV education accounted for the most variation in nutrition knowledge change scores in the

regression model (Beta=.40). Health incentives was the next strongest predictor (Beta=.28), with the association begin negative. However, neither of these associations were significant. Each of the remaining variables, health behavior, health locus of control, and income, accounted for a small amount of variance in nutrition knowledge change scores; but, these associations were not significant. Although not significant, the R square value was 0.182, revealing that only 18 percent of the variation in nutrition knowledge change scores can be explained by the combination of the predictor variables, health orientations, and the control variables, age, income, and education. Therefore, the results indicated that the hypothesis regarding the predictability of nutrition knowlede scores on the basis of health orientations was not supported in this study.

The results from the regression model for nutrition beliefs change scores indicated that health locus of control, income, and age were strong predictors of nutrition beliefs change scores as shown in Table XV. The strongest predictor was health locus of control (Beta=-.43). The association was significant and negative. The next strongest predictor was income. The association between income and nutrition beliefs change scores was significant and negative (Beta=-.41). Age was also a significant predictor of nutri-

TABLE XV

PREDICTORS OF NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR CHANGE SCORE

Predictors'	Nutrition Knowledge Change Scores	Nutrition Beliefs Change Scores	Nutrition Behavior Change Scores
Health Behavior	-.00	-.43	-.67[3]
Health Locus of Control	-.08	-.43[2]	-.19
Health Incentives	-.28	-.08	-.25
Age	-.06	-.33[2]	-.13
Level of Household Income	-.11	-.41[2]	-.58[3]
Number of Years of Education	-.40	-.09	-.33
	R square= 0.18	R square= 0.517	R square= 0.53
	F=0.89	F=4.28[3]	F=4.52[3]

[1] N=31

[2] $P \leq 0.05$

[3] $P \leq 0.01$

tion beliefs change scores (Beta=-.03), with the association being negative. Health behavior, health incentives, and education were not significant predictors of nutrition beliefs change scores. While the Beta score for health behavior was large (Beta=-.43), it was not significant at the 0.05 level. Therefore, the hypothesis regarding the predictability of low nutrition beliefs change scores on the basis of positive health locus of control was supported in this study. Positive health incentives are significant predictors of low nutrition beliefs change scores. Health behavior and health locus of control were not significant predictors.

Collectively, health orientations and the three control variables, age, income, and education, accounted for 52 percent (R^2=.517) of the variation in nutrition beliefs change scores. This R square value was significant.

In examining the individual effect of health orientations and control variables, age, income, and education, on nutrition behavior change scores, the results indicated that health behavior accounted for the most variation in nutrition behavior change scores, with a Beta score of -.67 (Table XV). This association was significant and negative. The next strongest predictor of nutrition behavior change scores was income (Beta=.58). This positive association was significant. The remaining variables, health locus of con-

trol, health incentives, and education, were not significant predictors of nutrition behavior change scores. While the Beta score for number of years of education was large (Beta=.33), it was not significant at the 0.05 level. Therefore, the hypothesis regarding the predictability of low nutrition behavior change scores on the basis of positive health behavior was supported in this study. Positive health behavior is a significant predictor of low nutrition behavior change scores. Health locus of control and health incentives were not significant predictors.

Collectively, the three predictor variables, health behavior, health locus of control, and health incentives, and the three control variables, age, income, and education, accounted for 53 percent of the variation in nutrition behavior change scores. The R square value was significant.

Chapter V

DISCUSSION

The purpose of this study was four-fold: (1) to determine whether participant's with positive health orientations will possess more positive nutrition knowledge, beliefs, and behavior, before participation in the Red Cross nutrition course; (2) to determine whether the differences between participants' pretest and posttest nutrition knowledge, beliefs, and behavior scores were significant and positive; (3) to determine whether participants' pretest scores for nutrition knowledge, beliefs, and behavior are related to their respective change scores; and, (4) to determine whether participants' nutrition knowledge, beliefs, and behavior change scores can be predicted on the basis of their health orientations.

I. RELATIONSHIP BETWEEN CONTROL VARIABLES AND HEALTH ORIENTATIONS

The findings reveal that age was not significantly related to a participant's health orientations. This finding leads to the conclusion that no one age group over another engaged in more positive health behaviors, possessed higher degree of internal locus of control, or perceived health activities as more beneficial. Level of household income was

significantly and positively associated with health behavior, health locus of control and health incentives. A similar finding emerged with education. The positive associations between number of years of education and the variables, health locus of control and health incentives, were positive and significant. A positive association existed between education and health behavior, but it was not significant. Other studies have reported that health status and preventive health behavior have been strongly associated with income and education (56,74-76, 148). In conclusion, this study found the more affluent and educated participants possessed a higher degree of internal locus of control and perceived the benefits of engaging in health actions as more significant motivators than the barriers. This suggests that individuals with higher income and higher educational status have the financial flexibility and the knowledge base to extend the boundaries surrounding their health actions.

II. RELATIONSHIP BETWEEN HEALTH ORIENTATIONS AND DEPENDENT VARIABLES

The results indicated that participants' health behavior was not significantly related to their pretest nutrition knowledge, which is consistent with other findings (2,103,124). The amount of nutrition knowledge participants possessed prior to exposure to the nutrition course was not

associated with their engaging in more positive health behaviors. If nutrition knowledge is veiwed as a dimension of health knowledge, then individuals who engaged in positive health behaviors may not possess a greater amount of nutrition knowledge (86). This supports the research findings of others who have challenged the knowledge-attitude-behavior paradigm (2,103,124). These researchers did not find a significant relationship between knowledge and practice.

However, health locus of control was significantly and positively related to pretest nutrition knowledge. A participant with a higher level of internal locus of control possessed less nutrition misinformation prior to participation in the Red Cross nutrition course than participants with less positive internal locus of control. This may suggest that these individuals had a greater sense of personal control over a situation, in this case their health. Therefore, individuals with a higher level of internal locus of control were inclined to seek out information on nutrition from their enviroment which resulted in their possessing greater knowledge prior to participation in the nutrition course. They may have recognized that nutrition is a component of their health which they can control. As a result nutrition information was required for them to make nutrition decisions - maintain control - which led to their nu-

trition actions. The fact that the majority of the participants possessed a higher degree of internal locus of control and were self-selected further lends support to these conclusions.

While the association was positive, health incentives were not significantly associated with the participants' pretest nutrition knowledge. Thus participants' nutrition knowledge was not influenced by their perceptions of the barriers and benefits to engaging in health activities.

Although not significant, age was negatively associated with pretest nutrition knowledge. An absence of a significant relationship may be due to the small sample size. With a larger sample size a significant relationship might have existed between age and pretest nutrition knowledge, such a finding would have been consistent with trends identified in other research, which revealed that older individuals possessed less nutrition information than younger adults (61).

The importance of household income on level of nutrition knowledge was confirmed by the positive and significant association between these two variables (61,116). Thus those with higher incomes possessed more valid knowledge of nutrition.

Because of the nonsignificant association, this study did not reaffirm that education is positively associated with

valid nutrition information (61,104,127). In this study participants with more years of formal education did not possess a greater amount of valid nutrition information than their less educated classmates.

The positive relationship which existed between all three health orientations and pretest nutrition beliefs was significant. This finding indicates that those participants who engaged in positive health behaviors, possessed a higher degree of internal locus of control, and perceived the benefits of engaging in health activities as more significant motivators than the costs possessed valid nutrition beliefs. Beliefs are strong internal forces which influence action (25). Therefore, those participants who believed in the value of health activities and were motivated to engage in such activities because of the health benefits they offer would be expected to hold valid nutrition beliefs. Individuals with a higher degree of internal locus of control would possess more valid beliefs about nutrition because they want to be in control of a situation themselves. This suggests that they have sought out and challenged information which has led to a greater opportunity to develop valid beliefs about nutrition.

Although a positive relationship existed, age, income, and education were not significantly related to the pretest

nutrition beliefs held by participants. These findings are inconsistent with other research which reported significant relationships between these socio-demographic variables and nutrition beliefs. Jalso, Rivers and Burns (104) reported a significant negative correlation between age and valid nutrition opinions and a significant positive correlation between education and valid nutrition beliefs. Growtkowaski and Sims (116) found the direction of the relationship of age and socio-economic status with beliefs was dependent on the specific belief under study.

The relationships between the two health orientations variables, health behavior and health incentives, and pretest nutrition behavior were significant and positive. These findings indicate that those participants who engaged in positive health behaviors and perceived the benefits rather than the barriers as significant motivators to engaging in health activities were also the individuals who engaged in desirable nutrition behavior. Interestly, health locus of control was not significantly related to pretest nutrition behavior. This finding is inconsistent with some research which reported significant and positive relationships between locus of control and health behaviors in the areas of smoking, birth control, weight loss, use of seat belts, and preventive dental care (68). Individuals with a

higher degree of internal locus of control were more likely to engage in behaviors that support well-being. However, Hallal (149) found that practicing breast self-examination was not significantly correlated with an internal locus of control. These contradictory findings suggest that further research is needed to examine the link between locus of control and health practices such as nutrition behavior.

There was a very strong and positive relationship between age and pretest nutrition behavior. The older course participants engaged in more positive behaviors. This was inconsistent with many studies which found the converse to be true. As individuals grow older they become more resistent to change (100,103,104,128). However, other researchers found health as a motivator grew stronger with age (99). This study suggests that age may have a positive effect on nutrition behavior. As one grows older maintaining health may serve as a motivator to engaging in desirable nutrition behaviors. Since the participants in this study were self-selected, this suggests that the older participants may have sought out this course to reinforce or further improve their nutritional health.

The positive association between level of household income and nutrition behavior was not significant. However, other studies have indicated a significant and positive re-

lationship between household income and nutrition practices (103,105,116). This study did not verify such results. These findings may suggest that income has little influence on nutrition behavior provided the actions are not a strain on financial resources.

Number of years of education was not significantly related to pretest nutrition behavior. Individuals with more education did not engage in positive nutrition behaviors. This finding is inconsistent with other studies which reported the converse to be true. These other studies reported that the more educated individuals practiced more desirable nutrition behaviors (103,128),.

A possible explanation for the inconsistency between the findings of this study and the findings of other studies, which investigated the relationships between socio-demographic variables, income and education, and nutrition behavior, may be that the studies are not comparable. Nutrition behavior constructs have been operationalized differently. Further research is needed to investigate the relationship between these socio-demographic variables, income and education, and specific nutrition behaviors.

III. EFFECT OF COURSE ON NUTRITION CHANGE SCORES

As expected there was a significant improvement in nutrition knowledge, beliefs, and behavior scores after participation in the Red Cross nutrition course. However, the statistical significance of the change in nutrition knowledge, beliefs, and behavior scores must be interpreted with caution because of the small number of participants who completed both the pretest and posttest. While there was not a dramatic change in nutrition knowledge, beliefs, and behavior, the change was clearly significant.

In conclusion, because of the small sample size and the lack of a control group, these results must be viewed with caution. This before-and-after design leaves the evaluation results vulnerable to challenge. Because of the lack of a control group for comparison, it is difficult to conclude that the posttest scores of the participants were solely the result of the course intervention (150). This is not to say that a nonexperimental design does not have value. It is useful for formative purposes by serving as a preliminary assessment of effectiveness of the nutrition invervention (151). This design allows the researcher to produce information that is useful when a program is in developmental stages.

IV. RELATIONSHIP BETWEEN NUTRITION KNOWLEDGE, BELIEFS AND BEHAVIOR PRETEST SCORES AND RESPECTIVE CHANGE SCORES

Nutrition knowledge, beliefs, and behavior change scores were analyzed to determine the relationship between pretest scores and change scores. The analysis revealed a significant and inverse relationship between pretest scores and change scores. Those participants who scored the highest on nutrition knowledge, beliefs, and behavior pretest showed the least gain in knowledge and less improvement in beliefs and nutrition behavior. This suggests that change as a rsult of the nutrition course intervention is a function of the pretest scores. In other words, the effects of the course on nutrition knowledge, beliefs, and behavior change scores is dependent on entry-level nutrition knowledge, beliefs, and behavior.

Perhaps for those participants who entered the course with more valid nutrition information and beliefs and engaged in more positive nutrition behaviors the nutrition course may have served as a reinforcement to maintaining their knowledge, beliefs, and behavior, rather than solely as a motivator of change. This is consistent with the premise of the Health Belief Model which stresses the importance of reinforcement in health maintenance as well as in motivating change (55). For these participants their main moti-

vation for deciding to take the course may have been to further reinforce their nutrition knowledge, beliefs, and behavior.

V. PREDICTORS OF NUTRITION KNOWLEDGE, BELIEFS, AND BEHAVIOR CHANGE SCORES

None of the predictor or control variables included in the multiple rgression analysis were shown to have a significant effect on nutrition knowledge changes scores. Health behavior and health incentives were not significantly associated with nutrition knowledge change scores. Since health behavior and health incentives were not significantly related to pretest nutrition knowledge, the lack of a significant relationship between health behavior and health incentives and the nutrition change scores would be expected. Health locus of control was significantly and positively related to pretest nutrition knowledge; but, it did not exhibit a significant effect on nutrition knowledge change scores. Although the correlation was very low in strength, it was in the hypothesized direction. A possible explanation for lack of a significant relatioship between health locus of control and nutrition behavior change scores may be the small sample size.

When examining the control variables, age, income, and education are not significant predictors of nutrition knowl-

edge change scores. This suggests that the participants' ability to change their nutrition knowledge as a result of exposure to the Red Cross nutrition course is the same regardless of age, income, and education. A comparison of the nutrition knowledge pretest with change scores reveals that age and education did not influence either the amount of nutrition knowledge participants brought with them to the learning environment, the Red Cross nutrition course, or the amount of nutrition knowledge gained after exposure to the course. On the other hand income was significantly related to the level of nutrition knowledge participants brought to the course; yet, income was not significantly related to the level of change in nutrition knowledge after participation in the course. A participant's level of income did not influence his ability to change his nutrition knowledge. These findings suggest that an individual's ability to change his nutrition knowledge can not be predicted on the basis of his health orientations, age, income, or education. In addition the joint influence of these six variables does not significantly account for the variation in nutrition knowledge change scores.

At least one of the predictor variables included in the regression analysis, health locus of control, was shown to have an effect on nutrition beliefs change scores indepen-

dently of the other predictor variables, health behavior and health incentives, and the control variables, age, income, and education. A higher degree of internal health locus of control is a significant predictor of low nutrition beliefs change scores. This negative relationship was hypothesized. Participants with a higher degree of internal health locus of control and high pretest beliefs scores showed minimal change in nutrition beliefs. The nutrition beliefs pretest scores were negatively related to the change scores for nutrition beliefs. Thus a higher degree of internal locus of control is a strong predictor of low nutrition beliefs change scores.

Although health behavior and health incentives were significantly related to pretest nutrition beliefs, the results revealed that these two predictor variables did not have a significant effect on nutrition beliefs change scores. Because the direction of the relationship was negative as postulated, a possible explanation for the lack of a significant relationship may be the small sample size.

Two of the control variables, age and income, are strong predictors of nutrition beliefs change scores. The negative association between age and nutrition beliefs change scores reveals that older participants displayed less change in nutrition beliefs. This suggests that older participants are

less prone to change their nutrition beliefs. Similar findings have been suggested by other researchers, but only in an ex post facto research study (104). In the case of income, results revealed that participants with higher incomes displayed greater improvements in nutrition beliefs after participation in the Red Cross nutrition course. While the association was positive, education is not a significant predictor of nutrition beliefs change scores. This suggests that the amount of education a participant possesses does not influence his ability to change his nutrition beliefs. Sims (130) reported similar findings. The researcher found that education was not related to the beliefs held by vegetarians and nonvegetarians.

Jointly, all variables, health behavior, health locus control, health incentives, age, income, and education, accounted for half of the variance in participants' nutrition beliefs change scores. This means that the combined effects of all six variables significantly adds to the effect of each variable separately. As a set of variables together, health orientations, age, income, and education are strong predictors of the degree of change in participants' nutrition beliefs after participation in the Red Cross nutrition course.

Of the three health orientations variables, only health behavior is a significant predictor of nutrition behavior change scores. The negative association with nutrition behavior change scores was expected. Participants who engaged in positive health behaviors and positive nutrition behaviors showed minimal change in nutrition behavior. Nutrition behavior pretest scores were negatively related to the change scores for nutrition behavior.

Health locus of control and health incentives are not significant predictors of nutrition behavior change scores. Since health locus of control was not significantly related to pretest nutrition behavior, it is plausiable that there would be no relationship between health locus of control and nutrition behavior change scores as well. However, the same pattern did not exist with health incentives. Health incentives was significantly related to pretest nutrition behavior; but, health incentives was not significantly related to nutrition behavior change scores. Since the negative association was in the expected direction, the lack of a significant relationship may be due to the small sample size.

Income is a significant predictor of nutrition behavior change scores. Those participants with higher incomes had greater gains in their nutrition behavior. While income was not significantly related to entry-level nutrition behavior,

this study suggests that an individual's ability to change his nutrition behavior is influenced by his income; the more affluent the individual, the more likely the individual is to have a greater gain in nutrition behavior.

Age and education are not significant predictors of nutrition behavior change scores. While age was significantly and positively related to pretest nutrition behavior, this was not the case with nutrition behavior change scores. Age did not affect participants' ability to change their nutrition behavior. Education did not relate to participants' pretest or change scores for nutrition behavior. Therefore, a participant's educational level did not enhance his propensity to change his nutrition behavior after participation in the Red Cross nutrition course.

However, half of the variance in the nutrition behavior change scores is explained by the combination of the three predictor variables, health behavior, health locus of control, and health incentives, with the influence of the control variables, age, income, and education. This set of variables together accounts for a strong influence on a participant's ability to change his nutrition behavior after participating in the Red Cross nutrition course.

In summary, the findings from the multiple regression analysis are inconclusive because of the small sample size.

The smaller the sample size the larger the potential for error (150). For this reason, it is impossible to attempt to explain with any certainty the change in the dependent variable because of the impact of the independent variables. It is plausable that a larger sample size would have led to more meaningful and conclusive results. Stronger predictor variables might have emerged with a larger sample size.

Despite the sample size problem, many implications can be drawn from this study. This study may provide the preliminary step in the development of a predictive model for nutrition knowledge, beliefs, and behavior. Further research is needed to determine whether health orientations, age, income, and education are indeed significant predictors of nutrition knowledge, beliefs, and behavor change scores. The assumptions commonly held about the influence of the socio-demographic variables, age, income and education, were not always supported in this study. Both retrospective and prospective research is needed to examine further the interplay between socio-demographic variables and nutrition knowledge, beliefs, and behavior. The results from this study can only suggest a link between health orientations and nutrition knowledge, beliefs, and behavior. It would be interesting to repeat this study with a larger sample size and to examine the effect nutrition education intervention may have on

an individual's health orientations. The question posed is: Are participants' health orientations improved after exposure to nutrition education intervention? Further research is needed to explore the answer to this question.

Chapter VI

CONCLUSIONS

The major conclusions drawn from the present investigation are implicit in the following findings:

(1) Participants' health locus of control was significantly and positively related to their pretest nutrition knowledge; but, their health behavior and health incentives were not significantly related to pretest nutrition knowledge.

(2) Participants' health behavior, health locus of control, and health incentives were significantly and positively related to their pretest nutrition knowledge.

(3) Participants' health behavior and health incentives were significantly and positively related to pretest nutrition behavior; but, their health locus of control was not significantly related to pretest nutrition behavior.

(4) There was a significant difference between pre- and posttest scores for nutrition knowledge, beliefs, and behavior.

(5) Participants' pretest scores for nutrition knowledge, beliefs, and behavior were significantly and negatively related to their respective change scores.

(6) Low change scores for nutrition knowledge can not be predicted on the basis of positive health behavior, health locus of control, and health incentives.

(7) Low change scores for nutrition beliefs can be predicted on the basis of positive health locus of control; but, health behavior and health incentives are not significant predictors. Fifty-two percent of the variation in nutrition beliefs change scores is explained by the combined effect of the predictor variables, health behavior, health locus of control, and health incentives, together with the influence of the control variables, age, income, and education.

(8) Low change scores for nutrition behavior can be predicted on the basis of positive health behavior; but, health locus of control and health incentives are not significant predictors. Fifty-three percent of the variation in nutrition

behavior change scores is explained by the combined effect of the predictor variables, health behavior, health locus of control, and health incentives, together with the influence of the control variables, age, income, and education.

Although this study revealed some significant findings concerning health orientations and nutrition knowledge, beliefs, and behavior, the results were inconclusive because of the small sample size and lack of a control group. Despite these inherent weaknesses, the study is of value because it did occur in an action setting. Further research in nutrition education needs to be conducted in action settings, while recognizing that the research must adapt to the ever changing enviroment and priorities of the program. Such research needs to employ more creative evaluation research techniques in order to attempt to overcome the validity problems encountered in this study. Utilizing an unmatched control group of individuals from programs similar to the one under study would be one feasible solution. In this way pre- and posttest measure of both groups and results could be compared (151).

In addition, research is needed that goes beyond ex post facto research designs. Researchers need to test conceptual frameworks by experimentally manipulating the variables pro-

posed in the model. These studies must be prospective and occur in an action setting, with variables measured before and after intervention and in both experimental and control groups. Many evaluation instruments used in nutrition education research are simply modifications of instruments developed by other researchers and the validity and reliability of the instruments have often not been determined. It is essential that evaluation instruments be developed specifically for the program objectives and target group of the study and tested prior to use. These studies should be realistic and feasible by considering the larger environment which encompasses the nutrition education program. Through such research nutrition education researchers can begin to develop an understanding of the relationships between independent, dependent, and environmental variables. Such research could assist nutrition educators in designing programs to achieve desired outcomes.

Further research demonstrating the effects of external and internal factors on the learner's propensity to increase his nutrition knowledge, improve nutrition beliefs, and positively change nutrition behavior is needed. The data collected in this study is necessary, but not sufficient, to establish the hypothesized relationships without further experimental support. The effect of nonnutrition related fac-

tors such as health behaviors, personality factors (health locus of control) and motivational factors (incentives and disincentives) on desired nutrition outcomes needs to be investigated further.

Evaluation research can assist nutrition educators in obtaining a broad knowledge base from which to develop programs that meet learner needs and expectations, and, thus, encourage learner acceptance and application of nutrition recommendations. Only through such research can nutrition education programs be developed to meet the needs of those persons their programs seek to serve.

Chapter VII

SUMMARY

This study was conducted for the following purposes: (1) to determine the relatioship between participants' health orientations and their nutrition knowledge, beliefs, and behavior before participation in the Red Cross nutrition course, (2) to determine whether the differences between participant's pretest and posttest scores for nutrition knowledge, beliefs, and behavior were significant and positive, (3) to determine whether the pretest scores for nutrition knowledge, beliefs, and behavior were significantly and negatively related to their respective change scores, and, (4) to determine whether participants' nutrition knowledge, beliefs, and behavior change scores can be predicted on the basis of their health orientations. The specific objectives of the study were to obtain answers to the following questions:

(1) Are participants' health orientations significantly and positively related to their nutrition knowledge, beliefs, and behavior before their participation in the Red Cross nutrition course?

(2) Are there significant and positive differences between the nutrition knowledge, beliefs, and behavior of participants before and after participation in the Red Cross nutrition coursse?

(3) Are participants' pretest scores for nutrition knowledge, beliefs, and behavior significantly and negatively related to their respective change scores?

(4) Can participants' low nutrition knowledge, beliefs, and behavior change scores be predicted on the basis of their positive health orientations after participation in the Red Cross nutrition course?

A pretest-posttest design was used in this study. The subjects in this study were self-selected participants who attended the American Red Cross nutrition course, Better Eating for Better Health, which was offered through six Red Cross chapters during the fall of 1982. The Baseline Survey was completed by 114 participants and 75 participants completed the Posttest Survey.

The health orientations instrument was designed for this study. It consisted of three scales, health behavior, health locus of control, and health incentives. The Alpha

coefficients for the health behavior, health locus of control, and health incentives scales were .71, .60, and .65, respectively. Participants' health orientations were assessed before they paticipated in the Red Cross nutrition course. In addition, pre- and posttest measures were taken of the nutrition knowledge, beliefs, and behavior of the participants. The instrument used to assess nutrition knowledge, beliefs, and behavior was developed by other researchers. The age, level of household income, and number of years of education of participants were used as control variables.

Results indicated that praticipants with a higher degree of internal health locus of control possessed the least amount of misinformation about nutrition. The correlation coefficient between health locus of control and pretest nutrition knowledge was significant and positive. The associations between the remaining health orientations variables, health behavior and health incentives, and pretest nutrition knowledge were not significant. Of the three control variables, age, income, and education, only the correlation coefficient between level of household income and pretest nutrition knowledge was significant and positive.

In the case of pretest nutrition beliefs, participants with positive health behavior, health locus of control, and

health incentives were found to possess valid nutrition beliefs than those with lower scores on these scales. The association between these three health orientations variables and pretest nutrition beliefs were significant and positive. Age, income, and education were not significantly related to pretest nutrition beliefs.

After examining the relationship between health orientations and pretest nutrition behavior, the results revealed that participants with positive health behavior and health incentives engaged in positive nutrition behavior. The correlation coefficients for health behavior and health incentives with pretest nutrition behavior were significant and positive. Health locus of control was not significantly related to pretest nutrition behavior. Of the three control variables, age, income, and education, only age was significantly and positively related to pretest nutrition behavior.

Calculated t-values revealed that the difference between pre- and posttest scores for nutrition knowledge, beliefs, and behavior was significant. Thus there was a significant improvement in nutrition knowledge, beliefs, ad behavior scores after participation in the Red Cross nutrition course.

Regarding the relationship between pretest and change scores, nutrition knowledge, beliefs, and behavior change

scores were found to be a function of the respective pretest scores. The correlation coefficients between pretest scores for nutrition knowledge, beliefs, and behavior and respective change scores were significant and negative. Participants with high scores on the pretest for nutrition knowledge, beliefs, and behavior displayed the least amount of gain in the respective posttest scores.

The multiple regression analysis was used to determine whether participants' low change scores for nutrition knowledge, beliefs, and behavior could be predicted on the basis of their positive health orientations, when controlling for age, education, and income. Results indicated that health orientations as well as the control variables, age, income and education, were not significant predictors of nutrition knowledge change scores. However, in the case of nutrition beliefs change scores, health locus of control, age, and income were found to be significant predictors of nutrition beliefs change scores. The Beta scores for health locus of control and age were negative. The association between income and nutrition beliefs change scores was positive. Collectively, the three predictor variables, health behavior, health locus of control, and health incentives, and the three control variables, age, income, and education, accounted for 52 percent of the variation in nutrition beliefs

change scores. In examining the individual effect of health orientations and the control variables, age, income, and education, on nutrition behavior change scores, the results indicated that health behavior and income were significant predictors of nutrition behavior change scores. The association between health behavior and nutrition behavior change scores was negative and the association between income and nutrition behavior change scores was positive. The joint effect of all three predictor variables, health behavior, health locus of control, and health incentives, and the three control variables, age, income, and education, accounted for 53 percent of the variation in nutrition behavior change scores.

Because of the small sample size, the results of this study were inconclusive. However, this study may provide the initial step in the development of a predictive model for nutrition knowledge, beliefs, and behavior. Further research is needed in this area.

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APPENDIX A

OUTLINE OF THE EVALUATION PLAN FOR THE RED CROSS NUTRITION COURSE:

To ensure the success of the Red Cross nutrition course, Better Eating for Better Health, an extensive evaluation program was undertaken. The evaluation program consisted of a technical review, three pilot stages, a field test and design analysis. Instructor training was conducted between Pilot Tests II and III.

Needs Assessment: September-November 1980

A consumer survey was conducted through VPI & SU and Hood College for the purpose of determining nutrition interests and needs of adult consumers. The population was drawn from a metropolitan area and a rural area.

Technical Review: January-March 1982

Forty-seven nutrition experts reviewed the materials for technical accuracy and for objectivity. These reviewers were selected from academia, industry, government, and the health sector. Also, Nursing and Health Services staff from National Headquarters of the American Red Cross served as technical reviewers.

Pilot I: April-May 1982

The purpose of Pilot I was to --

1. Test course materials on a small group of typical course instructors. This served as a form of learner verification. The first draft of curriculum materials was reviewed for educational value, readability, organization, and level of difficulty.

2. Obtain feedback from Red Cross instruction specialists on the training strategies and the usefulness of the course Instructor's Guide.

The following chapters participated in Pilot I:

1. District of Columbia Chapter, Washington, DC
2. Prince Georges County Chapter, Hyattsville, Maryland
3. Roanoke Valley Chapter, Roanoke, Virginia
4. St. Paul Area Chapter, St. Paul, Minnesota
5. Oregon Trail Chapter, Portland, Oregon

There were 20 participants in Pilot I.

Pilot II: May-July 1982

The purpose of Pilot II was to --

1. Test the usefulness and acceptability of course materials, the effects of instructor-participant interaction, and the relevancy of course content to participants.

2. Assess the reliability and validity of each item of the field test evaluation instruments.

3. Provide an opportunity for instructor specialists to teach the consumer course before training nutrition instructors for Pilot III.

The same chapters that participated in Pilot I participated in Pilot II. There were 61 participants and 6 instructors in Pilot II.

Instructor Training Between Pilots II and III

The purpose of instructor training between Pilots II and III was to conduct a nutrition instructor specialist course to train instructors for Pilot III. The same five chapters, as well as those listed below, participated in this training:

1. Essex College, East Orange, New Jersey
2. Tidewater Chapter, Norfolk, Virginia
3. Cincinnati Area Chapter, Cincinnati, Ohio

Fifty instructors were trained.

Pilot III: August-October 1982

The purpose of Pilot III was to --

1. Conduct preliminary assessment of evaluation instruments for the field test.

2. Conduct the nutrition course in as typical an instructional setting as possible.

3. Conduct a follow-up telephone survey of course participants during January to February to determine the:
   -Quality of instruction.
   -Value of the course to participants.

-Behavior changes made or attempted and any barriers to them.
-Knowledge and belief changes.
-Reasons for participant dropout.
-Preliminary assessment of telephone survey instrument to be used in the field test.

All seven chapters listed above except the Tidewater Chapter participated. There were 129 participants.

Field Test: January 15 - April 30 1983

The purpose of the field test was to --

1. Determine the socioeconomic and demographic characteristics of participants.

2. Determine the effectiveness of the course in increasing participants' knowledge and in affecting their beliefs and behaviors.

3. Test the usefulness of the course materials and teaching methods.

4. Determine the usefulness of the promotional materials and methods.

5. Determine the methods used in the recruitment of instructors.

6. Evaluate instructor qualifications.

7. Determine the acceptable price range for the course.

There were 64 participating chapters and an estimated 2,000 participants.

Design Analysis: February-May 1983

A critical assessment of the design and application of the course materials was conducted by an education curriculum design expert.

APPENDIX B

PILOT TEST III

NUTRITION EDUCATION COURSE PARTICIPANT BASELINE SURVEY

YOUR HEALTH PRACTICES AND OPINIONS

Questions 1 to 23
Please read each of the following statements and circle 1 if you *NEVER* do this, 2 if you *RARELY* do this, 3 if you *SOMETIMES* do this, 4 if you *USUALLY* do this, or 5 if you *ALWAYS* do this. Circle only one response option for each statement.

		NEVER	*RARELY*	*SOME TIMES*	*USUAL*	*ALWAYS*
1.	Visit a dentist for an annual checkup whether I have a problem or not.	1	2	3	4	5
2.	Follow nutritional guidelines when I plan what I eat.	1	2	3	4	5
3.	Trim the fat off meat before I eat it.	1	2	3	4	5
4.	Use seat belts while riding in a car.	1	2	3	4	5
5.	Read ingredient labels to determine what additives are present.	1	2	3	4	5
6.	Follow the advice of a doctor or dentist when it is given.	1	2	3	4	5
7.	Avoid starchy foods like bread or potatoes when I try to lose or maintain my weight.	1	2	3	4	5
8.	Take over-the-counter drugs when I feel sick.	1	2	3	4	5
9.	Eat three different kinds of vegetables a day.	1	2	3	4	5
10.	Read the nutrition information labels on the foods I buy.	1	2	3	4	5
11.	Brush my teeth twice a day.	1	2	3	4	5
12.	Keep a salt shaker on my table during meals.	1	2	3	4	5

		NEVER	RARELY	SOME TIMES	USUAL	ALWAYS
13.	Eat at least 3 servings of whole grain breads (1 slice=1 serving) or cereal (1/2 cup=1 serving) products every day.	1	2	3	4	5
14.	Try to maintain or improve my physical fitness.	1	2	3	4	5
15.	Eat fresh fruit or fruits packed in their own juice instead of canned fruits in heavy syrup.	1	2	3	4	5
16.	Drink no more than 1 or 2 alcoholic drinks a day.	1	2	3	4	5
17.	Look for the sodium content in processed foods before I buy them.	1	2	3	4	5
18.	Try to get an adequate amount of sleep each night.	1	2	3	4	5
19.	Take vitamin and/or mineral supplements.	1	2	3	4	5
20.	Try to allow for leisure time activities every week.	1	2	3	4	5
21.	Consider the special nutrient needs of my age group when I plan what I eat.	1	2	3	4	5
22.	Eat a bean dish rather than a meat dish at least once a week.	1	2	3	4	5
23.	Floss my teeth daily.	1	2	3	4	5

Questions 24 to 48
Now indicate how you feel about the following statements by circling 1 if you *STRONGLY DISAGREE*, 2 if you *DISAGREE*, 3 if you are *UNDECIDED*, 4 if you *AGREE*, or 5 if you *STRONGLY AGREE*. Circle only one answer for each statement.

		STRONG DIS-AGREE	*DIS-AGREE*	*UNDE-CIDED*	*AGREE*	*STRONG AGREE*
24.	I can change my health habits.	1	2	3	4	5
25.	Preventive health care costs too much.	1	2	3	4	5
26.	People need the same nutrients throughout the life cycle.	1	2	3	4	5
27.	Large doses of vitamin C can cure the common cold.	1	2	3	4	5
28.	People can't control what happens to their health.	1	2	3	4	5
29.	I do not enjoy most foods unless I can salt them.	1	2	3	4	5
30.	If it is meant to be I will stay healthy.	1	2	3	4	5
31.	Whether I gain or lose weight is up to me.	1	2	3	4	5
32.	Following a balanced diet is a lot of trouble.	1	2	3	4	5
33.	Good health is largely a matter of good fortune.	1	2	3	4	5
34.	Most food additives don't present health risks.	1	2	3	4	5
35.	For most people a moderate reduction in cholesterol is highly desirable.	1	2	3	4	5
36.	I take my health for granted.	1	2	3	4	5
37.	The best way to lose weight is to eliminate most starchy foods.	1	2	3	4	5

		STRONG DIS-AGREE	DIS-AGREE	UNDE-CIDED	AGREE	STRONG AGREE
38.	Practicing good health habits is just too complicated.	1	2	3	4	5
39.	Vitamin supplements are important to most people's health.	1	2	3	4	5
40.	Exercise helps to control your appetite.	1	2	3	4	5
41.	I am directly responsible for my health.	1	2	3	4	5
42.	Food decisions are only a matter of taste.	1	2	3	4	5
43.	Taking care of my health requires too much time.	1	2	3	4	5
44.	The labels on processed foods are useful for making food decisions.	1	2	3	4	5
45.	My health care patterns are influenced by the people I know.	1	2	3	4	5
46.	I can tell if foods have sugar in tham because they taste sweet.	1	2	3	4	5
47.	Practicing good health habits is not fun.	1	2	3	4	5
48.	My health depends on how well I take care of myself.	1	2	3	4	5

YOUR NUTRITION KNOWLEDGE

The following questions have to do with facts about nutrition. These questions are not a test. They will help your instructor know what areas of nutrition to emphasize in the course. Please circle the number next to the question that you think is the best answer.

49. Which of the following statements is false?
    1. Food choices are very personal and important.
    2. Food choices have evolved since childhood.
    3. It can be difficult to change eating patterns.
    4. Nutrition concerns are the most important factors influencing food choices.
    5. Successful modification of food choices requires effort and commitment.

50. Which of the following is not a nutrient?
    1. calories
    2. fat
    3. carbohydrates
    4. water
    5. protein

51. Food guides group foods by:
    1. the common source of the food
    2. the amount and type of nutrients in the food
    3. the number of servings of a food needed for a day
    4. the amount of food needed by different ages and sex of individuals
    5. the importance of the food to health

52. On a daily basis, it is recommended that most people should try to:
    1. increase their protein intake
    2. cut out all foods containing sugar
    3. avoid all processed foods
    4. limit breads and cereals to 2 servings
    5. eat three servings of vegetables

53. Ingredient labels can help us to determine:
    1. all the nutrients present in a food
    2. the serving size of the food that is right for us
    3. exactly how much of each ingredient is in the food
    4. how packaged foods can be used in our diet
    5. how to identify standards for foods

54. The most common disease in the U.S. related to excessive sugar consumption is:
    1. diabetes
    2. dental caries
    3. obesity
    4. cirrhosis
    5. gastrointestinal disorders

55. The food additives which we consume the most are:
    1. sugar, corn syrup and salt
    2. MSG, baking soda and yeast
    3. garlic, MSG and Red Dye #4
    4. nitrate, Red Dye #4 and sugar
    5. saccharin, nitrate and baking powder

56. Food labels contain nutrition information based on the:
    1. four basic food groups
    2. NRC-RDA
    3. seven basic food groups
    4. miminum daily allowances
    5. U.S. RDA

57. In order to reduce risk of cancer it would be better to:
    1. eat fresh fruit rather than frozen
    2. eat fresh fish rather than smoked fish
    3. eat smoked fish rather than salt cured fish
    4. eat lean beef rather than fish
    5. drink beer rather than wine

58. Which of the following best describes food additives?
    1. Generally additives serve no useful function in food except to enhance flavor.
    2. Food additives make the food cost more.
    3. Food additives are generally harmful and should be banned.
    4. Most food additives are safe; only a few may cause problems.
    5. Food additives are added for the benefit of the manufacturer, not the consumer.

59. Which of the following is <u>not</u> a good practice for reducing sugar in the diet?
    1. substitute a glass of juice or ice water for an afternoon cola
    2. substitute molasses instead of sugar for a sweetener
    3. reach for fresh fruits rather than canned fruits
    4. cut back on the amount of sugar in recipes when baking.
    5. cut back on foods containing fructose as a sweetener.

60. Which nutrient is <u>not</u> required on nutrition information labels?
    1. protein
    2. fat
    3. sodium
    4. carbohydrate
    5. vitamin C

61. Vitamins are:
    1. needed by the body in large amounts, so be sure to take a supplement
    2. generally eliminated from foods during processing
    3. needed by the body in small amounts and can usually be obtained from the diet
    4. the major nutrients needed by the body and, therefore, the most important
    5. nutrients which supply energy to the body

62. The Dietary Guidelines for Americans are intended:
    1. to guarantee health and well being for all people
    2. for people with some diet-related disease
    3. for people who are already healthy
    4. to be a food guide
    5. to help people control their weight

63. A person who follows a diet to minimize the risk of coronary heart disease should:
    1. eat more fish and less beef
    2. drink homogenized milk and juice
    3. eat fewer eggs and more beef
    4. eat more fried than broiled foods
    5. eat fried chicken rather than broiled fish

64. In general, excess amounts of water soluble vitamins (B vitamins and vitamin C) are:
    1. excreted by the body
    2. stored by the body
    3. used by the body
    4. used to control weight
    5. a good preventive health measure

65. In order to lose weight, one must:
    1. cut fat intake to 35 percent
    2. eat vegetables and fruits but avoid breads and cereals
    3. follow a high protein, low carbohydrate diet
    4. either exercise more or eat fewer calories
    5. follow a diet that one gets at the bookstore

66. The same nutrients are needed by all persons; however:
    1. some people can't utilize all these nutrients
    2. most people can't get sufficient nutrients from their diet
    3. the amounts vary throughout the life cycle
    4. the amounts of nutrients contained in the normal diet is inadquate
    5. most people need vitamin supplements

67. Moderately active people and pregnant women should select more servings of:
    1. bread and cereals
    2. milk and dairy products
    3. nuts and seeds
    4. meat and poultry
    5. fat and sweets

68. Fast food meals are generally:
    1. high in sodium and fat
    2. high in sugar but low in sodium
    3. high in fiber
    4. very low in most nutrients
    5. high in protein and low in fat

69. Taking a vitamin supplement:
    1. is a good idea for everyone
    2. means you don't have to worry about your diet
    3. is not necessary if your diet is balanced
    4. is only for those persons who are sick
    5. is a form of health insurance

70. Regular exercise:
    1. stimulates the appetite and makes you hungry
    2. helps to control appetite
    3. fails to lower food intake
    4. increases your blood pressure
    5. is stressful

71. During middle age, the most important component to adjust in one's diet is:
    1. protein intake
    2. carbohydate intake
    3. vitamin intake
    4. water intake
    5. energy intake

72. If a weight loss diet contains 1000 calories or less it is important to look for:
    1. foods that a person likes to eat
    2. a balance of vitamins and minerals
    3. sources of fat, as it may be possible to cut calories even more
    4. adequate protein because weight loss diets seldom contain enough
    5. medical credentials of the author to see if the diet is safe

HOUSEHOLD INFORMATION

The next questions concern information about you or members of your household. These questions will help us to develop a nutrition education course which will be appropriate to the needs of a variety of participants. Therefore, it is important that you answer all of the questions. The information you provide us will be held in strict confidence.

Please circle the best answer to each question, or fill in the blank where indicated.

73. Does anyone in your household (including yourself) have an overweight problem? |1
    1. Yes
    2. No

74. Does anyone in your household (including yourself) have a health problem requiring a special diet? |2
    1. Yes
    2. No

75. Does anyone in your household (including yourself) have food allergies? |3
    1. Yes
    2. No

76. Does anyone in your household (including yourself) follow a vegetarian diet? |4
    1. Yes
    2. No

77. Would you say your health is: |5
    1. poor
    2. fair
    3. good
    4. excellent

78. Who in your family has the primary responsibility for deciding what to serve? |6
    1. Yourself
    2. Another member of the household

79. Who in your family has the primary responsibility for shopping for food? |7
    1. Yourself
    2. Another member of the household

80. Who in your family has the primary responsibility for preparing meals? |8
    1. Yourself
    2. Another member of the household

81. When it comes down to it, what would you say is the single biggest influence on what your household eats? |9
    1. taste
    2. calories
    3. cost
    4. convenience
    5. nutrient value

82. Which of the following is your most important source of nutrition information? Circle only one answer. |10
    1. food industry publications
    2. government publications
    3. health professionals (doctors, nurses, etc.)
    4. nutrition specialists (dietitians, public health nutritionists, home economists).
    5. radio
    6. television
    7. newspapers
    8. popular magazines
    9. books

83. Where did you first hear about this nutrition education course? Circle only one answer. |11
    1. radio announcement
    2. local newspaper
    3. mailed notice
    4. club or organizational announcement
    5. Red Cross volunteer
    6. friends or relatives

84. Are you: |12
    1. female
    2. male

85. How many years have you attended school? (Include technical school, college, or graduate school if appropriate.) |13-14
    |_____|

86. Which of the following best describes your current employment status? |15
    1. employed full time for pay
    2. employed part time for pay
    3. unemployed, looking for work
    4. retired
    5. in school
    6. full time homemaker

87. How old are you? _____ |16-17

How many members of your household, excluding yourself, are in the following age groups? (Please indicate 0 in the space if there are none.)

88. Under 12 years old _____ |18

89. 12 to 17 _____ |19

90. 18 to 34 _____ |20

91. 35 to 55 _____ |21

92. over 55 _____ |22

93. What is your marital status? |
    1. Married |23
    2. Divorced |
    3. Single |
    4. Widowed |

94. On the average, how much money do you estimate your household spends for food on a weekly basis for the food you eat at home? Try to exclude non-food items you buy at the market. |24
    1. under $25.00 |
    2. $25.00 to $49.99 |
    3. $50.00 to $74.99 |
    4. $75.00 to $99.99 |
    5. $100.00 to $124.99 |
    6. over $125.00 |
    7. don't know |

95. On the average, how much money do you estimate your household spends for food on a weekly basis for food you food you eat away from home? Include lunches that are purchased at work or school. |25
    1. under $10.00 |
    2. $10.00 to $24.99 |
    3. $25.00 to $49.99 |
    4. $50.00 to $74.99 |
    5. $75.00 to $99.99 |
    6. over $100.00 |
    7. don't know |

96. In what category do the annual earnings of your ENTIRE household fall? Include the income of all household members who are working. | 26

1. under $10,000
2. $10,000 to $14,999
3. $15,000 to $19,999
4. $20,000 to $24,999
5. $25,000 to $29,999
6. $30,000 to $34,999
7. $35,000 to $39,999
8. $40,000 to $44,999
9. over $45,000

97. Are you: | 27

1. Black
2. Oriental
3. Hispanic
4. White
5. Other

In the space below, could you tell us why you decided to take this course? Please be sure to complete the following identification information. Your telephone number will be used to match up this survey with the survey that will be conducted at the end of the course.

NAME_____

YOUR TELEPHONE _____ /_____ | 28-33
area code

RED CROSS CHAPTER NAME: _____ | 34

INSTRUCTOR'S NAME(S): _____ | 35

_____ | 36

THANK YOU FOR YOUR COOPERATION

APPENDIX C

PILOT TEST III
NUTRITION EDUCATION COURSE PARTICIPANT POSTTEST SURVEY

YOUR HEALTH PRACTICES AND OPINIONS
Please read each of the following statements and circle 1 if you *NEVER* do this, 2 if you *RARELY* do this, 3 if you *SOMETIMES* do this, 4 if you *USUALLY* do this, or 5 if you *ALWAYS* do this. Circle only one response option for each statement.

		NEVER	RARELY	S'TIMES	USUAL	ALWAYS
1.	Follow nutritional guidelines when I plan what I eat.	1	2	3	4	5
2.	Trim the fat off meat before I eat it.	1	2	3	4	5
3.	Read ingredient labels to determine what additives are present.	1	2	3	4	5
4.	Avoid starchy foods like bread or potatoes when I try to lose or maintain my weight.	1	2	3	4	5
5.	Eat three different kinds of vegetables a day.	1	2	3	4	5
6.	Read the nutrition information labels on the foods I buy.	1	2	3	4	5
7.	Keep a salt shaker on my table during meals.	1	2	3	4	5
8.	Eat at least 3 servings of whole grain breads (1 slice=1 serving) or cereal (1/2 cup=1 serving) products every day.	1	2	3	4	5
9.	Eat fresh fruit or fruits packed in their own juice instead of canned fruits in heavy syrup.	1	2	3	4	5
10.	Look for the sodium content in processed foods before I buy them.	1	2	3	4	5
11.	Take vitamin and/or mineral supplements.	1	2	3	4	5
12.	Consider the special nutrient needs of my age group when I plan what I eat.	1	2	3	4	5
13.	Eat a bean dish once a week.	1	2	3	4	5

Questions 14 to 26

Now indicate how you feel about the following statements by circling 1 if you *STRONGLY DISAGREE*, 2 if you *DISAGREE*, 3 if you are *UNDECIDED*, 4 if you *AGREE*, or 5 if you *STRONGLY AGREE*. Circle only one answer for each statement.

		STRONG DIS-AGREE	DIS-AGREE	UNDE-CIDED	AGREE	STRONG AGREE
14.	People need the same nutrients throughout the life cycle.	1	2	3	4	5
15.	Large doses of vitamin C cure the common cold.	1	2	3	4	5
16.	I do not enjoy most foods unless I can salt them.	1	2	3	4	5
17.	Whether I gain or lose weight is up to me.	1	2	3	4	5
18.	Following a balanced diet is a lot of trouble.	1	2	3	4	5
19.	Most food additives don't present health risks.	1	2	3	4	5
20.	For most people a moderate reduction in dietary fat is highly desirable.	1	2	3	4	5
21.	The best way to lose weight is to eliminate most starchy foods.	1	2	3	4	5
22.	Vitamin supplements are important to most people's health.	1	2	3	4	5
23.	Exercise helps to control your appetite.	1	2	3	4	5
24.	Food decisions are only a matter of taste.	1	2	3	4	5
25.	The labels on processed foods are useful for making food decisions.	1	2	3	4	5
26.	I can tell if foods have sugar in them because they taste sweet.	1	2	3	4	5

YOUR NUTRITION KNOWLEDGE

Please circle the number next to the correct answer for each of the following questions.

27. Which of the following statements is false?
    1. Food choices are very personal and important.
    2. Food choices have evolved since childhood.
    3. It can be difficult to change eating patterns.
    4. Nutrition concerns are the most important factors influencing food choices.
    5. Successful modification of food choices requires effort and commitment.

28. Which of the following is not a nutrient?
    1. calories
    2. fat
    3. carbohydrates
    4. water
    5. protein

29. Food guides group foods by:
    1. the common source of the food
    2. the amount and type of nutrients in the food
    3. the number of servings of a food needed for a day
    4. the amount of food needed by different ages and sex of individuals
    5. the importance of the food to health

30. On a daily basis, it is recommended that most people should try to:
    1. increase their protein intake
    2. cut out all foods containing sugar
    3. avoid all processed foods
    4. limit breads and cereals to 2 servings
    5. eat three servings of vegetables

31. Ingredient labels can help us to determine:
    1. all the nutrients present in a food
    2. the serving size of the food that is right for us
    3. exactly how much of each ingredient is in the food
    4. how packaged foods can be used in our diet
    5. how to identify standards for foods

32. The most common disease in the U.S. related to excessive sugar consumption is:
    1. diabetes
    2. dental caries
    3. obesity
    4. cirrhosis
    5. gastrointestinal disorders

33. The food additives which we consume the most are:
    1. sugar, corn syrup and salt
    2. MSG, baking soda and yeast
    3. garlic, MSG and Red Dye #4
    4. nitrate, Red Dye #4 and sugar
    5. saccharin, nitrate and baking powder

34. Food labels contain nutrition information based on the:
    1. four basic food groups
    2. NRC-RDA
    3. seven basic food groups
    4. miminum daily allowances
    5. U.S. RDA

35. In order to reduce risk of cancer it would be better to:
    1. eat fresh fruit rather than frozen
    2. eat fresh fish rather than smoked fish
    3. eat smoked fish rather than salt cured fish
    4. eat lean beef rather than fish
    5. drink beer rather than wine

36. Which of the following best describes food additives?
    1. Generally additives serve no useful function in food except to enhance flavor.
    2. Food additives make the food cost more.
    3. Food additives are generally harmful and should be banned.
    4. Most food additives are safe; only a few may cause problems.
    5. Food additives are added for the benefit of the manufacturer, not the consumer.

37. Which of the following is <u>not</u> a <u>good</u> <u>practice</u> <u>for</u> reducing sugar in the diet?
    1. substitute a glass of juice or ice water for an afternoon cola
    2. substitute molasses instead of sugar for a sweetener
    3. reach for fresh fruits rather than canned fruits
    4. cut back on the amount of sugar in recipes when baking.
    5. cut back on foods containing fructose as a sweetener.

38. Which nutrient is <u>not</u> required on nutrition information labels?
    1. protein
    2. fat
    3. sodium
    4. carbohydrate
    5. vitamin C

39. Vitamins are:
    1. needed by the body in large amounts, so be sure to take a supplement
    2. generally eliminated from foods during processing
    3. needed by the body in small amounts and can usually be obtained from the diet
    4. the major nutrients needed by the body and, therefore, the most important
    5. nutrients which supply energy to the body

40. The Dietary Guidelines for Americans are intended:
    1. to guarantee health and well being for all people
    2. for people with some diet-related disease
    3. for people who are already healthy
    4. to be a food guide
    5. to help people control their weight

41. A person who follows a diet to minimize the risk of coronary heart disease should:
    1. eat lowfat dairy products, lean meat, fish and poultry
    2. drink homogenized milk and juice
    3. eat fewer eggs and more beef
    4. eat more fried than broiled foods
    5. eat fried chicken rather than broiled fish

42. In general, excess amounts of water soluble vitamins (B vitamins and vitamin C) are:
    1. excreted by the body
    2. stored by the body
    3. used by the body
    4. used to control weight
    5. a good preventive health measure

43. In order to lose weight, one must:
    1. cut fat intake to 35 percent
    2. eat vegetables and fruits but avoid breads and cereals
    3. follow a high protein, low carbohydrate diet
    4. either exercise more and/or eat fewer calories
    5. follow a diet that one gets at the bookstore

44. The same nutrients are needed by all persons; however:
    1. some people can't utilize all these nutrients
    2. most people can't get sufficient nutrients from their diet
    3. the amounts vary throughout the life cycle
    4. the amounts of nutrients contained in the normal diet is inadequate
    5. most people need vitamin supplements

45. The best sources of extra calories for moderately active people are
    1. bread, cereals, vegetables and fruits
    2. milk and dairy products
    3. nuts, seeds and vegetable oils
    4. foods of any kind which provide extra calories
    5. fat and sweets

46. Fast food meals are generally:
    1. high in sodium and fat
    2. high in sugar but low in sodium
    3. high in fiber
    4. very low in most nutrients
    5. high in protein and low in fat

47. Taking a vitamin supplement:
    1. is a good idea for everyone
    2. means you don't have to worry about your diet
    3. is not necessary if your diet is balanced
    4. is only for those persons who are sick
    5. is a form of health insurance

48. Regular exercise:
    1. stimulates the appetite and makes you hungry
    2. helps to control appetite
    3. fails to lower food intake
    4. increases your blood pressure
    5. is stressful

49. During middle age, the most important component to adjust in one's diet is:
    1. protein intake
    2. carbohydate intake
    3. vitamin intake
    4. water intake
    5. energy (calorie) intake

50. When evaluating a weight loss diet plan it is important to look for:
    1. a rapid weight loss in the first week to help you get started
    2. special foods which enable you to burn calories faster
    3. a menu plan providing a variety and balance of types and amounts of foods
    4. high protein foods, because weight loss diets seldom contain enough protein
    5. a plan that eliminates starch

51. When it comes down to it, what would you say was the <u>single biggest influence</u> on what your household ate during the past month?
    1. taste
    2. calories
    3. cost
    4. convenience
    5. nutrient value

COURSE EVALUATION

These questions will help us to learn what you think about the content and administration of this nutrition education course. Please circle only one answer for each question.

52. Which method of instruction do you generally prefer?
    1. classes taught by one instructor
    2. team teaching

53. Was this course taught by:
    1. an individual instructor
    2. two or more instructors

54. In terms of your own time commitments, what is the best time to schedule classes of this sort?
    1. weekday mornings
    2. weekday afternoons
    3. weekday evenings
    4. Saturday mornings
    5. Saturday afternoons

55. If there was a charge for this course, what is the most you would be willing to pay?
    1. $1.00
    2. $5.00
    3. $10.00
    4. $15.00
    5. $25.00
    6. I would not be willing to pay

56. If you had to do it over again, would you rather:
    1. take only certain parts of the course which are of particular interest to you?
    2. take all of the sessions?

IN THE SPACE BELOW, PLEASE LIST THE TWO SUBJECTS IN COURSE THAT WERE THE MOST USEFUL TO YOU.

Questions 57 to 68

How would you rate each of the following activities or sessions of the course in terms of its educational value? Circle 1 if you did *NOT ATTEND* the session or complete the activity. If you attended or completed this activity circle 2 if its value was *POOR*, 3 if it was *FAIR*, 4 if it was *GOOD*, or 5 if it was *EXCELLENT*.

		DID NOT ATTEND/ COMPLETE	Educational Value			
			POOR	FAIR	GOOD	EXCEL
57.	Session One: Food and You	1	2	3	4	5
58.	Activity: The Food Checklist	1	2	3	4	5
59.	Film: Table Talk	1	2	3	4	5
60.	Session Two: What's in Your Food?	1	2	3	4	5
61.	Activity: Rating Your Diet for Variety	1	2	3	4	5
62.	Session Three: Eating for Health	1	2	3	4	5
63.	Activity: Estimating the Amount of Salt Added from Salt Shaker	1	2	3	4	5
64.	Session Four: Food Decisions	1	2	3	4	5
65.	Session Five: Nutrition and the Life Cycle	1	2	3	4	5
66.	Activity: Small Group Discussion of One Stage of the Life Cycle	1	2	3	4	5
67.	Session Six: Putting it Together	1	2	3	4	5
68.	Activity: Food Tasting or Recipe Exchange	1	2	3	4	5

69. How informative was the Participant's Guide?
    1. I did not read it
    2. It was a waste of time
    3. I learned something from it
    4. I learned a lot from it

70. What was your reaction to the activity which helped participants identify food habits to change?
    1. I did not identify a food habit I wanted to change.
    2. I identified a food habit I wanted to change but probably won't change it.
    3. I identified a food habit I want to change and will try to change it.

71. Was this course:
    1. too long
    2. just about right
    3. too short

72. Overall, would you say the course materials were:
    1. too difficult to understand easily
    2. about the right level of difficulty
    3. too easy

Please be sure to complete the following identification information. In two months we will be conducting a very brief telephone survey of a sample of course participants. Thus we ask that you write your name and telephone number below. Also indicate the time of day which would be best to contact you by telephone.

NAME_____

YOUR TELEPHONE _____ /_____ |1-6
area code |
|

BEST TIME OF DAY TO CONTACT YOU:_____

RED CROSS CHAPTER NAME: _____ |7

INSTRUCTOR'S NAME(S): _____ |8

_____ |9

PLEASE COMPLETE THE INFORMATION ON THE BACK OF THIS PAGE

Answer these last questions in the spaces below.

A. What did you like most about this course?

B. What did you like least about the course?

C. What, if any changes have you, or members of your household made in their eating patterns since you began this course?

D. As you know, the name of this course is *BETTER EATING FOR BETTER HEALTH*. Do you like this name? Have you any suggestions for a more appropriate name?

THANK YOU FOR YOUR COOPERATION

APPENDIX D

AMERICAN RED CROSS NUTRITION COURSE: BETTER EATING FOR BETTER HEALTH

COURSE OUTLINE

Session I. Food and You

Introduction to the course - overview of topics, explanation of process, resources
Film, "Table Talk," followed by discussion of participant's own motivations about factors influencing food choices
Basic facts about nutrition:
- major nutrients
- daily food guide
- importance of variety, moderation and balance

Session II. What's in Your Food?

Self-assessment of participants' eating patterns and comparison with nutritional recommendations
Trade offs in food selection
Serving sizes
Ingredient and nutrition labelling
Food additives

Session III. Eating for Health

Relationship between diet and health, organized around the Dietary Guidelines
Strategies to moderate consumption of dietary fat, sodium and sugar in the diet

Session IV. Food Decisions

Vitamin/mineral supplementation
Calories, weight control and exercise

Session V. Nutrition and the Life Cycle

A. Self study units
In class, small group discussion of selected units

Pregnancy

Infant feeding
Early childhood (1 through 5)
Middle childhood (6 through 11)
Adolescence (12 through 18)
Adulthood -- young, middle, mature

B. Group discussion summarizing nutritional issues throughout the lifecycle

Session VI. Putting It Together

Evaluating alternate eating plans
Sharing experiences in trying out new food
Sharing of food selection techniqes that follow the recommendations of the Dietary Guidelines
Identifying a new food selection behavior that meets personal health goals and lifestyle

APPENDIX E

FACT SHEET

Instructor for Better Eating for Better Health (Red Cross Nutrition Course)

POSITION

A nutrition course instructor is prepared to teach the Red Cross course, Better Eating for Better Health, in schools and the community under the auspices of a Red Cross chapter.

QUALIFICATIONS

Instructor candidates must meet the following criteria:

1. Be age 21 or older.
2. Have preparation in nutrition (as a registered dietitian or a nutritionist), but preparation in a related field is accepted if it includes the science of human nutrition. Examples of related fields include those of a registered nurse, a health educator, a home economics teacher, or a county extension home economist.
3. Have basic knowledge of the human digestive system and understanding of human nutritional requirements.

PROCEDURES

The procedure for becoming an authorized instructor for the Red Cross nutrition course, Better Eating for Better Better Eating for Better Health, is as follows:

1. Contact your American Red Cross chapter.
2. Submit an Application for Authorization to Teach (Form 1082) to the Red Cross chapter.
3. Interview with the chapter representatives of Nursing and Health Services.

4. Complete the Red Cross Nursing and Health Services Core Curriculum.

5. Complete the Nutrition Instructor Specialty Course.

6. Teach one nutrition course either under the observation of an instruction specialist, with an experienced instructor, or with an instructor candidate who is a registered nurse, registered dietitian, nutritionist, home economics teacher, or county extension home economist.

7. Submit a Class Report in Nursing and Health Services (Form 306), with an outline of the topics covered, to the Red Cross chapter.

INSTRUCTOR SPECIALTY COURSE

1. Purpose: The purpose of the Nutrition Instructor Specialty Course is to prepare instructor candidates to provide educational programs that assist individuals to --

   a. Apply principles of nutrition to making personal
      to making personal choices.

   b. Develop personal nutritional health
      health decision-making skills.
   c. Maximize personal potential for
      for nutritional health and well-being.

2. Prerequisite: Core Curriculum (6 hours).

3. Instructor class time: 12 hours (minimum)

4. Recommended class size: 8-13 instructor candidates.

5. Instruction: provided by an authorized Red Cross instruction specialist in nutrition.

6. Materials: Participant's Packet, Better Eating for Better Health, which contains Participant's Guide, Food Wheel, and six Nutrition and the Life Cycle booklets.

7. Content: Assessment of the learning needs of participants, community resources, teaching methods, practice teaching and evaluation; implementation of the course; Red Cross responsibilities.

NOTE. The Red Cross recognizes that many instructor candidates are health professionals with nutrition and education backgrounds. For these individuals, instructor preparation may be a modification of the content and instructor skills listed above. However, Nursing and Health Services strongly recommends that experiences persons interested in expanding Red Cross health education services participate in instructor training to --

-Promote the sharing of skills and community resources.

-Promote the development of a network of the agencies that provide nutrition information in the community.

-Contribute to maintaining the quality and standardization of Red Cross health instructor preparation.

-Complete the requirements for becoming an instruction specialist in nutrition.

APPENDIX F

EVALUATION OF THE NUTRITION KNOWLEDGE, BELIEFS AND BEHAVIOR SCALES (146)

The following is a description of the development and evaluation of the nutrition knowledge, beliefs, and behavior scales. The scales were specifically developed for the field test evaluation of the Red Cross nutrition course, Better Eating for Better Health.

Nutrition Knowledge Scale

The nutrition knowledge scale was designed to provide a rigorous test of nutrition knowledge. The items represented the factual information which the course transmitted to the participants.

After development of the nutrition knowledge scale, it was reviewed by the project team. Items were reviewed for clarity and compatibility with course content and objectives. The revised scale was then tested on 61 participants in Pilot II. As a result of the preliminary test, items were modified or deleted in order to improve the reliability of the scale.

The revised nutrition knowledge scale, consisting of twenty-four multiple choice items, was administered in Pilot III. The same items were used on both the Baseline Survey and the Posttest Survey. The items (items 49 through 72) were located on pages 5 through 8 on the Baseline Survey and pages 3 though 6 on the Posttest Survey (items 27 through 51).

The Alpha Coefficient was used to estimate the reliability of the knowledge scale. Reliability of the scale was α = .78 on the pretest and .82 on the posttest.

Nutrition Beliefs Scale

The purpose for measuring nutrition beliefs was to determine how participants' perception of common nutrition beliefs and to assess the ability of the course to positively alter these nutrition beliefs. Beliefs referred to the affective variables which are thought to predispose individuals to act in a particular manner (5).

After development, the scale was reviewed by the project team. They assessed each item for clarity and compatibility

with the course content and objectives. The revised scale was tested on 61 participants in Pilot Test II. As a result of this preliminary assessment, the items were modified or deleted in order to improve the reliability of the scale.

The revised nutrition beliefs scale was administered in Pilot Test III and consisted of thirteen items. The same items were used in both the Baseline Survey and the Posttest Survey. These items (items 26, 27, 29, 31, 32, 34, 35, 37, 39, 40, 42, 44, 46) appeared on pages 3 and 4 of the Baseline Survey and on page 2 of the Posttest (items 14 through 26). Each participant indicated the strength in which he agreed with each belief statement. Response options were: strongly disagree, disagree, undecided, agree, and strongly agree. The responses were coded so that the most positive response was given the highest score. The reliability of the scale on the pretest was $\alpha = .62$ and on the posttest it was
$\alpha = .57$.

Nutrition Behavior Scale

The purpose for measuring nutrition behavior was to determine the short term effects of the Red Cross nutrition course on the participant's nutrition behavior. Items represented those nutrition behaviors of individuals the course was designed to positively change.

The scale was reviewed by the project team for clarity and compatibility with course content and objectives. A major consideration during the review process was identifying nutrition behaviors that could be realistically altered by the course. Following modifications recommended by the project team the scale was tested on 61 participants in Pilot Test II. As a result of this preliminary assessment items were further modified or deleted in order to improve the reliability of the scale.

The revised nutrition behavior scale was administered in Pilot III and consisted of thirteen items (Baseline items 2, 3, 5, 7, 9, 10, 12, 13, 15, 17, 19, 21, 22 and items 1 through 13 on the posttest). Each participant indicated the frequency with which he engaged in various behaviors. The response options were: never, rarely, sometimes, usually, and always. The most positive response was coded to receive the highest score. The reliability for the pretest was $\alpha = .78$ and $\alpha = .69$ for the posttest.

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