ASSESSMENT OF ATTITUDES TOWARD DIETARY CHANGE OF PARTICIPANTS IN THE MICHIGAN EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM

By

Anne Seymour Murphy

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Food Science and Human Nutrition

1987

ABSTRACT

ASSESSMENT OF ATTITUDES TOWARD DIETARY CHANGE OF PARTICIPANTS IN THE MICHIGAN EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM

By

Anne Seymour Murphy

Assessment of attitudes toward dietary change has not been conducted in prior evaluations of the Expanded Food and Nutrition Education Program (EFNEP). This research was conducted in the Michigan EFNEP to determine (1) if attitudes toward dietary change of participating homemakers improved as a result of program participation, (2) how pretest attitude scores were related to change in food recall scores, (3) if change in attitude and food recall scores of homemakers were related, (4) if attitude change of homemakers was predicted by: pretest attitude scores of homemakers or instructors, food recall pretest or change scores of homemakers, instructors' years of experience, locus of control pretest or change scores of homemakers, and (5) if dietary (food recall) change could be predicted by: locus of control changes scores of homemakers, instructors' years of experience, attitude change or pretest food recall scores, or pretest attitude scores of homemakers or instructors.

A Likert scale was used to assess attitudes toward dietary change and locus of control. A 24-hour food recall was used to measure self-reported dietary intake. Content

and contruct validity and reliability of the attitude and locus of control instruments was established. Data were collected from 195 low-income homemakers, 47 program aides and a comparison group of 66 women enrolled in the Supplemental Food Program for Women, Infants, and Children.

Results of ANOVA and t-test analyses indicated that attitudes toward dietary change of EFNEP participants improved significantly ($p < .001$) from pre- to posttesting and that posttest attitude scores were significantly higher ($p < .001$) than those of the comparison group. Subjects with high pretest attitude scores did not have significantly greater change in food recall scores than homemakers with low pretest attitude scores ($p = .126$). Change in attitude and food recall scores of homemakers were not correlated. Results of multiple regression analyses indicated that pretest food recall scores accounted for 57.88% of the variance in food recall change of homemakers. Due to correlations between the independent variables, two separate regression runs were conducted to find predictors of attitude change. Results of the separate regression analyses indicated that variance in attitude change could be predicted by pretest locus of control (9.83%), change in locus of control (51.35%), and pretest attitude scores of homemakers (40.28%).

To my parents, Seymour and Harriet

And my children, Lila and Katiejane

ACKNOWLEDGMENTS

I would like to acknowledge the assistance of my advisor, Dr. Jenny Taylor Bond, whose trust in my abilities and respect for me as a person provided the encouragement I needed to complete this research and dissertation. As the director of this research, she provided food for thought in the planning stages, timely suggestions for collecting and processing data, a thorough review of dissertation drafts, and unending support in all phases of the project. Dr. Bond is a very "human" scholar. I am grateful to her for guidance related to my doctoral studies, but more importantly for her influence and concern in my development as a person.

I also appreciate the individual and combined efforts of my other committee members, Drs. Sharon Hoerr, Linda Nierman, Judith Anderson, and Fred Ignatovich, who provided guidance in planning, implementing, and evaluating this project. A special thanks to Dr. Linda Nierman, who allowed me to direct this research project with freedom and flexibility.

The contribution of the Michigan EFNEP extension home economists and program aides, and Doris Showerman and the Ingham County WIC Department staff, who assisted in the collection of research data is also appreciated. A special thanks to Win-Jing Chung for his prompt and efficient assistance with data analysis and to Bethany Ledford, Kim Johns, and Janeen Hunt for their role as support staff.

I sincerely appreciate the support and suggestions from friends, especially Kendra Anderson, Barb Mutch, Pat Lynch, and John Kallas. I also am thankful to my sister, Cathy, for providing spiritual guidance at appropriate intervals during this undertaking and to my sisters Maria and Carol for providing encouragement.

I am grateful for the financial support provided by the Michigan Expanded Food and Nutrition Education Program, the Michigan State University Department of Food Science and Human Nutrition, the College of Human Ecology, and the George D. Searle and Mead Johnson Scholarships which were awarded through the American Dietetic Association.

I am grateful to my father, Seymour, who inspired me to pursue a doctoral degree. His confidence in my abilites provided a continual source of "silent" support and his lifetime of achievements provided footsteps to follow. I sincerely appreciate my mother's continual assistance with my family responsibilites and for providing emotional and financial support, which allowed me to channel my efforts into writing this dissertation.

I would also like to acknowledge the support provided by my husband, Luke, whose willingness to assume the roles of mother and father to our children, and cheerleader to me, expedited my efforts in completing this dissertation.

Lastly, I would like to acknowledge the roles of my daughters, Lila and Katiejane. Lila was a good sport about giving me the time and peace I needed to "do my homework" and Katiejane taught me the meaning of "strength" and how it can be applied to accomplish the "impossible".

To these people, and others who provided suggestions and encouragement, I am sincerely grateful for their contributions in assisting me in completion of this research and dissertation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

The Expanded Food and Nutrition Education Program (EFNEP) is a federally funded program which provides basic nutrition education to low-income families, especially those with young children. EFNEP was initiated in 1968 by the United States Department of Agriculture (USDA) to promote positive changes in nutrition-related knowledge, attitude, skills, and behaviors of limited income families. The program is implemented under the direction of the Cooperative Extension Service in fifty states, the District of Columbia, Guam, Puerto Rico, Micronesia, American Samoa, and the Virgin Islands.

In EFNEP, paraprofessionals who are often indigenous to the community in which they work, are employed as instructors (program aides) to deliver the educational program to low-income homemakers with young children. Although some teaching takes place in groups or by self-instruction, the primary delivery method is individual instruction by the program aide in the client's home.

Aides are trained in areas of basic foods and nutrition such as food selection and preparation, meal planning, food safety, food sources of nutrients, food

preservation, gardening, weight control, and maternal/infant nutrition. Since the initiation of this study, Michigan EFNEP program aides have also received training in methods for promoting positive changes in homemakers' attitudes toward dietary change[1].

Statement of the Problem

To provide accountability data, program evaluation should be conducted to determine whether EFNEP program objectives (improved knowledge, skills, attitudes[2], and behaviors[3]) are achieved. Cooperative Extension Service (1981) published "Program Evaluation in Extension: A Comprehensive Study of Methods, Practices, and Procedures." Recommendations listed in the report include:

1. development of a system for accountability and evaluation to provide greater specificity and clarity about national accountability needs.

---

[1] "Attitudes toward dietary change" is defined in this dissertation to mean evaluative responses in regard to making changes in food consumption practices.

[2] "Attitudes" are defined as an evaluative position with regard to a fact or issue based on an individual's beliefs

[3] The term "behavior" is commonly used in the literature cited in this dissertation to refer to self-reports of foods consumed. When authors use "behavior" in this manner, it will be followed by "(food recall)" for the purpose of clarification. When "behavior" is not followed by "(food recall)" it is used in the more general sense to mean manner of acting.

2. implementation of a more systematic approach to evaluation at all organizational levels.
3. establishment of greater clarity regarding the needs and purposes of evaluation among different program areas and organizational levels.
4. assessment of the availability and method of organization of evaluation resources.
5. provide staff development in the area of program evaluation.

Additionally, a recommendation from the General Accounting Office included in the Report to the Secretary of Agriculture (1980, p.8) stated "We recommend that Cooperative Extension Service...develop (1) objective and measurable standards for judging program effectiveness and (2) the evaluation and feedback tools needed to measure program performance against such standards."

Comprehensive program evaluative efforts are needed to determine if the objectives of the EFNEP program are being met. It is the goal of the Expanded Food and Nutrition Education Program to assist low-income families to "acquire the knowledge, skills, attitudes, and changed behaviors necessary for nutritionally sound diets" (USDA, 1976, p.6). As in most nutrition education programs, measurement has been conducted to evaluate change in knowledge and dietary change (using the food recall instrument) of EFNEP homemakers (e.g., Hutsey, 1970; Marketing Economics Research Service, 1972; Napier

and Wharton, 1974; Kerr et al., 1979; Nierman et al., 1983; Wagner et al., 1983). Although EFNEP names positive attitude change as a component of the program objective, only a few studies (e.g., Baird and Schutz, 1976; Kaplowitz and Olson, 1983; Block et al., 1984) have been conducted to assess attitudes of homemakers and/or aides. Attitudes toward dietary change of EFNEP participants or instructors have not been evaluated prior to this study.

Nutrition education programs need to provide data which indicate whether positive changes in attitudes toward dietary change have occurred in addition to conducting assessment of knowledge and behavior (food recall) (McKenna, 1983). Results related to attitude change can be used in formative evaluation to assess the need for instructor training and in summative evaluation to determine the effect of program participation on attitude change. In addition to assessment of attitude change due to program participation, it is desirable to examine the relationship between attitudes and dietary change. Carruth et al. (1977) proposed that if the relationship between attitudes and dietary (food recall) change is important in terms of modifying future dietary intake, the results of attitude assessment might be useful to predict the potential amount of dietary change that can be anticipated by program participation. They suggested that more definitive research is needed to determine how attitudes are modified by nutrition education programs and

to what extent attitude change is related to dietary change.

Nutrition educators have often assumed that if positive change in knowledge occurs, positive change in attitude and behavior (food recall) automatically follows. A primary reason for measurement of attitudes in the past has been because of an assumed link between attitudes and self-reported dietary change. It cannot, however, be assumed that these variables are positively correlated.

The consistency between attitude and behaviors has been challenged by several investigators (e.g., LaPiere, 1934; Kutner et al., 1952; Harding et al., 1954). Research has been conducted to determine if a significant correlation between nutrition-related attitudes and dietary intake (primarily assessed using the 24-hour food recall instrument) exixts. (e.g., Picardi and Porter, 1976; Sims, 1978; Schafer, 1978; Daelhousen and Guthrie, 1982; Perron and Endres, 1985). Pre- and posttest attitude and food recall scores have been assessed, correlations computed and reported, followed by conclusions regarding the strength of the relationship.

Some researchers (Picardi and Porter, 1976; Daelhousen and Guthrie, 1982; Perron and Endres, 1985) have indicated that there is an inconsistency between these two variables. Other investigators (e.g. Schwartz, 1976; Schafer, 1978; Kok et al., 1982) have reported positive correlations between attitude and food recall scores.

If moderating factors had been included as independent variables in these studies rather than computing only correlations, data might have been generated to provide specific information to determine if attitude scores predict dietary change (food recall) or if food recall scores predict attitude change. Results of correlational and regression analyses which is based on inclusion of multiple variables provides more information about the relationship between attitudes and dietary intake (food recalls) than the single correlational analyses used in the reports cited. Based on the need for information (1) to determine if there is a change in attitudes of EFNEP participants, (2) to determine if there is a correlation between attitude and behavior change, and (3) to assess the predictive potential of several independent variables on attitude change and/or food recall change, the following research objectives and hypotheses were proposed.

Research Objectives

The objectives of this study were:

1. To determine if attitudes toward dietary change of EFNEP homemakers (a) change from program enrollment to program completion (b) have significantly greater change compared to a comparison group and (c) result in more/less change depending on pretest attitude scores (low vs high);

2. To determine if change in attitude and food recall scores of homemakers enrolled in EFNEP are correlated;

3a. To determine if instructors' pretest attitude scores, years of instructor experience, homemaker attitude change or pretest attitude scores, change in locus of control scores, or pretest food reecall scores of homemakers predict change in food recall scores of homemakers;

3b. To determine if instructors' pretest attitude scores, instructor years of experience, pretest or change in homemakers' food recall scores, pretest or change in homemakers' locus of control scores, or homemakers' pretest attitude scores predict change in attitude scores of homemakers.

Research Hypotheses

1a. There is no difference between pre- and posttest attitude scores of EFNEP participants;

1b. There is no difference between attitude change scores of the comparison and experimental groups;

1c. There is no difference between the amount of food recall change of groups of homemakers with high vs low pretest attitude scores;

2. Attitude change is not positively correlated with food recall change of EFNEP homemakers;

3a. Food recall change is not predicted by: change in locus of control scores of homemakers, instructors' years of job experience, pretest instructors' attitude scores, food recall pretest scores of homemakers,or pretest or change in attitude scores of homemakers;

3b. Attitude change is not predicted by: homemaker pretest or food recall change scores, pretest or change in locus of control scores of homemakers, instructors' years of job experience, homemaker pretest attitude scores, or pretest attitude scores of instructors.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter provides a review of the existing literature related to the hypotheses being tested. The first section reviews research reports regarding assessment of attitude change in EFNEP and other nutrition education programs. The second section includes a review of the literature in which correlations between attitude and dietary intake (food recall) are reported. The third section is a review of models which have been proposed for purposes of predicting attitude or behavior (dietary) change.

Assessment of Change in Attitudes of EFNEP Participants

Although results related to assessment of "attitudes toward dietary change" of EFNEP participants have not been reported, some research has been conducted to assess changes in general attitudes of EFNEP participants (Baird and Schutz, 1976; Kaplowitz and Olson, 1983; Block et al., 1984).

Block et al. (1984) included twelve attitude statements as a component of an instrument used to assess long-term effects of program participation in the

California EFNEP on knowledge, attitudes, and food recall change of homemakers. A significant positive change was reported in food recall scores with the greatest improvement in consumption of milk/milk products (a 15.6% increase in number of persons consuming two or more servings) and fruit/vegetable consumption (21% increase in persons reporting consumption of four or more servings). Improvements were reported in cooking skills (65% improvement), knowledge (47% improvement), and attitudes (9% increase) from pre- to posttesting. Results of this study indicate that participants showed great improvements in knowledge and food recall, but that only slight increases in attitude scores occurred.

Kaplowitz and Olson (1983) evaluated knowledge and attitudes toward breastfeeding, and incidence and duration of breastfeeding of women enrolled in EFNEP. They found that knowledge scores increased for women who were predisposed to bottlefeed ($p<.05$) or undecided regarding method of infant feeding ($p<.001$) but not for subjects who had decided to breastfeed at the time of the pretest. The program did not result in improvements of attitudes toward breastfeeding, an increase in the number of women who actually breastfed, or the duration of breastfeeding (compared to a control group). The authors attributed these results to the small sample size and use of a non-personal educational approach (mailing pamphlets).

Baird and Schutz (1976) assessed the relationship

between attitudes regarding food use and dietary intake of foods as measured by 24-hour food recall scores of homemakers participating in EFNEP. The respondents indicated their attitudes related to use of 20 foods given situations or descriptors such as "a family favorite" or "easy to make." A significant relationship was found between attitudes regarding uses of foods and the use of foods as indicated by self-reports of food consumption (food recalls) ($p<.05$). Fifty-one percent of the variation in food recalls was accounted for by attitude scores. Problems reported by respondents as interfering with making dietary changes included: trouble with food preparation, digestion difficulties, lack of knowledge about nutrition, and dietary monotony. The authors suggested that assessing food-related attitudes can be useful to predict food recall scores. However, it is apparent from the respondents' remarks that food choices are affected by several factors in addition to attitudes regarding use of foods.

Assessment of Attitude Change of Participants in Nutrition Education Programs

A factor cited by Sunseri et al. (1984) which affects behavior change is the readiness to change of program participants. They claimed that when new information is learned, formation of positive attitudes and dietary improvements do not automatically follow because of resistance and/or lack of motivation to change existing

habits. They investigated changes between pretest, posttest, and follow-up test scores of sixth-grade students participating in a cardiovascular risk reduction program. Results indicated that although knowledge scores increased, attitude (toward heart-healthy eating practices) scores decreased significantly between posttest and follow-up testing ($p<.01$). Dietary scores decreased from pre- to posttests ($p<.001$) and from posttesting to follow-up testing ($p<.05$). The authors stated that knowledge functions as a tool only if and when people are ready to make changes. If a health education program is to alter food intake, it should provide opportunities for the participants to experience the desired behavior. The authors also indicated that family involvement, length of the program, and reading level might have affected results.

Byrd-Bredbenner et al. (1984) assessed the affect of participation in a health education program on nutrition knowledge, attitudes ("caring about nutrition", "eating new foods", "nutrition affects health", and "learning about nutrition"), and dietary change (as measured by a food frequency instrument). Knowledge scores significantly increased. Attitude scores increased for senior high students, but not for subjects in junior high school. Neither knowledge nor attitude scores were significant predictors of food frequency change. The authors attributed the differences in attitude score

change between the two groups of students to differences in maturity and exposure to nutrition information. The authors, however, did not specify age levels of junior vs senior high students or consider the overlap in maturity level between the two groups. Food frequency scores did not increase for students at either junior or senior high level. They suggested that the lack of significant change in food frequency scores from pre- to posttesting might have been due to instrumentation (lack of sensitivity in the food frequency tool used) and to lack of control over food choices in this age group. Shortness of the program (six to ten weeks) was also named as a primary factor contributing to lack of changes in attitudes and food frequency scores of students.

Ries and Schoon (1986) evaluated the effectiveness of a cafeteria-based nutrition education program to improve the knowledge and attitudes of college students. Knowledge regarding the relationship between nutrition and health and attitudes toward nutrition and health were assessed. Knowledge scores increased significantly from pre- to posttesting ($p<.001$), but no significant change in attitudes of the students occurred. The authors attributed the lack of improvement in attitudes to shortness of program (eight weeks), effect of pretesting, and high pretest scores in the control (84%) and experimental (81.25%) groups. That changes in attitude and dietary scores might be influenced by high pretest scores was also

indicated by results reported by Daelhousen and Guthrie (1982).

The goal of an affective-based educational program implemented by Brush et al. (1986) was to increase the flexibility of attitudes of participants. Flexibility vs rigidity of attitudes was assessed using a six-point Likert scale. Participants used the nominal group technique to develop and rank objectives for the educational program according to priority. The program was based on learner needs as determined from the nominal group procedure. The program included self-awareness and value clarification techniques. Nutrition knowledge increased in experimental and control groups; dietary intake, as measured by a 24-hour food recall, improved in the experimental group only. Flexibility of nutrition attitudes did not improve in either group. The authors attributed the lack of significant improvement in attitudes to high pretest scores and the length of the program.

In a study by Ross (1984), knowledge of nutrition principles and attitudes of nursing students were assessed before and after participation in a nutrition education program. Knowledge scores significantly increased ($p<.001$). The author reported that there were no significant changes in scores on thirteen of fifteen attitude statements ($p.<05$). Constructs represented were: "role of the nurse in nutrition education", "the role of

dietitians in the hospital", "nutrition education in nursing", and "general nutrition." The reason given for the lack of positive improvement in attitudes of the nursing students in this study was regression toward the mean on posttest scores (high pretest scores).

Attitude change might be affected by characteristics of the educational message. Looker and Shannon (1984) investigated the effect of threat vs benefit appeal of an educational message regarding nutrition and health. Two types of pamphlets were provided, one which emphasized the benefits of dietary change and the other which focused on the negative consequences of not complying with dietary recommendations. Investigators assessed knowledge about nutrient density, attitudes regarding learning about nutrition and use of nutrient dense foods, and food choice behavior regarding selection of nutrient dense foods. The authors indicated that the purpose of their research was to identify strategies that positively influence nutrition-related attitudes and behaviors, as well as knowledge. They found that there was no significant difference in attitude scores related to the type of message presented (threat vs benefit), but the group that received nutrition education showed greater increases in knowledge scores than the control group. No improvements in food choice behavior of either group were reported. The authors concluded that the threat message may have been too mild so that there was not enough difference in

the materials to result in significant differences in attitude scores. The authors also indicated that a high attrition level and high pretest scores affected posttest scores.

Research was conducted by Rosander and Sims (1981) to determine if food/nutrition knowledge regarding food's affect on health, attitude related to control over eating habits, and behavior (food frequency) of low-income women increased after program participation. They developed an affective-based nutrition intervention to be used in the Special Supplemental Food Program for Women, Infants, and Children (WIC). The intervention consisted of a series of three lessons, delivered one month apart. The instrument developed to measure the affective domain was a five-point Likert scale representing two constructs: "personal control over eating habits" and "foods effect in health and feelings." The respondents had significantly higher posttest scores on both attitude scales. The dietary scores, as measured by a food frequency, showed statistically significant improvement for the instructed group. Authors concluded that affective-based nutrition education is successful in improving knowledge, attitudes, and food frequency scores of low-income women.

The Correlational Relationship Between Attitude and Behavior (Dietary Change)

Numerous studies have been conducted in which attitude and behavior were assessed for the purpose of

determining if these two variables were significantly correlated (Appendix A). Conflicting results have been reported and are summarized in the following review which relates to the second research hypothesis.

Correlational Inconsistency Between Attitude and Behavior (Dietary Change)

Even though many investigators (e.g. Allport, 1935; Doob, 1947; Green, 1954; Campbell, 1963) defined attitudes as including a behavioral component, a weak relationship between attitude and behavior has been reported by LaPiere (1934), Picardi and Porter (1976), Daelhousen and Guthrie (1982), and Perron and Endres (1985).

A study by LaPiere (1934) was conducted to investigate the level of consistency between attitude and behavior. In this study the incidence of acceptance or rejection on the part of proprietors at several inns to provide lodging to a Chinese couple was assessed. They were refused accommodations at only one place. A follow-up questionnaire was sent to the places at which the couple had sought lodging. Most proprietors (71.8%) indicated on the questionnaire that they would refuse lodging to Chinese people; indicating a discrepency between self-reported attitudes (toward providing lodging to Chinese people) and actual behavior. LaPiere (1934) concluded that there was unreliability of the attitude responses to predict discriminatory behavior. This study, however, had several weaknesses. The attitude

questionnaire was sent months after the traveling situation occurred increasing temporal instability of the measurement. Because the attitude questionnaire was used after behavior wase observed, this study actually assessed ability of behavior to predict attitude. There was no indication that the person who accepted/rejected the travelers was the same person who filled out the questionnaire or that the employee was able to identify the nationality of the couple. Although limitations of the study seriously weaken LaPiere's claim that there is inconsistency between attitudes and behavior, this study is frequently cited as landmark research related to the relationship between these two variables.

In contrast to LaPiere's (1934) conclusions, Harding et al. (1954) stated that the literature has confused correlational inconsistency with situational threshold differences and has thus exaggerated the inconsistency between attitude and behavior. These authors claim that attitude has a lower threshold than behavior; i.e., it is easier to agree with attitude statements than to perform the parallel behavior. In LaPiere's study (1934), it was easier for questionnaire respondents to state that they would refuse to give the couple lodging than to actually turn them away in person. According to Harding et al. (1956) there would only be inconsistency if a behavior were performed (couple turned away) that conflicted with the attitude (accept Chinese people as guests). The

authors concluded that threshold differences accounted for inconsistencies reported in the literature between attitudes and behavior.

Kutner et al. (1952) conducted a study to examine how threshold differences affect the consistency between attitude and behavior. In this study, two white women were seated in a restaurant and were then joined by a black women. In all cases, they were served without incident. Then a request for a group reservation was sent to each establishment. It was explained that the party would include black and white persons. No replies were received. When the investigator placed follow-up phone calls to the restaurants, eight of eleven managers told him no request had been received. Most refused to accomadate a party that was racially mixed. In this study, the behavior (serving the women) was performed which conflicted with the attitude (refusal to serve a mixed party of black and white persons). These results support those of LaPiere's research; attitudes of restaurant personnel regarding serving blacks were negative but the conflicting behavior (serving blacks) was performed.

Several factors have been indicated to explain the lack of a positive correlation between attitude and behavior. These are summarized in the following review.

Length of program participation was named as a factor that affected the consistency between attitude and dietary

change in a study by Picardi and Porter (1976). They conducted an assessment of nutrition knowledge, attitude (health concerns), and food choice behavior of high school students participating in a food/nutrition minicourse. These researchers found no significant correlation between knowledge, attitude, or food choice behavior. There was a significant improvement in knowledge, but not attitude or food selection scores. The authors attributed the results to the shortness of program participation (30 hours).

In an evaluation of a self-instructional nutrition education program for pregnant women, Daelhousen and Guthrie (1982) used a five-point Likert scale to determine changes in attitudes regarding importance of nutrition during pregnancy. Dietary change was assessed using a 3-day food record and 24-hour food recall. The self-instructional program consisted of a 16-minute video which included information regarding nutritional needs and selection of an adequate diet to meet nutrient needs during pregnancy. The video included information designed to encourage positive attitudes toward nutrition during pregnancy. The reported correlation between attitude and dietary scores was not significant ($r=.08$). The authors attributed the lack of a significant correlation to extremely high pretest scores for both control (89.6%) and experimental (90.8%) groups which limited the amount of positive change possible.

Existing attitudes and lack of control over food

choices were named as variables that influenced dietary scores in a study by Perron and Endres (1985). These authors investigated the relationship between nutritional knowledge, attitudes toward "general nutrition" and "nutrition for the athlete", and food intake of adolescent female athletes. Food intake was measured using a 24-hour food recall and a 48-hour food record. The attitude instrument was a 5-point Likert scale. Knowledge and attitude were significantly correlated (r=.52). No significant correlation was found between attitude and dietary scores. The authors concluded that in this population (female athletes), food intake may be shaped by a strong desire to be thin, rather than by nutrition information. They felt that the adolescents' lack of control over foods served, in addition to the existing attitude of concern for weight, accounted for the correlational inconsistency between attitudes and dietary scores.

Correlational Consistency Between Attitude and Behavior (Dietary Change)

Several researchers (Schwartz, 1976; Regan and Fazio, 1977; Fazio and Zanna 1978; Schafer, 1978; Kok et al., 1982) have reported positive correlations between nutrition-related attitudes and self-reports of food intake. The strength of the correlation was attributed to various factors which are presented in the following review.

Schafer (1978) assessed personal factors (attitudes, self concept, beliefs) and social factors (influence of friends and family members, advertisements, TV programs, and educational programs) that influenced dietary adequacy and "empty calories" of self-reported food intake (24-hour food recall). The most influential factor related to food consumption for men and women were personal food preferences. Factors which influenced food preferences for women, in order of importance, were: nutrition, taste, cost, health, convenience, habit, and weight control. Men's food choices were influenced by the following: taste, nutrition, cost, health, appearance, convenience, and habit. The author considered women's ranking of "nutrition" as the primary factor in determining food preferences to be consistent with their traditional role in selecting and providing nutritious foods for the family. Children's food preferences influenced the food choices of women more strongly than men. Health of family members was ranked as a more important factor than self health by men and women. Educational programs (consumer education and Extension Service) had a small, but greater effect than the influence of media, on foods selected by women. Schafer (1978) conducted correlational analyses between attitudinal factors and dietary adequacy. Results indicated that "personal preferences" and dietary adequacy were positively correlated for women ($r=.23$, $p<.01$) but not for men ($r=-.03$). When cost was reported as a

significant factor of food choices, more empty calories were consumed (r=.17, p<.05) and diets were less adequate (r=-.19,p<.05). There was a positive correlation between health as a factor and quality of diet for men (r=.16, p<.05) and women (r=.19, p<.05). The more men perceived women to influence their diets, the fewer empty calories they consumed (r=.32), p<.001) and the higher the quality of their diets (r=.18, p<.05). Participation in educational programs was inversely related to empty calories consumed (r-.19, p<.05) and positively correlated with dietary adequacy (r=.27, p<.01) for women. "Information" was positively correlated with dietary quality for men (r=.18, p<.05) and women (r=.21, p<.01). The author concluded that when women influenced their own or their husband's food choices, dietary adequacy was high; the more concerned men and women were about the health of family members, the better the quality of the diet; when cost was considered an important factor, quality of the diet was low and more empty calories were consumed. Participation in nutrition education was positively related to dietary adequacy for women, but not for men.

The research by Schafer (1978) investigated the affect of several factors on dietary intake. This type of research where the relationship between multiple attitudinal factors and dietary scores is investigated is more helpful in understanding the process of dietary

change than research that assesses and correlates only attitude (usually towards the importance of nutrition) and food recall scores.

A study was conducted by Kok et al. (1982) to assess knowledge about cardiovascular disease (CVD), attitudes toward CVD, and dietary intake of subjects in the Netherlands. Attitudes were assessed using a five-point Likert scale. The reported correlation between attitude and food intake (measured by 24-hour food recall) was .20 ($p<.001$), between knowledge and attitude was .19 ($p<.001$), and .12 ($p<.001$) between knowledge and food recall scores. There was a stronger correlation between attitudes and food intake for those who had high food recall pretest scores than for those that had low pretest scores on the food intake measure. The authors suggested that multiple factors affect food recall change such as: influence of significant others, difficulty in changing food habits (30% of respondents said that it would be difficult to change food habits), and insufficient knowledge (23% indicated that they did not have sufficient knowledge to determine "what kind of diet was healthy"). "Taste" emerged as a primary reason for food choices. The authors suggested that attitudes, and factors that influence attitudes and food selection, should be addressed in planning and implementing educational programs.

The manner of attitude formation (direct or indirect experience) is important in the attitude-behavior

relationship. Fazio and Zanna (1978) on the basis of their research stated that there is increased consistency between attitude and behavior if the individual has formed attitudes on the basis of direct, rather than indirect, experience. A group of students was asked questions to assess their attitude and behavior regarding participation as subjects in experimental research. They were classified according to past experience as subjects (minimal, intermediate, high). The correlation between attitude and behavior was calculated. The group that had a high level of previous participation (direct experience) had a high degree of consistency between attitude and behavior ($r=.42$). The group with an intermediate level of experience also had a significant positive correlation between attitude toward participation in research and actual participation ($r=.36$). Attitude and behavior in the group with minimal previous experience were not significantly correlated ($r=-.03$). The authors concluded that the direct experience of being research subjects strengthened the correlation between attitude and behavior because the experience focused the subjects' thinking which increased the accessibility of the information from memory.

A study by Regan and Fazio (1977) compared behavior (signing of petitions regarding changing housing regulations) of college freshmen who were refused housing due to a shortage of dormitory rooms with behavior of

freshmen who were provided with dormitory rooms. The students who were required to use temporary housing were considered to be the group that used direct experience in forming attitudes regarding university housing problems. Those that were provided with permanent housing were considered to have formed attitudes regarding problems with housing from indirect experiences (campus paper, discussions with others). Although the attitude scores in both groups were similar, attitude-behavior consistency was much greater in the direct experience group. These authors concluded that although individuals may hold similar attitudes, the strength of the attitude-behavior consistency depends on whether direct experience was used in formation of these attitudes.

Bem (1970) promoted a theory that individuals have difficulty drawing associations between the attitude object and evaluation categories unless they have been involved in some behavior (experience) toward the object. He claimed that previous experience strengthens the evaluative component of the attitude, increasing the likelihood of accessing the attitude to guide the individual in evaluation of the attitude object. Most nutrition education programs do not include direct experience (active participation) as part of the educational intervention. It is possible that greater positive change in attitudes would occur if client participation (direct experience) were included in

nutrition education programs such as in EFNEP.

Schwartz (1976) evaluated changes in attitudes after participation in nutrition education that included the affective domain. She assessed the relationship between nutritional knowledge, attitudes toward nutrition (eating habits, nutritional counseling, meal planning, food preparation) and counseling practices of public health nurses. The instructional program included encouragement to identify and explore feelings about food/nutrition. The attitude assessment was based on program objectives representing the affective domain. This intervention differed from many others in that the affective domain was included as part of the educational program. Respondents indicated whether they agreed or disagreed with opinion statements and the degree of certainty of their responses. Practices were assessed by indicating the frequency the behavior occured (always, frequently, sometimes, never). Factors that were significantly correlated ($p<.05$) with positive attitudes were age ("over forty") and "cooks for family and friends." Factors positively correlated with positive counseling behaviors were age ("over forty"), "use of health agency publications", "consultation with a home economist", and "cooks for family and friends." Significant positive correlations were found between knowledge-attitude and attitude-practices (behaviors).

The theory of cognitive dissonance states that people

tend to behave in a manner that is consistent with existing attitudes and beliefs (Bem, 1970; Schafer and Yetley, 1975). Behaviors are not performed that conflict with the existing cognitive framework.

Schafer and Yetley (1975) applied the theory of cognitive dissonance to the area of nutritional behavior change. They claimed that people prefer to develop and maintain stability in dietary patterns that are consistent with their values and perceptions of their environment. Tension is produced when stability is disturbed. Attitudes are seen as anchors within the frame of reference used to evaluate the environment. The authors indicated that food choices are based on the need to maintain consistent environmental patterns to avoid dissonance. When events occur (such as acquisition of nutrition information) to disrupt the existing pattern, restructuring of the cognitive belief system occurs only if the new information does not conflict with existing values/beliefs. If the new information is not consistent with existing attitudes or beliefs, it is not likely to be integrated into the individual's existing cognitive framework. The authors indicated that the effectiveness of nutrition education to affect behavior change can be increased by assessing the existing values and beliefs of learners. Nutrition educators should be aware that if information they provide is dissonant with the individual's existing patterns, behavior change is not

likely to occur; the instructor's message may be perceived as threatening and could result in defensive or avoidance behavior in the learner.

Summary: The Relationship Between Attitudes and Behavior

In reporting results of research in which attitude and dietary intake have been assessed, authors have indicated that several factors in addition to attitude affect dietary change (Appendix A). These factors include: existing habits (Kok et al., 1982; Perron and Endres, 1985), lack of control over food choices (Byrd-Bredbenner et al., 1984; Perron and Endres, 1985), readiness to change (Ramsey and Cloyd, 1979; Sunseri et al., 1984), length of program (Picardi and Porter, 1976; Bryd-Bredbenner et al., 1984; Ries and Schoon, 1986), high pretest scores (Daelhousen and Guthrie, 1982; Ross, 1984; Ries and Shoon, 1986), locus of control (Sims, 1976; Wallston and Wallston, 1978; Eden et al., 1984; Hollis et al., 1986), attitudes of the instructor (Yperman and Vermeersch, 1979) previous experiences (Maiman et al., 1979; O'Connell et al., 1981; Penner and Kolasa, 1983; Reames, 1985), influence of significant others (Schafer, 1978; Yperman and Vermeersch, 1979; Kok et al., 1982), problems with attitude measurement (Harding et al., 1954; Picardi and Porter, 1976; Kok et al., 1982), taste preferences (Schafer, 1978; Kok et al., 1982; Dalton et al., 1986), and discrepancies between measurement

instruments and program content (Peterson and Kies, 1972; Schwartz, 1976; Rosander and Sims, 1981; Daelhousen and Guthrie, 1982; Eden et al., 1984; Brush et al., 1986).

Usability of the results reported depends on, to a great extent, the validity and reliability of the instrument used to collect the data. Indications that validity and reliability were determined were provided in only a few of the studies reviewed (Picardi and Porter, 1976; Carruth et al., 1977; Sims, 1978; O'Connell et al., 1981; Kaplowitz and Olson, 1983; Kok et al., 1982; Penner and Kolasa, 1983; Byrd-Bredbenner et al., 1984; Looker and Shannon, 1984; Ries and Schoon, 1986; Brush et al., 1986; Guiry and Bisogni, 1986; Dalton et al., 1986). Use of research results to make program planning and implementation decisions should be limited to research in which a valid and reliable instrument was used.

A primary reason for measurement of attitude in the past has been because of the assumed link between attitude and behavior (dietary change). This literature review indicates that the direct correlation between attitude and dietary scores might depend on one or more of these factors.

Models of the Relationship Between Attitude and Behavior

There has been disagreement in the literature regarding the "correct" sequence between attitude (A) and behavior change (B). Regression analysis has been used to determine if attitude scores predict behavior change or if behavior scores predict attitude change. A review of research which tests these and other models follows.

Model One: Attitudes Predict Behavior (A-B):

Sims (1978) tested the assumptions of two models which proposed different sequences in which attitude preceeded behavior change, as measured by one-day food/ beverage records (Figure 1). Both models propose that attitude change preceeds dietary change but the effect of knowledge differs in its relationship to attitude.

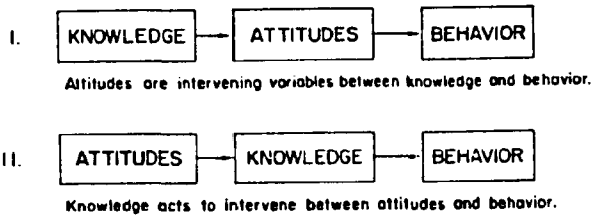


Figure 1. Models related to the dietary change sequence (Sims, 1978)

She assessed the knowledge, attitude, and dietary intake of lactating women. Sims assessed four attitude constructs: "nutrition is important", "vitamin supplements are necessary", "meal planning is important", and "meal preparation is enjoyable." Dietary intake was assessed using three one-day food recalls. Total calories, protein, calcium, vitamin A, thiamin, riboflavin, niacin, and ascorbic acid were calculated. Results indicated that nutrition knowledge was positively correlated with "nutrition is important" ($r=.31$, $p<.01$), and education ($r=.55$, $p<.01$). "Vitamin supplements are necessary" was negatively correlated with education ($r=-.37$, $p<.01$). "Nutrition is important" was positively correlated with protein intake ($r=.25$, $p<.01$). There were no other significant correlations between the attitude constructs and any of the dietary factors.

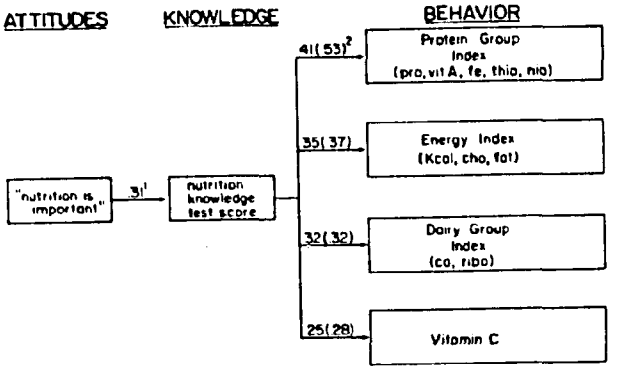


Figure 2. The relationship between nutritional attitudes, knowledge, and practices (Sims, 1978)

Path analysis indicated that nutrition knowledge was an intervening variable between attitudes and dietary adequacy which supports Model II ("attitudes cause knowledge change which causes behavior") rather than Model I ("knowledge leads to attitudes, which lead to nutrient intake") (Figure 2).

On this basis, Sims concluded that positive attitudes toward nutrition increased subjects' interest in acquiring knowledge which led to dietary change (A-K-B). She recommended that educational programs focus initially on attitude change to promote comprehension of cognitive information (knowledge change), resulting in dietary change.

Olson and Sims (1980) presented a model of information processing that outlined several stages from the point of receiving nutrition information to demonstration of changes in food selection and menu planning behaviors (Figure 3). In this model exposure to and comprehension of the message and formation of attitudes and intentions preceed behaviors (food selection). New information is acquired, stored, and retrieved for later decision-making purposes. The information must be processed through the various stages, including formation of attitudes, to result in a change of (food selection) behaviors.

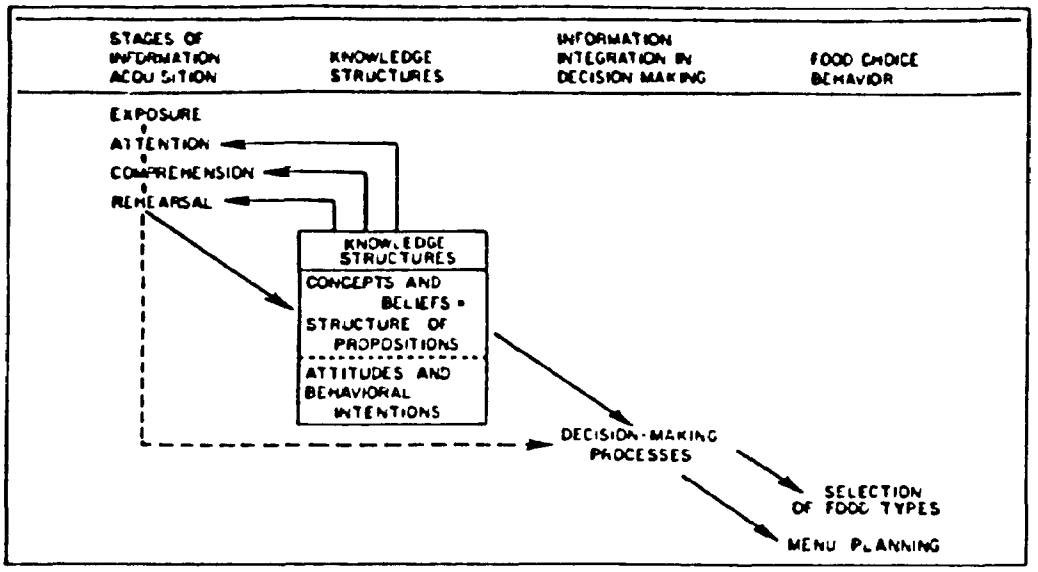


Figure 3. The information processing model (Olson and Sims, 1980)

Schwartz (1975) conducted a study to determine which model (Figure 4) best explained the relationship between knowledge, attitudes, and practices of college students who had enrolled in high school home economics courses. Knowledge and attitude, and attitudes and practices were significantly correlated; knowledge and practices were not. Based on these findings, Schwartz accepted Model I, which indicates that attitudes influence knowledge and practices, to describe the relationship between the variables.

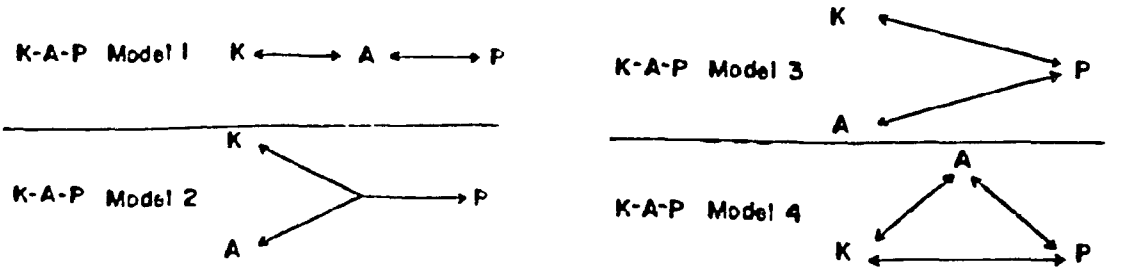


Figure 4. Four possible models of the interrelationship between nutritional knowledge, attitudes, and practices (Schwartz, 1975)

Peterson and Kies (1972) investigated nutrition knowledge, attitudes toward teaching nutrition and toward the school lunch program, and teaching practices of K-3 teachers related to teaching nutrition. Sixty-three percent of the teachers surveyed felt that nutrition should be taught as an integral part of the elementary school curriculum and 53% reported teaching nutrition in this manner. Although this appears to indicate a high level of consistency between attitudes toward teaching nutrition and teaching practices, actual teaching behaviors were not evaluated. Ninety-one percent of teachers thought that promoting a favorable attitude towards nutrition was more important than teaching factual information in achieving positive eating habits. There were no positive correlations between knowledge and attitudes toward teaching nutrition or between the

importance of nutrition in promoting desirable dietary habits and the school feeding program. The authors concluded that nutrition knowledge of elementary school teachers was not related to attitudes toward teaching nutrition but that teacher attitudes toward the importance of teaching nutrition predicted teaching behaviors.

Results found in research by Guiry and Bisogni (1986) illustrate how the correlation between attitudes and behavior is affected by specificity of attitude measurement. They reported that the attitude construct "It is hard to limit coffee consumption" was a strong predictor of caffeine consumption. This attitude explained 42.4% of the variance in caffeine consumption. They also used a more general scale to assess attitudes toward the importance of nutrition. This measure did not predict caffeine consumption as measured using a 24-hour beverage recall and a beverage frequency list. If this study had assessed only the attitudes related to "importance of nutrition", no relationship between attitude and caffeine consumption would have been found. The attitude construct "It is hard to limit coffee consumption" is more specific related to caffeine consumption than the general construct "importance of nutrition."

A model by McGuire (Flay et al., 1980) supports the model by Olson and Sims (1980) in that it assumes modifications in behavior follow changes in knowledge, attitudes and intentions. A series of progressive steps

leading to behavioral change is outlined in the McGuire Persuasion Matrix (Flay et al., 1980). This model (Figure 5) conceptualizes the change process and the complexities of the relationships between knowledge, attitude, and behavior in the communication process. The message is presented (exposure); if the message is recognized (awareness) and comprehended, a change in knowledge results. If the message is accepted, there is a yielding to the message and a change in beliefs and attitudes occurs. If the new beliefs and attitudes are reinforced and if appropriate skills are present, the belief/attitude will persist and result in behavior change.

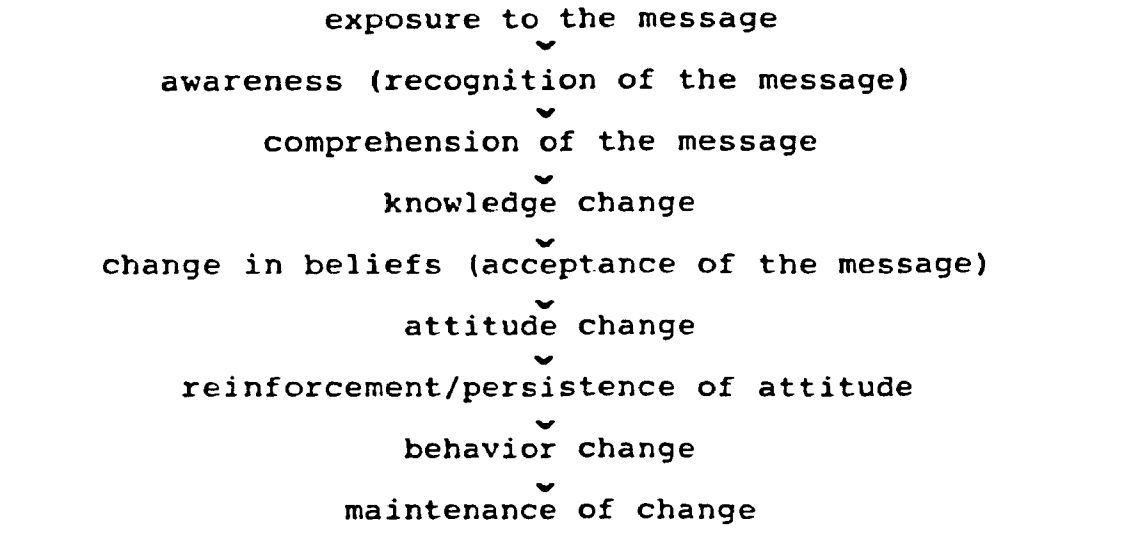
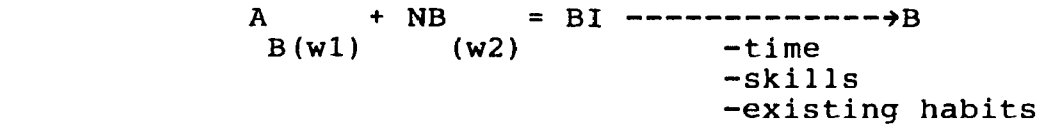


Figure 5. The McGuire persuasion matrix (Flay et al., 1980)

Program ineffectiveness in influencing behavior change may be due to incomplete processing at any stage in the model.

For instance, the target audience may not be reached (lack of exposure); the message may not be attended to (lack of awareness); the message may not be understood (no change in knowledge) or yielded to (no change in beliefs); attitudes might not be changed because beliefs are not retained, and subsequent behavior might not occur because the attitude is not reinforced. When behavior change is assessed in program evaluation procedures, the educational program should be examined to determine if the learner is allowed/encouraged to proceed through the steps included in this model.

Ajzen and Fishbein's (1980) theory of reasoned action, proposes that behavior is determined by attitudes (A) and normative beliefs (NB) (Figure 6). Normative beliefs are perceptions about what people whose opinions are valued think about the behavior. Normative beliefs are influenced by social values. Attitudes are influenced by perceived advantages, disadvantages, and consequences of performing the behavior which is considered to be a social, factor. Weights are assigned (beta weights from the regression equation) which are proportional to the relative importance of the predictor.



Where:

A_B = attitude toward the behavior

NB = normative beliefs

BI = behavioral intentions

B = behavior

w1 = weight applied to attitudes

w2 = weight applied to subjective norms

Figure 6. Theory of reasoned action (Ajzen and Fishbein, 1980)

Ajzen and Fishbein (1980) propose that other variables might influence behavioral intentions indirectly by influencing attitudes or normative beliefs. The connection between intentions and behavior is influenced by time, skills needed to perform the behavior (the more complex the skill needed, the less likely the behavior is to be performed), and existing habits (the stronger the existing habits, the less likely they will be modified) (Figure 6).

Dalton et al. (1986) conducted research to assess the ability of several determinants to predict food choice behavior. They tested the model of reasoned action proposed by Ajzen and Fishbein (1980) (Figure 7).

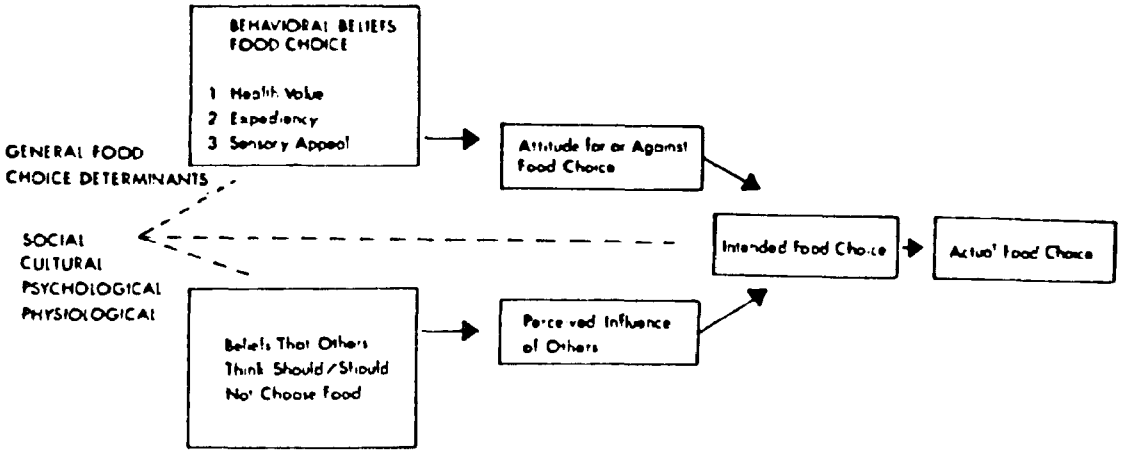


Figure 7. A food-choice behavior model adapted from the theory of reasoned action (Dalton et al., 1986)

Attitudes toward food choices, intended food choices, and actual food choices of employees at their workplace were assessed. They reported that employees who made food choices that were consistent with intentions had more positive attitudes ($p<.05$) toward foods they selected than persons who made food choices that were inconsistent with stated intentions. "Sensory appeal" was the best predictor of intentions and actual food choices. "Health value" was the second strongest predictor of intentions, but did not predict food choices. These results indicated that attitudes were more important than normative beliefs (perceived influence of others) in predicting intended and actual food choices. Based on these findings, the authors

suggested that nutrition educators should consider taste (sensory appeal) as a primary factor affecting intentions and food choice behaviors. They suggested that educational programs which attempt to modify food choices could increase effectiveness if factors (e.g. taste, health beliefs, and influence of others) underlying food choices are investigated.

Matheney et al. (1987) applied the theory of reasoned action to determine the predictive value of attitude and normative beliefs on mothers' beliefs, intentions, and actions regarding method of infant feeding. Results of this study indicated that attitudes, based on beliefs, were more predictive of actions than normative beliefs (perceived influence of others). Based on these results, the authors recommended that nutrition education programs should assess attitudes and beliefs because of their potential importance in predicting food choice behavior.

A model (Figure 8) which includes several factors to explain the process by which attitudes guide behavior has been proposed by Fazio (1986) of Indiana University.

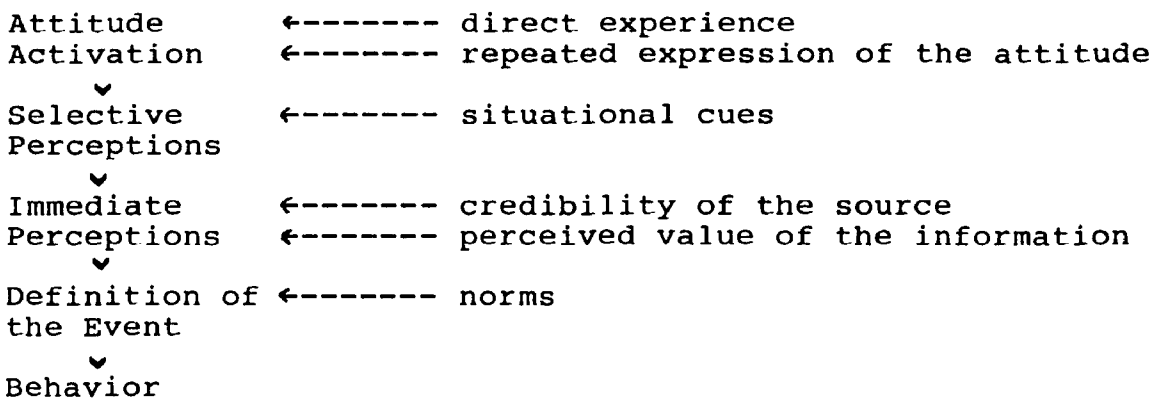


Figure 8. Model of the attitude-to-behavior process proposed by Fazio (1986)

Attitude activation is the first component of Fazio's Model (Figure 8). Fazio claimed that existing attitudes need to be recalled (activated) from memory and considered before the new attitude can be integrated into the individual's cognitive structure. The strength of the attitude affects attitude activation. The stronger the attitude the more easily it is accessed from memory. If an evaluative opinion is strongly associated with an object, the attitude is easily accessed and is therefore available to guide behavior. Behavior is not likely to be guided by existing attitudes unless they are strong enough to be accessed from memory. If accessed attitudes are positive, then the positive components of the attitude issue are likely to be considered. A negative attitude would prompt the individual to focus on the negative aspects of the attitude issue. The activated attitude functions to guide

information processing, attitude formation or change, and related behavioral change.

Fazio (1986) claimed that attitude activation is influenced by two factors which affect the strength of the attitude: direct experience in the formation of the attitude and repeated expression of the attitude. He thinks that attitudes formed involving direct experience are stronger predictors of subsequent behavior than those based on indirect experiences because attitudes are more likely to be strengthened resulting in increased accessibility from memory.

Selective perception occurs when people selectively recall information when confronted with a new situation. The information recalled influences immediate perceptions related to the attitude object encountered. Selective perception is influenced by situational cues (verbal, printed) which prompt an individual to access existing attitudes which may influence their definition of the situation. Selective perceptions such as opinions about the credibility of the source and expectations regarding the value of the information to be received, affect immediate perceptions.

The individual's selective and immediate perceptions influence the definition of the situation which guides behaviors. If the definition of the situation is positive, then approach behaviors are likely to result; if the definition of the event is negative, then avoidance

behavior occurs (Fazio, 1986).

This model proposed by Fazio (1986) provides one explanation of the process by which attitudes guide behavior. Whereas early investigations of the attitude-behavior relationship focused on determining whether there was consistency between attitude and behaviors (correlational analysis), this model attempts to explain how the method of attitude formation and strength of existing attitudes affect the individual's definition of the attitudinal issue and subsequent behavior change. Fazio suggested that future research investigations should assess the ability of several factors (independent variables) to predict behavior change (dependent variable) rather than to assess only attitude and behavior and compute a single correlation between them.

Model Two: Behavior Predicts Attitude (B-A)

Some investigators think that behaviors are accurate predictors of attitude change (e.g. Brehm, 1956; Maiman et al., 1979; O'Connell et al, 1981). This model is abbreviated as B-A.

Brehm (1956) suggests that acquisition of new information leads first to behavioral improvements which result in formation of positive attitudes. Brehm measured attitudes and behaviors regarding certain consumer products. He asked consumers to evaluate several products and then told them they could select one item in payment

for their participation. He found that evaluation of the item selected as the reward increased in favorability. The evaluative opinion toward the other items was less favorable on the second evaluation. Brehm concluded that the behavior of selecting a reward influenced attitudes toward consumer products (B-A).

Several investigators (Maiman et al., 1979; O'Connell et al., 1981; Penner and Kolasa, 1983; Reames, 1985) found that attitude change depends in part on previous experiences (behavior) of subjects.

A study was conducted by Penner and Kolasa (1983) to investigate attitudes of secondary school teachers towards teaching nutrition, nutrition knowledge, and previous experience teaching nutrition. Attitudes toward teaching nutrition were assessed using a five-point Likert scale and two semantic differential scales ("my own nutrition" and "my teaching food and nutrition"). Researchers found that teachers of health, physical education, home economics, science, and social science who had taught some aspect of nutrition had more positive attitudes than those who had not taught nutrition. Teachers that indicated they had previous experience teaching nutrition were more likely to have taken food/nutrition courses and had higher scores on the nutrition knowledge test. Whether the positive attitudes of teachers with previous experience teaching nutrition influenced subsequent teaching behavior was not reported.

O'Connell et al. (1981) investigated the relationship between attitudes of teachers ("nutrition is important" and "favors nutrition education in schools") and teaching behavior ("commitment to teaching nutrition"). Scores on the attitude assessments were significantly correlated ($r=0.23$ $p<.05$ and $r=0.41$ $p<.001$) with "commitment to teaching nutrition." Teachers who had taught nutrition had significantly higher means ($p<.05$) on "favors nutrition education" than those who had not. Scores on the "commitment to teaching nutrition" scale were influenced by competition for teaching time from other subjects and high pretest scores. The authors concluded that the experience of teaching nutrition might result in more favorable attitudes toward including it in the curriculum.

A study by Reames (1985) was conducted to determine level of consistency between attitudes and practices of physicians regarding infant feeding practices. Scores revealed that physicians had strong positive attitudes regarding (1) importance of breastfeeding on the well-being of infants and (2) breastfeeding as the best form of nourishment for infants. However, recommendations of the physicians regarding breastfeeding and infant feeding practices were not consistent with successful breastfeeding practices. Physicians whose children had been breastfed felt breastfeeding was more important and recommended breastfeeding to patients more often, than

physicians whose children had not been breastfed. Previous experiences (having children who were breastfed) seems to have influenced the formation of positive attitudes and subsequent related behavior (infant feeding recommendations).

Maiman et al. (1979) reported that dietitians' own successful weight loss experiences were significantly correlated ($r=.38$, $p<.05$) with attitudes toward obesity (self image, weight loss). Authors concluded that personal experience was a better predictor of attitude-belief consistency than knowledge or job experience.

The debate related to whether attitude scores predict dietary change or whether dietary scores predict attitude change is important to nutrition educators. If attitude change accounts for variance in dietary change, implementation of educational programs should address the affective domain to facilitate dietary change. If attitude change is not necessary for dietary change to occur, promotion of positive attitudes need not be considered as mandatory in programs which promote dietary change. In examining the models presented it can be seen that investigators have reached different conclusions based on results of their research. It is likely that the relationship between attitudes and behavior (dietary change) depends on other factors which were not included in these models. Instead of asking whether attitudes predict behavior change or vise versa it seems more

important to investigate additional factors, such as locus of control, attitude of the instructor, and job experience of the instructor, which would indicate the ability of several factors to predict attitude or dietary change.

Locus of Control as a Predictor of Dietary Change

Locus of control/powerlessness has been assessed in attitude research investigations because of its proposed relationship to behavioral change (Haggstrom, 1966; Sims, 1976; Wallston and Wallston, 1978; Eden et al., 1984; Hollis et al., 1986). People who believe events in their lives are beyond their control are considered to have an external locus of control (high powerlessness). Externally controlled persons can further be classified into two groups (a) those who expect that fate, luck, or chance control events in their lives (b) those who believe others are responsible for controlling events in their lives. Persons with an internal locus of control (low powerlessness) perceive themselves as having control over events in their lives.

Haggstrom (1966) suggested that low-income persons usually have an external locus of control due to lack of support and reinforcement. He indicated that a sense of feeling victimized, due to limited income, was congruent with a high level of powerlessness. He suggested that if low-income persons gain a feeling of increased control due to participation in educational programs, the feeling of being victimized and powerless may be lessened and

positive behavioral change might be increased as a result of a more internal locus of control.

Wallston and Wallston (1978) defined locus of control as "one's beliefs about the relationship between one's behavior and its outcomes." Persons with an internal locus of control are more likely to adopt preventative dietary behaviors. They exhibit "approach" behavior and are motivated by long-term benefits resulting from health-oriented behaviors. The authors suggested that the outcome of adapting positive health behaviors acts as reinforcement to the person with an internal locus of control. Persons with an external locus of control do not think that their immediate behaviors can influence long-term health status. They need more reinforcement from others to adopt and maintain positive attitudes and behaviors. The authors further recommend that information from powerlessness scales be used in planning and implementing nutrition education programs.

Eden et al. (1984) recommended that locus of control scores be used to help plan programs in dietary behavior change. They suggested that subjects with an internal locus of control are likely to be more motivated to adopt positive attitudes and behaviors with minimal instruction and support than clients with an external locus of control who require more support, use of motivational techniques, and more assistance in behavioral change.

Hollis et al. (1986) used a semantic differential

attitude instrument which included a "helpless and unhealthy" (HU) scale. Cardiovascular risk (cholesterol, serum triglycerides, lipoprotein levels and blood pressure), medical risk, psychological risk, and diet habits were also assessed. Women scored significantly higher than men on the HU factor suggesting that women perceived themselves to be less in control of their dietary habits and less healthy than men. High scores were significantly negatively correlated with age ($r=-.31$, $p<.01$) for men, not women. Men who scored high on the "helpless and unhealthy" scale had a high incidence of medical ($r=.16$, $p<.05$) and psychological ($r=.18$, $p<.05$) risk factors as did women ($r=.25$ and $.25$ respectively at $p<.01$). Significant positive correlations were found between HU scores and the general severity of total distress as measured by the Hopkins Symptoms Checklist for men ($r=.21$, $p<.01$) and for women ($r=.24$, $p<.01$). Scores on this factor (HU) were also predictive of high blood cholesterol (men: $r=.18$, $p<.05$ and women: $r=.33$, $p<.01$); low density lipoproteins (men: $r=.21$, $p<.05$ and women: $r=.33$, $p<.01$); and serum triglycerides ($r=.30$, $p<.01$), diastolic blood pressure ($r=.25$, $p<.01$), and high density lipoproteins ($-.24$, $p<.01$) in women. "Helpless and unhealthy" may be an indicator of low self-efficacy and be indicative of inability of the individual to form, modify, and maintain health-promoting dietary habits.

A study was conducted by Ramsey and Cloyd (1979) to

assess EFNEP homemakers pre- and posttest (powerlessness) locus of control, orientation toward use of professional agencies, and dietary change as measured by 48-hour food recalls of the participating homemaker and one child. Results indicated that powerlessness increased for both EFNEP participants and the control (non-EFNEP) group (i.e., locus of control became more external after program participation). Significant improvements ($p<.05$) were reported in the children's diets, and homemakers' use of agencies to solve problems. However improvements in the homemakers' food recalls were not significant. Powerlessness was inversely related to the husband's educational level (Tau $C=-.40$, $p<.001$). The researchers stated that positive changes were greater if the individual was already in the process of change and if program content was similar to program objectives. Additional factors suggested by the authors that could have affected results of this study were strength of the learner-teacher relationship and readiness to learn.

Davie et al. (1973) investigated the relationship between 83 program aides' level of powerlessness and their program success in Washington State EFNEP. Program success of aides was measured using performance rankings by CES Agents and other aides and improvement in 24-hour food recalls of homemakers. The powerlessness scale used included response pairs in which one choice represented a situation where a person indicated control over events in

their lives (internal locus of control) and the alternative response indicated a belief that their environment was controlled by fate, chance, luck, or powerful others (external locus of control). The score of aides indicated a low level of powerlessness (high internal locus of control). The authors suggested that an awareness of the socially acceptable responses might have affected results. There was no significant difference between powerlessness scores of aides rated by agents or peers as successful compared to those rated as unsuccessful. However, positive changes in food recall scores of homemakers taught by aides with low powerlessness scores were greater than for homemakers taught by aides with high powerlessness scores. The authors suggested that if powerlessness scores were used in the selection of program aides, the amount of improvement on the food recalls might be increased.

Job Experience as a Predictor of Dietary Change

Munger (1971) conducted a study of the national EFNEP to determine if demographic characteristics (education, years of job experience, ethnicity) of aides were related to improved dietary recalls of homemakers. No relationship was found between the level of education, years of employment in EFNEP, or ethnic background of the aide, and improvement in food recall scores of homemakers.

Attitudes of Instructors as a Predictor of Dietary Change

The attitude of the teacher, parent, or health care professional might influence the amount of change in attitude and/or dietary change of participants in nutrition education programs. Carruth et al. (1977) and Yperman and Vermeersch (1979) have investigated the relationship between attitudes of persons in an instructional role (teacher, parents) and the attitude and dietary change scores of learners.

Yperman and Vermeersch (1979) found that parents' attitudes toward "importance of nutrition" ($p<.01$) and mother's educational level ($p<.05$) were the strongest predictors of variety in the diets of children. However, food preferences of parents were significantly different from preferences of their children ($p<.001$) indicating that parents preferences did not directly account for variance in food preferences of their children.

Carruth et al. (1977) conducted an assessment in the Missouri EFNEP to determine how flexibility to change, personality factors, nutrition knowledge related to weight modification concepts, and requests for literature affected observed and verbal nutrition-related behaviors of program aides. Results reported by Carruth and Anderson (1977) indicated that significant gains occurred in knowledge ($p<.05$) of aides that participated in training sessions related to weight management, but knowledge was not an accurate predictor of behavior.

Twenty-eight percent of aides agreed with the statement, "Knowing something is good for me has little or no influence on what I choose to eat." Eighteen percent agreed that "traditional ways of preparing foods are the best ways." Sixty-seven percent agreed that "The basic four food groups are the only usable tools for planning an adequate diet" and 35% agreed with the statement, "Restricting my meal patterns to familiar foods ensures that I enjoy what I eat" indicating that aides' attitudes were not consistent with program content that they were responsible to teach (importance of including a variety of foods in the diet. Attitude ($r=.79$, $p<.01$) and age ($r=-.25$, $p<.01$) were significantly correlated with aides' nutrition-related behaviors. Results of regression analyses indicated that scores on these two variables accounted for 75% of the variance in behavior. The authors concluded that although attitudes of aides toward nutrition tended to be flexible, attitudes regarding teaching methods and personal dietary change were inflexible. This research indicated that the assumption that nutrition education instructors have positive nutrition-related attitudes is not necessarily valid.

Food Recall as a Predictor of Dietary Change

Limitations of using the food recall instrument to assess dietary intake are presented by Madden et al., (1976); Beaton et al., (1979); Axelson, (1984); and Guthrie (1984).

Axelson (1984) reported that measurement error influences results when the 24-hour food recall is used to assess dietary intake. She found that mean scores for most nutrients increased (but not significantly) from pre- to post-recalls in a study where no intervention was included between the two assessments. Intra-individual variation (variation within subjects) in daily nutrient intake was reported in this study. Axelson also suggests that the experience of participating in the food recall might account for some of the difference in pre-posttest results. The "flat-slope syndrome" also threatens validity of food recall results. This is the tendency for persons who consume large quantities of food to underestimate amounts of foods consumed, and for light eaters to overestimate quantities eaten. Axelson suggests that caution be used in concluding that differences in posttest food recall scores are due to participation in nutrition education programs.

Presence of the "flat-slope syndrome" was also reported by Madden et al. (1976) also indicated the occurance of this syndrome in dietary recall reports from elderly persons participating in special lunch programs.

Guthrie (1984) indicated that the ability of the food recall interviewee to estimate serving size, even with the assistance of measuring devices and food models, was poor. Men tended to overestimate, and women underestimated, serving sizes.

Beaton et al. (1979) conducted a study to determine the amount of variance in the 24-hour food recall in which highly-trained investigators interviewed 60 subjects, each six times. Based on results of their study, they indicated no effect of training and no difference between interviewers, but reported significant effect of sex and "day of the week" for women. When investigators controlled for differences in energy, neither of these effects was significant. They reported that the larger the number of subjects, the lower the between-group variability; the more observations per subject, the lower the intra-individual variation. They concluded that high intra-individual variation limits the usefulness of a one-day food recall to assess food intake. The investigators presented a formula by which to estimate the minimum number of days needed to reduce the variance to the point where nutrient estimates were valid.

Strengths of the food recall instrument are presented by Young et al., (1952); Alford and Ekvall, (1984); Sorenson et al., (1985); and Pao et al., (1985). Pao et al. (1985) compared one- and three-day food recalls of subjects participating in the USDA Nationwide Food Consumption Survey (1977-78). When comparing one and three-day food recalls there were no significant differences (less than 2% variation) between kilocalories, fat, and carbohydrate; less than 3% variation between calcium, iron, magnesium, and phosphorus; and less than 5%

variation in thiamin, riboflavin, niacin, and vitamin B6. Levels of vitamin C showed little variation except in 15-18 year old males and 19-22 year old females. Mean vitamin A values were higher for the three-day recall period than for the one-day assessment period. These authors concluded that use of the 24-hour recall was adequate to determine self-reported intake of all nutrients assessed in this study, except Vitamin A.

Young et al. (1952) compared the 24-hour food recall to a 7-day food record in three different populations: seventh and eighth grade students, high school and college students, and pregnant women. Results from this study indicated that the two methods were significantly different in estimating kilocalorie level of diets and adequacy of nine nutrients in individuals. In comparing group results, there were no significant differences between results of the 24-hour recall and seven-day record for any of the groups except for niacin. Based on these findings the authors suggest that the 24-hour recall is as valid as the seven-day food record in assessing self-reported dietary intake for groups, but less expensive and time consuming. These authors estimated that measurement error accounted for ten percent of the variance in dietary intake results.

Sorenson et al. (1985) compared the 24-hour food recall to a two-day food record, seven-day usual food intake, and food frequency. Results of the 24-hour food

recall for fiber, calcium, phosphorus, potassium, and vitamins A and C were lower for the 24-hour food recall compared to results from the other three methods. The food frequency gave the highest mean values, but not after results were adjusted for energy level. Nutrients that were most consistently estimated when comparing all methods of assessment were: fat, cholesterol, protein, sodium, iron, thiamin, and niacin. Least consistent values were obtained for fiber, calcium, and vitamins A and C. There was more variability in nutrient intake when using the short-term instruments (two-day food record, food recall) than when using the food frequency or seven-day usual food intake instruments.

Alford and Ekvall (1984) assessed inter-rater reliability between nutritionists and students, and between undergraduate and graduate students who conducted diet historys. The data collectors reported subjects' frequency of consuming servings of the four food groups. A significant difference was found between graduate and undergraduate students' reports for servings of meats and for calcium, Vitamin D, and total calorie values. There were no differences between results of the combined student groups and nutritionists. The authors concluded that variability between investigators is not a significant contributor (accounts for <10 percent of the variance) to results of self-reports of foods eaten. Use of different food composition tables probably also

contributed to the variability between investigators.

Sanjur (1982) provides a review of the strengths and limitations of the food recall instrument. She indicates that major limitations of the food recall instrument include: lack of accurate quantitative information, inaccurate representation of usual food intake, and reliance on honesty and memory of the subject. She cautions that dietary information resulting from the 24-hour food recalls shoulg not be used as an indicator of nutritional status of subjects. Sanjur suggests that investigators should consider these limitations when using the food recall in collection, reporting, and interpretation of results. She suggests that food recalls are of some use because they are inexpensive, provide qualitative dietary information, and are quick and easy to administer. The twenty-four hour food recall is considered to be valid for the assessment of dietary intake of groups, but not individuals.

An objective of the dietary assessment is to provide accurate information regarding eating habits of the population surveyed. However, results of the food recall instrument represent only reports of foods consumed in response to questions from program aides, not information regarding dietary behaviors of subjects. It simply provides information which can be used to compare differences in self-reports at two different points in time (program entry and completion). It cannot be assumed

that differences in scores are influenced by program participation unless random assignment of subjects to control and experimental groups is used.

Due to the importance of examining multiple factors that play a role in dietary change, several determinants were selected as independent variables for this study including: attitudes of instructors toward dietary change, instructors' years of experience in EFNEP, locus of control of the EFNEP program participants and instructors, pretest and attitude change scores of homemakers. By calculating the correlation between attitude and food recall change and by regressing the independent variables on the dependent variables (attitude and food recall change of homemakers) information regarding attitude and dietary change of EFNEP participants is provided.

CHAPTER 3

METHODS

The objectives of this research was to evaluate the effectiveness of Michigan EFNEP in promoting positive changes of participants in attitudes toward dietary change, to assess the relationship between attitude change and food recall change of enrolled homemakers, and to investigate the ability of independent variables to predict change in attitude and food recall scores. Methods which were selected and used to provide data to fulfill these objectives are described in this chapter.

Approval to Conduct the Study

Permission to seek consent to participate from homemakers enrolled in EFNEP and to collect data from them was granted by the Associate Program Director of Home Economics Programs.

Approval to conduct this study was granted by the University Committee on Research Involving Human Subjects in March, 1986 prior to the collection of data (Appendix B).

Subjects

The subjects were homemakers who initiated enrollment in EFNEP during August and September of 1986 and aides who provided instruction to clients enrolled during that time period. The Unit Report Summary for this period of homemaker enrollment provided demographic information which is presented in Appendix C.

The comparison group of subjects included low-income women who were enrolled in The Special Supplemental Food Program for Women, Infants, and Children (WIC) in Ingham County during the time the study was conducted. Women who were, or had been, enrolled in EFNEP were excluded from the WIC comparison group sample to avoid possible contamination.

The attitudes and behaviors of program aides in all counties were assessed at the onset and completion of the data collection period. A description of demographic characteristics of program aides is provided in Appendix C.

Research Sites

Data were collected by program aides under the direction of County Extension Home Economists in ten Michigan Counties: Berrien, Muskegon, Macomb, Saginaw, Kent, Kalamazoo, Wayne, Oakland, Ingham, and Genesee. The attitude survey, locus of control scale, and 24-hour food recall were administered by aides to subjects in their homes. The data for the comparison group were collected by

WIC nutritionists at the Ingham County Public Health Services Building in Lansing, Michigan.

Program Description

A description of the program components is included in Appendix D. The curriculum used to teach lessons during the time of the study was "Eating Right is Basic 2" (Michigan State University Cooperative Extension Service, 1986). These teaching materials were developed by the Michigan EFNEP staff and are used nationally. The lesson activities are designed to teach basic nutrition principles and skills related to nutrient needs, food preparation, food storage, food selection, and meal planning. This curriculum does not specifically contain information/activities to promote positive attitude change. Although attitude improvement is named as a major program goal area, no national program guidelines are provided for including attitudinal information in curricular materials.

The number of lessons taught to individual homemakers depends on results of a competency-based pretest which is administered upon enrollment. The assessment includes one item to measure each of 126 competencies which were judged to represent content information that was essential for EFNEP homemakers to master. If all items that represent an individual lesson are answered correctly the homemaker "passes out" of that lesson; that is they do not receive

instruction in that area. This process is used to shorten program enrollment by targeting instruction to specific areas of need for individual homemakers.

Research Design: Hypotheses Testing

To test the first hypothesis t-tests were used (1) to determine if the difference between pre- and posttest attitude scores of ENFEP participants were significantly different (2) to determine if the amount of change in attitude scores of the experimental group was significantly greater than change in the attitude scores of the comparison group (3) to determine if homemakers with high attitude pretest scores had a significantly different amount of change in food recall scores than homemakers with low pretest attitude scores.

The t-test statistic was used with pretest scores to determine the initial equivalence of the control and experimental groups. The range, standard deviations, and variance of scores were computed. Frequencies of pre- and posttest scores of control and experimental groups were calculated to determine normality of distribution.

Two-way ANOVA (Solomen Four Group Design) was used to assess the main effects of pretesting and program participation while controlling for the effects of maturation and history by using the comparison group (Campbell and Stanley, 1963). In this design (Figure 9), the column means represent the main effect of EFNEP participation and the row means represent the effect of

pretesting.

Factor B: Pretesting	Factor A: Program Participation EFNEP	non-EFNEP
Pretested Group	n = 98	n = 36
Non-pretested Group	n = 97	n = 30

Figure 9. Two-way ANOVA: Solomen four group design

In attitude research, the pretest focuses the attention of the respondent on the attitudinal issue. This poses a threat to internal validity, called test effect, because the experience of responding to the pretest attitude items might influence posttest scores (FitzGibbon and Morris, 1983; Fazio et al., 1983; Fazio, 1986).

To minimize test effect and maximize the generalizability of the results, a non-pretested group within the experimental and control groups was added to the traditional two-group experimental design (Figure 9). Results using the traditional pretest-posttest control group design can only be generalized to pretested groups.

Five of the ten participating counties were randomly selected to use the attitude pretest and posttest These subjects were the EFNEP "pretested group." The staff in

the other five counties administered only the posttest attitude survey to homemakers (non-pretested group).

The second hypothesis was tested by computing correlations between attitude change and food recall change scores of EFNEP participants.

The third hypothesis was tested by conducting multiple regression analyses to determine which factors accounted for variance in food recall change scores (the dependent variable). Independent variables were entered into regression analysis using the stepwise procedure. Independent variables included: pretest attitude scores of homemakers and instructors, pretest locus of control scores of homemakers and instructors, locus of control change scores of homemakers and instructors, attitude change of homemakers, and instructors' years of experience. To avoid using independent variables that were correlated in the same regression analyses, two runs were conducted using pretest scores in one computation and change scores in a separate run.

To determine which factors predicted change in attitude scores (the dependent variable) the following independent variables were entered into the regression equation: pretest food recall scores of homemakers, pretest attitude and locus of control scores of homemakers and instructors, locus of control change scores of homemakers and instructors, years of experience of instructors, and food recall change scores of homemakers.

To determine if aides' years of job exp ience in EFNEP or attitude scores were related to amount of change of homemakers on attitude and food recall measures, t-tests were conducted, in addition to regression analyses, after dividing aide scores into "high" and "low" groups according to pretest attitude scores and years of experience.

Development of the Attitude Instrument

The purpose of the attitude instrument used in this study was to assess the subjects' attitudes toward dietary change so that the proposed hypotheses could be retained or rejected. The following steps were followed to develop an instrument that was valid, reliable, and usable for the purpose of assessing attitudes toward dietary change:

1. Existing instruments were reviewed by the primary research investigator to determine their usability in this research. Although some items from existing instruments were included in the initial list of items to be reviewed, an instrument that could be used with the low-income population to assess "attitudes toward dietary change" was not found.

2. Two interviews with program aides in Ingham and Genesee Counties were conducted by the primary research investigator to elicit information related to the attitudes toward dietary change of the target audience (homemakers participating in EFNEP). Questions were asked

by the primary research investigator to obtain information from program aides regarding characteristics of homemakers with positive or negative attitudes. Information from the interviews was used to develop items to specifically measure the construct "attitudes toward dietary change" in the EFNEP population. By finding out how positive vs. negative attitudes are demonstrated in this population, an instrument specific to the given construct could be developed for use with this population. A summary of the interviews is reported in Appendix E.

3. Based on the results of the preliminary research interviews, a list of items was developed by the primary research investigator using a combination of existing and newly developed items (Appendix F). Specifications for development of a Likert scale (Likert, 1978) were followed in the construction of items. These guidelines are presented in Appendix G.

4. Content validity was determined by submitting test items to expert reviewers for the purpose of assessing the ability of items to represent the construct "attitudes toward dietary change". Six reviewers were selected because of their expertise in one of the following areas: program evaluation, attitude assessment, or experience with EFNEP. A review form was provided for evaluation of individual items (Appendix H).

5. The items were revised based on the results of the expert review.

6. The first draft of the attitude instrument (Appendix I) was pilot tested in Kent County with twenty enrolled homemakers. The survey included sixty items and used a seven-point Likert scale. Complete instructions including procedures to follow to conduct the pilot test are included in Appendix J.

7. An item analysis was conducted to determine construct validity and reliability of the instrument with this group of subjects.

a. Construct validity of items was determined by comparing item means of high scorers (upper 18%) vs. low scorers (lower 18%). If the items are valid, the mean scores between high and low groups should differ in the expected direction. To determine whether individual items discriminated between homemakers with positive vs. negative attitudes toward dietary change, the discrimination indices were calculated for each item. The discrimination index reports the difference in mean percent scores between the upper and lower groups of scorers and ranges from -1.00 to +1.00. Only items with a discrimination index of >.33 were considered to adequately distinguish between high and low scorers. The discrimination index applied in this item analysis was:

$\bar{X}_H - \bar{X}_L$

Where:

$\bar{X}_H$ = mean item score of homemakers in the high scoring group (upper 18%)

$\bar{X}_L$ = mean item score of homemakers in the low scoring group (lower 18%)

b. The difficulty index is the mean percentage of respondents who selected the most positive response. The range for this index is 0-100. An item was considered to be too "hard" if the difficulty index was < 20% or too "easy" if the difficulty index was > 80%.

c. In comparing total mean scores of the upper vs. lower scoring group of respondents, the means were 88.10 and 66.37 respectively (Table 1). The difference between these two means is 21.73.

Table 1. Pilot test means and ranges of attitude scores for upper and lower scoring groups

Group	Mean Score	Range of Scores
High Scorers (n=3)	88.10	77.1 - 89.0
Low Scorers (n=3)	66.37	63.1 - 67.9
All Subjects (n=16)	75.65	63.1 - 89.0

8. Using the criteria indicated previously for acceptable discrimination and difficulty indices for individual items, a second draft of the instrument was developed.

Aides that administered the initial pilot test were asked to complete a review form regarding the instrument's usability with the EFNEP population (Appendix K). Comments from these reviews were also used to revise the format of the instrument after the first pilot. Based on recommendations from program aides, a five-point Likert scale was used (instead of seven response categories as in the pilot test instrument) and the number of items was reduced from 60 on the first pilot to 33 for the second pilot.

9. A second pilot test was conducted in Oakland County with 25 homemakers using an attitude instrument which included two different response formats (Appendix L). An item analysis of the second pilot test was conducted. Difficulty and discrimination indices which were calculated using the same procedures as with the first pilot test are presented in Appendix M. Total mean scores for the second pilot test of the attitude instrument are presented in Table 2.

Table 2. Results of the second pilot test of the attitude instrument

Group	Mean	Range
High Scorers (n=4)	86.87	80.8 - 92.9
Low Scorers (n=4)	57.58	52.0 - 61.1
All Subjects (n=25)	69.51	52.0 - 92.9

10. Items which met standards set for discrimination and difficulty indices and that were approved by program aides regarding usability were compiled into a final draft of the instrument which was used for data collection in this study (Appendix N).

Development of the Locus of Control Instrument

One of the independent variables used in regression analyses in this study was the locus of control[1] of homemakers and aides. Two existing instruments (Appendix O) which assessed locus of control were pilot tested in Muskegon and Berrien Counties to determine which items were valid, reliable, and usable with this population. Indices of discrimination and difficulty were computed using the same standard procedures that were used during the attitude scale pilot tests. Items which met the standards specified in this research (discrimination index of >.33; difficulty index of .20-.80) were included in the second pilot test instrument (Appendix L) and tested in Oakland County. Items which were determined to be valid (discriminated between the upper and lower 18% of scorers) and that were considered by program aides to be usable with EFNEP homemakers were included as items 1-5 on the survey (Appendix N) and scored as a separate scale.

---

[1] locus of control is defined as the perceived level of control individuals have over their environment. Individuals with an internal locus of control perceive themselves to be in control over their environment; an external locus on control is characterized by a percieved lack of control over environmental situations (Eden et al. 1984).

Development and Justification for Use of the 24-Hour Food Recall Instrument

Although controversy exists regarding the validity of the 24-hour food recall for individuals, it has consistently been used in EFNEP to assess dietary adequacy of enrolled homemakers and is considered valid for groups. It is used because it is quick, easy, well-accepted by homemakers and instructors, and is not as intrusive as clinical or biochemical assessment procedures. Although the primary research investigator considers this instrument to have severe limitations in assessing actual dietary intake or nutritional status, it was used as a general measure of self-reported dietary intake of homemakers as a group because it was the instrument in place during the period of time that the attitude and locus of control instruments were used to collect data. It was not an option for the primary research investigator to implement the use of additional dietary assessment instrument or to modify the existing measure by taking recalls of additional days.

The food recall instrument used the method of scoring developed by the Synetics Scoring System for use in EFNEP by the USDA (Jones et al., 1975). A comprehensive numerical food recall score from 0-100 was assigned based on the quantity (number of total servings) and variety as measured by number of servings reported from each food group as follows: two servings of milk/milk products, two servings of meat or meat alternates, four servings of

fruits or vegetables, and four servings of grains. Additional points were assigned if 50% of the recommended servings were consumed for all food groups.

The form used and procedure for scoring the food recall used in this study to collect data related to self-reported food/beverage intake is presented in Appendix P.

Training of Data Collectors

There are ten counties in Michigan in which the EFNEP program is conducted. Aides in all counties attended an inservice conducted by the primary research investigator at which the purpose of the research and procedures for collecting data were explained. (A summary of this inservice program is provided as a component of "Program Description", Appendix D). Aides were encouraged to participate in the study. It was explained to program aides that their scores, and the scores of the homemakers, would not be used to evaluate their individual job performance and that the scores would be coded to provide anonymity. The Consent Form (Appendix B) was distributed and reviewed. Aides that were willing to participate were asked to sign the form and to complete the attitude and locus of control surveys (pretests). Appropriate use of the attitude/locus of control instrument and procedures for compiling and returning surveys was presented.

Aides had previously been trained in the procedure for conducting 24-hour food recalls. To maximize inter-

and intra-rater reliability, the training included use of "food recall kits" which include dishes with serving sizes marked so that accuracy of estimating portion sizes could be improved.

Data Collection

Data were collected by all paraprofessional aides who were employed during the time period that the study was conducted (August 1, 1986 to March 1, 1987). The paraprofessional aides were chosen to collect the data because they were not considered to be as threatening to the homemakers as a research investigator might be.

A consent form (Appendix B) was presented by aides to potential subjects on an individual basis when they enrolled in the program. Questions regarding the survey were elicited and answered by program aides. The attitude, locus of control, and 24-hour food recall measures were administered at the first lesson to all consenting homemakers who enrolled in the program between August 1 and September 30 of 1986. The posttest was administered to individual homemakers as they completed participation in EFNEP.

The program aide read the attitude/locus of control items to subjects and then asked them to indicate their responses by selecting one of the response choices. Although aides were encouraged to use computer forms for recording responses to save the step of transferring answers from the survey to the computer form for scoring,

some were not comfortable using this form. Therefore, whether answers were recorded on the computer forms or directly on the survey was left up to the individual aide. If the surveys were used as answer sheets, responses were transferred by the secretary at the county level or by the primary research investigator after they were sent to the EFNEP State Office. A score for each item was obtained by assigning a value of 1-5 with the score of five representing the most positive response. The total score for individual respondents was achieved by summing item scores. Total scores were converted to percentages by dividing the raw score by the total possible points. The item analyses were conducted by the MSU Scoring Office to provide indices of discriminination and difficulty for individual items and to determine the coefficient of reliability. To compute correlational analyses, t-tests, ANOVA, and regression analyses of group scores the SPSSX program for microcomputers was used (SPSS, 1983).

Twenty-four hour food recalls of EFNEP homemakers were conducted by program aides at the beginning and completion of homemaker enrollment (Appendix P). The homemaker was prompted by the program aide to report all foods and beverages comsumed within the previous 24-hour period. To increase the accuracy of serving size estimates, serving sizes were marked on sample glasses, cups, bowls, and plates which were used by aides to conduct food recalls. The dietary items named by

homemakers were recorded by program aides and then classified according to food groups and coded for computer analysis by clerical staff in the counties. A comprehensive score (percent) was assigned, based on computer analysis which represents the total number of servings reported and number of servings within the four food groups compared to the recommended number of servings (Appendix P). The score assigned to individual homemaker recalls was determined as specified previously.

The attitude and locus of control pre- and posttests were also administered to the comparison group (consenting WIC clients who were enrolled during the same time period) using the same procedures as with the experimental group. The 24-hour food recall instrument was not used with the comparison group because the purpose of this study was not to determine if the experimental group showed greater change in food recall scores than the comparison group. Program aides in all the counties completed the attitude and locus of control assessments at the beginning and end of the data collection period so that their scores could be used as independent variables in regression analyses.

CHAPTER 4

RESULTS AND DISCUSSION

The results of data analyses are reported and discussed in this chapter. Information related to the distribution of scores and the effect of pretesting are reported initially. The results, and a discussion of the results follows and are presented according to the three hypotheses of this study.

Distribution of Scores and Reliability

Reliability coefficients using the Kuder-Richardson 20 method (Kuder and Richardson, 1937) were .803 and .744 for the attitude pre- and posttests respectively and .476 and .509 for locus of control pre- and posttests. Since this method scores the items dichotomously, only the most positive response was scored as correct resulting in an underestimation of reliability.

Frequency analysis was conducted on all variables to assess distribution, standard deviation, skew, and range of scores (Table 3).

Table 3. Distribution of attitude, locus of control, and food recall scores

Variable	Range	Mean ± SD	Skew
EFNEP Homemakers and WIC Clients (n=261):			
Attitude pretest	43-94	71.19 ± 9.40	-0.038
Attitude posttest	44-95	74.22 ± 9.41	-0.513
Locus of Control pretest	44-96	69.13 ± 11.72	-0.071
Locus of Control posttest	44-96	71.96 ± 11.40	-0.230
EFNEP Homemakers (n=195):			
Food Recall pretest	4-100	51.81 ± 26.16	+0.273
Food Recall posttest	10-100	84.74 ± 19.00	-1.471
Program Aides (n=67):			
Attitude pretest	63-94	82.82 ± 6.60	-0.583
Attitude posttest	63-92	79.11 ± 6.37	-0.642

The food recall scores were well distributed across the full range of possible values. There was a much larger deviation, within groups, and a more normally distributed curve for the food recall measure than for the attitude and locus of control surveys. The values on the attitude assessment, particularly for program aides, were limited to the top half of the score range as indicated by the range and skew values presented in Table 3. This author suggests that the occurence of high scores (and resulting negative skew) on the attitude assessment were due to response set (i.e., the desire to please the investigator and the ability of respondents to choose the socially

acceptable response) (See "Strengths and Limitations of the Study"). Food recall scores piled up at the value of 100%. This author believes that the ceiling effect at the highest score value on the food recall was due to overreporting of foods consumed. A weakness of the way the food recall is scored in EFNEP is that a high score can be achieved by reporting consumption of several, or large amounts of foods. This is one of the weaknesses of using the food recall instrument, as scored in EFNEP, as a measure of food intake in this study. Other limitations and strengths of this measure are reported in the section "Strengths and Limitations of the Study".

The Effect of Pretesting

Subjects were randomly assigned to "pretested" or "non-pretested" groups. To assess the effect of pretesting, mean posttest scores for the pretested (n=133) vs non-pretested (n=127) groups were computed and are presented in Table 4.

Table 4. Posttest scores of pretested and non-pretested groups

Variable	Mean Score	
	Pretested Group	Non-pretested Group
Attitude	74.62	73.81
Food Recall	86.97	82.08
Locus of Control	71.85	72.08

The effect of pretesting was analyzed by computing t-test values for the groups that completed pre- and posttests vs. groups that took only the posttest (Table 5).

Table 5. Results of t-tests to determine the effect of pretesting

Variable	Degrees of Freedom	t-test Value	p Value
Attitude	257.81	.64	.524
Locus of Control	257.33	-.16	.871
Food Recall (EFNEP only)	155.53	1.65	.100

Groups that were pretested did not score significantly different than non-pretested groups on any of the variables. The t-test results indicate that test effect was not a threat to the validity in this study.

The Effect of EFNEP Participation on Attitudes Toward Dietary Change of Enrolled Homemakers

HYPOTHESIS 1a: There is no difference between pre- and posttest attitude scores of EFNEP participants.

Equivalence of Pretest Scores

It is important to determine equivalence of pretest scores between the comparison and experimental groups to qualify interpretation of posttest results. If group pretest means were significantly different, comparing

posttest scores would not be an accurate method for determining the effect of program participation. The attitude pretest means for experimental and comparison groups were similar (Table 6).

Table 6. Comparison of pretest attitude means of the experimental and comparison groups

Variable	Mean Experimental Group (n=98)	Comparison Group (n=36)
Pretest attitude	71.42	70.58

A t-test was used to compare the attitude pretest scores of the comparison (n=98) and experimental (n=36) groups to determine if the difference was significant (Table 7).

Table 7. Initial equality of comparison vs experimental group pretest attitude scores

Variable	Degrees of Freedom	t-test Value	p Value
Pretest attitude	78.26	0.51	.515

The t-test value for the attitude test was not significant at the .05 level indicating that the experimental and control groups were not significantly different at the onset of the study.

Results of Item Analyses of Homemaker Attitude Surveys

A comparison of pre- and posttest item means for the attitude measure is provided in Table 8.

Table 8. Homemaker mean item scores for the pre- and posttest attitude survey

Item	Pretest	Posttest
In general, I don't like to make changes.	3.63	3.50
Improving the way I eat is important to me.	4.42	4.47
I can't do much to improve the way I eat because of my income.	3.27	3.62
I often talk about nutriton with my family or friends.	3.22	3.82
Nutrition is not a priority in my life.	3.49	3.78
I am motivated to prepare nutritious meals.	3.59	4.04
The way I eat now doesn't need improvement.	3.61	3.35
It would benefit me to improve the way I eat.	4.10	3.99
Nutrition is a boring topic to me.	3.89	4.12
There are not enough advantages to improving my diet to make it worth the effort.	3.80	4.07
There are many things I am more concerned with than improving my eating habits.	2.93	3.47
How convenient a food is to prepare affects whether I use it.	2.85	3.18
The price of a food affects whether I buy it.	3.74	3.69

Mean scores on 9 of the 13 items showed positive change. In summary, the item analyses of pre-and posttest means (Table 8) indicated that homemakers: felt less constrained by income in making dietary changes; believed that making dietary changes would be beneficial; felt that dietary improvement was important; talked more about nutrition to family and friends; agreed more strongly that nutrition is a priority; and were more motivated to prepare nutritious meals. The percent of persons selecting each response category and indices of difficulty and discrimination are provided in Appendix Q.

Results of Group Data Analysis of Homemaker Attitude Scores

The attitude pretest mean for participants in the EFNEP program was 71.42; the posttest mean was 75.79 (Table 9).

Table 9. Attitude pre- and posttest results of the experimental group

Variable	Mean	Range	Standard Deviation
Attitude pretest (n=98)	71.21	43-94	9.93
Attitude posttest (n=195)	75.79	44-95	8.46

A paired sample t-test was conducted to determine if the differences between pre- and posttest attitude scores of the experimental group were significant (Table 10). The t-test value representing differences in pre- to posttest

attitude scores was significant ($p < .001$).

Table 10. Differences in pre- and posttest scores for the experimental group

Variable	Degrees of Freedom	t-test Value	p Value
Attitude change (n=97)	96	-3.65	.000*

* $p < .001$

These results indicate a significant improvement in attitude scores of participating homemakers from the time of program entry to graduation from the Michigan EFNEP.

This author attributes these results to characteristics of the EFNEP program. In the Michigan EFNEP, attitude improvement is considered an important objective in addition to promotion of positive changes in food recall and knowledge scores. EFNEP is more than an information program. Homemakers are taught skills which assist them in using cognitive (factual) information to make dietary changes. Program content is broken down into manageable tasks represented by 126 competencies (Michigan State University Cooperative Extension Service, 1986). The curriculum materials, and related training, focus on mastery of information and skills needed to implement changes in food selection and preparation methods which are likely to result in improved food recall scores (Michigan State University Cooperative Extension Service,

1986). Although none of the competencies specifically addresses formation of positive attitudes, encouragement and reinforcement provided by program aides probably result in positive attitude change as indicated in this study.

Based on these findings the first null hypothesis (1a) can be rejected.

Change in Attitudes of Experimental vs. Comparison Groups

HYPOTHESIS 1b: There is no difference between attitude scores of the comparison vs. experimental groups.

Pretest and posttest means for subjects in the comparison group (n=66) are reported in Table 11.

Table 11. Attitude pre- and posttest results of the comparison group

Variable	Mean	Range	Standard Deviation
Attitude pretest	70.58	55-88	7.87
Attitude posttest	71.08	51-89	8.76

The t-test values comparing pre- and posttest attitude (p=.422) means of the comparison group subjects were not significantly different (Table 12). This finding indicates that there was no improvement (change) between pre- and posttest attitude scores of the comparison group.

Table 12. Differences in pre- and posttest attitude scores of the comparison group

Variable	Degrees of Freedom	t-test Value	p Value
Attitude change	35	-0.81	.422

A t-test was conducted to determine if posttest scores, and amount of change from pre- to posttests between groups was significant (Table 13). T-test results showed that the experimental (n=195) and comparison (n=66) group scores were significantly different on the posttest attitude measure ($p<.05$) and the amount of change on the attitude measure (posttest score minus pretest score) was also significant ($p<.05$).

Table 13. Comparison vs. experimental group attitude posttest means (effect of program participation)

Variable	Degrees of Freedom	t-test Value	p Value
Attitude posttest	121.34	3.34	.001**
Attitude change	127.42	2.48	.014*

*p <.001

A two-way analysis of variance (ANOVA) was conducted (n=261) to test for the main effects of program participation (EFNEP) and pretesting (Table 14). F-ratios were computed to determine the significance of F (p-value) to test for the effect of program participation at

the .01 level of significance. The F-ratio represents how much group means vary compared with how much means within a group vary. A significant F-value indicates that the variance is great between the groups and minimal within the groups. Error is the unexplained variance (Iversen and Norpoth, 1976).

Table 14. Two-way ANOVA of attitude posttest scores to test for the effects of EFNEP and pretesting

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Value	p Value
Main Effects					
pretesting	1	58.829	58.829	.685	.409
EFNEP	1	892.863	892.863	10.396	.001**
Interaction Effect					
EFNEP by pretesting	1	.437	.437	.005	.943
Explained	3	935.453	311.818	3.630	.014*
Residual	256	21987.608	85.889		
Total	259	22923.062	88.506		

* p <.05 ** p <.001

The effect of program participation on attitude posttest scores was significant at the .001 level (p=.001) indicating that a significant amount of the variation in attitude scores between the experimental (n=195) and comparison groups (n=66) can be attributed to program participation (Table 14). ANOVA results indicated that the effect of pretesting on attitude posttest scores was not significant (i.e., test effect was not a threat in this

study). Based on these findings, Hypothesis 1b can be rejected.

This author attributes the significant differences in attitude scores between the groups to differences in characteristics of the programs. The WIC program includes a nutrition education component which is primarily cognitive based. If knowledge changes had been evaluated, it is possible that the comparison group would have shown improvement on that variable. Based on personal experience with the WIC program, it the observation of the principal research investigator that the time involved in nutrition education in WIC is minimal. The primary purpose of WIC is to improve the nutritional status of participants determined to be at nutritional risk by providing coupons which can be redeemed for foods. The educational component is a minor component of the program which provides information related to nutrient needs during pregnancy and infancy. Attitude change is not a primary goal of WIC. In contrast, EFNEP is an educational program rather than a supplemental food program. The clients spend several hours in one-to-one instruction. Goals of the EFNEP program are to improve knowledge, skills, attitudes, and behaviors of low-income homemakers (UDSA, 1976). EFNEP aides in Michigan receive training to assist them in improving attitudes and dietary adequacy of clients. Such training has not been provided for WIC Nutritionists who participated in this study.

The Effect of Pretest Attitude Scores on Food Recall Change of EFNEP Homemakers

HYPOTHESIS 1c: There is no difference between food recall change of groups with high vs. low pretest attitude scores.

Pretest attitude scores of homemakers (n=90) were divided at the median into two groups. The range of pretest attitude scores in the high scoring group was 43-69. The range of scores in the low attitude group was 71-94. A comparison of food recall means is presented in Table 15.

Table 15. A comparison of change in food recall scores for groups with high vs. low pretest attitude scores

Group	Mean Food Recall Change ± SD
Low pretest attitude (n=39)	33.10 ± 23.57
High pretest attitude (n=51)	41.49 ± 27.81

When amount of food recall change between the groups was compared using t-test analysis, results indicated that although the amount of change on the food recall measure was significant ($p < .001$) for all subjects as a group, when subjects were divided according to high vs. low pretest attitude scores, there was no difference between mean food recall change scores.

Table 16. T-test analysis of food recall change in homemakers with high vs. low pretest attitude scores.

Variable	Degrees of Freedom	t-test Value	p Value
Food Recall Change			
High vs. low pretest attitude groups	87.02	-1.55	.126
All subjects	89.00	-13.68	.000*

* p <.001

These findings indicate that Hypothesis 1c can be retained i.e., there is no difference in amount of food recall change between groups related to pretest attitude scores. The large standard deviations (Table 15) contributed to the t-test analysis finding of "no differences".

The Relationship Between Attitude and Food Recall Change Scores of EFNEP Homemakers

HYPOTHESIS 2: Attitude change of homemakers is not correlated with food recall change of EFNEP homemakers.

Correlational Analysis

Correlations were computed to determine the strength of the relationship between attitude and food recall change scores of homemakers. The correlation between attitude and food recall change was .15 which is not significant at the .01 level. Based on the results of this study, it cannot be concluded that changes in attitude and

food recall scores are related. A report of all correlations between attitude and food recall variables is presented in Table 17.

Table 17. Correlations between homemaker attitude, locus of control, and food recall scores.

Variable	1	2	3	4	5	6	7	8	9
Locus of Control									
1. Pretest	1.000	.266	.605**	.420**	.101	-.325*	.157	.126	-.050
2. Posttest	.266	1.000	.610**	.205	.483**	.209	.068	.048	-.041
3. Change	.605**	.610**	1.000	-.176	.316*	.439**			.007
Attitude									
4. Pretest	.420	.205	-.176	1.000	.406**	-.635**	.048	.005	.017
5. Posttest	.101	.483**	.316*	.406**	1.000	.448**	.320	-.166	.164
6. Change	-.325*	.209	.439**	-.635**	.448**	1.000	***	***	.122
Food Recall									
7. Pretest	.157	-.068	***	-.048	-.320	***	.000	.251	***
8. Posttest	.126	.048	***	.005	.166	***	.251	1.000	***
9. Change	-.050	-.041	.007	.017	.164	.122	***	***	1.000

* p <.01 ** p< .001 *** correlation not calculated

A summary of studies cited in the review of the literature, reporting correlations between attitude and behavior (food recall) scores is presented in Appendix A. Some investigators reported significant positive correlations between nutrition-related attitudes and food intake measures (e.g. Brehm, 1956; Baird and Schutz, 1976; Sims, 1978; O'Connell et al., 1981; Dalton et al., 1986); others did not (e.g. Picardi and Porter, 1976; Daelhousen and Guthrie, 1982; Ross, 1984; Byrd-Bredbenner et al., 1984; Sunseri et al., 1984; Ries and Shoon, 1986). Results from this study regarding the relationship between attitude and dietary change of homemakers show that these factors are not correlated. Based on this finding the second research hypothesis can retained.

The Ability of Independent Variables to Predict Change in Attitude and Food Recall Scores.

HYPOTHESIS 3a: Food recall change is not predicted by: instructor years of experience, pretest attitude scores of instructor, homemakers' locus of control change score, attitude pretest or change score of homemakers, or pretest food recall scores of homemakers.

HYPOTHESIS 3b: Attitude change is not predicted by: instructor years of experience, pretest attitude of homemakers, homemaker pretest or change in food recall, instructors' pretest attitude, homemakers' pretest or change in locus of control scores.

Regression Analysis

Regression analyses were conducted to determine if change in attitude or food recall scores depended on several independent variables. The results are reported related to the percentage of variance (R-squared)

accounted for by each independent variable. The variance of all independent variables (total variance) represents the degree of prediction of the dependent variable. At each phase of the stepwise procedure, the "fit" of the independent variables was analyzed while controlling for the variance contributed by the other independent variables.

Dependent Variable:

Food recall change of homemakers
(posttest minus pretest score)

Independent Variables

First Regression Run

Instructors pretest attitude
Homemaker attitude change
Homemaker pretest food recall

Second Regression Run

Homemaker pretest attitude
Homemaker locus of control change
Instructor years of experience

Figure 10. Regression analysis model to assess the ability of independent variables to predict food recall change

Independent variables were regressed on food recall change using the stepwise procedure in two separate analyses to avoid use of variables that were correlated within the same analysis (Figure 10).

Results of these two regression runs indicated that only one factor, homemaker pretest food recall scores,

entered into the regression equation (Table 18).

Table 18. Results of the first regression analysis run to predict variance in food recall change

Step/ Variable	Multiple R	R^2	F-Value	Signicance of F	Beta
1. Homemaker food recall pretest	.7608	.5788	119.54	.000	-.7608

This factor accounted for 57.88% of the variance in food recall change ($p<.001$). None of the other independent variables included in this run, or the second regression run, accounted for a significant amount ($p<.05$) of the variance in food recall change. Based on these results Hypothesis 3a can be retained for all variables except pretest food recall scores of homemakers. These findings indicate that 57.88% of the change in food recall scores from beginning to end of program participation in Michigan EFNEP can be predicted by the pretest food recall score.

Independent variables that were entered into the regression equation to predict attitude change (dependent variable) are listed in Figure 11. Two separate regression runs were conducted so independent variables that were correlated (Table 17) would not be entered into the same regression equation.

Dependent Variable:

Attitude change of homemakers
(posttest minus pretest score)

Independent Variables

First Regression Run

Instructor pretest attitude
Instructor years of experience
Homemaker pretest locus of control
Homemaker pretest food recall

Second Regression Run

Homemaker locus of control change
Homemaker pretest attitude
Homemaker food recall change

Figure 11. Regression analysis model to assess the ability of independent variables to predict attitude change

Results of the first regression analysis run indicated that pretest locus of control accounted for 9.83% of the variance in attitude change (Table 19).

Table 19. Results of the first regression analysis run to predict variance in attitude change

Step/ Variable	Multiple R	R^2	F-Value	Signicance of F	Beta
1. Homemaker pretest locus of control	.3136	.0983	10.25	.002	-.3136

The other independent variables that were included in this run (pretest food recall, instructor years of experience,

and instructor pretest attitude score) did not have a significance level which was high enough ($p < .05$) for entry into the regression equation.

Results of the second regression run to predict variance in attitude change showed that pretest attitude scores of homemakers accounted for 40.28% of the variance of attitude change and that locus of control change scores predicted 51.35% ($p < .001$) of the variance in the dependent variable (Table 20).

Table 20. Results of the second regression analysis run to predict variation in attitude change

Step/ Variable	Multiple R	R^2	F-Value	Significance of F	Beta
1. Homemaker attitude pretest	.6347	.4028	58.69	.000	-.5751
2. Homemaker locus of control change	.7166	.5135	45.38	.000	.3379

The other independent variable which was included in the second regression run (food recall change of homemakers) did not have a significance level ($p < .05$) high enough to result in entry into the regression equation. The total variance in attitude change explained by the independent variables in the first regression run was 9.83%; the total variance predicted in the second regression run was 91.63%.

Several studies were reviewed in this dissertation

that proposed two models: "attitudes predict dietary change" or "dietary intake predicts attitude change". Results from this study show that most of the variance in attitude change was accounted for by pretest locus of control scores, locus of control change scores, and pretest attitude scores, but not food recall scores. Therefore the model which proposes that food recall scores predict attitude change is not supported by this research. These results indicate that nutrition educators/evaluators can predict change in attitudes from pre- to posttesting, using pretest attitude, pretest locus of control, and locus of control change scores of homemakers as predictors.

Variance in food recall change was not accounted for by attitude scores (although pretest food recall scores were a significant predictor) indicating that the "attitude predicts food recall change" model does not apply to this sample of low-income homemakers participating in the Michigan EFNEP program. These results indicate that most of the variance in food recall change was not predicted by variables included in this study. Variables other than those included in this research should be assessed in an attempt to find predictors of dietary change. Suggestions regarding such research will be discussed in more detail in Chapter 5.

Results of Data Analysis Related to Attrition

If the pretest means of subjects that dropped out of the program are significantly higher or lower than persons who completed the program (posttest), results will be affected. By comparing the number of cases (percent) lost from the experimental and comparison groups and the pretest means of subjects that did vs. those that did not complete program participation, the potential threat of attrition can be determined.

The pretest means for subjects that dropped out of the program compared to pretest means of respondents that did complete the program (and posttest) are presented in Table 21.

Table 21. A comparison of pretest means for subjects that did, and did not, take the posttest.

Group/Variable	Attrition Rate	Pretest Means Dropouts	Graduates
Aides:			
Attitude/ Locus of Control	20.90%	79.71	80.73
Homemakers:			
Attitude/ Locus of Control	22.10%	69.21	71.21
Food Recall		44.48	48.75
Comparison Group:			
Attitude/ Locus of Control	13.50%	70.06	70.56

There was a higher percentage of dropouts in the experimental (22.10%) than the comparison groups (13.50%). This is probably due to differences in the programs. In the WIC program the client receives food; in EFNEP participants receive education. Food coupons might provide a stronger incentive to remain in the program than education.

Although there was a difference of 8.6% between the number of persons that dropped out of EFNEP compared to the non-EFNEP comparison group, results were not affected by pretest scores of persons who terminated because only matched pairs of scores were used in analyses of data. The pretest means of homemakers that did and did not complete the posttest were similar (Table 21).

The pretest attitude means of dropouts vs. completers in the comparison group were very similar (Table 21). Pretest scores of WIC clients who did not take the posttest were: 83.3, 66.7, 60.0, 21.5, and 12.0. The two low scores (21.5 and 12.0) had a dramatic lowering affect on the pretest mean. These results indicate that the pretest mean scores for the comparison group may have been lower if the persons that did not take the posttest had been included in data analyses. This was not a threat in this study because pretest scores of persons who did not take the posttest were not inlcuded in data analysis.

The pretest attitude means of the program aides that terminated employment before the attitude posttest was

conducted were similar to pretest means for aides that completed the pre- and posttests (Table 21).

In summary, attrition was not a threat to results of the data analysis in this study because pretest scores were not included unless a matched posttest score was available and percentages of persons that terminated program participation were not great enough to affect sample sizes.

Summary of Results

There were three research hypotheses in this study. The first hypothesis stated that (a) there was no difference between pre- and posttest attitude scores of the experimental group (homemakers enrolled in EFNEP), (b) there was no difference between posttest attitude scores of the experimental vs. comparison group and (c) there was no difference between change in food recall scores of homemakers with low vs. high pretest attitude scores. Results of t-tests and ANOVA indicated that homemakers attitude ($p=.001$) and food recall scores ($p=.001$) showed significant improvement from pre- to posttests and that attitude posttest scores ($p=.001$) and change scores were significantly greater ($p=.05$) than posttest or change scores of the comparison group. Based on findings of this study, parts (a) and (b) of this hypothesis can be rejected. Results of t-test analyses indicated that homemakers with low pretest attitude scores did not show significantly more change on the food recall posttest ($p=$

.126). Based on this finding part (c) of the first hypothesis can be retained.

The second research hypothesis stated that attitude and food recall change scores of EFNEP homemakers were not correlated. Correlational analyses indicated that homemaker change scores on attitude and food recall variables were not correlated indicating that the second research hypothesis can be retained.

The third research hypothesis stated that independent variables entered into the regression equation would not account for variance in (a) food recall change or (b) attitude change. Part (a) of this hypothesis can be retained for all independent variables except pretest food recall scores of homemakers which accounted for 57.88% of the variance in food recall change.

Part (b) of the hypothesis can be rejected for pretest and change in locus of control scores and pretest attitude scores of homemakers and retained for instructor years of experience, pretest food recall of homemakers, pretest attitude scores of instructors, and food recall change of homemakers. The amount of variance in attitude change which was accounted for in the first regression run was 9.83%. The total predictive ability of the variables entered into the regression equation in the second run was 91.63%. Only variables that were not correlated were used within a single regression run.

STRENGTHS AND LIMITATIONS OF THE STUDY

The usability of results of attitude assessment depends on the validity and reliability of the instrument used. Matheney et al., (1987) suggested that failure to verify validity of attitude measures has severely limited the interpretation of research findings in the area of attitude assessment. Steps must be taken to insure that measurement instruments address the construct of interest by including expert review or factor analysis in the instrument development stages. It is also necessary to determine if the instrument is usable with the identified population and if it demonstrates reliability.

Sims (1981) examined issues regarding the measurement of attitudes. She suggested that attitude assessment can be strengthened by using instruments that measure a common dimension, are reliable (consistent), and valid (measure what they are supposed to measure). Sims stated that methodological factors such as reliability and validity also influence the strength of the correlation between attitude and behavior (dietary change).

Validity and Reliability of the Measurement Instrument

A strong point of this study was that appropriate steps were taken in the preliminary research and pilot test stages of this study to insure that the attitude and locus of control instruments were valid, reliable, and appropriate for use with EFNEP clients.

Content validity is the degree to which test items represent a specific domain (construct) (Shaw and Wright, 1967). In this study, content validity was verified in the development stages of the attitude instrument by expert reviewers.

Construct validity is demonstrated if persons with differing attitudes actually respond differently on the attitude measure i.e., the measure discriminates between defined criterion groups in the expected direction (Shaw and Wright, 1967). A valid scale consists of items that yield different scores for high vs. low scoring groups (a high discrimination index). Construct validity in this study was determined during pilot testing by comparing item means of homemakers with high vs low scores.

Threats to Internal Validity

Threats to internal validity include history, maturation, and selection (Campbell and Stanley, 1963). Use of the comparison group minimized the threats of history and maturation. A control group could have been formed by delaying enrollment to a group of eligible persons and administering the assessment to this group when the experimental group was tested. Random assignment of subjects to such a control group would have controlled for the threat of selection. This procedure was not used in this study because it was considered to be unethical to keep potential EFNEP clients from entering the program for

the eight-month period that data were collected. It is likely that negative feelings would be formed by withholding enrollment, which could affect scores of the control group. Attrition of the "delayed entry group" would probably be high due to loss of interest during the waiting period. For this reason, the threats of history and maturation were controlled by using a comparison group formed using clients from the Supplemental Food Program for Women, Infants, and Children (WIC). The threat of selection into EFNEP vs. non-EFNEP groups could not be controlled because subjects were self-selected rather than randomly assigned to comparison and experimental groups. The threat of selection into pretested vs. non-pretested groups was controlled by randomly assigning subjects (by county for the experimental group and by alternation for the comparison group).

To determine if "selection" confounded results, pretest scores of the experimental and comparison groups should be compared (Campbell and Stanley, 1963), as they were in this study. Results of the t-test (Table 5) indicated that pretest attitude and food frequency scores for the experimental and comparison groups were not significantly different indicating initial equivalence of groups.

A limitation of all attitude measurement which poses a threat to internal validity is the time lag between the message (educational intervention),a formation of new

attitudes, intent to change, and subsequent dietary changes. These steps related to the change process might or might not occur within the time of the educational intervention and assessment. Changes in attitude or food recall scores are used as evaluative measures to determine program effectiveness. However, attitude change resulting from the educational experience continues to evolve after program participation has ended. The program has only acted as the initial stimulus. Therefore, posttest attitude and food recall scores might underestimate positive changes resulting from program participation. Connell et al. (1985) suggested that posttest attitude scores "are the result of a relatively brief exposure to instruction." Posttest assessment scores may underestimate the actual effect of the intervention on attitude and dietary change for this reason. "Holding the program accountable for having a strong immediate effect would be unfair" (Henerson et al., 1978).

The assessment of attitudes uses indirect measurement. Campbell and Stanley (1963) stated that "Attitude is a hypothetical or latent variable, rather than an immediately observable variable. Attitudes constantly fluctuate depending on the time of day, influence of others, changes in related attitudes, and other factors." "An attitude is not something we can examine and measure in the same way we can measure the heart rate. We can only infer that a person has attitudes

by her words and actions" (Henerson et al., 1978).

Since it is not possible to measure attitudes directly, assessment of them is based on self-reported responses given item statements as a stimulus. These self-reports vary depending on the honesty of the respondent and their ability to understand the statement and to categorize their attitudes into fixed response choices. There is an assumption that it is valid to accept a person's responses about their own attitudes as accurate indicators of the attitude. It is likely that scores obtained overestimate true attitudes because of the tendency for people to represent their attitudes as more positive than they actually are.

The food recall instrument is an indirect measure of food intake. The accuracy of this measure depends on honesty of self-reported food consumption, the ability of the respondent to recall foods consumed, and the accuracy of the data collector to estimate number and size of servings of food consumed based on the information supplied by the respondent. It is not possible to distinguish whether improvement in food recall scores represents actual dietary change or whether nutritional knowledge which was acquired in the educational program is applied to the reporting of foods consumed i.e., the desire to please the investigator by reporting consumption of foods known or perceived to be "nutritious". The validity of these instruments also depends on whether the

data collectors introduced bias when obtaining or reporting information from subjects. Although aides were told that scores of homemakers would not affect evaluation of their job performance, there might have been a tendency to encourage positive responses on the attitude measure. Interpretation and usability of the results of data collected from the food recall instrument is limited due to these weaknesses which pose a threat to internal validity of the food recall instrument. The procedures for scoring and the justification for use of the 24-hour food recall instrument are presented in Chapter 3, pp. 72-73.

Threats to External Validity

External validity is the extent to which results can be generalized to, or across, persons, settings, or times. External validity can be maximized by random selection of subjects from the universe to which the investigator plans to generalize. In this study, data were collected from all consenting participants who were enrolled in the Michigan EFNEP during a specific time period. Although it is desirable to generalize results of this study to EFNEP clients in all states, results can only be generalized to participants in the Michigan program because subjects were not randomly selected from all states.

Response set is a threat to external validity. Orne (1962) stated that any feature of a research setting or procedure that might indicate to the subject how they should respond affects responses (response set). Answers

that will please the investigator might be given instead of true responses. If someone wanted to appear agreeable (acquiescent), or if they want to "go along with" the socially acceptable response, they might select primarily the "agree" response category.

Another type of response set is when the respondent does not read the item statements but simply indicates their reponses by marking a single response category for all items. This type of response set can be minimized by wording items positively and negatively and placing them randomly on the questionnaire. The surveys can be spotchecked to determine if this type of response set is a threat to validity. Review of the questionnaires by the primary research investigator indicated that multiple selection of a single response did not occur on the attitude assessment. However, it is very likely that acquiescence and perceived social desirability of responses were confounding factors in this research. The socially acceptable answer is frequently obvious on an attitude measure, and that response might be selected even though it does not represent the respondents' attitudes. Interest in pleasing the investigator might have affected results, especially on the posttest because of the close relationship that might have been established between the aide and the homemaker.

The measurement setting was not highly standardized and poses a threat to the external validity of the study.

Although instructors were provided with group training regarding data collection procedures, administration of the survey was conducted on an individual basis in the clients' homes. Many factors could have affected homemaker responses including: interruptions from children, neighbors, or phone; fluctuations in environmental conditions or noise level; time of day; day of the week; and events that occurred in the home on the day of the testing. Aides conducted data collection at various times of the day and week. This variable could not be controlled. It is possible that time of the month related to receipt of food stamps may have confounded the results of the 24-hour food recall.

Reliability is the ability of the measurement instrument to maintain stability and consistency over repeated use. Stability is measured by correlating scores from subsequent tests. Internal consistency is measured by correlating item means within a single test administration (Carmines and Zeller, 1979). The K-R 20 coefficient of reliability (Kuder and Richardson, 1937) was used in this study to determine the reliability of the attitude measure. Because the K-R 20 method is based on a dichotomous system of scoring, it underestimates the true reliability of the instrument. The Cronbach alpha method of assessing reliability might have been a more appropriate statistical procedure to use.

Weaknesses of the Likert Scale

The Likert scale does not have a true zero point (point at which attitudes change from positive to negative) and response category intervals are not demonstrated to be equal (Shaw and Wright, 1967).

The "undecided" response choice is not a true zero point. A respondent might choose this response category for a variety of reasons: because they have no opinion regarding the statement, because they have some positive and some negative feelings regarding the statement, or if they have not thought enough about the issue to select a response that indicates agreement or disagreement.

The Likert scale makes the assumption that the distances between response categories (strongly agree, agree, no opinion, disagree, and strongly disagree) are equal. It can be assumed that "strongly agree" has more "agreement" than other response categories, but it is not known if the distance between all response categories is equal.

Because equal intervals cannot be verified, the Likert scale is an ordinal, rather than interval, scale. An assumption in the use of parametric statistics is that the scale is interval or ratio level (not ordinal). However, parametric statistics (t-tests, regression analysis, ANOVA, Pierson product moment correlation) are commonly used, rather than the less powerful non-parametric tests, in analyzing data collected using the

Likert scale. Non-parametric tests do not assume that the scale has equal intervals (i.e., they are appropriate for use with ordinal level scales). But when the non-parametric statistics are used, the strength of the statistic, and therefore the conclusions made from the results, are weaker. More specific information can be obtained when parametric statistics are used, but the assumptions underlying the use of the tests are not completely met (Blalock, 1974).

"The appropriateness of a given statistic is conditioned by the nature of the scale against which measurements are made...Having measured a set of items by making numerical assignments in accordance with a set of rules, we are free to change the assignments by whatever transformations will preserve the empirical information on the scale...the empirical operations that underline the scale determine what tranformation can be made without sacrifice of information, and the permissable transformations determine, in turn, the appropriate statistical measures" (Blalock, 1974).

On the other hand, Bohrnstedt and Carter (1971) argue that regression analysis is so robust that the assumption of equal intervals is not a serious limitation of data analysis when the Likert scale is used.

It is the opinion of this researcher that use of parametric statistical procedures (t-test, ANOVA, regression analysis, Pearson product-moment correlations)

is justified to analyze these data even though Likert scale intervals have not been demonstrated to be equal. The ordering among response categories is preserved by applying weights (e.g. 1-5) and using the scores obtained in data analysis procedures.

Rationale for Use of the Likert Scale

In the second field test of the attitude instrument, two different response formats were used, a five-point Likert scale and a magnitude estimation scale (Appendix L) The same item statements were used on both versions of the survey; only the method for selecting responses varied.

These two versions of response format were used to determine which scale would result in a minimum loss of information and be easiest for aides and homemakers to use. With the magnitude estimation scale, the homemakers could assign any value from zero to ten to their response depending on strength of agreement with the item statement. This type of scale has the highest potential for collecting exact response information. It does not require the respondent to "force" their answers into fixed response categories as does the Likert scale. Another advantage of the magnitude estimation scale is that it is a true interval scale which satisfies the assumption needed to justify use of parametric statistics (Lodge, 1981). The Likert scale is an ordinal scale; equal intervals are assumed. In theory, the magnitude

estimation scale is superior to the Likert scale, but this was not the case when it was used with this population. Although homemakers were instructed to select a number from 0-10 to express their level of agreement or disagreement with an item, they almost exclusively selected 0, 5, or 10. This limitation resulted in a greater loss of true response information than with the Likert scale which included five fixed response categories.

Although the magnitude estimation scale has the advantage of being interval rather than ordinal, and has the potential to collect the most accurate response information, it is not as effective in eliciting response information from the EFNEP population as the Likert scale. Therefore, a five-point Likert scale was selected for use in this study.

CHAPTER 5

RECOMMENDATIONS

Based on the findings of this research, this author has several recommendations to make regarding inclusion of the affective domain in instructor training and implementation and evaluation of nutrition education programs. In addition, recommendations related to the assessment of attitudes and dietary change are presented.

Implementation of Nutrition Education Programs

To effectively promote improvement in attitudes toward dietary change, the nutrition education intervention should include an affective-based component. An objective of instructors and supporting materials should be to assist clients with formation of positive, and replacement of negative, attitudes.

Instructors can assist homemakers through the process of improving attitudes toward dietary change and in making dietary improvements using a combination of the following methods. Planning sessions where the learner and instructor specify goals to be reached by program completion related to dietary change could be conducted at the beginning of the lesson series. The food recall pretest could be used for discussion purposes during this

goal-setting procedure. Circumstances which influence current dietary patterns such as environmental cues which trigger positive or negative dietary behaviors should be identified. Instructors can provide encouragement and reinforcement to facilitate the modification of existing attitudes and dietary behaviors. In EFNEP, integration of new attitudes and behaviors into the existing cognitive framework can be promoted by encouraging the participant to discuss attitudes using the completed attitude/locus of control pretest as a stimulus for such a discussion.

Evaluation of changes in attitude and dietary behaviors should be conducted after participation in programs which include an affective- and behavior-based intervention. It is likely that greater changes in attitude would result if instructors were trained in use of methods to promote positive changes in attitudes and dietary intake. In the past many programs have taught primarily cognitive-based information, but have used the food recall instrument in addition to a knowledge assessment to determine impact of program participation. Changes on the food recall from pre- to posttesting might be due to several factors. Additional assessment using methods which assess dietary behavior, rather than reports of "foods eaten yesterday" are needed. It is the recommendation of this author that it is time to go beyond the use of the food recall instrument as a measure of dietary change, and include instruction and assessment

related to dietary behavior change.

Instructor Training

Instructors need a strong system of support in working to promote positive changes in attitudes and dietary behaviors. They might be frustrated from working in a situation where attempts to promote attitude and dietary change are negated by many factors which are not within the control of the instructor. Instructors need to be reminded that their teaching responsibility is to provide information, activities, and encouragement to promote positive changes in attitudes, skills, and dietary behaviors, but they cannot assume the change process for the learners and should not feel defeated when clients do not choose to implement changed attitudes and behaviors.

Training for instructors should include information regarding the relationship between attitude and dietary change and include training in use of motivational techniques to assist clients to improve attitudes and behaviors. Techniques to assist in managing job-related frustrations should be included for instructors, such as EFNEP aides. This type of information/support has been provided through inservice workshops in Michigan EFNEP.

Assessment of Attitudes: Future Research Investigations

Several investigators (Appendix A) have reported that attitudes are one of the factors that influence dietary change. But quantitative attitude assessment data in EFNEP

which has resulted in insufficient program evaluation data needed to determine if this program is improving attitudes of participants. Evaluation of major objectives in Extension programs is increasingly important as federal appropriation of funding is steadily threatened. This situation demands that funded programs, such as EFNEP, use valid and reliable attitude instruments, such as the one used in this study, to collect specific information on a regular basis to determine if the program results in positive attitude changes in participating homemakers. The results of this study should be used to formulate recommendations addressing internal accountability needs regarding ongoing program management decisions such as training needs of instructors, need to assess attitudes of potential instructors and clients, and to determine the need for modification in the teaching methods and materials to promote positive attitude and dietary change of program participants. Additional research is needed to determine what factors influence the ability of EFNEP instructors to work effectively with this population (i.e., promote positive changes in attitudes and dietary behavior).

Results of this study provide evidence regarding the effect of program participation on attitude improvement related to the general construct "attitudes toward dietary change." It appears that there might be more than one construct within this general construct such as:

motivation to change dietary behaviors, p rc ived importance of making improvements in dietary behaviors, and perceived benefits of making dietary improvements. A factor analysis could be conducted to determine if this is true. If other factors emerge, mean item scores could be grouped according to these constructs which would provide additional information for use in prediction of dietary change.

Use of Multiple Factors to Predict Dietary Change: Future Research Investigations

Several models have been proposed (e.g. Brehm, 1956; Carlson, 1956; Rosenberg, 1960; Schwartz; 1975; and Sims, 1978) to explain the ability of attitudes to predict behavior (dietary change) and for dietary scores to predict attitude change. According to results of this study, attitudes did not account for any of the variance in food recall change scores. It is the opinion of this investigator, based on results of regression analysis from this, and other studies, that most of the variance in food recall scores is accounted for by factors other than attitude. Although attitude change may be an important objective in nutrition education programs, these results indicate that dietary change is influenced by various determinants in addition to attitude that were not assessed in this study. Results of this research indicate that locus of control is one factor that influences change in attitude. Other factors might include: past experience

(failure) in implementing positive dietary changes, poor self esteem, perceived importance and benefits of making dietary changes, and normative beliefs (Theory of reasoned action). This author recommends inclusion of items to evaluate these factors in future research.

Heider (1958), Bem (1970), and Schafer and Yetley (1975), suggested that tension (cognitive dissonance) is produced when stability related to existing attitudes and behaviors are disturbed. It is likely that homemakers' resistance to change attitudes or dietary behaviors is to avoid conflict between existing attitudes and behaviors and those promoted by the instructor or program materials. Although subjects might agree with attitude item statements regarding the importance and perceived benefits of changing, reluctance to adapt new behaviors may account for the lack of a positive correlation between attitude and food recall change scores.

Expecting significant positive attitude and dietary change might not be realistic, especially if program participation is short and if the program does not train instructors in use of methods for promotion of attitude and dietary change. Immediate problems (e.g., housing, transportation, family interactions, and healthcare) often demand the immediate attention of program participants with limited incomes; dietary change may not be a priority. It is the opinion of this author that whether learners improve attitude and food recall scores after

participating in nutrition education programs, such as EFNEP, depends on the level of stability in their environment at the time of participation.

Valid and reliable assessments to measure factors such as cognitive dissonance, self esteem, and normative beliefs should be developed so that a more complete investigation of factors that influence change in attitudes, dietary intake, and dietary behaviors can be conducted. Results from such an investigation could provide information that could be used, in addition to results from this study, to further understand the relationship between attitudes toward dietary change and dietary improvements.

In summary, factors which were included in this research to predict dietary change were: pretest attitude of the instructor, locus of control of the homemakers (pretest and change scores), attitude of the homemakers (pretest and change scores), years of experience of the instructor, and pretest food recall scores. Future investigations should evaluate the ability of additional factors to predict dietary change such as: normative beliefs, self esteem, motivation, perceived importance and benefits of making improvements in the diet. Instruments used to assess these factors should be valid and reliable. Results of this study and future research should be used in planning, implementing, and evaluating effectiveness of nutrition education programs to promote dietary change.

APPENDICES

APPENDIX A

ASSESSMENT OF THE RELATIONSHIP BETWEEN ATTITUDE AND BEHAVIORS
A SUMMARY OF LITERATURE CITED

AUTHOR	ASSESSMENT MEASURES	FACTORS INDICATED**
Baird and Schutz (1976)*	food use (a) 24-hour food recall (b) food habit change (b)	food preparation, ethnicity, perceived food use, knowledge
Brehm (1956)*	evaluation of products (a) selection of a product (b)	consistency between attitudes and behavior
Brush et al. (1986)	nutrition knowledge (k) flexibility of attitudes toward nutrition (a)	length of program high pretest scores
Byrd-Bredbenner et al. (1984)	caring about nutrition (a) eating new foods (a) nutrition affects health (a) learn about nutrition (a) food frequency (b)	measurement limitations, length of program, lack of control over food choices
Carruth et al. (1977)*	flexibility to change (a) nutrition practices (b) observed nutrition practices requests for literature (b) knowledge about weight loss (k) personality questionnaire	flexibility of attitudes age
Cosper and Wakefield (1975)	trying new foods (a) motivation (a) food choices (b)	preferences of husband/child personal food preferences recommendations of health care professionals
Daelhousen and Guthrie (1982)	3-day food record (b) 24-hour recall (b) nutrition during pregnancy (a)	high pretest scores
Dalton et al. (1986)*	food choices (a,b) intended food choices	specificity of the measures, influence of others, taste, health beliefs
Davie et al. (1973)*	powerlessness-teacher (a) food recall-learner (b) job experience (b)	job experience, measurement limitations

* a positive correlation was reported between attitude and behaviors
** factors accounting for results reported in studies cited
(a) = assessment of attitudes
(b) = assessment of food/nutrition behaviors (dietary change)
(k) = assessment of knowledge

AUTHOR	ASSESSMENT MEASURES	FACTORS INDICATED
Fazio and Zanna (1978)*	experience as a subject (b) attitudes toward research participation (a)	direct exp ience
Guiry and Bisogni(1986)*	24-hour beverage recall (b) beverage frequency list (b) limiting coffee consumption(a) caffeine consumption during pregnancy (a) knowledge about caffeine (k)	specificity of the measurement instrument
Hollis et al. (1986)*	diet habit survey (b) powerlessness (a) cardiovascular risk medical symptoms	age, powerlessness medical risk cardiovascular risk
Kaplowitz and Olson (1983)	breastfeeding (a,k,b)	small sample size non-personal program
Kok et al. (1982)*	cardiovascular disease (a) knowledge about cvd (k) 24-hour food recall (b)	significant others, knowledge difficulty in changing habits taste, existing attitudes and behaviors
Kutner et al. (1952)	willingness to serve a racially mixed party (a) serving a racially mixed party (b)	inconsistency between attitudes and behavior
LaPiere (1934)	providing lodging to Chinese people (b) attitudes toward providing lodging to Chinese people (a)	inconsistency between attitudes and behavior
Looker and Shannon (1984)	learning about nutrient density (a) nutrient dense foods (k) nutrient density of foods (b)	message characteristics high pretest scores attrition
Maiman et al. (1979)*	weight loss experience (b) ways to lose weight (k) attitudes about obesity (a)	personal experience
O'Connell et al.(1981)*	Commitment to teach nutrition (b), importance of nutrition (a) favors nutrition education(a)	experience teaching nutrition time available high pretest scores
Penner and Kolasa (1983)*	teaching nutrition (a) my teaching nutrition (b) my own nutrition (b)	experience teaching nutrition

AUTHOR	ASSESSMENT MEASURES	FACTORS INDICATED
Perron and Endres (1985)	24-hour food recall (b) 48-hour food record (b) attitudes about nutrition (a) nutrition for the athlete (a)	existing attitudes/behavior, lack of control over food choices
Peterson and Kies (1972)*	teaching nutrition (a,b) school lunch (a) general nutrition (k)	consistency between attitudes and behavior
Picardi and Porter (1976)	health concerns (a) food choices (b) nutrition knowledge (k)	readiness to change length of program
Ramsey and Cloyd (1979)	powerlessness (a) use of agencies (b) 48-hour recall, mother and child (b)	husband's education, readiness to learn (change), teacher-learner relationship
Reames (1985)	Infant feeding recommendations (b) attitudes about breastfeeding	knowledge previous experience
Regan and Fazio (1977)*	petition signing (b)	direct experience
Ries and Schoon (1986)	nutrition and health (a,k)	length of program high pretest scores effect of pretesting
Rosander and Sims (1981)*	locus of control (a) food frequency (b) food's effect on health	affective-based intervention
Ross (1984)	general nutrition (a) nutrition education in nursing school (a) role of the nurse in nutrition education (a) role of hospital dietitians (a) nutrition principles (k)	high pretest scores (regression toward mean)
Schafer (1978)*	dietary adequacy (b) empty calories consumed (b) personal/social factors (a)	personal food preferences, self-concept, values/beliefs, cost, convenience, knowledge, health of the family, media, weight/appearance, self-health, nutritional value

AUTHOR	ASSESSMENT MEASURES	FACTORS INDICATED
Schwartz (1976)*	counseling practices (b) use of publications (b) attitudes toward meal planning, food preparation, eating habits, counseling (a)	attitudes toward counseling, meal planning/preparation, affective-based intervention
Sims (1978)*	general nutrition (k) nutrition is important (a) vitamin supplements (a) meal planning is important (a) meal preparation is enjoyable (a) one-day food record (b)	knowledge
Sunseri et al. (1984)	nutrition knowledge (k) attitudes about nutrition (a) heart-healthy eating and shopping practices (b)	readiness to change length of program reading level family involvement
Yperman and Vermeersch (1979)	importance of nutrition(a) variety of foods eaten (b) nutrition knowlege (k) parents' food preferences friends' food preferences	mother's education, family/friends preferences parents attitudes

APPENDIX B

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
230 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING • MICHIGAN • 48824-1046

April 3, 1986

Ms. Anne Murphy-Roy
202 Wills House
Expanded Nutrition

Dear Ms. Murphy-Roy:

Subject: Proposal Entitled, "The Measurement of Attitudes and Behavioral Intentions of Participants and Instructors in The Expanded Food and Nutrition Education Program"

I am pleased to advise that I concur with your evaluation that this project is exempt from full UCRIHS review, and approval is herewith granted for conduct of the project.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval prior to April 3, 1987.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

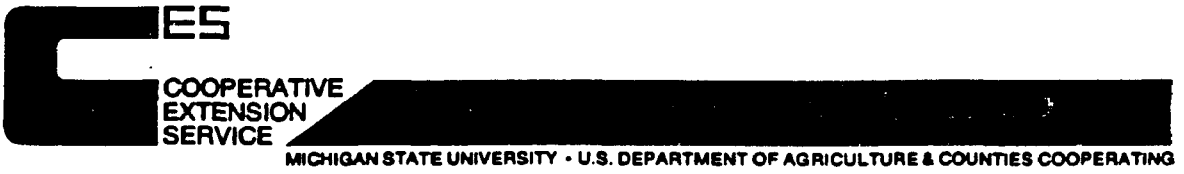
Thank you for bringing this project to my attention. If I can be of any future help, please do not hesitate to let me know.

Sincerely,

Henry E. Bredeck
Chairman, UCRIHS

HEB/jms

cc: Dr. Jenny T. Bond



Expanded Nutrition Program
202 Wilis House
East Lansing, MI 48824
Phone: 517-353-9102

Consent Form: Program Participants

I, _____, agree to participate in a project to determine poeoples' feeling about nutrition which is being conducted by the Expanded Food nd Nutrition Education Program (EFNEP). The purpose of this project is to learn more about opinions of people in this program regarding changing food habits.

I understand I will be asked to respond to several questions about how I feel about making changes in my life, especially related to food habits. I understand that I am free to decide not to participate. I may choose not to answer any or all of these questions and I will still be able to receive nutrition lessons for the nutrition instructor.

I understand that my responses will be treated condidentially and that all information about me will be anonymous. My name will not be used in any part of the project. General results of the project will be avialable to me at my request.

Signed_____

Date_____

COOPERATIVE EXTENSION SERVICE
MICHIGAN STATE UNIVERSITY • U.S. DEPARTMENT OF AGRICULTURE & COUNTIES COOPERATING

Expanded Nutrition Program
202 Wills House
East Lansing, MI 48824
Phone: 517-353-9102

Consent Form: Program Instructors

I, _____, agree to participate in the project to measure attitudes of instructors and participants in the Michigan EFNEP program. I understand that the purpose of this project is to determine how participation in the program affects attitude of low-income homemakers and to identify how attitudes are related to behavior change of participants.

As a participant in this project I realize that I will be asked to fill out a written survey at the beginning and end of the project.

I understand that I am free to decide not to participate and if I choose not to, it will have no influence on my employment status with the Cooperative Extension Service. I may also decline to answer any questions I find unacceptable. I understand that my responses and all information about me will be treated in strict confidence and that I will remain anonymous (all information will be coded by number). General results of the study will be made available to me at my request.

Signed _____

Date _____

APPENDIX C

DEMOGRAPHIC INFORMATION
EFNEP Unit Report Summary
(August 1986 - March 1987)

HOMEMAKERS:

FACTOR	PERCENT OF HOMEMAKERS
Average length of participation	
0-5 months	64.02
6-11 months	29.49
12-18 months	5.10
>18 months	0.29
Sex	
Female	97.71
Male	2.29
Racial/Ethnic	
White	52.74
Black	38.20
Hispanic	6.83
Indian	1.17
Asian/Pacific Islander	1.08
Type of Instruction	
Individual	62.44
Group	14.21
Both	23.35
Place of Residence	
Farms	1.10
Towns <10,000	11.66
10,000-15,000	29.59
suburbs	13.09
>50,000	44.55

FACTOR	PERCENT OF HOMEMAKERS
Number of Children	
0	10.31
1-2	54.28
3-5	31.32
>5	4.09
Monthly Income ($)	
<438	47.40
439-588	19.66
589-738	14.07
739-888	7.04
889-1038	5.61
1039-1188	2.08
1189-1338	1.73
>1338	2.41

PROGRAM AIDES:

FACTOR	PERCENT OF AIDES
Sex	
Female	97.96
Male	2.04
Race	
White	41.84
Black	44.90
Hispanic	10.20
Indian	3.06
Asian/Pacific Islander	0.0

APPENDIX D

PROGRAM DESCRIPTION

The first research objective was to determine the effect of program participation on attiutde toward dietary change. The homemaker "program" is considered to be the instruction which occurred between pre- and posttest measurements. For instructors, the "program" consisted of all information related to attitude change which was provided either through inservices or in written materials at the initiation and throughout the study.

Instructor Program:

1. Inservice Workshop: July, 1986

   Explanation of the purpose of the project:

   -attitude improvement is an objective of EFNEP

   -attitude change has not been assessed to date

   -the effect of aides' attitudes on attitude and food recall change have not been assessed to date

   Obtaining informed consent (Appendix B)

   Assessment of instructors' pretest attitudes

   Training for data collection, Handout provided for data collection procedures ("Attitude Survey" p. 131)

   Presentation of information related to the relationship between attitude and dietary change

   -effect of existing (negative) attitudes of homemakers

   -attitude formation (direct vs indirect experience)

   -effect of the learning environment on attitude change

   -effect of cost, convenience, culture, and taste preferences on food selection

   -effect of locus of control on behavior

   -effect of instructors' attitudes on attitude and dietary change of learners

2. Collection of Data (August-September, 1986)

3. "Effective Aide Techniques" (Newsletter article, September 1986, p. 132)

4. Assessment of Instructors' Attitudes (posttest)

Homemaker Program:

1. First visit to the homemaker (August-September 1986)

   Explanation of the purpose of the survey

   Elicitation of informed consent (Appendix B)

   Administration of attitude, locus of control, and food recall pretests (Appendices N and P)

2. Participation in individual or small group lessons

   Number of lessons received depended on results of competency-based assessment instrument

3. Posttest attitude, locus of control, and food recall instruments administered during last visit (Appendices N and P)

ATTITUDE SURVEY

Data Collection Procedures

Task	To Be Completed By	When
1. Attend inservice to receive trianing in positive attitude change of homemakers.	1a. EHE's 1b. program aides	1. July 29
2. Take survey.	2. program aides	2. July 29
3. Begin using survey with all homemakers that enroll in August and September (pre-test).	3. program aides: Muskegon, Berrien, Genesee, Ingham, and Kent counties	3. August 1 - September 30, 1986
4. Mail all completed computer forms, a copy of the Food Recall Form, and Family Record to Anne Roy at the State Office	4a. EHE's of counties in #3 4b. EHE's of ocunties in #6; send recall and Family Record form only	4. September 30, 1986
5. Send list of all homemakers who need to take the post-test.	5. Anne	5. October
6. Use survey with all homemakers that took pre-test when they finish lessons (post-test).	6. program aides: Muskegon, Berrien, Genesee, Ingham, and Macomb counties	6. last lesson (deadline: March 30, 1986)
7. Use survey with all homemakers that began enrollment in EFNEP during August-September when they finish lessons (post-test only).	7. program aides: Oakland, Wayne, Kalamazoo, Kent, and Saginaw counties	7. last lesson
8. Analyze results	8. Anne	8. April-June, 1987

NOTE: If a homemaker takes the pre-test but does not complete the program and takes the post-test, write the date of withdrawl and the reason on the ocmputer form and recall form.

TEACHING

EFFECTIVE AIDE TECHNIQUES

- Use a non-authoritarian approach
- Smile! Have a good sense of humor
- Explain that the program is not part of Social Services
- Use 2-way approach (learn from homemakers)
- Encourage behavior change by using food preparation that reinforces lesson material
- Praise positive changes
- Answer honestly
- Be open minded
- Avoid "know it all" approach
- Accept the homemakers where they are
- Be "human"
- Be respectful and considerate of homemakers
- Don't become overly friendly
- Don't rush through the lesson
- Become involved in the lesson; involve the homemaker
- Relate all lesson material to saving money

--Ann Roy, Graduate Assistant, EFNEP



TRIVIA ANSWERS

1. Berrien, Genesee, Ingham, Kalamazoo, Kent, Macomb, Muskegon, Oakland, Saginaw, and Wayne.
2. Eating Right Is Basic 2
3. 4,300
4. 80%
5. 160 families

APPENDIX E

PRELIMINARY RESEARCH INTERVIEW SCRIPT AND RESPONSES

"The purpose of this interview is to obtain information about the attitudes and behaviors of EFNEP homemakers. I will ask several questions. Please answer the questions with the first response that comes to mind. The information will be used to design a survey which will be used to learn more about the attitudes and behaviors of the people who participate in EFNEP."

QUESTION TOPIC: POSITIVE ATTITUDES

1a. How would you describe a homemaker that you consider to have positive attitudes about foods and nutrition?

- they are there when you make a home visit (not a "no show")
- they are "ready" for the lesson
- they ask questions, act interested
- they are usually involved with their children
- they are confident and have a good self-image in general

1b. What do they (homemakers) <u>say</u> to indicate their positive feelings about foods and nutrition?

- they ask the opinion of the aide regarding their food practices
- they want to know how to manage their money so they can be less dependent on social services

1c. What do they (homemakers) <u>do</u> to indicate these positive feelings about foods and nutrition?

- recommend the program to their friends/neighbors
- are open to new information, receptive
- have good eye contact during a lesson

1d. What do homemakers say or do that indicates they think nutrition is important?

- they ask questions about "how to feed their kids right"

QUESTION TOPIC: NEGATIVE ATTITUDES

2a. How would you describe a homemaker that has negative attitudes about foods and nutrition?

- they have a "huffy" attitude
- they don't want the program but are required to participate
- they act like the lessons are "owed" to them
- they are defensive about their eating habits
- referrals from food banks and "cheese lines" are usually the least motivated homemakers

2b. What do they <u>say</u> to indicate their negative feelings about food and nutrition?

- the nutrition lessons are a waste of time

2c. What do they <u>do</u> to indicate their negative feelings about foods and nutrition?

- they are not there for scheduled lessons and do not call to re-schedule
- they don't act interested in the lessons (watch T.V.)
- they are not prepared for the lesson

QUESTION TOPIC: POSITIVE BEHAVIORS

3a. Think about a homemaker that has positive or good nutritional practices. What does that person say or do that demonstrates that they have good nutritional habits or behaviors?

- they provide feedback regarding improved nutritional practices from lesson to lesson
- they make comments about their own food habits while they take the knowledge quiz
- they use recipes provided by program aides
- they are able to "control" the eating habits of their children
- they discuss food preferences

3b. What do homemakers say or do that indicates that they think improving food preparation skills is important?

- they want to know how they can change food preparation methods so that food stamps will last through the month

QUESTION TOPIC: NEGATIVE BEHAVIORS

4. Think about a homemaker that has poor nutritional practices. What does that person say or do that demonstrates that they have poor nutritional habits or behaviors?

- they are not interested in trying new foods/recipes

- they don't ask the aide's opinion about their food habits

QUESTION TOPIC: FOOD SELECTION

5. What do homemakers say or do that indicates that they think selecting and serving nutritious foods is important?

- they think that their children's behavior is related to foods eaten

QUESTION TOPIC: FOOD SAFETY

6. What do homemakers say or do that indicates that they think food safety is important?

- they like the information provided about food safety if it is not "personal"

- they are "open" to the information in this area because they think it will help them to save money by avoiding waste

QUESTION TOPIC: PROGRAM PARTICIPATION

7a. What do homemakers say or do that indicates that they think learning about nutrition is important?

- they ask questions when they are taking the quizzes

- they ask "Am I doing right when I do..."

7b. What do homemakers say or do that indicates that they think participating in EFNEP results in improvement of dietary habits?

- they say they "eat better" and save money

- they are more open to trying new foods as the lessons progress

QUESTION TOPIC: FOOD BUDGETING

8. What do homemakers say or do that indicates that they think learning how to manage food dollars is important?

- most of them want budgeting information more than any of the other information we teach
- they say that food stamps are lasting longer now than before they began program participation
- sometimes you can see that they have more food available

QUESTION TOPIC: MOTIVATION

9. What motivational techniques have you tried that have improved the attitudes of homemakers you have worked with?

- use a non-authoritarian approach
- smile
- have a good sense of humor
- explain that the program is not part of social services so they will not feel threatened by our presence in the home
- teach lessons using the 2-way approach (be open to learn as well as teach)
- bring food items that the homemaker has been hesitant to try. Trying will help them change their attitude towards the food, whereas talking about it does not
- praise positive changes they make
- always answer honestly
- be open minded
- relate to the level the homemaker is at
- be "human"
- respect homemakers
- don't get "over-friendly"
- don't rush through the lesson just to get done
- get "involved" in the lesson
- have a positive attitude about food/nutrition
- offer support and encouragement

QUESTION TOPIC: SUMMARY

10. How would you describe the difference in homemakers that are/are not motivated to learn new information?

- Homemakers can be divided into two groups: those that are really interested in saving money and improving food habits and those that feel the government owes them food stamps, commodity foods, and EFNEP lessons.

APPENDIX F

TEST ITEMS FOR REVIEW

Please use the attached form to evaluate the ability of these items to assess attitudes regarding "dietary change."

1. I feel ready to learn more about foods and nutrition.

2. I have a lot of questions about how to "eat right."

3. I am interested in learning new ways of doing things.

4. I would like to learn more about nutrition.

5. I consider myself to be a confident person.

6. I feel good about how my life is going.

7. I wish I had more confidence.

8. Many areas of my life are "out of control."

9. I do not feel in control of my life.

10. Learning how to manage my "food dollars" will help me to have more control in my life.

11. I cook about the same way my mother did.

12. I consider myself to be open-minded.

13. I generally like to hear new information.

14. I am receptive to new information.

15. I don't like to hear information that is new to me.

16. I really don't like to change my habits.

17. Because of my low income, I feel trapped in a bad situation.

18. If I try hard, I know I can improve my life.

19. Learning new information is a waste of time.

20. Old habits are hard to change.

21. I don't have much trouble "changing my ways."

22. I want to know if the way I am feeding my family is OK.

23. I like to taste new foods.

24. I don't like to try new recipes.

25. I have improved the way I eat during the past year.

26. I am eating about the same way now as I did a year ago.

27. The way I eat could use a lot of improvement.

28. I like to try foods I have never eaten.

29. I consider myself open to new ideas.

30. There is a lot for me to learn about nutrition.

31. I do not feel like I am in control of choosing the foods my family eats.

32. How I eat doesn't really affect my health.

33. I sometimes feel like it's too hard to feed my family nutritious meals.

34. I enjoy the responsibility of selecting foods for my family.

35. I like to "take charge" of situations.

36. I enjoy eating many types of food.

37. I would really like to make improvements in the way I eat.

38. I've been eating the same way for years.

39. I wish I knew more about nutrition.

40. I like to cook.

41. I enjoy planning menus.

42. I like trying new foods.

43. My parent(s) were not very interested in serving nutritious meals.

44. I wish my family was more concerned with nutrition.

45. I like to make my own decisions about what I eat, but often I eat what everyone else is eating.

46. For the most part, my husband/boyfriend decides what the family will eat.

47. The food I eat has nothing to do with the way I feel.

48. I feel guilty when I eat "junk" food.

49. I think I know a lot about nutrition

50. I don't feel very motivated to shop for and prepare nutritious meals.

51. I have enough information to make good food choices.

52. I consider myself to be a person who can make good decisions.

53. Making decisions is easy for me.

54. The way I eat is too strong of a habit to change easily.

55. I often buy certain foods my family wants, even if I don't think they are nutritious.

56. My friends opinions about me are more important than my own.

57. If snacks are available, I usually eat them.

58. I don't have much will power.

59. When I "eat right" I am proud of myself.

60. I overeat more often than I should.

61. Time I have spent learning about nutrition has been well worth it.

62. I have forgotten most nutrition information I have learned.

63. Nutrition is a boring topic to me.

64. I consider myself to be someone who can manage a food budget well.

65. I am eager to learn new ways to improve my food habits.

66. I tend to ask questions about new information I hear or read.

67. I am not very interested in nutrition.

68. I am proud of myself when I learn to do something better.

o9. I easily forget what I learn.

70. I enjoy eating fruits.

71. I enjoy eating vegetables.

72. I enjoy being active.

73. I enjoy drinking milk or eating cheese.

74. Someday I hope I won't need food stamps.

75. I eat too many:
(check all that apply)

_____ fruits

_____ vegetables

_____ meats

_____ milk/milk products

_____ breads/cereals

_____ sweets

_____ salty foods

76. I eat too few:
(check all that apply)

_____ fruits

_____ vegetables

_____ meats

_____ milk/milk products

_____ breads/cereals

_____ nutritious foods

77. I often talk about nutrition to my friends.

78. I'm not convinced that what I eat affects my health.

79. Teaching children good food habits is important.

80. Eating a variety of foods is the key to good nutrition.

APPENDIX G

Specifications for Development of the Likert Scale

The following steps should be included in development of a Likert scale (Likert, 1974 and Green, 1978)

1. List a large number (75-100) of statements concerning the attitude to be assesed. Likert (1974) states that items should be such that persons with different points of view regarding a particular attitude, will respond differently. If people with different attitudes respond in the same way, the item is unsatisfactory. Items should represent feelings or opinions, not facts. Persons with different attitudes may respond the same to factual statements. Each item should be clear, concise, and straight forward, with no double-barreled statements or double negatives within the item.

2. Classify each item as "favorable" or "unfavorable" with regard to the attitude construct. It is desirable to have about half of the items classified at each end of the continuum to avoid response set.

3. Conduct a pilot test with a sub group of the population in which the respondent checks one of the following descriptors:

a. strongly agree
b. agree
c. undecided
d. disagree
e. strongly disagree

4. Assign a numerical weight to each reponse (e.g. 1-5).

5. Calculate the total attitude score of the individual by summing the weights associated with each response.

6. Calculate the discrimination index for each item. Select items which discriminate between high and low scorers. (greatest difference in means between high and low scorers.

7. Calculate reliability.

8. Correlate the mean item scores against the total mean to see if the numerical values are properly assigned (item differentiation). If the correlation between the individual item and the total item mean is negative, the weights assigned to responses should be reversed. If the correlation is zero or very low, the statements may represent a different attitude construct, or may be factual rather than attitudinal.

APPENDIX H

ATTITUDE QUESTIONNAIRE REVIEW FORM

Item Number _____

	Yes	Questionable	No
1. Is the item clearly written for the EFNEP audience?	_____	_____	_____
2. Is the item free from irrelevant material?	_____	_____	_____
3. Are the grammar and punctuation correct?	_____	_____	_____
4. Is the item worded in such a way that the respondent will feel compelled to select the strongly agree or strongly disagree response (i.e. is the item written so that there is clearly one socially acceptable response)?	_____	_____	_____
5. Does the item adequately represent the purpose of the instrument (i.e. to assess attitudes toward dietary behavioral changes)?	_____	_____	_____
6. Is the item appropriate for the EFNEP homemaker?	_____	_____	_____

Suggested Revisions:

Additional Comments:

APPENDIX I

Aide ID Number: _____

EFNEP SURVEY

Directions for the Aide:

Before you give this survey to the homemakers, please indicate whether you think this homemaker has a ____ positive or a ____ non-positive attitude about changing food behaviors (habits). Read all items to the homemaker (you may have to read some of the items twice). Record the responses on this form.

PART A: Directions (read to the homemaker):

I will read several statements about foods, nutrition, and changing habits. These are opinion statements; there are no right or wrong answers. We need to know how you feel about these topics so we can improve this program. There are several answer choices. Here is a card with the possible answers on it. The neutral choice means you neither agree, nor disagree. Please choose the answer that is closest to the way you feel. Are you willing to participate in this survey? (If yes, go on. If no, go on with the lesson.)

1. *If I try hard, I know I can improve my life.*

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

2. I cook about the same way my mother did.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

3. I consider myself to be open-minded.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

4. I have a lot of questions about how to "eat right."

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

5. I would like to learn more about nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

6. I think I am a confident person.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

7. I feel good about how my life is going.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

8. Many areas of my life are "out of control."

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

9. I generally like to learn new information.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

10. I would really like to make improvements in the way I eat.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

11. I feel guilty when I eat "junk" food.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

12. I think I know a lot about nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

13. Generally, I make good decisions.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

14. I feel I am not in control of my life.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

15. It's important to eat nutritious food.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

16. I've been eating the same way for years.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

17. I wish I knew more about nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

18. I like to cook.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

19. I wish I had more confidence.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

20. I easily forget what I learn.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

21. I think I am open to new ideas.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

22. I like to taste new foods.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

23. I have little trouble "changing my ways."

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

24. Old habits are hard to change.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

25. Making decisions is easy for me.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

26. Because of my low income, I feel trapped in a bad situation.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

27. I often talk about nutrition to my family or friends.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

28. What I eat affects my health.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

29. Teaching children good food habits is important.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

30. Eating many different types of foods is the key to good nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

31. I am disinterested in nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

32. Learning how to manage my grocery money will help me to have more control in my life.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

33. I think I'm good at managing a food budget.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

34. I am eager to learn new ways to improve my food habits.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

35. I like to "take charge" of situations.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

36. The way that I eat is a habit that is too strong to change easily.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

37. I often buy certain foods my family wants, even if I don't think they are nutritious.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

38. My friends' opinions about me are more important than my own.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

39. I have very little will power.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

40. Nutrition is a boring topic to me.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

41. Some people consider me to be a stubborn person.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

42. I don't feel very motivated to prepare nutritious meals.

☐ very strongly agree ☐ strongly agree ☐ neutral

☐ disagree ☐ strongly disagree ☐ very strongly disagree

43. I wish my family would be more concerned with nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

44. I have enough information to make good food choices.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

45. I overeat more often than I should.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

46. Time I have spent learning about nutrition has been well worth it.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

47. I enjoy planning menus.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

48. I like trying new foods.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

49. My parent(s) were not very interested in nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

50. I like to make my own decisions about what I eat.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

51. For the most part, someone other than myself decides what the family will eat.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

52. I dislike trying new recipes.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

53. I have improved the way I eat during the past year.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

54. The way I eat could use a lot of improvement.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

55. I like to try foods I have never eaten.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

56. I am eating no better now than I did a year ago.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

57. Eating habits are related to health.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

58. Sometimes it's too hard to feed my family nutritious meals.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

59. There is a lot for me to learn about nutrition.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

60. I enjoy the responsibility of selecting foods for my family.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

PART B: Directions (read to the homemaker):

The next set of questions relates to your food choices! Please answer according to how you usually eat.

61. I like to eat fruits.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

62. I like to eat vegetables.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

63. I like to eat meat.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

64. I like to eat bread and other grain foods.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

65. I like to eat cheese or drink milk.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

66. I like to eat many different types of foods.

☐ very strongly agree ☐ strongly agree ☐ neutral
☐ disagree ☐ strongly disagree ☐ very strongly disagree

67.

I eat too many: (check all that apply)	I eat too few: (check all that apply)
_____ fruits	_____ fruits
_____ vegetables	_____ vegetables
_____ meats	_____ meats
_____ milk/milk products	_____ milk/milk products
_____ breads/cereals	_____ breads/cereals
_____ sweets	
_____ salty foods	_____ nutritious foods

APPENDIX J

PILOT TEST INSTRUCTIONS FOR PROGRAM AIDES

1. You will be administering the attitude survey to 4 of your regular homemakers during the week of June 16, 1986. Choose 2 homemakers that you feel have a positive attitude about changing food behaviors, and two that do not. It does not matter how long the homemakers have been in the program -- but it is very important to choose 2 with positive attitudes and 2 with non-positive attitudes. This information will help you decide:

   A homemaker with **positive** attitudes toward changing food behavior:

   - is there when you make a home visit
   - is prepared for the lesson
   - acts interested, asks questions, maintains eye contact
   - asks your opinion about their food habits
   - are confident about their homemaking skills
   - are open to new information; do not act threatened or defensive
   - tries new foods/recipes

   A homemaker with **non-positive** attitudes toward changing food behavior:

   - is not home when you visit; does not call to reschedule
   - is not prepared for the lesson
   - does not act interested in the lesson material
   - does not discuss her own food habits
   - is not confident about homemaking skills
   - is not open to new information; acts threatened or defensive
   - does not try new foods/recipes

   Think about these two descriptions, and select 2 homemakers with positive attitudes (as described) that you will be visiting during the week of June 16th. Select 2 homemakers that you feel have non-positive attitudes (as described) that you are scheduled to visit.

2. Before using this survey with the homemakers, take the survey yourself so that:
   (a) you will become familiar with it
   (b) we can see if the test scores of Aides are higher than those of homemakers (If the survey is a good measure of attitude, Aides should score higher than homemakers. We want to see if this is true.)

3. Use the survey with the four homemakers you have selected. The survey will take about 10 minutes. It should not replace the lesson -- just use it before or after your usual lesson. Directions are included on the survey. Notecards with the answer choices are provided. They will help her/him to remember the choices so that you will not have to read them after each item. (The survey used in Muskegon county has just two answers -- a or b. No response cards will be used.) If the homemaker chooses not to participate, proceed on with your scheduled lesson and select a different homemaker to use the survey with.

4. Read each item once. Repeat the item if they ask you to or if they have not responded after several seconds. If they begin to talk about the item, repeat it again and ask them for their answer. Do **not** discuss the statement with them. Do **not** help them decide. If they do not give you an answer, leave the item blank. Do not in any way indicate whether you approve or disapprove of the answers they give. You will be completing a review form on which you will be listing all items that the homemakers had difficulty with. **Please circle or make marks directly on the survey** which will help you remember what problems the homemaker had.

5. After comleting the survey with 4 homemakers, complete the (pink) Review Form. Your comments on this review form are extremely helpful in revising the survey so that it is appropriate for use with EFNEP homemakers.

6. Give the completed homemaker surveys and review forms to your EHE. All information collected from this survey will be analyzed so that Aides and Homemakers remain anonymous. No individual names or comments will be included in the results. **THANK YOU** for your time and cooperation with this important project. I know this pilot test is an extra task in addition to your already busy schedule. It is appreciated! Results of this pilot will be reported at the July 29th Inservice.

APPENDIX K

REVIEW FORM: PROGRAM AIDES

1. What changes need to be made regarding the format of the survey:

   length _____

   layout _____

   size of type _____

2. Which items did the homemakers have difficulty understanding? (list item numbers and describe the problem)

   _____

   _____

   _____

3. How did homemakers feel about taking the survey (interested, bored, apprehensive, etc.)

   _____

   _____

4. How did you feel about giving the survey? Were any items "touchy" or not appropriate for homemakers? Were you uncomfortable about any of the procedures or item statements?

   _____

   _____

   _____

   _____

5. Are any of the directions, statements, or responses unclear?

   _____

   _____

   _____

6. Did homemakers have difficulty understanding how to choose an answer?

   _____

7. Are there any changes you would recommend to make this survey easier for aides to give or for homemakers to take?

   _____

   _____

Thanks for your help!

APPENDIX L

Aide ID Number: _____

EFNEP SURVEY

Directions for the Aide:

Before you give this survey to the homemakers, please indicate whether you think this homemaker has a _____ positive or a _____ non-positive attitude about changing food behaviors (habits). Read all items to the homemaker (you may have to read some of the items twice). Record the responses on this form.

Part A: Directions (read to the homemaker):

I will read several statements about food and nutrition. These are opinion statements; there are no right or wrong answers. We need to know how you feel about these topics so we can improve this program. There are several answer choices. Here is a card with the possible answers on it. Please choose the answer that is closest to the way you feel. Are you willing to participate in this survey? (If yes, continue with the survey. If no, go on with the lesson.)

	completely agree	strongly agree	agree	disagree	strongly disagree	completely disagree
1. It's hard for me to use new ideas.						
2. Improving the way I eat is important to me.						
3. Becoming a success is a matter of hard work; luck has little to do with it.						
4. I feel good about how my life is going.						
5. In general, I feel I am not in control of my life.						
6. It isn't easy to make changes in the way I eat.						
7. Other people are more in control of my life than I am.						
8. I've been eating the same way for years.						
9. I like to cook.						
10. I easily forget what I learn.						
11. Trying new recipes is not worth the trouble.						
12. I can't do much to improve my diet because of my income.						
13. When I am short of money, I feel trapped in a bad situation.						
I often talk about nutrition with my family or friends.						

	completely agree	strongly agree	agree	disagree	strongly disagree	completely disagree
15. I think I'm good at managing a food budget.						
16. I like to "take charge" of situations.						
17. Nutrition is a boring topic to me.						
18. I am motivated to prepare nutritious meals.						
19. I enjoy planning meals.						
20. I like trying new foods.						
21. I have improved the way I eat during the past year.						
22. I enjoy selecting foods for my family.						
23. Many times I feel that it does not do any real good to think about what to do.						
24. A person who gets a good job is just luck to be at the right place at the right time.						
25. Much of what happens to me is probably a matter of chance or luck.						
26. The things that happen to most people are outside their own control.						
27. It isn't wise to plan too far ahead because most things turn out to be a matter of chance anyhow.						
28. When things are going well for me I usually think of it as a run of good luck.						
29. I have usually found that what is going to happen will happen no matter what I think or do about it.						
30. Most of the things that have disappointed me in my life have come because my luck ran out.						
31. Success is mostly a matter of getting good breaks.						
32. Many times I feel that I have little influence over the things that happen to me.						
33. Sometimes I feel that I don't have enough control over the way my life is going.						

35. How many times per day do you eat:

	one	two	three	four	five or more
vegetables					
fruit or fruit juice					
soft drinks					
cheese or milk					
bread or other grain foods					
meat, eggs, poultry, or fish					
dried beans, split peas, nuts or peanut butter					
sweets (cookies, candies, cakes, etc.)					

36. Do you take a supplement (vitamin/mineral pills):

_____yes _____ no

37. If so, what type (i.e. vitamin C, protein, multiple, etc.):

_____

Thank you for answering these questions. We appreciate your help!

Aide ID Number: _____

EFNEP SURVEY

Directions for the Aide:

Before you give this survey to the homemakers, please indicate whether you think this homemaker has a _____ positive or a _____ non-positive attitude about changing food behaviors (habits). Read all items to the homemaker (you may have to read some of the items twice). Record the responses on this form.

Part A: Directions (read to the homemaker):

I will read several statements about food and nutrition. These are opinion statements; there are no right or wrong answers. We need to know how you feel about these topics so we can improve this program. Choose an answer from 0 to 10. 0 = no agreement at all; 10 = complete agreement. The more you agree with the statement the higher the number you should give for your answer (up to 10). Five (5) represents a "middle" level of agreement. Please choose the answer that is closest to the way you feel. Are you willing to participate in this survey? (If yes, continue with the survey. If no, go on with the lesson.)

10 = complete agreement
0 = no agreement

1.	It's hard for me to use new ideas.	Answer: _____
2.	Improving the way I eat is important to me.	Answer: _____
3.	Becoming a success is a matter of hard work; luck has little to do with it.	Answer: _____
4.	I feel good about how my life is going.	Answer: _____
5.	In general, I feel I am not in control of my life.	Answer: _____
6.	It isn't easy to make changes in the way I eat.	Answer: _____
7.	Other people are more in control of my life than I am.	Answer: _____
8.	I've been eating the same way for years.	Answer: _____
9.	I like to cook.	Answer: _____
10.	I easily forget what I learn.	Answer: _____
11.	Trying new recipes is not worth the trouble.	Answer: _____
12.	I can't do much to improve my diet because of my income.	Answer: _____
13.	When I am short of money, I feel trapped in a bad situation.	Answer: _____
14.	I often talk about nutrition with my family or friends.	Answer: _____
15.	I think I'm good at managing a food budget.	Answer: _____

16. I like to "take charge" of situations. Answer: _____

17. Nutrition is a boring topic to me. Answer: _____

18. I am motivated to prepare nutritious meals. Answer: _____

19. I enjoy planning meals. Answer: _____

20. I like trying new foods. Answer: _____

21. I have improved the way I eat during the past year. Answer: _____

22. I enjoy selecting foods for my family. Answer: _____

23. Many times I feel that it does not do any real good to think about what to do. Answer: _____

24. A person who gets a good job is just luck to be at the right place at the right time. Answer: _____

25. Much of what happens to me is probably a matter of chance or luck. Answer: _____

26. The things that happen to most people are outside their own control. Answer: _____

27. It isn't wise to plan too far ahead because most things turn out to be a matter of chance anyhow. Answer: _____

28. When things are going well for me I usually think of it as a run of good luck. Answer: _____

29. I have usually found that what is going to happen will happen no matter what I think or do about it. Answer: _____

30. Most of the things that have disappointed me in my life have come because my luck ran out. Answer: _____

31. Success is mostly a matter of getting good breaks. Answer: _____

32. Many times I feel that I have little influence over the things that happen to me. Answer: _____

33. Sometimes I feel that I don't have enough control over the way my life is going. Answer: _____

Part B: Dirctions (read to the homemaker):

34. How much does each of the following affect whether you buy a food or not. There are 5 choices. Use the number 1 for the answer that affects your food choices the most. Continue to rank by using the numbers 2, 3, 4, and 5. The answer that affects your choice the least should have the number 5.

_____ cost _____ taste _____ ease of preparation

_____ nutritional value _____ family likes it

Part B: Directions (read to the homemaker):

34. How much does each of the following affect whether you buy a food or not. There are 5 choices. Use the number 1 for the answer that affects your food choices the most. Continue to rank by using the numbers 2, 3, 4, and 5. The answer that affects your choice the least should have the number 5.

_____ cost
_____ taste
_____ nutritional value
_____ ease of preparation
_____ family likes it

35. How many times per day do you eat:

	one	two	three	four	five or more
vegetables					
fruit or fruit juice					
soft drinks					
cheese or milk					
bread or other grain foods					
meat, eggs, poultry, or fish					
dried beans, spilt peas, nuts or peanut butter					
sweets (cookies, candies, cakes, etc.)					

36. Do you take a supplement (vitamin/mineral pills):

_____ yes _____ no

37. If so, what type (i.e. vitamin C, protein, multiple, etc.):

_____

Thank you for answering these questions. We appreciate your help!

APPENDIX M

PILOT TEST: DISCRIMINATION AND DIFFICULTY INDICES

Number	Item	Difficulty Index	Discrimination Index
1.	It's hard for me to use new ideas	69.7	.30
2.	Improving the way I eat is important to me	68.2	.08
3.	Becoming a succes is a matter of hard work; luck has little to do with it	71.2	.30
4.	I feel good about how my life is going	61.7	.18
5.	In general, I feel I am not in control of my life	65.2	.34
6.	It isn't easy to make changes in the way I eat	53.0	.30
7.	Other people are more in control of my life than I am	65.2	.35
8.	I've been eating the same way for years	54.5	.17
9.	I like to cook	63.6	.13
10.	I easily forget what I learn	75.8	.38
11.	Trying new recipes is not worth the trouble	80.0	.22
12.	I can't do much to improve my diet because of my income	63.6	.42
13.	When I am short of money, I feel trapped in a bad situation	14.9	.05
14.	I often talk about nutrition with my family or friends	69.2	.27
15.	I think I'm good at managing a food budget	78.5	.38
16.	I like to take charge of situations	74.3	.35
17.	Nutrition is a boring topic to me	68.2	.17

18.	I am motivated to prepare nutritious meals	75.5	.17
19.	I enjoy planning meals	74.3	.25
20.	I like trying new foods	80.0	.08
21.	I have improved the way I eat in the past year	74.3	.34
22.	I enjoy selecting foods for my family	80.0	.17
23.	Many times I feel that it does not do any real good to think about what I do	72.7	.17
24.	A person who gets a good job is just lucky	96.7	.38
25.	Much of what happens to me is probably a matter of luck or chance	72.7	.30
26.	The things that happen to most people are outside their control	74.3	.38
27.	It isn't wise to plan too far ahead because most things turn out to be a matter of chance anyhow	59.1	.18
28.	When things are going well for me I think of it as a run of luck	69.7	.42
29.	I have usually found that what is	72.7	.34
30.	Most of the things that have disappointed me in my life have come because my luck ran out	75.8	.43
31.	Success is mostly a matter of getting good breaks	74.3	.50
32.	Many times I feel that I have little influence over the things that happen to me	75.8	.43
33.	Sometimes I feel that I don't have enough control over the way my life is going	66.7	.43

APPENDIX N

Aide I.D. No: _____
Aide Code No: _____
Homemaker I.D. _____
Lesson No: _____
Aide Experience (years) _____

County _____

EFNEP SURVEY

Directions:

This survey has three sets of questions. The first part deals with your opinions about some general areas. The second part asks for your opinions about nutrition. The last part relates to your usual pattern of eating. Please answer all questions based on how much you agree or disagree with the statement. There are no right or wrong answers since this survey is about feelings and opinions. All responses will be treated confidentially.

PART A: General Questions	1 strongly agree	2 agree	3 neither agree or disagree	4 disagree	5 strongly disagree
1. I feel good about how my life is going.					
2. Success is mostly a matter of getting good breaks.					
3. I like to "take charge" of situations.					
4. Much of what happens to me is probably a matter of chance or luck.					
5. The things that happen to most people are outside their own control.					
6. In general, I don't like to make changes.					

PART B: Nutrition Questions					
7. Improving the way I eat is important to me.					
8. I can't do much to improve the way I eat because of my income.					
9. I often talk about nutrition with my family or friends.					
10. Nutrition is not a priority in my life.					
11. I am motivated to prepare nutritious meals.					
12. The way I eat now doesn't need improvement.					
13. It would benefit me to improve the way I eat.					
14. Nutrition is a boring topic to me.					
15. There are not enough advantages to improving my diet to make it worth the effort.					

PART B: Nutrition Questions (cont.)

	strongly agree	agree	neither agree or disagree	disagree	strongly disagree
16. There are many things I am more concerned with than improving my eating habits.					
17. How convenient a food is to prepare affects whether I use it.					
18. The price of a food affects whether I buy it.					

PART C: Food Habits

Write the number 1 next to the answer that is the most important reason you choose foods as you do; give a number "2" to the seocnd most important reason; and use "3" for the least important reason.

19. How do nutritional value, taste, and cost affect your food choices? (1 = most important; 3 = least important)

_____ taste/flavor _____ nutritional value _____ cost

20. The improvements I have made in the way I eat have been: (1 = best reason; 3 = worst reason)

_____ to improve my health _____ to save money

_____ because of new information I have learned

21. The biggest reason I have not made more improvements in the way I eat is: (1 = most important reason; 3 = least important reason)

_____ it's too hard to change my food habits.

_____ it probably won't result in any benefit to me.

_____ I am too busy with other things.

22. How many servings of each of these types of food do you usually eat every day?

	0	1-2 times per week	1	2	3	4
vegetables						
fruit or fruit juice						
soft drinks						
cheese/milk						
bread/pasta/grain foods						
meat, eggs, poultry, or fish						
dried beans, split peas, nuts, peanut butter						
sweets (cookies, candies, cakes, etc.)						

23. Do you take a nutritional supplement (pill)?

_____ yes _____ no

24. If yes, what type? _____

THANK YOU FOR YOUR PARTICIPATION!

APPENDIX O

Aide ID Number: _____

POWERLESSNESS SURVEY

Read to the Homemaker: We need your help in answering some questions that will help us to improve this program. I will read several statements about various topics. They are opinions that have been collected from many different people. There are no right or wrong answers; for each item there is a large number of people that agree and disagree. Please show whether you agree or disagree by choosing one of these responses: "completely agree" if you completely agree with the statement. Choose "strongly agree" if you agree quite strongly with the statement. Select "agree" if you are somewhat in agreement with the statement. Choose "neutral" if you neither disagree nor agree with the statement. Choose disagree if you are somewhat in disagreement with the statement. Choose "strongly disagree" if you are in strong disagreement with the statement. Choose "completely disagree" if you completely disagree with the statement. I will not put your name on this survey. You will remain anonymous. Are you willing to participate in this survey? (If yes, go on. If no, go on with the lesson.)

	completely agree	strongly agree	agree	neutral	disagree	strongly disagree	completely disagree
1. I think we will always have wars between countries no matter what we do to try to stop them.							
2. If you are successful you will usually have more good breaks than bad breaks.							
3. Many times I feel that it does not do any real good to think about what to do.							
4. A person who gets a good job is just lucky to be at the right place at the right time.							
5. I don't understand why other people act toward me the way that they do.							
6. Much of what happens to me is probably a matter of chance or luck.							
7. I feel I have little influence over the way other people act.							
8. It is very hard to figure out what the future will be.							
9. The ordinary person has very little control over what politicians do.							

	completely agree	strongly agree	agree	neutral	disagree	strongly disagree	completely disagree
10. The things that happen to most people are outside their own control.							
11. It isn't wise to plan too far ahead because most things turn out to be a matter of chance anyhow.							
12. You can't really tell how other people are going to act.							
13. When things are going well for me I usually think of it as a run of good luck.							
14. Most people don't realize how much their lives are influenced by things that just accidently happen.							
15. I have usually found that what is going to happen will happen no matter what I think or do about it.							
16. Most of the things that have disappointed me in my life have come because my luck ran out.							
17. I don't really believe the saying that a person can be "The master of his fate."							
18. Success is mostly a matter of getting good breaks.							
19. What happens in the world seems to be beyond the control of most people.							
20. I feel that most people can't really be held responsible for their actions.							
21. Many times the way people act has absolutely no reason behind it.							
22. Success in working with other people depends much more on the way they feel than how I feel.							
23. Many times I feel that I have little influence over the things that happen to me.							
24. Sometimes I feel that I don't have enough control over the way my life is going.							
25. To get ahead you have to gamble on things that you are unsure of.							

Thank you for your help by completing the survey.

Aide ID Number: _____

WHAT DO YOU THINK?

We hope you will help us improve our program by participating in a survey. There are several items here regarding how people feel about events in our lives. Each item has two choices lettered a or b. Choose the statement which you actually believe to be most true as far as you are concerned. Choose the one choice of each pair that represents how you feel. Are you willing to participate? (If yes, go on. If no, go on with the lesson.)

This is a survey of personal opinions -- there are no right or wrong answers.

Which statement in each pair do you agree with more?

1.

a. Many of the unhappy things in people's lives are partly due to bad luck.

b. People's misfortunes result from the mistakes they make.

2.

a. In the long run, people get the respect they deserve.

b. Unfortunately, people often don't get credit for what they do no matter how hard they try.

3.

a. Without the right breaks, one cannot be a good leader.

b. Being a good leader depends on having many skills.

4.

a. No matter how hard you try, some people just don't like you.

b. People who are not liked, often do not try very hard to be liked.

5.

a. Becoming a success is a matter of hard work; luck has little or nothing to do with it.

b. Getting a good job depends mainly on being in the right place at the right time.

6.

a. The average citizen can have an influence in government decisions.

b. This world is run by the few people in power, and there is not much the little guy can do about it.

What Do You Think?

7.

a. When I make plans, I am almost certain that I can make them work.

b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

8.

a. In my case, getting what I want has little or nothing to do with luck.

b. Many times we might just as well decide what to do by flipping a coin.

9.

a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

b. Getting "to the top" depends upon ability; luck has little or nothing to do with it.

10.

a. As far as world affairs are concerned, most of us are the victims of forces we cannot understand or control.

b. By taking an active part in political and social affairs, the people can influence world events.

11.

a. Most people don't realize how much their lives are controlled by chance.

b. There really is no such thing as "luck."

12.

a. It is hard to know whether or not a person really likes you.

b. You can usually tell when a person likes you.

13.

a. With enough effort, we can wipe out political corruption.

b. It is difficult for people to have much control over the things politicians do.

14.

a. Many times I feel that I have little control over the things that happen to me.

b. It is impossible for me to believe that chance or luck plays an important role in my life.

What Do You Think?

15.

a. People are lonely because of their own personality.

b. There is not much use in trying too hard to please people; if they like you, they like you.

16.

a. Most of the time I can't understand why politicians behave the way they do.

b. In the long run, the people are responsible for bad government.

APPENDIX P

MICHIGAN EXPANDED FOOD & NUTRITION EDUCATION PROGRAM
EFNEP Reporting Project

24-HOUR DIETARY FOOD RECALL

Aide's Name_____ Date_____

Aide's ID#_____ Report Period: ___April ___October

Family Name_____ Computer Use: ___yes ___no

Family ID#_____ Food Recall Number_____

FOOD	AMOUNT	FOOD CODE	NUMBER OF SERVINGS	MILK	MEAT	FRUIT & VEG.	BREAD & CEREAL	OTHER
Meal 1								
Snack								
Meal 2								
Snack								
Meal 3								
Snack								
			Total Number Servings					

Is the homemaker pregnant or lactating? ___yes ___no

Amount spent on food: $_____

NUTRITION SPOTCHECK REPORT

Percent of RDA

_____Calories	_____Alcohol	_____Niacin	_____Calcium
_____Protein	_____Vitamin A	_____Vitamin C	_____Sodium
_____Fat	_____Thiamine	_____Vitamin D	_____Potassium
_____Carbohydrate	_____Riboflavin	_____Iron	_____Zinc

Number of Servings

_____Milk	_____Fruits & Vegetables
_____Meat	_____Bread & Cereal
	_____Other

Food Recall Score_____

Computer Record Date_____

Revised 09/85
NCCI Project

SCORING TABLE FOR TWENTY-FOUR HOUR DIET

To find the Twenty-four Hour Diet score:

1. Select the appropriate table (below) on the basis of the number of *milk* servings reported in Item 7, FAMILY RECORD-B (0, 1, (2) or more). NOTE: Circled numbers ((2), (4)) are the highest score possible in a food group. For number of servings larger than the circled number, use the circled number. Example, for 3 servings of milk, use the (2) MILK SERVINGS table.
2. Select the proper column of the table on the basis of the number of *meat* servings reported in Item 8.
3. Select the proper area of the table on the basis of the number of *vegetable/fruit* servings reported in Item 9 (0, 1, 2, 3, (4) or more).
4. Find the proper line of the table on the basis of the number of *bread/cereal* servings reported in Item 10.

The number to the right of this (in type style "74") is the Twenty-four Hour Diet score. Enter the diet score at the appropriate "months in program" time on the homemaker's FOOD AND NUTRITION PROGRESSION RECORD.

0 MILK SERVINGS

0 MEAT SERVINGS			1 MEAT SERVING			(2) MEAT SERVINGS		
Veg. Fruit	Bread Cereal	Score	Veg. Fruit	Bread Cereal	Score	Veg. Fruit	Bread Cereal	Score
0	0	0	0	0	3	0	0	8
	1	2		1	10		1	14
	2	4		2	12		2	17
	3	6		3	16		3	26
	(4)	8		(4)	23		(4)	29
1	0	2	1	0	10	1	0	14
	1	9		1	22		1	27
	2	11		2	26		2	36
	3	13		3	33		3	39
	(4)	21		(4)	37		(4)	43
2	0	4	2	0	12	2	0	17
	1	11		1	26		1	36
	2	13		2	33		2	39
	3	21		3	37		3	43
	(4)	25		(4)	41		(4)	47
3	0	6	3	0	16	3	0	26
	1	13		1	33		1	39
	2	21		2	37		2	43
	3	25		3	41		3	47
	(4)	29		(4)	46		(4)	80
(4)	0	8	(4)	0	23	(4)	0	29
	1	21		1	37		1	43
	2	25		2	41		2	47
	3	29		3	46		3	80
	(4)	33		(4)	58		(4)	85

1 MILK SERVING

0 MEAT SERVINGS			1 MEAT SERVING			(2) MEAT SERVINGS		
Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score
0	0	3	0	0	11	0	0	16
	1	10		1	24		1	28
	2	12		2	27		2	37
	3	16		3	35		3	41
	(4)	23		(4)	39		(4)	46
1	0	10	1	0	24	1	0	29
	1	22		1	42		1	52
	2	26		2	50		2	56
	3	33		3	54		3	60
	(4)	37		(4)	58		(4)	64
2	0	12	2	0	27	2	0	37
	1	26		1	50		1	56
	2	33		2	56		2	62
	3	37		3	60		3	66
	(4)	41		(4)	64		(4)	79
3	0	16	3	0	35	3	0	41
	1	33		1	64		1	60
	2	37		2	60		2	66
	3	41		3	64		3	79
	(4)	46		(4)	77		(4)	85
(4)	0	23	(4)	0	39	(4)	0	46
	1	37		1	58		1	64
	2	41		2	64		2	79
	3	46		3	77		3	85
	(4)	58		(4)	82		(4)	91

(2) MILK SERVINGS

0 MEAT SERVINGS			1 MEAT SERVING			(2) MEAT SERVINGS		
Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score
0	0	8	0	0	16	0	0	21
	1	14		1	28		1	38
	2	17		2	37		2	43
	3	26		3	41		3	47
	(4)	29		(4)	46		(4)	61
1	0	14	1	0	29	1	0	39
	1	27		1	52		1	68
	2	36		2	56		2	82
	3	39		3	60		3	86
	(4)	43		(4)	64		(4)	80
2	0	17	2	0	37	2	0	43
	1	36		1	56		1	82
	2	39		2	62		2	86
	3	43		3	66		3	92
	(4)	47		(4)	79		(4)	88
3	0	26	3	0	41	3	0	47
	1	39		1	60		1	66
	2	43		2	66		2	82
	3	47		3	79		3	88
	(4)	60		(4)	86		(4)	94
(4)	0	29	(4)	0	46	(4)	0	61
	1	43		1	64		1	80
	2	47		2	79		2	86
	3	60		3	85		3	94
	(4)	86		(4)	91		(4)	100

APPENDIX Q

Pre Test Item Analysis Results: Homemaker Attitude Survey
(n = 130)

ITEM		DIFFICULTY INDEX	DISCRIMINATION INDEX
1.	I feel good about how my life is going.	24	37
2.	Success is mostly a matter of getting good breaks.	12	31
3.	I like to "take charge" of situations.	15	29
4.	Much of what happens to me is probably a matter of chance or luck.	18	43
5.	The things that happen to most people are outside their own control.	8	20
6.	In general, I don't like to make changes.	15	46
7.	Improving the way I eat is important to me.	47	89
8.	I can't do much to improve the way I eat because of my income.	9	26
9.	I often talk about nutrition with my family or friends.	8	26
10.	Nutrition is not a priority in my life.	15	43
11.	I am motivated to prepare nutritious meals.	18	51
12.	The way I eat now doesn't need improvement.	17	49
13.	It would benefit me to improve the way I eat.	35	71
14.	Nutrition is a boring topic to me.	26	83
15.	There are not enough advantages to improving my diet to make it worth the effort.	19	60
16.	There are many things I am more concerned with than improving my eating habits.	5	20
17.	How convenient a food is to prepare affects whether I use it.	26	14
18.	The price of a food affects whether I buy it.	22	40

Standard deviation = 3.25

Variance = 10.60

Mean item difficulty = 18

Mean item discrimination = 43

Post Test Item Analysis Results: Homemaker Attitude Survey

(n = 177)

ITEM		DIFFICULTY INDEX	DISCRIMINATION INDEX
1.	I feel good about how my life is going.	28	47
2.	Success is mostly a matter of getting good breaks.	15	34
3.	I like to "take charge" of situations.	16	22
4.	Much of what happens to me is probably a matter of chance or luck.	12	33
5.	The things that happen to most people are outside their own control.	14	20
6.	In general, I don't like to make changes.	13	30
7.	Improving the way I eat is important to me.	52	78
8.	I can't do much to improve the way I eat because of my income.	18	51
9.	I often talk about nutrition with my family or friends.	16	45
10.	Nutrition is not a priority in my life.	27	56
11.	I am motivated to prepare nutritious meals.	31	70
12.	The way I eat now doesn't need improvement.	7	23
13.	It would benefit me to improve the way I eat.	27	49
14.	Nutrition is a boring topic to me.	32	72
15.	There are not enough advantages to improving my diet to make it worth the effort.	31	70
16.	There are many things I am more concerned with than improving my eating habits.	13	34
17.	How convenient a food is to prepare affects whether I use it.	8	21
18.	The price of a food affects whether I buy it.	21	41

Standard deviation = 3.39

Variance = 11.51

Mean item difficulty = 22

Mean item discrimination = 38

Aide I.D. No: _____
Aide Code No: _____
Homemaker I.D. _____
Lesson No: _____
Aide Experience (years) _____

Post Test Item Analysis for homemakers
EFNEP SURVEY
n = 177

Directions:

This survey has three sets of questions. The first part deals with your opinions about some general areas. The second part asks for your opinions about nutrition. The last part relates to your usual pattern of eating. Please answer all questions based on how much you agree or disagree with the statement. There are no right or wrong answers since this survey is about feelings and opinions. All responses will be treated confidentially.

	strongly agree	agree	neither agree or disagree	disagree	strongly disagree
PART A: General Questions					
1. I feel good about how my life is going.	28*	51	12	6	3
2. Success is mostly a matter of getting good breaks.	8	24	17	36	15*
3. I like to "take charge" of situations.	16*	48	24	10	2
4. Much of what happens to me is probably a matter of chance or luck.	6	19	14	49	12*
5. The things that happen to most people are outside their own control.	5	13	19	49	14*
6. In general, I don't like to make changes.	4	19	11	53	13*
PART B: Nutrition Questions					
7. Improving the way I eat is important to me.	52*	44	3	1	0
8. I can't do much to improve the way I eat because of my income.	7	14	8	53	18*
9. I often talk about nutrition with my family or friends.	16*	61	14	9	1
10. Nutrition is not a priority in my life.	6	11	10	46	27*
11. I am motivated to prepare nutritious meals.	31*	53	9	6	0
12. The way I eat now doesn't need improvement.	7*	18	14	54	7*
13. It would benefit me to improve the way I eat.	27*	57	7	5	3
14. Nutrition is a boring topic to me.	2	5	6	56	32*
15. There are not enough advantages to improving my diet to make it worth the effort.	3	2	9	54	31*

PART B: Nutrition Questions (cont.)	strongly agree	agree	neither agree disagree	disagree	strongly dis.	
16. There are many things I am more concerned with than improving my eating habits.	6	15	19	47	13*	
17. How convenient a food is to prepare affects whether I use it.	4	31	17	40	8*	
18. The price of a food affects whether I buy it.	21*	50	10	16	2	

PART C: Food Habits

Write the number 1 next to the answer that is the most important reason you choose foods as you do; give a number "2" to the seocnd most important reason; and use "3" for the least important reason.

19. How do nutritional value, taste, and cost affect your food choices? (1 = most important; 3 = least important)

    21 taste/flavor 45 nutritional value 25 cost

20. The improvements I have made in the way I eat have been: (1 = best reason; 3 = worst reason)

    50 to improve my health 14 to save money

    27 because of new information I have learned

21. The biggest reason I have not made more improvements in the way I eat is: (1 = most important reason; 3 = least important reason)

    52 it's too hard to change my food habits.

    8 it probably won't result in any benefit to me.

    28 I am too busy with other things.

22. How many servings of each of these types of food do you usually eat every day?

	0	1-2 times per week	1	2	3	4
vegetables						
fruit or fruit juice						
soft drinks						
cheese/milk						
bread/pasta/grain foods						
meat, eggs, poultry, or fish						
dried beans, split peas, nuts, peanut butter						
sweets (cookies, candies, cakes, etc.)						

23. Do you take a vitamin supplement (pill)?

    _____ yes _____ no

24. If yes, what type? _____

THANK YOU FOR YOUR PARTICIPATION!

Pre Test Item Analysis Results: Aide Attitude Survey
(n = 67)

ITEM		DIFFICULTY INDEX	DISCRIMINATIO INDEX
1.	I feel good about how my life is going.	46	61
2.	Success is mostly a matter of getting good breaks.	31	67
3.	I like to "take charge" of situations.	25	22
4.	Much of what happens to me is probably a matter of chance or luck.	39	61
5.	The things that happen to most people are outside their own control.	22	44
6.	In general, I don't like to make changes.	25	61
7.	Improving the way I eat is important to me.	64	61
8.	I can't do much to improve the way I eat because of my income.	60	83
9.	I often talk about nutrition with my family or friends.	48	78
10.	Nutrition is not a priority in my life.	46	77
11.	I am motivated to prepare nutritious meals.	54	88
12.	The way I eat now doesn't need improvement.	13	16
13.	It would benefit me to improve the way I eat.	40	45
14.	Nutrition is a boring topic to me.	40	83
15.	There are not enough advantages to improving my diet to make it worth the effort.	48	67
16.	There are many things I am more concerned with than improving my eating habits.	12	39
17.	How convenient a food is to prepare affects whether I use it.	13	0
18.	The price of a food affects whether I buy it.	25	22

Standard deviation = 3.96

Variance = 15.73

Mean item difficulty = 37

Mean item discrimination = 54

Item Analysis Results: Aide Post Test Survey
(n = 44)

ITEM		DIFFICULTY INDEX	DISCRIMINATION INDEX
1.	I feel good about how my life is going.	34	27
2.	Success is mostly a matter of getting good breaks.	20	55
3.	I like to "take charge" of situations.	14	9
4.	Much of what happens to me is probably a matter of chance or luck.	32	73
5.	The things that happen to most people are outside their own control.	23	64
6.	In general, I don't like to make changes.	9	18
7.	Improving the way I eat is important to me.	68	55
8.	I can't do much to improve the way I eat because of my income.	41	82
9.	I often talk about nutrition with my family or friends.	52	55
10.	Nutrition is not a priority in my life.	34	82
11.	I am motivated to prepare nutritious meals.	50	91
12.	The way I eat now doesn't need improvement.	14	27
13.	It would benefit me to improve the way I eat.	27	36
14.	Nutrition is a boring topic to me.	55	82
15.	There are not enough advantages to improving my diet to make it worth the effort.	55	91
16.	There are many things I am more concerned with than improving my eating habits.	16	45
17.	How convenient a food is to prepare affects whether I use it.	16	45
18.	The price of a food affects whether I buy it.	11	9

Standard deviation = 3.80

Variance = 14.46

Mean item difficulty = 30

Mean item discrimination = 45

Aide I.D. No: _____
Aide Code No: _____
Homemaker I.D. _____
Lesson No: _____
Aide Experience (years) _____

Post Test Item Analysis for Program Aides
EFNEP SURVEY
(n = 44)

Directions:

This survey has three sets of questions. The first part deals with your opinions about some general areas. The second part asks for your opinions about nutrition. The last part relates to your usual pattern of eating. Please answer all questions based on how much you agree or disagree with the statement. There are no right or wrong answers since this survey is about feelings and opinions. All responses will be treated confidentially.

PART A: General Questions	strongly agree	agree	neither agree or disagree	disagree	strongly disagree
1. I feel good about how my life is going.	34*	50	9	2	2
2. Success is mostly a matter of getting good breaks.	0	9	20	50	20*
3. I like to "take charge" of situations.	14*	52	16	16	2
4. Much of what happens to me is probably a matter of chance or luck.	0	0	18	50	32*
5. The things that happen to most people are outside their own control.	2	5	18	52	23*
6. In general, I don't like to make changes.	2	14	18	50	9*

PART B: Nutrition Questions					
7. Improving the way I eat is important to me.	68*	25	5	2	0
8. I can't do much to improve the way I eat because of my income.	2	0	11	43	41*
9. I often talk about nutrition with my family or friends.	52*	45	2	0	0
10. Nutrition is not a priority in my life.	5	5	11	45	34*
11. I am motivated to prepare nutritious meals.	50*	43	5	2	0
12. The way I eat now doesn't need improvement.	0	9	18	59	14*
13. It would benefit me to improve the way I eat.	27*	57	5	9	2
14. Nutrition is a boring topic to me.	2	2	2	39	55*
15. There are not enough advantages to improving my diet to make it worth the effort.	2	0	2	41	55*

PART B: Nutrition Questions (cont.)	strongly agree	agree	neither agree disagree	disagree	strongly disagree	
16. There are many things I am more concerned with than improving my eating habits.	2	16	23	43	16*	
17. How convenient a food is to prepare affects whether I use it.	5	9	27	43	16*	
18. The price of a food affects whether I buy it.	11*	41	23	16	9	

PART C: Food Habits

Write the number 1 next to the answer that is the most important reason you choose foods as you do; give a number "2" to the seocnd most important reason; and use "3" for the least important reason.

19. How do nutritional value, taste, and cost affect your food choices? (1 = most important; 3 = least important)

    41 taste/flavor 48 nutritional value 9 cost

20. The improvements I have made in the way I eat have been: (1 = best reason; 3 = worst reason)

    57 to improve my health 5 to save money

    36 because of new information I have learned

21. The biggest reason I have not made more improvements in the way I eat is: (1 = most important reason; 3 = least important reason)

    50 it's too hard to change my food habits.

    0 it probably won't result in any benefit to me.

    34 I am too busy with other things.

22. How many servings of each of these types of food do you usually eat every day?

	0	1-2 times per week	1	2	3	4
vegetables						
fruit or fruit juice						
soft drinks						
cheese/milk						
bread/pasta/grain foods						
meat, eggs, poultry, or fish						
dried beans, split peas, nuts, peanut butter						
sweets (cookies, candies, cakes, etc.)						

23. Do you take a vitamin supplement (pill)?

    _____ yes _____ no

24. If yes, what type? _____

THANK YOU FOR YOUR PARTICIPATION!

LIST OF REFERENCES

LIST OF REFERENCES

Ajzen, I., and M. Fishbein. Understanding attitudes and predicting social behavior, Englewood Cliffs, NJ: Prentice-Hall, Inc., 1980, pp. 41-91.

Alford, H. and S. Ekvall. Variability of dietary assessment values among nutrition students. Journal of the American Dietetic Association 84:71-74, 1984.

Allport, G.W. Attitudes, In A handbook of social psychology. C.A. Murchison, ed. New York: Russell & Russell, 1935, pp. 798-884.

Axelson, J.M. Repeated measurements in evaluation. Journal of Nutrition Education 16:12-14, 1984.

Baird, P.C. and H.G. Schutz. The marketing concept applied to "selling" good nutrition. Journal of Nutrition Education 8:13-17, 1976.

Beaton, G.H., J. Milner, P. Corey, V. McGuire, M. Cusins, E. Stewart, M. de Ramos, D. Hewitt, P.V. Grambsch, N. Kassim, and J.A. Little. Sources of variance in 24-hour dietary recall data: Implications for nutrition study design and interpretation. American Journal of Clinical Nutrition 32:2546-59, 1979.

Bem, D.J. Beliefs, attitudes and human affairs. Belmont, CA: Brook and Cole, 1970, pp.66-70.

Blalock, H.M. Jr. Beyond ordinal measurement: Weak tests of strong theories. In Measurement in the social sciences: Theories and strategies. Chicago: Aldine Publishers, 1974, pp. 424-33.

Block, A., S. Laughlin, A. DelTredici, and C. Omelich. Executive Summary: The California EFNEP Evaluation Study, 1984, 6pp.

Bohrnstedt, G.W., and T.M Carter. Robustness in regression analysis, In Sociological methodology. H.L. Costner, ed. San Francisco: Jossey-Bass, 1971, pp. 116-22.

Brehm, J. Post-decision changes in desirability of alternatives. Journal of Abnormal and Social Psychology 52:384-89, 1956.

Brush, K.H., D.M. Woolcott, and G. F. Kawash. Evaluation of an affective-based adult nutrition education program. Journal of Nutrition Education 18:258-64, 1986.

Byrd-Bredbenner, C., L.H. O'Connell, B. Shannon, and J.M. Eddy. A nutrition curriculum for health education: Its effect on students' knowledge, attitude, and behavior. Journal of School Health 54:385-88, 1984.

Campbell, D.T. Social attitudes and other acquired behavioral dispositions, In Psychology: A study of a science. S. Koch, ed. New York: McGraw-Hill, 1963, pp. 94-164.

Campbell, D.T. and J.C. Stanley. Experimental and quasi-experimental design for research. Boston: Houghton Mifflin Co., 1963, pp. 24-25.

Carlson, E.R. Attitude change through modification of attitude structure. Journal of Abnormal and Social Psychology 52:256-61, 1956.

Carmines, E.G., and R. A Zeller. Reliability and validity assessment. J. Sullivan, Ed. Beverly Hills: Sage Publications, 1979, p. 48.

Carruth, B.R., and H L. Anderson. Scaling criteria in developing and evaluating an instrument. Journal of the American Dietetic Association 70:42-47, 1977.

Carruth, B.R., M. Mangel, and H.L. Anderson. Assessing change-proneness and nutrition-related behaviors. Journal of the American Dietetic Association 70:47-52, 1977.

Connell, D.B., R.R. Turner, and C.F. Mason. Summary of findings of the school health education evaluation: Health promotion effectiveness, implementation, and costs. Journal of School Health 55:316-21, 1985.

Cooperative Extension Service. Program evaluation in Extension: A comprehensive study of methods, practices, and procedures. 1981, pp 77-80.

Cosper,B.A., and L.M. Wakefield. Food choices of women. Journal of the American Dietetic Association 66:152-55, 1975.

Daelhousen, B.B., and H.A. Guthrie. A self-instruction nutrition program for pregnant women. Journal of the American Dietetic Association 81:407-12, 1982.

Dalton, S.D., R.A. Linke, and M.D. Simko. Worksite food choices: An investigation of intended and actual selections. Journal of Nutrition Education 18:182-86, 1986.

Davie, L.R., R.O. Butler, B. Williams, and S. Meiners. Final Report: A study of certain personality, skill, and demographic characteristics of the Expanded Food and Nutrition Education Program aides and homemakers. Washington State University Cooperation Extension Service, 1973, 141 pp.

Doob, L.W. The behavior of attitudes. Psychological Review 54:135-56, 1947.

Eden, I., S.K. Kamath, M.B. Kohrs, and R.E. Olson. Perceived control of nutrition behavior: A study of the locus of control theory among healthy subjects. Journal of the American Dietetic Association 84:1334-39, 1984.

Fazio, R.H. "How do attitudes guide behavior?" In The Handbook of motivation and cognition: Foundations of social behavior, R.M. Sorrentino and E.T. Higgins, Eds. New York: Guilford Press, 1986.

Fazio, R.H., M.C. Powell, and P.M. Herr. Toward a process model of the attitude-behavior relation: Accessing one's attitude upon mere observation of the attitude object. Journal of Personality and Social Psychology 44:723-35, 1983.

Fazio, R.H. and M.P. Zanna. On the predictive validity of attitudes: The role of direct experience and confidence. Journal of Personality 46:228-43, 1978.

Fishbein, M. Attitudes and the prediction of behavior, In Readings in attitude theory and measurement. M. Fishbein, ed. New York: John Wiley and Sons, 1967.

Fitz-Gibbon, D.T. and L.L. Morris. How to design a program evaluation. Beverly Hills: Sage Publications, 1983, pp. 27-31.

Flay, B.R., D. Phil, D. DiTecco, and R.P. Schlegel. Mass media in health promotion: An analysis using an extended information-processing model. Health Education Quarterly 7:127-47, 1980.

General Accounting Office. Areas needing improvement in the Adult Expanded Food and Nutrition Education Program. Publication No. CED-80-138, 1980, 41 pp.

Green, B.F. Attitude measurement. In Handbook of social psychology. Reading, Mass.: Addison-Wesley, 1954, pp. 335-69.

Green, P.E., and D.S. Tull. Research for marketing decisions. Englewood Cliffs, N.J.:Prentice Hall, Inc., 1978, pp 192-93.

Guiry, V.C., and C.A. Bisogni. Caffeine knowledge, attitudes, and practices of young women. Journal of Nutrition Education 18:16-22, 1986.

Guthrie, H.A. Selection and quantification of typical food portions by young adults. Journal of the American Dietetic Association 84:1440-44, 1984.

Haggstrom, W.C. The power of the poor, In Poverty in America. L.A. Rerman, J.L. Kornbluh, and A. Hobr, eds. Ann Arbor: University of Michigan Press, 1966, pp. 315-34.

Harding, J., B. Kutner, H. Proshansky, and I. Chein. Prejudice and ethnic relations, In Handbook of social psychology. G. Lindzey, ed. Reading, Massachusetts: Addison-Wesley, 1954, pp. 1021-61.

Heider, F. The psychology of interpersonal relations. New York: John Wiley and Sons, 1958.

Henerson, M., L.L. Morris, and C.T. FitzGibbon. How to measure attitudes. Beverly Hills: Sage Publications, 1978, pp. 131-150.

Hollis, J.F., T.P. Carmody, S.L. Conner, S.G. Fey, and J.D. Matavazzo. The nutrition attitude survey: Associations with dietary habits, psychological and physical well-being, and coronary risk factors. Health Psychology 5:359-74, 1986.

Hutsey, J. An evaluation of the Expanded Nutrition Education Program in Pennsylvania. University Park: Pennsylvania State University, 1970.

Iversen, G.R., and Norpoth, H. Analysis of variance. Beverly Hills: Sage Publications, 1976, pp 11-69.

Jones, E.M., S.J. Munger, and J.W. Altman. A field guide for evaluation of nutrition education. Allison Park, PA: Synectics Corporation, 1975.

Kaplowitz, D.D., and C.M. Olson. The effect of an education program on the decision to breastfeed. Journal of Nutrition Education 15:61-65, 1983.

Kerr, M., M. Andrews, L. Nierman, and C. Kataregga. Evaluation of the long-term effects of EFNEP in Michigan. E. Lansing, Michigan: Michigan State University Cooperative Extension Service, 1979, 22 pp.

Kok, F.J., A.W. Matroos, J.G.A.J. Hautvast, and A.W. Vandenban. Direction for nutrition education determined by target group segmentation. Journal of the American Dietetic Association 80:566-73, 1982.

Kuder, G.F. and M.W. Richardson. The theory of the estimation of test reliability. Psychometrika 32:1-13, 1937.

Kutner, B., C. Wilkins, and P.R. Yarrow. Verbal attitudes and overt behavior involving racial prejudice. Journal of Abnormal and Social Psychology 47:649-52, 1952.

LaPiere, R.T. Attitudes vs. actions. Social Forces 13:230-37, 1934.

Likert, R. The method of constructing an attitude scale, In Scaling: A sourcebook for behavioral scientists. G.M. Maranell, ed. Chicago: Aldine Publishing Co., 1978, pp 233-43.

Lodge, M. Magnitude Scaling: Quantitative measurement of opinions. Beverly Hills: Sage Publications, 1981.

Looker, A. and B. Shannon. Threat vs. benefit appeals: Effectiveness in adult nutrition education. Journal of Nutrition Education 16:173-76, 1984.

Madden, J.P., S.J. Goodman, and H.A. Guthrie. Validity of the 24-hour recall. Journal of the American Dietetic Association 68:143-47, 1976.

Maiman, L.A., V.L. Wang, M.H. Becker, J. Finlay, and M. Simonson. Attitudes toward obesity and the obese among professionals. Journal of the American Dietetic Association 74:331-36, 1979.

Marketing Economics Research Service. Impact of the Expanded Food and Nutrition Education Program on low-income families: An indepth analysis. Washington D.C.: U.S. Department of Agriculture Economic Research Service, Agricultural Economic Report No. 220, February, 1972, 73 pp.

Matheney, R.J., M.F. Picciano, and L. Birch. Attitudinal and social influences on infant-feeding preference. Journal of Nutrition Education 19:21-31, 1987.

McKenna, C. Evaluation for accountability. Journal of Extension September/October:22-26, 1983.

Michigan State University Cooperative Extension Service. Eating right is basic 2. E. Lansing, MI: Michigan State University Press, 1986.

Munger, S.J. Expanded Food and Nutrition Education Program: A final evaluation in the maturing program, April 1970 - March 1971. Allison Park, Penn.: Synectic Corporation, 1971, 65 pp.

Napier, T.L., and C. Wharton. The Expanded Food and Nutrition Education Program: An experiment in behavior change. Ohio Agriculture Research and Development Center, Research Bulletin No. 1070, 1974, 18 pp.

Nierman, L., S. Walker, and K. Akpom. Effectively teaching foods and nutrition to low income families. E. Lansing, Michigan: Michigan State University Cooperative Extension Service, August 1983, 69 pp.

O'Connell, L.H., B. Shannon, and L. Sims. Assessing nutrition-related attitudes and beliefs of teachers. Journal of Nutrition Education 13:S80-85, 1981.

Olson, J.C., and L.S. Sims. Assessing nutrition knowledge from an information processing perspective. Journal of Nutrition Education 12:157-61, 1980.

Orne, M. On the social psychology of the psychology experiment: With particular reference to demand characteristics and the implications. American Psychologist 17:776-83, 1962.

Pao, E.M., S.J. Mickle, and M.C. Burk. One-day and 3-day nutrient intakes by individuals - Nationwide food consumption survey findings, Spring 1977. Journal of the American Dietetic Association 85:313-24, 1985.

Penner, K.P., and K.M. Kolasa. Secondary teachers' nutrition knowledge, attitudes, and practices. Journal of Nutrition Education 15:141-45, 1983.

Perron, M. and J. Endres. Knowledge, attitudes, and dietary practices of female athletes. Journal of the American Dietetic Association 85:573-76, 1985.

Peterson, M.E., and C. Kies. Nutrition knowledge and attitudes of early elementary teachers. Journal of Nutrition Education 4:11-15, 1972.

Picardi, S.M., and D. Porter. Multidimensional evaluation of a food and nutrition minicourse. Journal of Nutrition Education 8:162-68, 1976.

Ramsey, C.E., and M. Cloyd. Multiple objectives and the success of educational programs. Journal of Nutrition Education 11:141-44, 1979.

Ramsey, C.E., and M. Cloyd. An evaluation of EFNEP side effects. Journal of Extension XIII:11-20, 1975.

Reames, E.S. Opinions of physicians and hospitals of current breast-feeding recommendations. Journal of the American Dietetic Association 85:79-80, 1985.

Regan, D.T., and R.H. Fazio. On the consistency between attitudes and behavior: Look to the method of attitude formation. Journal of Experimental Social Psychology 13:38-45, 1977.

Ries, C.P., and D.K. Schoon. Evaluation of a cafeteria-based education program for college students. Journal of Nutrition Education 18:107-10, 1986.

Rosander, K., and L.S. Sims. Measuring effects of an affective-based nutrition education intervention. Journal of Nutrition Education 13:102-5, 1981.

Rosenberg, M.J. Cognitive reorganization in response to the hypnotic reversal of attitudinal effect. Journal of Personality 28:39-63, 1960.

Ross, J.K. Nutrition attitudes and knowledge of nursing students. Journal of the American Dietetic Association 84:687-88, 1984.

Sanjur, D. Social and cultural perspectives in nutrition. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1982 pp. 169-231.

Schafer, R., and E.A. Yetley. Social psychology of food faddism. Journal of the American Dietetic Assoication 66:129-33, 1975.

Schafer, R.B. Factors affecting food behavior and the quality of husbands' and wives' diets. Journal of the American Dietetic Association, 72:138-43, 1978.

Schwartz, N.E. Nutrition knowledge, attitudes, and practices of high school graduates. Journal of the American Dietetics Association 66:28-31, 1975.

Schwartz, N.E. Nutrition knowledge, attitudes, and practices of Canadian public health nurses. Journal of Nutrition Education 8:28-31, 1976.

Shaw, M.E., and J.M. Wright. Scales for the measurement of attitudes. New York: McGraw-Hill Book Co., 1967, pp 1-21.

Sims, L.S. Demographic and attitudinal correlates of nutrition knowledge. Journal of Nutrition Education 8:122-25, 1976.

Sims, L.S. Dietary status of lactating women. Journal of the American Dietetic Association. 73:147-54, 1978.

Sims, L.S. Toward an understanding of attitude assessment in nutrition research. Journal of the American Dietetic Association 78:460-66, 1981.

Sorenson, A.W., B.M. Calkins, M.A. Connally, and E. Diamond. Comparison of nutrient intake determined by four dietary intake instruments. Journal of Nutrition Education 17:92-99, 1985.

SPSS, Inc. SPSSx user's guide. Chicago: McGraw Hill, 1983.

Stunkard, A.J., and M. Waxman. Accuracy of self-reports of food intake. Journal of the American Dietetic Association 79:547-51, 1981.

Sunseri, A.J., J.A. Alberti, N.D. Dent, J.A. Schoenberger, and T.A. Dolecek. Ingredients in nutrition education: Family involvement, reading, and race. Journal of School Health 54:193-96, 1984.

United States Department of Agriculture. Revised policy guidelines and suggestions for conducting the Extension Expanded Food and Nutrition Education Program. Home Economics Report No. 100, 1976, 19 pp.

Wagner M. M., M. H. Machover, L. Newman, and J. Fairweather. An experimental evaluation of nutrition education methods: Final Report, 1983, 177 pp.

Wallston, B.A., and K.A. Wallston. Locus of control and health: A review of the literature. Health Education Monographs 6:107-17, 1978.

Young, C.M., G.C. Hagan, R.E. Tucker, and W.D. Foster. A comparison of dietary study methods: Dietary history vs. seven-day record vs. 24-hour recall. Journal of the American Dietetic Association 28:218-21, 1952.

Yperman, A.M., and J.A. Vermeersch. Factors associated with children's food habits, Journal of Nutrition Education 11:72-76, 1979.