

**The Effects of Video Programming, Face-to-Face Instruction, Modeling, and Feedback on
Nutritious and Economical Food
Purchases**

by

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Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of
Doctorate
in
Psychology

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April 19, 1988
Blacksburg, Virginia

AS 8 7-25-16

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(ABSTRACT)

Currently, there is a public health need for effective and economical strategies designed to influence appropriate dietary modifications in the general public (e.g., reduction of dietary fats). To address this need, this study applied the behavioral systems framework in its design and application to nutrition change.

The primary research question was to experimentally assess the differential impacts of a combined media and personal interaction condition (specifically using participant modeling procedures) to a condition that combined media and personal attention strategies. A no treatment condition was also employed. Previous research had shown robust changes with interventions that combined media and personal interaction. This study addressed whether those changes were due to the procedures or to the personal attention received. To examine this question, self-report data on foods purchased and data from supermarket receipts were collected from 45 households across the 3 conditions.

Results indicated that persons in the media and personal interaction condition did demonstrate significant changes in the desired direction in the percentage of total fat content in foods purchased. A comparable change was not noted in the other conditions. Thus, it was concluded that some combination of factors (i.e., modeling, reinforcement, feedback, and goal setting) in addition to the procedures used in the video and the personal attention provided in the participant modeling, were

responsible for the dramatic decreases in total fats. From this study, it was not possible to determine which of the psychological principles were most effective in inducing change.

In addition to the experimental findings, subject characteristics (e.g., beliefs, knowledge, health locus of control, skills, self-efficacy, etc.) were examined. The results did not lead to a general set of individual characteristics being related to nutritional outcome. Rather, the information contributed to a clearer understanding of the needs of the sample and the environmental constraints and inducements for nutritional change in that target group.

Given the threat of dietary fat to the health of the American public, the reduction in total fat found in this study was an important finding. The application of the behavioral systems framework provided the necessary information to enable the message of the video and the modeling, feedback, and goal setting components to be effective in changing total fats among a segment of the target sample.

Acknowledgements

Among those most deserving of my thanks is Richard Winett. He shared his expertise and extended his friendship, and for that I am grateful. I could not have asked for a better advisor.

I would also like to express my gratitude to the other members of my dissertation committee: Russell Jones, Thomas Ollendick, Janet Walberg, and Philip Zeskind. Their input was extremely valuable. I want to offer a special thanks to Thomas Ollendick for his support and encouragement during my years at Virginia Tech.

Also, I would like to acknowledge and thank my parents and my father-in-law and mother-in-law for their unending love and support.

Finally, although words seem insufficient, a heartfelt thank you is extended to my husband for always standing by my side.

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Introduction

Health enhancement and prevention of disease are topics of major importance to many segments of our society, including consumers, health service providers, and policy makers. Some evidence of this interest is the many volumes written on the topics in recent years. Of particular concern in this literature are linkages between health and human behavior (Anderson, Morton, Green, 1978; Galli, 1978; Green, Kreuter, Deeds, & Partridge, 1980; Matarazzo, Weiss, Herd, Miller, & Weiss, 1984; Millon, Green, Meagher, 1982; Wilner, Walkley, O'Neill, 1978).

The relationships between health and behavior were targeted in a two and one-half year project by the Institute of Medicine (1981). More than 400 leaders in biomedical and behavioral sciences contributed to the report. In the document, specific behaviors were implicated in major public health problems. Among the behaviors discussed, improper nutrition was cited as a risk factor for certain degenerative diseases. The contributors recommended that dietary modifications be made to promote health and prevent disease.

This was not the first report to suggest dietary modifications. In a document entitled *Healthy People* (U.S. Department of Health Education and Welfare, 1979), the Surgeon General targeted nutrition as one of six key areas for change to promote health and prevent disease. The following year, a detailed set of health objectives for the nation were specified, and suggested dietary modifications were included (U.S. Department of Health and Human Services, 1980).

In a more recent, five-year study from Emory University, 14 primary causes of illness and premature death in the United States were examined (University of California, Berkeley School of Public Health, 1986). The researchers concluded that the "causes" of the illnesses and deaths were largely preventable. Improper nutrition was once again implicated and included among six primary risk factors for modification.

Although several agencies and research institutions have made dietary recommendations in recent years, the most controversial report to deal with nutrition came from the Senate Select Committee on Nutrition and Human Needs (1977). The Committee reviewed the typical American diet and epidemiological evidence which linked dietary patterns to diseases Figure 1 on page 3. They concluded that in order to promote health and prevent disease, specific types and quantities of foods needed to be consumed by Americans Figure 2 on page 4. This was the federal government's first official attempt at a national nutrition policy (Wadden & Brownell, 1984). The recommendations were revised later by the U.S. Department of Health, Education, and Welfare (U.S. DHEW) (1980) and issued as *Dietary Guidelines for Americans*. A second edition of the guidelines was issued in 1985 by the Department of Health and Human Services (U.S. DHHS). The U.S. DHEW (1980) and the U.S. DHHS (1985) suggested that consumers eat a wide variety of foods, maintain ideal body weight, consume a moderate intake of alcohol (if at all),

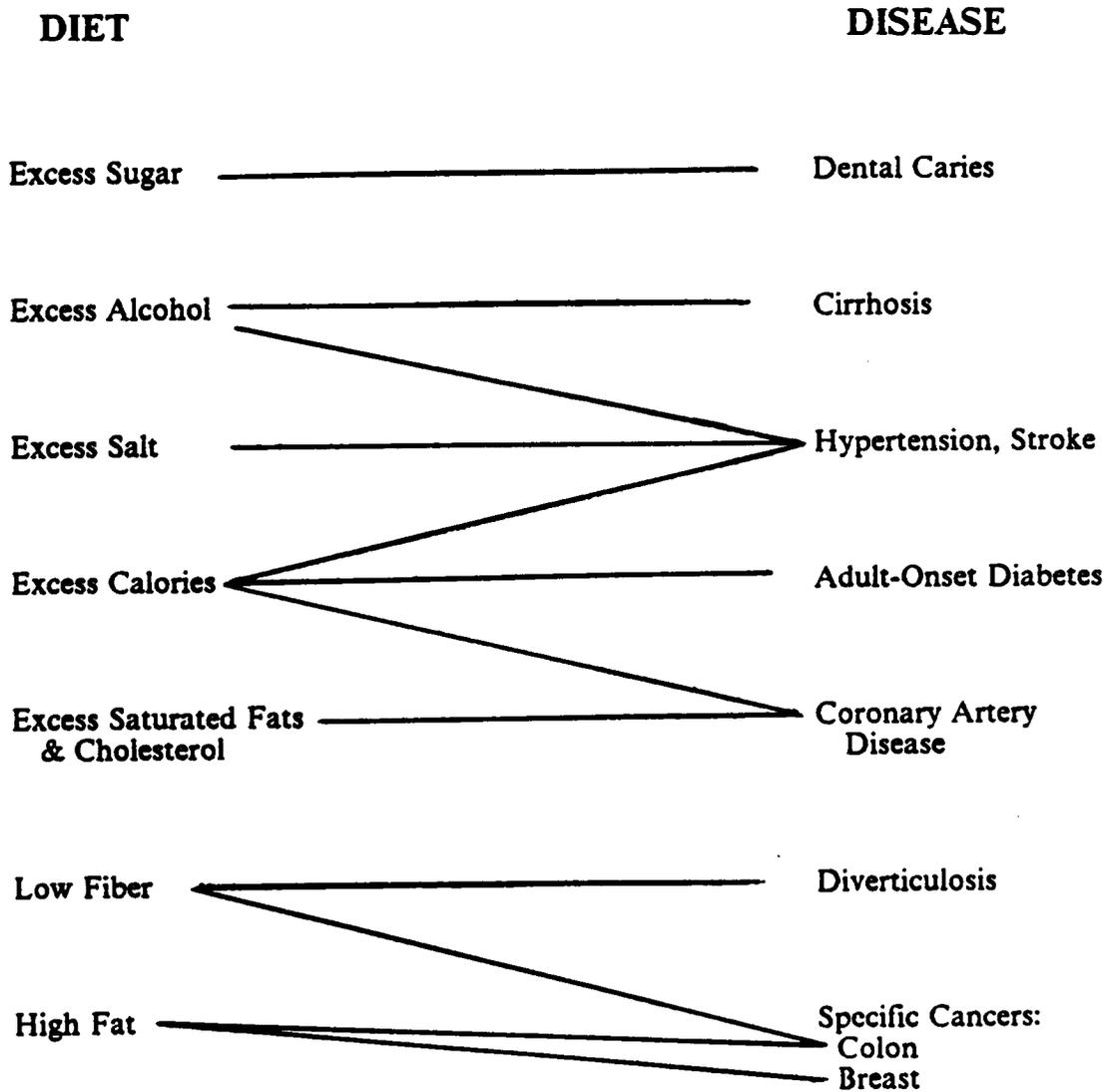
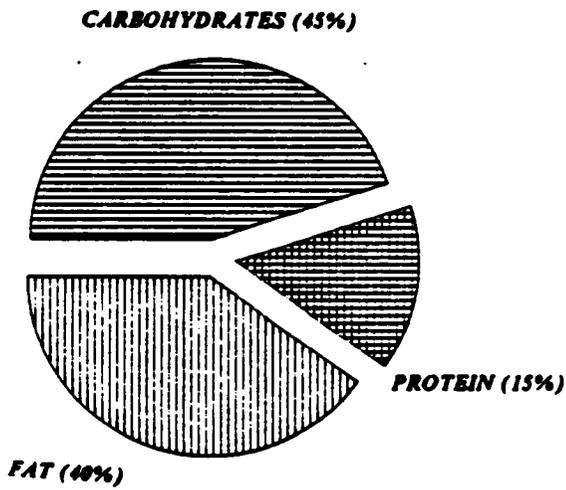


Figure 1. Dietary patterns positively correlated with diseases (Suitor & Hunter, 1980).

CURRENT DIET



DIETARY GOALS

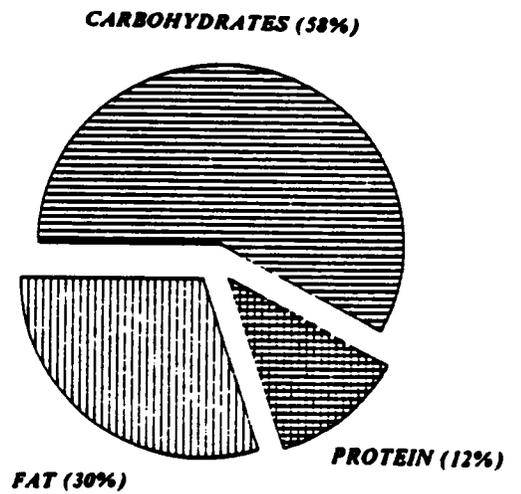


Figure 2. Percent of Calories from Different Nutrients in Current Dietary Patterns and Recommended Goals: Adapted from U.S. Senate Select Committee on Nutrition and Human Needs.

eat foods with adequate starch and fiber, and avoid excesses of fat, cholesterol, sugar, and salt.

Other agencies (e.g., the American Heart Association and the National Cancer Institute) have also made recommendations (see Table 1 for a comparison). The commonality among these recommendations include 1) weight management; 2) a reduction in fats; 3) an increase in complex carbohydrates; and 4) a varied diet. Furthermore, in addition to the shared dietary goals for 1990 of 12 percent protein, 58 percent carbohydrates, and 30 percent fat, the National Cancer Institute has called for a further reduction of fat to 25 percent by the year 2000 (Greenwald, Sondik, & Lynch, 1986).

The Debate

In the past several decades, government agencies and professional societies have stressed the need for more specific federal food and health policies. However, responses to the Senate Select Committee's recommendations and the set of dietary guidelines have been divided. Industries, such as the beef, dairy, and egg industries, were adamantly opposed to the recommendations (Harper, 1978). Among health professionals, many stated that the recommendations were based on interpretations of scientific information that remained far from complete (Harper, 1978; 1981; 1984).

Part of the controversy that has surrounded the Committee's recommendations pertained to the distinction between data on changes in whole populations as opposed to

Table 1. Recommended Dietary Guidelines

Category Guidelines	USDA DHHS	American Heart Association	American Cancer Society	National Research Council
Weight/Calories	Maintain Desired Weight	Maintain Desired Weight	Maintain Desired Weight	
Fat/Cholesterol	Avoid fat and cholesterol	Reduce fats (primarily saturated)	Reduce total fat intake	Reduce total fat intake
Alcohol	Drink in Moderation		Drink in Moderation	Drink in Moderation
Complete Carbohydrates and Fiber	Increase Intake of Both and Avoid Sugar	Increase Complex Carbohydrates	Increase high foods	Increase Complex Carbohydrates
Variety	Eat a variety of foods	Eat a variety of foods	Eat a variety of foods	
Sodium	Avoid too much	Reduce intake		Reduce intake
Salt-cured, smoked, pickled, or nitrate cured			Be moderate in Consumption	Minimal Consumption

(Adapted from Simons-Morton, O'Hara, and Simon-Morton, 1986)

data on changes in individuals at risk (Institute of Medicine, 1982). The Food and Nutrition Board of the National Academy of Sciences/ National Research Council (NAC/NRC) (1980) responded to the Committee's report by supporting dietary modifications, but only on an individual basis. The Board acknowledged that high serum cholesterol and low density lipoprotein levels are positive risk factors for coronary heart disease. However, the Board stated that they did not feel there was sufficient evidence to warrant large-scale dietary modifications.

The viewpoint of the Board on the "appropriate" level of intervention (i.e., the individual level) did not go unopposed. Many health professionals (particularly those in public health) felt that the Board's approach too closely aligned with the medical model of intervention and downplayed disease prevention (Wadden, et al., 1984). In addition, since health professionals following the medical model wait to be approached by persons in need, the number of people that can be treated is limited (Engel, 1977). The "waiting mode" of service delivery is incongruent with the philosophy of public health that traditionally operates in the "seeking mode" (Rappaport, 1977). Furthermore, public health programs attempt to prevent disease and promote health and are designed to meet the health needs of all persons in a community (Runyan, DeVellis, DeVellis, & Hochbaum, 1982). For these reasons, the NAC/NRC Board's recommendations were also controversial.

The debate over a national public policy on nutrition continues. However, it appears that the current stance of the majority of health professionals is one that supports any modification of diet which minimizes the risk of diseases related to either deficiency (e.g., fiber and calcium) or overconsumption (e.g., calories, fat, and sodium) (Hegsted, 1982; National Heart, Lung, and Blood Institute, 1981). The above changes may improve

health and certainly can *do no harm* to the American public (Wenk, Baren, Dewan, 1983).

The Typical American Diet

Since the turn of the century, dramatic changes in eating patterns have been noted in the United States. Today, the typical eating patterns of Americans are replete with low nutritious, highly processed foods; foods which have been emulsified, preserved, fortified, and/or packaged (Brewster & Jacobson, 1983). The fast-paced and relatively affluent lifestyles of Americans have contributed to this trend by influencing the demand for high-fat, high-sodium convenience foods (Simons-Morton, O'Hara, Simons-Morton, 1986). The demand for convenience foods is perpetuated by the high profit margins of prepared foods versus the low profit margin of fresh foods (Federal Trade Commission, 1978).

The nutritional imbalances found today in the typical American diet include excesses of fat, calories, sugar, and salt (U.S. Senate Select Committee on Nutrition and Human Needs, 1977). While the consumption of fat has risen dramatically since the turn of the century (up by 65 percent), the consumption of complex carbohydrates has declined by 45 percent (Brewster, et al., 1983). In addition, simple carbohydrates are selected more frequently than complex carbohydrates; more than 50 percent of the consumed carbohydrates are processed sugars (O'Donnell & Ainsworth, 1984).

Today, animal proteins contribute to approximately 66 percent of our protein intake, up from approximately 50 percent at the turn of the century (Brewster, et al., 1983). It appears that Americans are choosing animal sources of protein more frequently over plant sources. This trend has been influenced by the fallacy that complex carbohydrates (e.g., rice, potatoes, pasta, and beans) are fattening. Furthermore, as Americans became more affluent, many viewed beef as a status symbol and moved away from selecting foods such as beans (the "poor man's meat") (Brewster, et al., 1983). One result of choosing animal sources of protein more frequently than vegetable sources is that American diets are now higher in fat. Today, animals are fed while trapped in feed lots and are not as lean as game that run wild. For example, animals in feed lots can produce meat that contains as much as 50 to 75 percent fat (O'Donnell, et al., 1984).

One of the best sources describing the foods that Americans eat comes from the Department of Agriculture's report on the second National Health and Nutritional Examination Survey (NHANES), which was conducted from 1976 to 1980 (Block, Dresser, Hartman, & Carroll, 1985; 1985). A few of the salient findings include the following: 1) over 50 percent of calorie intake comes from 12 foods; 2) about 64 percent of sodium intake can be accounted for by eight foods; 3) forty-one percent of Americans consume 2 glasses of whole milk each day; and 4) thirty percent of Americans eat ham, lunch meat, or a hot dog each day.

It is of interest to note that the recent NHANES study revealed that the average American diet continues to be about 40 percent fat, 45 percent carbohydrates and 15 percent protein (Block, et al., 1985). Although there have been claims that the American diet is becoming more nutritious, the NHANES study would indicate that little has changed for most Americans since the Senate Select Committee on Nutrition and Hu-

man Needs (1977) recommended a shift in the proportions of nutrients eaten by Americans.

More recent data on food consumption trends suggested that there have been some nationwide food product shifts. The Economic Review Service's annual report of the 1985 per capita food consumption data revealed an incongruous mix of high and lowfat foods being purchased (Bunch, 1987). "For example, while consumption increased for chicken and fish and declined for whole milk [in 1985], use of fats and oils and cream rose. In addition, Americans consumed more fresh fruit and juices, but also more soft drinks (Bunch, 1987; p. 1). Furthermore, red meat purchases have declined since the record levels of the early 1970s, while fish and poultry consumption have increased (Bunch, 1987). This desired change from higher fat, animal sources of protein to lower fat sources may be offset by the dramatic increase in the use of fats and oils. Since 1967, overall fat consumption rose by 10 percent, and this increase has been attributed to the increased use of salad and cooking oils and shortening (Martin & Raper, 1987). Thus, even with a presumed increased awareness among some Americans that high fat diets may be harmful to health, shifts toward lowfat food purchases appear to have been rather selective.

Although some agencies have called for a change in the typical American diet, it should be noted that many individuals already make some choices for healthy foods. Thus, for some the recommendations may require only modest changes in dietary practices. It has been hypothesized that if Americans ate healthy foods 80 percent of the time, health would be enhanced (O'Donnell, et al., 1984). Furthermore, Matarazzo (1982) has stated that a small adjustment in the carbohydrate/fat compositions of meals (i.e., a 10 percent shift) could enhance individual's and the Nation's health.

The Task for Consumers

Given some of the conflicting reports within the scientific community, it is no surprise that consumers remain confused about nutrition facts. To add to the confusion, nutrition science is dynamic. For example, evidence has mounted for the past 2 decades linking a high-fat and low carbohydrate diet to cardiovascular diseases, the leading cause of death in the United States (Kannell, 1981; Simopoulos, 1986). However, it has only been within recent years that dietary practices definitely have been implicated in the second leading cause of death for Americans, cancer (Greenwald, et al., 1986). Epidemiological research (including international and migrant comparisons) have led scientists to conclude that diet is directly related to 25-30 percent of all cancer deaths (Doll & Peto, 1981); thus, implying that cancer is partially preventable through appropriate dietary practices (Greenwald, et al., 1986). However, as nutrition research continues, new findings may change current concepts. It will take a sophisticated consumer to stay abreast of nutrition facts.

Regardless of the controversy over a national nutrition policy, nutrition programs abound in the United States and abroad. Many large-scale programs in developing nations (e.g., in Ethiopia) continue to focus on hunger and nutritional deficiencies (Academy for Educational Development, 1977; Colle, 1983). However, Americans face different challenges. With an abundant food supply, overconsumption is a more common problem. Furthermore, Americans have to choose among the tremendous number

of foods available for sale (20,000 different foods, with some 10,000 food items in an average supermarket), and this can be confusing (Wadden, et al., 1984; Wenke, et al., 1983). In addition, trying to sort out fact from fiction among the onslaught of information provided through advertising and media from nutrition experts to product promoters can be a difficult task, even for the most educated consumer (Turner, 1984; Whelan & Stanko, 1983).

Moreover, food selection by consumers often is not well planned. One study reported that consumers made 50 percent of their choices for food purchases while in the supermarket (Point of Purchase Advertising Institute, 1978). Consumers appear to be highly susceptible to point-of-sale influences in supermarkets, often purchasing expensive and highly processed foods (Wenke, et al., 1983). Motivated by potentially higher profits, retail food sellers do what they can to encourage point-of-sale decision making, or impulse buying. For example, high profit foods are placed at eye level, including foods which appeal to children being placed at the eye level of a child seated in a grocery cart. More nutritious, and often less expensive foods are placed inconveniently on high and low shelves. Furthermore, aisle enders and checkout counters are used strategically for spur-of-the-moment selections.

Advertising, particularly television advertising, also appears to influence food selection. Approximately half of the television advertising is designed to influence children, with the average child viewing approximately 10,000 food commercials annually (Federal Trade Commission, 1978). With the recent advent of 10 second "spots", the number of commercials viewed today most likely is higher. In a report to the Senate Select Committee on Nutrition and Human Needs, it was noted that 70 percent of the ads for children promoted foods that were high in fats, cholesterol, sugar, and salt and only 7

percent were for nutritious items such as fruits and vegetables (Gerbner, Morgan, Signorielli, 1982). Children can be seen reaching for advertised products from the shopping cart even before they can talk (Wadden, et al., 1984). Furthermore, parents apparently comply with the children's requests a majority of the time, particularly for the purchases of cereals and snack foods (Atkin, 1982).

Public health nutrition programs attempting to influence appropriate behaviors have to compete with a multitude of advertisements for low-nutritious items. Comparative price publications revealed that advertisements for low-nutritious items outnumber the more proconsumer advertisements by about 5000 to 1 (Greene, Rouse, Green, and Clay; 1984). Furthermore, these ads are only one part of complex marketing campaigns designed to influence brand selections. In addition, nutrition programs are not readily accepted in supermarkets where food retailers encourage impulse buying of high profit, low-nutritious items. Thus, many of the nutrition programs have not been able to compete successfully. Although, it should be noted that there have been a few exceptions. For example, some supermarkets (i.e., Giant Foods) have provided selected nutritional information for consumers, presumably in an attempt to gain market position.

The Current Status of Large-Scale Nutrition Programs

Knowledge, Attitudes, Beliefs, and Behaviors

Historically, public health nutrition programs generally have relied on the assumption that knowledge, belief, and attitude change precedes and predicts behavior change (Wallack, 1981). This has been termed the "hierarchy of effect" model and was proposed by McGuire (1969) and Ray (1973). However, both McGuire and Ray cautioned that individuals do not always proceed sequentially from increases in knowledge, to changes in beliefs and attitudes, to changes in behaviors. This has been substantiated by studies in the consumer area (Beales, Mazis, Salop, & Staelin, 1981), in health promotion (Robertson, Kelly, O'Neill, Wixom, Eiswirth, & Haddon, 1974; Wallack, 1981), and health education (Galli, 1978), which have repeatedly shown that there is not a direct relationship between the variables (i.e., knowledge, beliefs, attitudes, and behaviors). Yet, program developers primarily continue to use educational strategies, attempt to change beliefs and attitudes, and ultimately hope to induce behavior changes (Kolasa, 1981).

Since the turn of the century, attempts have been underway to change nutrition behavior using education and communication strategies. During that time, the nutritional status and health of Americans improved (U.S. DHEW, 1979). Could it be said that the nutrition programs were responsible for the differences? Since other improvements were being realized during that time period, improved nutritional status could have been related more to factors other than the nutrition programs (e.g., improved availability,

storage, and distribution of foods; improved socioeconomic status; and/or general educational attainment).

Yarbrough (1981) addressed this issue by reviewing approximately 150 reports on nutrition interventions. Most interventions incorporated education and information strategies. Although most reports were methodologically weak, he was able to glean information from many evaluations. Yarbrough concluded that the nutrition interventions affected "only slight improvements in nutrition knowledge and attitudes and little or no change in behaviors" (p.540). Furthermore, the best predictors of change appeared to be socioeconomic status and general educational attainment.

Still current programs continue to use educational strategies. For example, Jeffery, Pirie, Rosenthal, Gerber, and Murray (1982) implemented an educational program in eight supermarkets in Minneapolis. Their aim was to influence greater purchasing of lowfat dairy products. This objective was not accomplished, but significant increases in knowledge were found. The obvious question continues to prevail. Are increases in knowledge sufficient to improve dietary behavior? Reviews have indicated that they are not.

Communication and Public Health

A common thread among public health programs has been the use of communication, particularly mass media. The use of media has been motivated by the potential for reaching large numbers of people with information designed to induce changes for health promotion and disease prevention (Solomon & Maccoby, 1984). Chapman (1985) estimated that "A 5% success rate among 10,000 people is over [33] times more efficient

than the 30% success rate achieved by group work involving 50 subjects" (p.918). Furthermore, if large-scale public health changes were realized, the cost per person could prove to be relatively small when compared to one-on-one and small group interventions.

Receiving information is an integral, though (as previously noted) not sufficient, component of the behavior change process. Thus, the mass media has become an important means of transmitting information in public health campaigns (Warner, 1987). As a result, the question of whether the media has the ability to induce health promoting behavior changes is a critical one (Ben-Sira, 1982). However, as previously noted, educational strategies aimed at increasing knowledge or awareness does not always lead to behavior change (Bandura, 1986). Thus, alternative strategies for use in the media, strategies which go beyond mere educational objectives, need to be examined empirically.

However, there have been some optimistic reports. For example, Warner (1987) reported communication he had with the Kellogg Incorporation, which suggested behavior changes resulting from a media campaign. Kellogg noted dramatic changes, by market standards, in the purchase of All-Bran cereal when they provided the National Cancer Institute's Hotline phone number during an advertising campaign. Kellogg stated that 90 percent of adults in America knew the cancer and fiber message given in the ad campaign (Warner, 1987). An independent analysis demonstrated that the ad campaign did increase All-Bran's share of the market, while at the same time generalizing to the purchase of other bran cereals (Levy & Stokes, 1987).

A partnership between communication and nutrition also has been found in a variety of projects throughout the world (Academy for Educational Development, 1977; Colle,

1983; Cerqueira, Casanueva, Ferrer, Fontanot, Chavez, & Flores, 1979). Programs in the United States and Finland which incorporated dietary changes in their objectives and used media for information flow include the well known *Stanford Heart Disease Prevention Program (SHDPP)* (Stern, Farquhar, Maccoby, & Russell, 1976), the *Pawtucket Heart Health Program (PHHP)* (Lefebvre, Peterson, McGraw, Lasater, Sennett, Kendall, Carleton, 1986); the *Minnesota Heart Health Project (MHHP)* (Mittelmark, Luepker, Jacobs, Bracht, Carlaw, Crow, Finnegan, Grimm, Jeffery, Kline, Mullis, Murray, Pechacek, Perry, Pirie, & Blackburn, 1986); and the *North Karelia Project* (Puska, 1984). Since the above large-scale programs have similar aims, their efficacy is of great interest.

Probably the strongest evidence (within the public health literature) in support of the ability for mass media to influence dietary changes has come from the SHDPP. Stern and associates (1976) reported that favorable changes in dietary patterns were found in the targeted populations, and this was further substantiated by Meyer, Nash, McAlister, Maccoby, and Farquhar (1980). In both articles, the researchers reported that individuals in a mass media alone condition did show specified changes in diet. However, greater and longer lasting changes appeared to be found in groups exposed to a supplementation condition that included media presentations with more intensive face-to-face instruction. The difference between the two conditions did appear to diminish with time.

Despite this relative success, a large number of public health nutrition programs have been unsuccessful in achieving the desired behavior changes (Yarbrough, 1981), and many observers are disillusioned with use of communication strategies for dietary change (Rozin, 1984). However, it appears that some of the obstacles to effective nutrition

interventions have included 1) inadequate assessment of needs; 2) lack of analysis of the target audience; and 3) lack of knowledge and application of proven communication and psychological principles (Yarbrough, 1981).

As noted, many communication campaigns relied solely on providing factual information to increase knowledge (an antecedent or cue to behavior). To reiterate, such cues do not always lead to health behavior change (Elder, Hovell, Lasater, Wells, Carleton, 1986). Communication strategies to activate behavior change should focus on antecedents and consequences with delivery being provided by appropriate models (e.g., models similar to the audience who address obstacles to change and ultimately experiencing success). Since it apparently takes more than information to induce behavior changes, effective and comprehensive strategies incorporating communication and psychological principles will be needed for program development. Such a framework will be presented in the following section and effective communication strategies will be addressed further.

Some researchers also have made suggestions for improving the ability of media to influence behaviors. These suggestions include the following: community leaders and agencies should assist in the effort (McAlister, Puska, Koskela, Pallonen, & Maccoby, 1980); products, services, or facilities should be available (Green & McAlister, 1984); and some face-to-face interactions should supplement the media presentations (Alcalay, 1983; Griffiths & Knutson, 1980; Meyer, et al., 1980; Stern, et al., 1977). Still, the view that the media can effectively influence healthier lifestyle choices has been met with some skepticism (Alcalay, 1983; Wallack, 1981), while others have been more optimistic (Flay, 1987; Rice & Paisley, 1981; Solomon, 1982; Solomon, et al., 1984; Winett & Kagel, 1984). Furthermore, through a program of research, Winett (1986) has demonstrated

that certain types of information (designed for specific segments of a population) can successfully affect behaviors.

Currently, there is a public health need for effective and economical strategies designed to influence dietary changes in nonclinical populations (Jeffrey, et al., 1982). One framework that shows promise for application in nutrition is the "behavioral systems framework" (Winett, 1986). This framework has been successful in achieving behavior changes in other areas, such as energy conservation practices (Winett, Leckliter, Chinn, Stahl, & Love, 1985).

The Behavioral Systems Framework

The behavioral systems framework integrates concepts from psychology, economics, communication, and marketing. Theories and principles from a variety of disciplines have been applied collectively to the study of information and behavior (Winett, 1986). As previously noted, there is a pessimistic attitude about the ability for information to affect behavior. However, it appears that this pessimism arises from observations that many past attempts to use communication to change behavior have failed. On the other hand, applications of the evolving behavioral systems framework have demonstrated that under certain circumstances, communication strategies can affect specific behaviors (Winett & Kagel, 1984; Winett, et al., 1985).

The behavioral systems framework relies on two basic assumptions first outlined by Bandura (1977) and then later expanded (1986). First, individual behavior and the environmental context are reciprocal systems, interacting with one another. Second, the interactions are dynamic and transactional. These assumptions also have been documented in the developmental psychology literature (Sameroff, 1975). Therefore, a careful multilevel analysis must be undertaken to understand the contingencies that reinforce or punish particular behaviors and the results those behavioral practices have on the environment (Bronfenbrenner, 1977). This analysis must be continued to fully understand the transactions which occur between individual behaviors and the environment. Such a thorough analysis should influence the design of interventions and help to anticipate and understand their potential impact.

Several other aspects of the behavioral systems framework are noteworthy and can be seen in Figure 3 (Winett & Kramer, in press). First, the focus is on behavior change. Although a directional or educational component is often necessary to incorporate for skill development, it is not sufficient for behavior change. Demonstrating that an individual has learned a skill (i.e., acquisition) does not ensure that she/he will engage in the behavior (i.e., performance). This aspect of the framework diverges from many past attempts in communication and public health. Second, the focus is on behavior change in "real world" or field settings. Since experimental field studies have been used in applying the framework, the outcomes of the research can contribute to both basic and applied research. Third, the behavioral systems perspective uses an overarching social marketing framework (Kotler, 1975; 1984) and makes extensive use of formative research (Palmer, 1981) in the development of the intervention and evaluation of the process variables.

BEHAVIORAL SYSTEMS FRAMEWORK

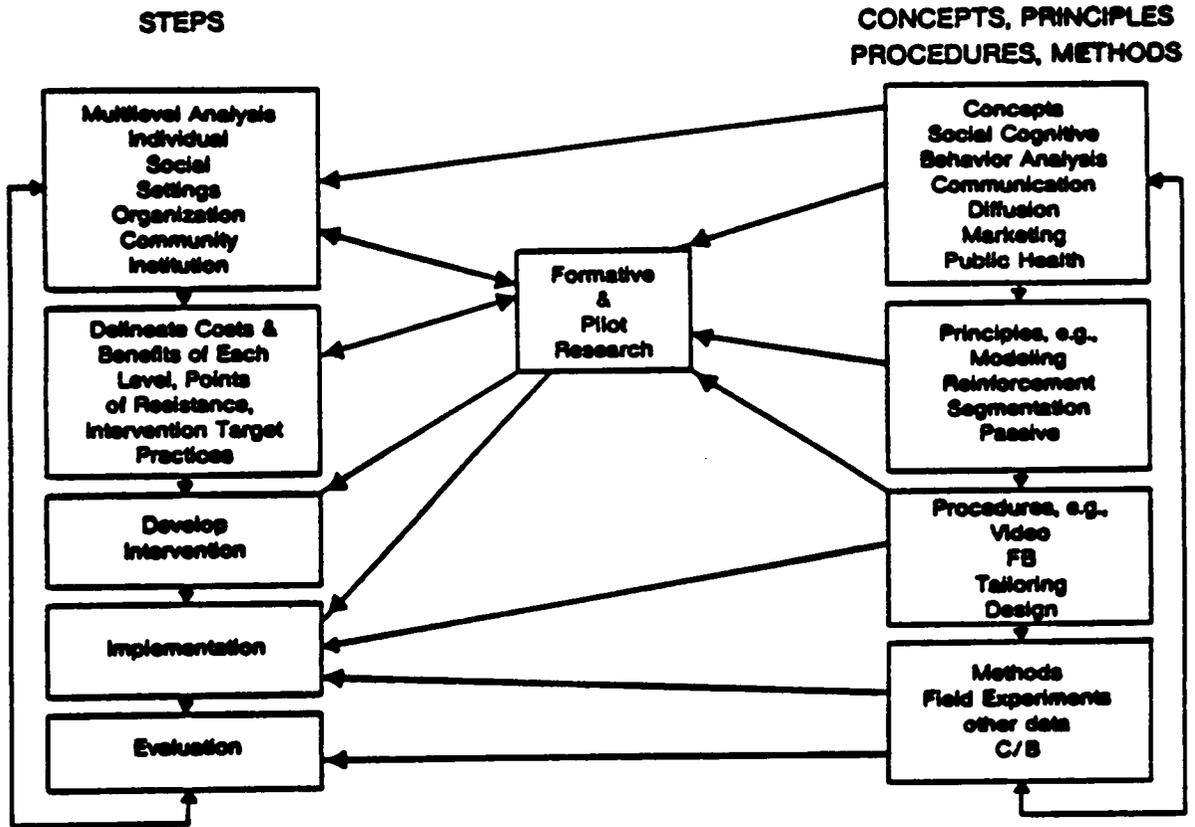


Figure 3. Behavioral Systems Framework

It should be noted that the behavioral systems framework shares some similarities with the PRECEDE model, developed by Green and associates (Green, Kreuter, & Deeds, 1980). The PRECEDE model, designed for health education program development, specifies techniques for examining links among health behaviors, targeting specific behaviors, and assessing reinforcing and enabling factors. The PRECEDE model is seen as unique within the health education community, in that it emphasizes consequences (e.g., reinforcers maintaining behaviors) as well as antecedents (e.g., knowledge which supposedly cues behaviors). It primarily differs from behavioral systems framework in that PRECEDE 1) does not clearly draw from social learning theory and 2) does not rely on an overarching social marketing framework.

Effective Communication

It has been acknowledged that for certain behaviors, such as family planning (Institute of Medicine, 1985) or safety belt use (Geller, 1986), more than information approaches may be necessary for large-scale behavior changes (e.g., legal, political, economic, and community supports may also be necessary) (Winett, 1986). However, if information campaigns are designed effectively and modest changes in behaviors can be realized on a relatively small-scale community basis, then more large-scale, comprehensive, proactive, and multidisciplinary approaches may be undertaken. The first step for communication campaigns is to demonstrate that behavioral changes can result from their efforts (Flay, 1987). Therefore, principles which have been shown to enhance effectiveness of communication should be adhered to.

Effective, as well as, noneffective methods for information campaigns have been discussed by Atkin (1981) and McGuire (1981). Effective elements include: 1) high quality formats used to enhance attention; 2) specific and vivid messages developed; 3) targeted exposure used; 4) appropriate media selected (given the objectives); 5) trustworthy, dynamic, and attractive sources employed; 6) extensive formative research used in development; 7) simple behaviors or behavioral sequences presented; 8) environmental context analyzed (including competing information and constraints); and 9) realistic, specific, and limited goals specified. If the goal is only for modest or limited behavioral changes, then the *aggregate* effect should be significant to warrant any undertaking. For example, as previously noted, it has been alleged that a 10 percent shift in the dietary patterns of Americans would be significant enough to enhance the Nation's health (Matarazzo, 1982).

Social Learning Theory

The primary theoretical basis for the behavioral systems framework rests on social learning theory (Bandura, 1977; 1986). Cognitive and behavioral principles are combined and applied in analyzing behaviors, designing appropriate interventions, and evaluating effectiveness. Extensive use of feedback, modeling, and reinforcement principles are incorporated into the communication design.

Goldfried (1980) has suggested that promoting corrective action and providing direct feedback are behavior change strategies which repeatedly are shown in the literature to be effective. Corrective action refers to methods which are used to facilitate new be-

haviors, such as behavioral rehearsal. Also for feedback to be effective, it should be direct, immediate, and specific. Direct feedback can be given in a variety of modes, including biological, cognitive, verbal, or written.

Symbolic modeling and participant modeling are two ways corrective action and feedback can be utilized (Bandura, 1986). In symbolic modeling, learning takes place by observing others perform behaviors, receive reinforcement, and receive direct feedback. In symbolic modeling, learning can occur by observation through video, live demonstration, or written formats.

Participant modeling combines symbolic modeling, direct feedback, corrective action, and reinforcement (Bandura, 1977). For example, individuals can observe a demonstration, then have an opportunity to practice what they have observed while receiving guidance and support. In addition, it is important to provide the rationale for the procedure and state specific objectives for performance. Participant modeling has been shown to be a powerful and effective strategy for modifying behavior (Bandura, 1976; Bandura, Jeffery, & Gajdos, 1975). Although much of the research using participant modeling has focused on phobias (Bandura, 1976; Cormier & Cormier, 1985), many of the health risk behaviors also lend themselves to change using this method (Thoreson, 1984).

The effectiveness of rewards or reinforcement contingencies in increasing the frequency of desired behaviors has been extensively researched and well documented in the literature. Therefore, the specifics of reinforcement theory will not be further elaborated.

Social Marketing

Social marketing is actually a particular and minor focus of commercial marketing. It is often differentiated from other types of marketing on the basis of its product (often a prosocial idea or practice) and proconsumer orientation (Kotler, 1975; Solomon, 1981). In addition, social marketing is viewed as distinct from selling, since it does not seek to create artificial and simplistic demands (such as switching from one brand to another). The goal of social marketing is market expansion and not market share enhancement. Social marketing does however, use the concepts of market segmentation and analysis, formative research, communication and behavioral strategies.

Social marketing concepts appear to have been embraced within the health community (Frederiksen, Solomon, & Brehony, 1984; Solomon, 1984). For example, Alford (1986) recommended using the more comprehensive framework for marketing nutrition to the general public. Presumably, social marketing offers a framework for guiding program development that is relatively easy to understand and effective. Conceptually, the framework is congruent with principles in health education which call for a full assessment of needs, targeting specific segments of a population, and addressing facilitators as well as barriers to change. In addition, health professionals note the efficacy of marketing campaigns, which primarily focus on brand selection, and may seek a similar hope of success from applications of social marketing to the area of health promotion.

The hallmark of marketing concepts are the 4 P's. These include 1) the *product*, which may be goods, services, concepts, or practices; 2) the *price*, which encompasses monetary, psychological, and time costs; 3) the *place*, which delineates the distribution channels; and 4) the *promotion*, which outlines the advantages of the product. In addition

to the 4 P's, *positioning* is becoming recognized as an additional concept (Frederiksen & Riley, 1984). Positioning emphasizes the importance of designing the promotion of the product so that it can be distinguished from other competing products. In addition, the product should be positioned so that its availability, importance, and/or necessity is apparent to the appropriate segment.

It is important to note that the social marketing framework entails the interactive use of the major marketing variables. Use of the more comprehensive framework is differentiated from only using promotional strategies (i.e., "social advertising"). Social advertising is a more limited focus and one which may have served to undermine many previous health communication efforts.

Predictors of Change

The previous discussion has emphasized the need in public health for effective and economical strategies of inducing behavior changes, particularly in the area of nutrition. This quest has formed the basis for much scientific inquiry. Of equal concern to researchers has been the search for predictors of change. In other words, are there variables that predict which people change (or not) and under what conditions? If so, such information could be used in concert with the development and selection of particular intervention strategies, for certain population segments.

Many variables have been selected over the years as potential predictors of change. These have included demographics, knowledge, beliefs, attitudes, levels of self-efficacy, health locus of control, and processes of change. It would seem that these variables are interrelated and together have an impact on future behaviors. The interrelationships among these variables and the potential for differential effects upon behavior change remain topics worthy of scientific investigation.

As previously noted, much of the research has consisted of changes in knowledge (Galli, 1978; Yarbrough, 1981); beliefs (Becker, 1974; Janz & Becker, 1984; Leventhal, Safer, & Panagis, 1983; Rosenstock, 1974); attitudes (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975); self-efficacy (Bandura, 1977; 1982; Stretcher, DeVellis, Becker, & Rosenstock, 1986); health locus of control (Wallston, Wallston, & DeVellis, 1978); and process of change (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983). However, it does not appear that an examination of the interrelationships of these variables has been undertaken. In addition, the relationship among the above factors and other variables (e.g., family history of disease and personal health risk) have also not been explored. Such investigations have relevance for understanding basic psychological processes (e.g., the relationships of cognitive and behavior change); for fine-tuning psychological programs; and for what has been called "life-style marketing", as differentiated from marketing strategies based more on demographics (Coreil & Levin, 1985).

Formative Research

Formative research was conducted and the findings were used for two purposes: 1) for the development of this dissertation, and 2) for research conducted by Richard A. Winett, Ph.D. and funded by the National Science Foundation. Although the results of the formative research were germane for both research projects, their relevance for the planning of this dissertation (including design, hypotheses, and measures) was critical and therefore, reported in this chapter.

Formative research was conducted over the course of approximately 8 months (beginning in the Spring of 1985), and was conducted in Roanoke and Blacksburg, Virginia. Recall that formative research is an integral part of the behavioral systems framework. Although it was known that this dissertation would have a media-based component and some initial research questions were formulated, the research design and the measures were refined during this phase of the project.

The formative research enabled a thorough analysis of the market segment (e.g., sociodemographics, current shopping behaviors, attitudes, intentions, beliefs, knowledge, self-efficacy, incentives and barriers to behavior change). Also, study and use of communication variables helped to develop an information approach (primarily based on social learning principles) that had been effective in the seemingly "simpler" area of residential energy conservation (Winett, et al., 1985). In addition, pilot video programs were developed for specific audience segments and then pretested. Furthermore, process evaluation occurred. Each of the program development stages will be discussed in the following sections.

Survey

The first step in the formative research process involved developing a one-hundred item survey which assessed knowledge, attitudes, beliefs, cultural preferences, and practices pertaining to the nutrition and shopping recommendations of the project (see Appendix A). This survey was first pretested with a group of 7 residents in the Blacksburg, Virginia area and later administered to approximately 180 residents in nearby Roanoke, Virginia.

The most salient findings from the survey were the following:

1. The majority of respondents, primary shoppers, and food preparers (i.e., cooks) were women.

2. General knowledge was adequate (e.g., knowledge of the linkages between specific dietary practices and diseases).
3. More definitive knowledge was inadequate.
 - a. The need for protein was dramatically overestimated.
 - b. Respondents were unable to identify complex carbohydrates.
 - c. Complex carbohydrates were identified incorrectly as high in caloric content.
 - d. Complex carbohydrates were not identified as good sources of protein.
4. The general belief that "starch is bad" was frequently found.
5. A 24-hour recall of the previous dinner showed meals which had high fat contents, i.e., typical American meals.
6. Use of store brands and shopping lists (i.e., shopping recommendations) were moderately reported.
7. Barriers to shopping and dietary change included the perceived need for additional time and effort and resistance of family members.
8. Weight control (i.e., limiting intake of high caloric foods) appeared to be a motivating force for dietary change, i.e., more important than health concerns.
9. Many included animal sources of protein in their meals several times per day (often hamburger or hot dogs).

The results of this initial survey also were relevant for the development of the questionnaires that were administered in the formal study. The longer questionnaires used in the formal study are described in the next chapter. A brief pre- and post-questionnaire on knowledge was administered during the pilot tests (see Appendix B).

Nutritional and Shopping Analysis

Reports of typical meals provided the basis for analyzing the nutritional content and costs of those meals. Those findings were then compared to the nutritional content and costs of an "ideal" meal (i.e., lowfat and high complex carbohydrate). A computer-based nutritional program (an adaptation by W. Bruce Walker, M.S. of an available software program), was used to analyze the nutritional content of various meals. Furthermore, an extensive market basket analysis compared the costs of the typical food purchases to purchases of more "ideal" foods. The computer program is described in more detail later in this chapter.

From the analyses, it became apparent that small changes in the proportions of foods eaten could effectively influence the nutritional content and costs of food purchases. For example, choosing a 4 ounce steak instead of an 8 ounce steak and selecting a large potato and salad over smaller ones would improve the nutritional content and lower the costs. It should be noted that if the potato was covered with butter and sour cream, and the salad was heavily covered with salad dressing, the above statement would not remain true.

In addition to adjusting the proportions of foods eaten, substitutions (e.g., fish, chicken, or a combination of complex carbohydrates for beef or pork) could be made. On the basis of the nutritional and market basket analyses, these types of substitutions had the desired effect. Again, modest changes in dietary patterns could result in lower caloric content foods and foods which more closely matched the recommended proportions of fats, proteins and carbohydrates.

One of the most significant and dramatic findings came from the market basket analysis. If selections at the supermarket included more complex carbohydrate foods and lower quantities of high fat foods, a dollar savings ranging from 20 to 30 percent could be realized. Therefore, more nutritious and lowfat foods could actually be purchased at a lower cost. Furthermore, such drastic savings could occur before the use of shopping guides (i.e., purchasing store brands, purchasing foods in season, and resisting impulse buying).

From these findings, it was determined that the information content would include a display of more nutritious and lowfat foods, a discussion of the lower caloric content of the more "ideal" foods, and a demonstration of the substantial cost savings. Health concerns served only as background information in materials that were developed, since those concerns were not as salient to respondents as were calories and costs of food.

Armed with this information, two short (approximately 7 minutes each) pilot videos were developed. Both contained the same dialogue, but were different in the presentation of the information. Note that the comparison of the effectiveness of different presentation formats was one objective of the larger grant project. The "high quality" video incorporated effective communication strategies and social learning principles which were delivered through symbolic modeling. On the other hand, the "talking head" video presented the information in a lecture format. Both videos were shown to focus groups and comments and suggestions were obtained. With one or two exceptions, the high quality video was preferred. This information was used for the next phase in developing the longer video formats (approximately 30 minutes each).

The comparison between formats, as noted, was relevant for Dr. Winett's research. For this study, the information was relevant for selection of the appropriate video format for

this dissertation. It was decided that only the high quality video would be used for the media component.

Measurement Development

All questionnaires, except for one standardized form, used in this study were developed by the author (described in detail in the next chapter). In addition, this involved the development of a measure to track food purchases, one of the premiere tasks undertaken during the formative research phase. The measure had to be valid, reliable, and easy to use. Surprisingly, a review of the literature did not reveal such a measure. Most nutritionists rely on 24-hour diet recalls (Rush & Kristal, 1982), which often have reliability and validity problems.

The development of the current food purchase measure (see Appendix C) involved development and testing of several prototype forms. Feedback on the measure was obtained from an initial group of approximately 10 individuals. The form was reevaluated and revised. It became readily evident that extensive recording would have to be avoided. If the recording procedure was too cumbersome, it would most likely contribute to unreliable data and possible attrition. In pilot field tests, other prototypes were tested with representatives from two market segments. Again, the form was reevaluated and revised.

Food purchase recording involved 1) locating the names of foods purchased in a food check-list, which contained about 250 food items grouped by category (e.g., dairy); 2) checking off, or filling in, minor details about quantities and sizes of the foods (e.g., 2 gallons of 2% milk); and 3) writing in items not listed. Code numbers for each food were provided. These code numbers were necessary for use in the nutritional computer program (described in the next section).

As each stage in the development of the food check-list was evaluated, it became more evident that variability in shopping would occur and more information would be needed from the households. For example, special purchases (such as additional steaks for a dinner party or quantity purchases of sale items) could skew the data and provide an inaccurate picture of that household's nutritional content for the week. Also, from preliminary data it was found that some households bought few vegetables, but on further inquiry it was found that they grew vegetables and primarily ate canned or frozen garden items. Others appeared to purchase little or no meat on a weekly basis. However, when contacted, it was found that some households would buy a side of beef and freeze it. Thus, it appeared from the weekly purchases that they were eating almost no meat, when in actuality they were eating meat daily. Therefore, additional sections were included to capture those special occurrences.

As reliability is a necessary criterion for data analysis, two strategies were developed and used in the formative research phase to evaluate the reliability of the food check-list. First, it was found that many shopped at stores that provided detailed receipts (often including product name, quantity, and price). Therefore, the grocery receipts were requested and used for reliability checks. The total number of items on the receipt were compared to the total number of items recorded on the food check-list (i.e., item reli-

ability). Second, since others did not shop at stores that provided such a detailed breakdown of food purchases, another measure was used for reliability. Standard costs of the food items listed on the check-list were estimated by directly observing price ranges of specific foods at area supermarkets. Thus, average costs of foods were obtained. This price information was included in the computer program, and used to assess reliability. Then, the estimated costs of the foods recorded could be compared to the total cost provided on the receipts (i.e., price reliability). Two other reliability estimates were developed after the formative research was complete (e.g., shopping list reliability and item cross-check reliability). These estimates ultimately were used and are described in the next chapter.

The results of reliability estimates based on the two methods (i.e., item reliability and price reliability) for two samples are reported in Table 2. As noted, the reliability estimates were within an acceptable range (e.g., mean item reliabilities were 84.9 and 82.2 percent and the mean price reliabilities were 81.8 and 81.4 percent). The reliabilities in all cases were lowered by one outlier in each category that fell in approximately the 35 to 45 percent range.

Computerized Data Analyses and Feedback

As previously noted, feedback can be a powerful behavior change strategy. A written feedback system and nutritional analysis was developed by Bruce Walker, M.S. using a

computer-based nutritional program. This program was pretested and refined during the pilot research.

The computer program operated as follows: First, each household's food purchases (recorded on the food check-list) were entered into the program. The program then analyzed those purchases and provided an individualized breakdown of simple carbohydrates, complex carbohydrates, total carbohydrates, protein, and saturated fat, and total fats in percentages by calories (see Appendix D). Also, feedback on costs initially were provided as calories per dollar spent. This was later modified to reflect actual dollars spent, since calories per dollar were numbers that were seemingly difficult to understand (e.g., 3,142 calories per dollar). In addition to individual data, means and grand means were computed.

The program also had the capability of making comparisons between baseline and intervention. Furthermore, the program compared weekly nutritional breakdowns to the recommended goals specified by the Senate Select Committee on Nutrition and Human Needs (1977).

Recall that the recommendation was an intake of 58 percent carbohydrates, 12 percent proteins, and 30 percent fats. For example, for a week's purchases, total fat could equal 42 percent, and this was compared to the goal figure of 30 percent fat (i.e., the National Cancer Institute's recommendation). Thus, a 12 percent reduction in fat content was recommended. Based on the output, specific nutritional and shopping recommendations could be made to each household in feedback conditions and included at the bottom of the form (e.g., To reduce your fat content, try lowfat dairy products and at least one meatless meal during the next week.).

Table 2. Average Reliability Estimates on Recording of Foods Purchased.

	Roanoke Subjects	Blacksburg Subjects
Item Reliability	84.9 per cent	82.2 per cent
Price Reliability	81.8 per cent	81.4 per cent

Pilot Procedures and Conditions

Two pilot tests were conducted, one in Roanoke and one in Blacksburg, Virginia. For each pilot, flyers were distributed in the targeted areas. Next, subjects were recruited via a door-to-door procedure. At the first contact, program descriptions and consent forms were left at each household. At the second contact, if subjects agreed to participate in the pilots, consent forms were collected. In addition, the first food check-lists and questionnaires were left for the first week of baseline data collection. Each subsequent week, food check-lists were delivered and picked-up.

Baseline data collection continued for approximately 3 to 4 weeks. Next the interventions occurred and data collection continued for approximately another 3-6 weeks. Those in the feedback conditions received weekly feedback on their food purchases (i.e., intervention). Subjects were randomly assigned to the following conditions:

Roanoke Pilot

Condition 1: High quality video format with feedback.

Condition 2: High quality video format without feedback.

Blacksburg Pilot

Condition 1: High quality video format with feedback.

Condition 2: High quality video format with feedback and participant modeling (personal-interactive).

During the intervention, all videos were shown in the subjects' homes using the project's video equipment. In addition, those subjects who were in the personal-interactive con-

dition were scheduled to go shopping with a "shopping advisor" (i.e., the author). The shopping component of the procedure was scheduled during the same week that the video was shown. The video provided the modeling component of the participant modeling procedure. Then subjects were exposed to guided practice and feedback (including constructive advice, support, and reinforcement).

Hypotheses for Pilot Studies

Past research has suggested that a goal of only modest changes in dietary behavior should be anticipated. Therefore a shift of 8 to 10 percent in the desired direction for food nutrient content and costs was set as a realistic (and some professionals, e.g., Dr. A. King, felt an overly optimistic) objective. In addition to that criterion, the following hypotheses were offered:

Roanoke Pilot

1. Those in both feedback conditions would show greater changes in the desired direction than those in the nonfeedback conditions.
2. Increases in knowledge would be found for all groups.

Blacksburg Pilot

1. Those in the personal-interactive/video/feedback condition would demonstrate greater changes than those in the video/feedback alone condition.
2. Increases in knowledge would be found for both groups.

Results

Results of both pilot tests generally appeared to support the above hypotheses. For both pilots and all conditions, mean baseline to intervention comparisons showed that complex carbohydrate intake increased; protein intake decreased (with the exception of the Blacksburg group where a small increase was noted); and total fats and saturated fats decreased. On the average, costs of foods purchased also decreased by approximately 10 percent. For those subjects who followed the program guidelines, the above trend was more evident. There were not, however, dramatic differences between the feedback and no/feedback conditions. In addition, the supplementation procedure (i.e., personal-interactive/video/ feedback) appeared to be effective for influencing substantial changes in the desired direction for complex carbohydrates, total fats, and saturated fats. However, for the same group, protein intake did to increase slightly. Refer to Table 3 for the findings.

In addition, general increases in nutrition knowledge were found when pre- and post-questionnaire data were examined. For example, complex carbohydrates could be identified and high fat foods in the form of animal fats were identified as less "ideal" foods than complex carbohydrates.

Table 3. Percent Changes in Total Calories/Nutrient in Baseline to Post-Intervention Averages for Two Pilot Tests.

**A. Roanoke Pilot
(n = 12)**

Video (Feedback and No Feedback Conditions)

Subjs. (FB)	Complex Carbo.	Proteins	Total Fats	Saturated Fats
#1	+03	-01	-03	00
#2	+05	00	-06	-03
#3	+03	-03	+01	+02
#4	-04	-02	+05	+03
#5	-04	-01	+05	+01
#6	+14	-09	-06	00
MEANS:	+2.8	-2.6	-.66	-0.5
(NO FB)				
#1	+05	00	-06	-02
#2	+01	-06	+04	00
#3	+11	-07	-04	-02
#4	+06	-09	+02	-02
#5	+03	+02	-06	-01
#6	-05	+02	+04	+02
MEANS:	+3.5	-03	-01	-.83

**B. Blacksburg Pilot
(n = 3)**

Video/Feedback and Video/Feedback/Participant Modeling Conditions

Subjs. (V/FB/PM)	Complex Carbo.	Proteins	Total Fats	Saturated Fats
#1	+17	+02	-18	-04
#2	+19	+02	-20	-04
#3	+22	+02	-21	-06
MEANS:	+19.3	+02	-19.6	-4.6

Process Evaluation

By receiving feedback from pilot subjects and having direct experience with certain procedures, valuable information was gained. For example, in response to feedback from subjects, focus groups, and other professionals, procedures (such as the wording and design of flyers and letters) were frequently modified. For example, the initial contact letter was quite long (e.g., one full page), and it was determined that the wording was too complex and lengthy. As a result, this letter was rewritten and made more concise in response to feedback (see Appendix E and F).

In addition, the information often influenced the promotion of the product (e.g., emphasizing improved nutrition at a lower cost and eating lower calorie foods, in contrast to the earlier emphasis on health). It was concluded that although formative research was costly and time consuming, it was invaluable both to the development of Dr. Winett's project and to the design of this dissertation.

Statement of the Problem

Effective strategies for improving nutritious and economical food purchases are needed for public health. One approach that has been shown to be effective in promoting behavior change in other areas is the comprehensive behavioral systems framework (Winett, et al., 1985). This framework was applied in this study.

Furthermore, it has been suggested that media presentations targeting nutrition should be supplemented with face-to-face interaction (Alcalay, 1983; Griffiths, et al., 1980; Meyer, et al., 1980; Stern, et al., 1977). This study examined this issue by comparing a component video and personal-interactive procedure with a video and attention control procedure.

In addition, several independent variables have been deemed as important factors in the health literature. This research examined the interrelationships of some of these variables, particularly for descriptive purposes and planning of future research.

Research Hypotheses

The following hypotheses are offered as a result of a thorough review of the literature and the results of the formative research:

1. Those in the video and personal-interactive (V/PI) condition will show greater improvements in nutritious and economical food purchases than those in either of the other 2 conditions (i.e., the no treatment control group or the video/attention control (V/AC) group). Specifically, those in the V/PI group will show greater:
 - a) decreases in total fats,
 - b) decreases in saturated fats,
 - c) increases in complex carbohydrates, and
 - d) decreases in dollar expenditures.

2. Changes in the desired direction for the V/PI condition will result from the component strategies of video programming (including symbolic modeling) and personal interaction (including face-to-face instruction, participant modeling, goal setting, and written and verbal feedback) and not due to the personal attention provided in a combined media and personal interaction package.
3. An assessment of independent variables (e.g., knowledge, beliefs, attention, self-efficacy, health locus of control, family history of disease, personal risk factors, process of change, readiness to change, and obstacles to change) will be interrelated.
4. A constellation of variables resulting in high levels of knowledge, beliefs, attention, self-efficacy, process of change, and readiness to change, high frequencies of personal risk factors, high frequencies of family history of disease, low frequencies of obstacles to change, and an internal locus of control will relate positively to desired changes in nutritional and economical food purchases.

Method

Setting

This study was conducted in Blacksburg, Virginia. Blacksburg is a rural community with a population of approximately 35,000. The largest employer is Virginia Polytechnic & State University, employing approximately 5000 persons. Subjects were selected and data collection was conducted over a three month period during the spring and summer of 1986.

Subject selection

Subjects who were recruited had to be the over 18 years of age, but could be either male and female. Through door-to-door recruitment, prospective subjects were contacted and volunteers solicited.

Initially, a flyer and a newspaper article, which briefly described the program, were left at each home (see Appendix G and H). The flyer alerted the households to the arrival of recruitment personnel in their neighborhood.

On the second day, recruiters went to each home in specified locations. If recruiters greeted someone over the age of 18, a 4 page pamphlet was left for the prospective subjects to read (see Appendix F), and an appointment was made for the following day.

The next day (i.e., the third day), the recruiters returned at the appointed times to determine households' decisions about participation. The last page of the pamphlet was a consent form, and it included questions about primary location of grocery shopping and specific medical history questions. The latter information was requested so that a priori decisions could be made about the appropriateness of the subjects for the project. For example, if a subject, or anyone in their household, was on a restricted diet, then their participation in the project was prohibited.

During the third contact, recruiters obtained the consent forms from those who agreed to participate and gave each household a note thanking them and informing them of the starting date of the program. If, on the other hand, prospective subjects were either not at home or uncertain of their decision, additional appointments were made for a second decision date (see Appendix I). Finally, just prior to the beginning of the program, a reminder letter was sent to the subjects informing them of the start-up date (see Appendix J).

Based on these methods, about 31 percent of the contacted households volunteered (180 out of approximately 585 households contacted) for the overall larger study. Verbal

feedback suggested that the perceived difficulty and time involved in the self-monitoring of food purchases prohibited some individuals from volunteering.

From this pool of subjects, 14 subjects were randomly assigned to each of the treatment groups and 27 subjects were randomly assigned to the no treatment control group for the treatment portion of this dissertation. The other subjects were randomly assigned to treatment groups for the on-going nutrition study conducted by Dr. Winett. Analysis of between group differences for all 7 treatment groups was performed and is reported elsewhere (Winett, Kramer, Walker, Malone, & Lane, in press).

For the descriptive portion of this dissertation (i.e., an examination of the interrelationships of several independent factors), subjects were pooled together (i.e., from all treatment groups) and the questionnaire data were analyzed ($n = 126$).

Procedures

Experimental conditions

Subjects were randomly assigned to one of 3 conditions following approximately 7 weeks of baseline. Due to the relative heterogeneity of the population in Blacksburg, a stratified random sampling procedure was used. Subjects were recruited from seven neighborhoods, distinct by geographic location and demographics. Thus, location or neighborhood was one stratification variable.

The other stratification variable was based on a main dependent variable (i.e., percent fat content from food purchases). A median split was performed on each households' fat content, which was based on an analysis of all food purchases which were recorded during baseline. Subjects were categorized as either high or low on fat content. Subsequently, subjects from each neighborhood were categorized by fat content and then randomly assigned to treatment groups.

The conditions were as follows:

Condition 1: NO TREATMENT CONTROL GROUP (n = 27)

At the end of the study, subjects received written nutrition information, and were given the opportunity to view the high quality video.

Condition 2: VIDEO/PERSONAL-INTERACTIVE GROUP (n = 14)

High quality video format with participant modeling, goal setting, and written and verbal feedback.

Condition 3: VIDEO/ATTENTION CONTROL GROUP (n = 14)

High quality video format with attention control (i.e., no participant modeling, goal setting, or written and verbal feedback).

Video development

The content of the video was developed and pretested, as noted, during the formative research phase. The information was provided using modeling and particular communication strategies (Wright & Huston, 1983). The video (entitled "Optimal Nutrition/Saving Money") was approximately 30 minutes long and designed to be shown in the home, so that attention to the content could be maximized. During the actual showing of the tape, interactions between the person showing the video and the subjects were kept to a minimum.

The cast included a middle age couple who gathered information, discussed issues with friends, and struggled together to overcome some barriers to change (e.g., beliefs that animal sources of protein were needed for health, and children who were initially resistant to change). The cast was comprised of individuals who were typical of the participants in the study.

The program began with a rationale for purchasing foods high in nutritional value and low in costs. Also, the video addressed some myths (e.g., that diet was not linked to health) and provided nutritional information (e.g., that complex carbohydrates were low in calories). In addition, the program emphasized shopping guides to help the couple make changes in their food purchases while resisting impulse buying. For example, guides for making complete shopping lists and adhering to them were offered (i.e., substituting high fat foods for lowfat ones and purchasing only foods which were on the shopping). Furthermore, suggestions were made for buying store and generic brands and buying fresh fruits and vegetables in season. Other strategies focused on: 1) meal planning, 2) changing proportions of foods eaten (e.g., choosing a smaller steak and a

larger potato and salad), 3) switching from red meat selections to fish or chicken, 4) including meatless meals (e.g., spaghetti with meatless toppings), or 5) a combination of the above.

The storyline of the program took place in the couple's home and at the supermarket. Graphical inserts were used to emphasize various points (e.g., shopping list development, calorie comparisons of foods, and prices of different meals). In addition, music was used in the background, and specific key points were repeated several times in audio and visual aspects of the tape (e.g., character generated words were superimposed to emphasize certain points). The result was a high quality video program.

Video showings, interpersonal, and feedback procedures

All subjects, with the exception of the no treatment control group, were contacted during approximately the fourth week of baseline. An appointment was made to go to each household with the videos and video cassette recording (VCR) equipment. For subjects in the video/personal-interactive condition (V/PI), an additional appointment was made and subjects were taken shopping during the same week (i.e., using the participant modeling procedure described in the next section). For subjects in the V/AC group, approximately 30 minutes were spent with the primary shopper talking in general terms (e.g., about family, eating behaviors, past attempts at nutrition change). Again, no instruction or feedback was provided.

All written feedback was delivered weekly to subjects in the V/PI condition, and it arrived within a mean of 4 days after the food checklists were picked-up from each

household. In addition, subjects received a one- or two-sentence prompt (e.g., "Increase your complex carbohydrates by purchasing more pasta, potatoes, and beans.") in their weekly data packet. The prompt differed each week and covered the key points of the video.

After delivery of the weekly feedback and prompts, subjects in the (V/PI) condition were telephoned, the written feedback was discussed, and questions were answered. Phone calls lasted approximately 5 minutes. In lieu of the written feedback, subjects in the video/attention control (V/AC) procedure received written notes describing the status of the program (e.g., how many persons were participating). The V/AC subjects were also phoned each week and approximately a 5 minute conversation ensued. The phone conversations were distinctly different from those in V/PI Condition, as specific instructions and feedback were not provided. Thus, for the V/AC (i.e., the attention control procedure) attempts were made to match the V/PI procedure in the time, frequency, and distribution of attention.

Participant modeling

The face-to-face interaction and feedback procedure was based on participant modeling (i.e., an interpersonal strategy) (Bandura, 1986). Bandura (1976) concluded that participant modeling achieves results given adequate demonstration, guided practice, and positive experiences. The participant modeling strategy used in this study contained 5 primary steps and they include the following:

1: Rationale

- 2: Modeling
- 3: Guided Practice
- 4: Feedback
- 5: Behavioral Enactment/Experiencing Success

Note that in the present application of this procedure, participant modeling did not include repetitive practice.

Each step of the procedure used in this study will be outlined below:

I. RATIONALE (as stated to the subjects): This procedure has been used successfully with other people in helping them to make changes in their behaviors. There are 3 basic things we will be doing. First, you will watch a video of a couple who will be demonstrating ways to eat more nutritiously and to save money while shopping. Next, you will practice one of the shopping guidelines with my assistance. Then we will arrange a time for the 1(2) of us to go shopping and try out the nutrition and shopping recommendations. This type of assistance and actual practice should increase the likelihood that you will be successful in your attempts to improve your nutrition. Are you willing to give this a try?

II. MODELING

A. Symbolic modeling

1. Via the video

III. GUIDED PARTICIPATION AND FEEDBACK

A. Making a complete shopping list at the subjects home

1. Subskills of shopping list development
 - a. listing food items needed
 - b. creating 2 specific meals

- 1) adding additional items needed
- c. substituting lowfat foods
- d. writing exact amounts needed
- 2. Taking the subject(s) grocery shopping
 - a. Using the shopping list
 - b. Resisting impulse buying
 - c. Client practicing with assistance
 - d. Providing direct feedback
 - 1) reinforcing positive performance
 - 2) providing constructive advice & corrective feedback
 - e. Using induction aids
 - 1) joint practice
 - 2) verbal coaching
 - f. Having opportunity for self-directed practice

IV. BEHAVIORAL ENACTMENT/EXPERIENCING SUCCESS

- A. Opportunity for experiencing successful or reinforcing experiences
 - 1. Skills being practiced in a low-risk situation
 - 2. Fostering competencies and confidence

The aim of the participant modeling procedure was to "... foster new competencies & confidence, rather than exposing deficiencies" (Bandura, 1976, p.272).

Independent measures

At the beginning of the study, if subjects agreed to participate and consent forms were signed, a request was made for them to fill out background information forms. For each household, information pertaining to education, occupation, age, income, height, weight, medical history, family health history, and specific shopping behaviors were obtained (see Appendix K). Certain questions were designed for each adult household member. This was done since specific demographic factors might be different for the two adults (e.g., education and occupation); health histories would vary; and self-reported behaviors about certain grocery shopping habits would be relevant only to the person who did the majority of the food purchasing. Two factors from the background information sheet were used as independent variables. These included a measure of personal health risks and a measure of family history of disease.

Personal health risks were computed by adding the total number of risks checked by each adult household member. The list is shown in Appendix K, and the diseases on the list included: 1) heart disease, 2) high blood pressure, 3) diabetes, 4) cancer, and 5) colitis or ulcers. In addition to the above listing, a measure of body mass was computed for each adult using the height and weight figures. The formula used is one currently recommended by the National Institutes of Health (1985) for the estimation of obesity. The body mass index (BMI) formula is calculated by dividing body weight (measured in kilograms) by the square of height (measured in meters). After calculating the BMI and determining how many individuals would be classified as obese by this measure, the total number of personal risk factors (those from the listing of diseases plus the BMI of obesity) for each household were computed, an additive scale from low personal risks (frequency = 0) to high personal risks frequency = 12).

In addition to the background information form, a set of questionnaires were administered to each adult member of the household. See Table 4 for the timeline of questionnaire administration. Also, in Appendix L the questions are listed by category.

The first questionnaire assessed knowledge and beliefs pertaining to nutrition and grocery shopping. The scaled score for knowledge was total number correct and for beliefs, the additive score from the Likert scale. During the second week, another questionnaire was administered and behaviors, perceived barriers to change, readiness to change, and process of change variables were assessed (again these were scaled by adding the responses).

Two different preintervention questionnaires were developed. If combined in one questionnaire and administered along with the background information form, the document would have been lengthy and probably cumbersome. The primary shopper in the family filled out a more lengthy questionnaire, which included questions relevant to shopping practices. If there was another adult member in the household, she/he filled out a shorter one.

In addition to the pre-questionnaires, three postintervention questionnaires were administered and these included measures of attention (i.e., to the video content), self-efficacy, and health locus of control (all additive scales). Again, postintervention assessment took place at two contacts (i.e., first, on-site, when the intervention took place, again one week later), and one including the health locus of control measure at the end of the intervention. Each questionnaire included other questions that were relevant to the larger study, but not included for analyses in this dissertation.

Table 4. Timeline of Questionnaire Administration

Time 1		Time 2		Time 3
Week 1	Week 2	Week 1	Week 2	
Knowledge				
Beliefs				
	Behaviors			
	Obstacles			
	Readiness to change			
	Process to change			
		Attention		
			Self-efficacy	
				Health Locus of Control

Dependent measures

In addition to the background information form and questionnaire #1 (administered at the beginning of the program), a food checklist and set of instructions were left with each household at the beginning of the program. Thus, the first week of baseline data collection began.

The food checklist was developed during the formative research phase. Recall that certain foods were listed and standard sizes and code numbers provided on the checklist. Additional space was provided for the recorder to write in quantities purchased and sizes of the foods (i.e., if they differed from the standard sizes provided). For example, if a 2 pound box of spaghetti was purchased, it would be located in the list; "2 pounds" would be written under the "other size" column; and "1" would be written under quantity (refer to Appendix C). Special food purchases (e.g., 8 t-bone steaks for a dinner party) and/or foods which have been frozen or canned, but not purchased (i.e., frozen garden items) were recorded on the first page of the checklist.

The nutrient breakdowns included total carbohydrates, complex carbohydrates, simple carbohydrates, proteins, total fats, and saturated fats. As previously noted, these measures were computed from an available computer software program which was adapted for the purposes of this research (described in the previous chapter). All items on the checklist were given standard nutritional and caloric values (Pennington and Church, 1985; USDA, 1981), and thus, a component nutrient analysis could be performed. In addition, to the nutrient comparisons, average costs comparisons were made between baseline and postintervention periods (means and grand means were also com-

puted). Costs of food items were obtained at the start of baseline from price lists from the largest supermarket in the area.

The dependent variables included average changes in percentages of nutrients (computed from foods purchased and recorded on the food checklist) from baseline to postintervention. Since there was considerable variability in week-to-week food purchases, weekly nutrient breakdowns were averaged together such that one baseline score was obtained for each household. This procedure was repeated for postintervention data.

Reliability estimates

Grocery receipts and shopping lists were requested and were to be attached to the top right corner of the checklist each week. Both the receipts and the shopping lists were used for reliability estimations of the food purchase recording procedure. The shopping list reliability check was an additional measure of reliability generated for this research. Furthermore, neighborhoods in the vicinity of a well known supermarket were selected to maximize the possibility of obtaining receipts from that store (receipts which were detailed and generally provided product name, quantity, and price). Reliability was assessed with three methods, and each are described below:

1. *Price reliability*: This method compared the estimated total costs of the foods listed (generated by a computer program) to the total costs found on the grocery receipts.

2. *Shopping list reliability*: This method compared the number of items on the shopping lists to the number of items on the food checklists. Since some shoppers did not use a list, this method was only used in cases where lists were offered.

3. *Item cross-check reliability*: This method was used for subjects who provide itemized computer receipts. The items on the receipts were cross-checked with those listed on the food checklists.

Item cross-check reliability was considered the most comprehensive measure of the three, since specific items could be matched from computerized receipts. This measure was the primary reliability estimation for the study. However, this measure also had limitations. For example, only about 65% of the sample shopped at the supermarket which gave computerized item-by-item receipts (e.g., specifically listing an item as sour cream instead of dairy). Furthermore, many shoppers could have listed items on their food checklists which were purchased elsewhere and for which no receipt was provided (e.g., buying milk at a convenience store). Thus, even for the portion of subjects who typically shopped at supermarkets that provided computerized item-by-item receipts, it was not possible to account for all items listed on the food checklists.

For each subject who shopped regularly at a store that provided detailed shopping receipts, one week was selected randomly from baseline and one from intervention for reliability checking. For subjects who did not shop regularly at such stores, weeks where receipts were available were selected for reliability checking.

The formula for item cross-check reliability was as follows: First, the number of items that corresponded between the checklist and receipt were divided by the total number of receipt items. Next, a correction figure was used for items recorded on the checklist,

but not found on the receipt. The correction figure was computed by dividing the items on the checklist, but not on the receipt, by the total number of items on the checklist. Finally, the correction figure was subtracted from the first figure and the result was multiplied by 100 percent. An example follows:

Corresponding items = 22

Receipt items = 25

Items on checklist, but not on receipt = 2

Checklist items = 24

$$[(22/25 = .88) - (2/24 = .08)] = .80 (100\%) = 80\%$$

Data enumerators and reliability

The procedures required weekly and extensive data enumerating. Seven data clerks worked to input data from the food checklists and provide output on the dependent variables for each individual household. Reliability of the data enumerating was estimated by weekly checks. Approximately 10 percent of the forms were evaluated weekly. Food items which were input in the computer were examined by cross-checking the data. Thus, total number of food comparisons were made by examining the checklists, the receipts, and the shopping lists (if provided). Those checking reliabilities were blind to experimental conditions. Reliabilities were averaged and recorded as a percentage.

Design and analyses

Compliance with the food purchasing and shopping procedures and the effectiveness of the information approaches (i.e., based on the behavioral systems framework) was evaluated by comparing three independent groups across two phases (i.e., preintervention and postintervention). This presented a mixed factorial design, which is a blending of the within-subjects (repeated measures) and between-subjects designs (Keppel, 1982). The between factor included the interventions or experimental conditions (3 levels) and the within factor was measurement phase (i.e., preintervention and postintervention). Thus, the design was a factorial of 3 conditions X 2 phases.

This study actually had two components (i.e., one experimental and one descriptive). Therefore two primary statistics were employed. First, the statistical analysis used for the experimental portion of the study was a multivariate analysis of covariance (MANCOVA). Covariates were used to control for initial subject differences on the nutrient levels.

Second, for the descriptive aspect of the study, the following independent variables were analyzed via factor analysis and correlational procedures: knowledge, beliefs, behaviors, health locus of control, self-efficacy, attention, family history of disease, personal health risk, barriers or obstacles to change, readiness to change, and process of change.

Results

Subjects' Participation

Of 585 households contacted, 180 households (31.7 percent recruited) agreed to participate in the studies and signed consent forms (i.e., for this research and Dr. Winett's). Initially, 10 households (5.5 percent of those who volunteered) were excluded for health and other special circumstances (e.g., diabetes, food allergies, or pregnancy). In addition, 33 households (18.3 percent of those who volunteered) decided not to participate prior to baseline. During baseline, but prior to implementing the intervention, another 11 households (6.1 percent of those who volunteered) dropped out of the study, reportedly due to time constraints. Thus, after dropouts and exclusions, the total number of subjects was 126 (for a participation rate of 70 percent and a conservative recruitment rate of 22 percent).

Recall that these 126 subjects were administered questionnaires during the study, and this data provided the descriptive examination of the interrelationships of commonly used independent variables. From these 126 subjects, random assignment to treatment groups was undertaken and 55 subjects were assigned to the treatment portion of this dissertation.

Of the 55 subjects assigned to the 3 treatments, 36 continued through the intervention phase (i.e., 18 in the control group, 9 in the video/personal-interactive condition, and 9 in the video/attention-control condition), for a participation rate of 65.5 percent. An additional criterion (i.e., mean dollars per week for food shopping > \$25) was used to select subjects a priori for statistical analyses (described in a following section called "Analyses of Treatments"), and this decreased the sample to 23 subjects (i.e., 11 in the control condition, 6 in the video/personal-interactive condition, and 6 in the video/attention-control condition). These 23 subjects represented 41.8 percent of the initial sample ($n = 55$) that was randomly selected for the 3 conditions.

Demographics of the Samples

Summary statistics will be presented for each of the two samples. Recall that 55 subjects were randomly assigned to the experimental treatments (a subsample of the larger study). These 55 subjects were not assigned to other treatment groups. For the descriptive examination of the interrelationships of various independent factors, however, subjects from all treatment groups were pooled together, and questionnaires were administered to all 126 subjects.

A visual examination of the data revealed that subjects from both of the samples were similar with regard to age, place of employment, and marital status. For example, ages for the subsample ($n = 55$) ranged from 20 to 77 years of age with a mean of 39 and for the larger sample ($n = 126$), 19 to 77 years of age with a mean of 38. Also, the most common primary place of employment for both samples was listed as government employee (presumably Virginia Tech).

The data for education, marital status, sex, and income are summarized in Tables 5 and 6. Note that the sample sizes vary for these data, because of missing data. The summary statistics for sex and marital status is presented for the primary grocery shopper of the household. When applicable, statistics on education are provided for both adults. Furthermore, income is listed as total family income.

As depicted in Table 5, approximately 30 percent of the subjects in the larger sample ($n = 126$) who were listed as the primary shopper had a graduate degree, and approximately 28 percent had some college education. For the other adult household members from that sample (e.g., spouses or roommates) a larger percentage had graduate degrees (e.g., 59.1 percent as compared to 30.2 percent). Similar findings were noted in the subsample ($n = 55$). However, a slightly higher percentage of the primary shoppers in this sample had graduate degrees (e.g., 38.2 percent as compared to 30.2 percent). As with the larger sample, over 50 percent of the other adult household members had graduate degrees. Thus, both samples generally presented highly educated individuals.

In addition to being relatively well educated, subjects from both samples were frequently in higher income brackets (see Table 6). For both samples the mean income level was approximately \$35,000. Also, the majority of subjects from both samples were married

Table 5. Summary Statistics for Education for Subjects from Both Samples

Variable	Larger Sample		Subsample	
	Freq	Percent	Freq	Percent
<u>Primary Shoppers' Education:</u>				
Finished grade school	1	0.9	1	1.8
Finished junior high	2	1.9	1	1.8
Some high school	1	0.9	1	1.8
Finished high school	6	5.7	3	5.5
Some college	30	28.3	12	21.8
Finished college	22	20.8	8	14.5
Some post graduate	12	11.3	8	14.5
Graduate degree	32	30.2	21	38.2
<u>Spouses'/Partners' Education:</u>				
High school or less	0	-	0	-
Some college	3	13.6	1	11.1
Finished college	3	13.6	2	22.2
Some post graduate	3	13.6	1	11.1
Graduate degree	13	59.1	5	55.6

Table 6. Summary Statistics for Income, Marital Status, and Sex for Subjects from Both Samples.

Variable	Larger Sample		Subsample	
	Freq	Percent	Freq	Percent
<u>Joint Income:</u>				
Less than 10,000	15	12.1	7	15.6
10,001 to 20,000	14	11.4	5	11.1
20,001 to 30,000	13	10.6	6	13.3
30,001 to 40,000	20	16.3	8	17.7
40,001 to 55,000	38	30.9	12	26.6
Greater than 55,000	23	18.7	7	15.6
<u>Sex:</u>				
Female	85	81.0	39	72.2
Male	20	19.0	15	27.8
<u>Marital Status:</u>				
Single	17	16.3	7	13.0
Married	77	74.0	42	77.8
Divorced	8	7.7	3	5.6
Widowed	2	1.9	2	3.7

(e.g., 74.0 percent for the larger sample and 77.8 percent for the subsample). Furthermore, 81 percent of the primary grocery shoppers for households were females.

In addition to sociodemographic variables, questions were asked to assess exercise behavior (an indicant of health status) (see Table 7), personal health risks (see Table 8), and family history of disease (see Table 9) of the participants. The data reported are for those subjects (i.e., all adults in households) in the three treatment groups ($n = 55$). From this data it was determined that 58.2 percent of the sample ($n = 32$) reported that they exercised regularly (i.e., at least 3 times per week for 30 minutes or 4 times per week for 20 minutes). In addition, 87.5 percent of the samples reported one or less personal risk factors (e.g., heart disease, high blood pressure, or colitis). A somewhat higher percentage of subjects reported family history of disease, with 25.6 percent reporting a combined total of 4 major family risk factors.

Reliability

Shopper reliability

Reliabilities are reported as means across geographic areas. Upon visual examination, there were no differences across these areas, and no reason to assume they were different across conditions. As shown in Table 10, reliability of the primary shoppers' recordings on the food checklists for the item cross-check and the price reliabilities ranged from 70.0 percent to 77.0 percent. Although these reliabilites are lower than the generally accepted

Table 7. Reported Exercise Habits of the Primary Shoppers in the Subsample

	Yes	No
Primary Shopper	58.2 (n = 32)	41.8 (n = 23)

Table 8. Total Frequency and Percentage of Reported Personal Health Risks for All Adult Household Members in the Subsample

Number of Risks	Frequency	Percent
0	19	59.4
1	9	28.1
3	1	3.1
5	1	3.1
6	2	6.3

Table 9. Total Frequency and Percentage of Adult Household Members Reporting Family History of Disease in the Subsample

Number of Risks	Frequency	Percent
0	6	14.0
1	2	4.7
2	8	18.6
3	4	9.3
4	11	25.6
5	4	9.3
6	5	11.6
7	3	7.0

level of 80 percent (Kazdin, 1984), the best available procedures used in this study for calculating reliabilities had limitations (discussed previously). It would be difficult to achieve considerably high reliabilities with the methods employed in this study. As previously noted, the primary method for examining shopper reliability was the item cross-check procedure. However all three calculations of reliability (i.e., item cross-check, price, and shopping reliability) are reported in Table 10.

Both item cross-check and price reliability increased from preintervention (i.e., baseline) to intervention (e.g., from 74 to 77 percent and 70 to 74 percent respectively). Also, the shopping list reliability checks were considerably lower during baseline (58.3 percent), but increased to 70.3 percent during intervention (indicating a potential response to the intervention which recommended the use of complete shopping lists). Although approximately 87 reliability checks were undertaken during the study for item cross-check and price reliability, fewer reliabilities could be calculated for shopping list reliability. Since many subjects did not provide shopping lists each week, this limited the number of reliability checks that could be done using this latter procedure.

Data enumerator reliability

Reliability estimations for data enumerators varied across persons. Reliabilities for some enumerators were consistently higher than 90 percent, while others were closer to 65 percent. The average reliability across data enumerators for all phases of the study was approximately 71 percent.

Table 10. Mean Shopper Reliability Estimates for Subjects Across Geographic Areas

Estimates	Preintervention	Intervention	n
Item Cross-Check	74%	77%	87
Price Reliability	70%	74%	87
Shopping List Reliability	58%	70%	28

Since this reliability was somewhat low, one person (blind to experimental conditions) rerecorded data for households where data enumeration reliability was low. After this procedure of rerecording, two additional persons double-checked the data (i.e., any data < 70%) and reentered data as needed to increase the accuracy of the data recording. Thus, a concerted effort was made to achieve accurate recordings from the food checklists. Based on their inspection and reentry procedures, data that was computer entered was reliable at close to 100 percent of data recorded by subjects.

Analyses of Treatments

An examination of food purchase data indicated that small shoppers ($x < \$25$ per week) contributed considerable variability to the data. In some cases, these participants were single individuals or couples who ate many of their meals outside their home. Thus, in these cases, food shopping represented a small amount of their actual food consumption each week and a potentially inaccurate representation of nutrient intake.

Removal of small shoppers left 36 subjects (i.e., 18 in the control group, 9 in the video/personal-interactive condition, and 9 in the video/attention-control condition). Of these subjects, 23 regularly shopped in stores which provided detailed receipts. With detailed receipts, an opportunity was available to more accurately assess the reliability of the self-reported data used in the analyses. Therefore, these 23 subjects were selected

a priori for statistical analyses of nutrient and dollar expenditure data (i.e., 11 in the control group, 6 in the video/personal-interactive condition, and 6 in the video/attention-control condition).

Even with the elimination of small shoppers, variability in subjects' week-to-week food purchases and dollar amounts spent was noted. For example, a subject might spend \$28 dollars one week on a few commonly used items (e.g., milk, bread, juice), and the following week do a more extensive purchase of foods and spend, for example, \$96. Thus, weekly scores were averaged into preintervention and intervention scores for each subject, in order to capture a more complete picture of households' food purchases.

To test for initial differences among groups on the dependent variables, preintervention scores were analyzed using a multivariate analysis of variance (MANOVA). The results showed no significant differences among the 3 groups on the preintervention scores for the six dependent variables (complex carbohydrates (CC), simple carbohydrates (SC), protein (PT), total fats (TF), saturated fats (SF), and dollar expenditures (M)), $F(3, 20) = 1.51$ $p < .17$.

Even though the analysis demonstrated no significant pretreatment differences, it was hypothesized that the initial nutrient levels of the individual subjects (i.e., at preintervention) could influence the amount of change that occurred during intervention. For example, someone with an average percent of total fat content in their food purchases of 48 percent would have potential change toward goal level of 18 percentage points, whereas someone else with an initial total fat level of 35 percent at preintervention could decrease by only 5 percentage points. Therefore, a multivariate analyses of covariance (MANCOVAs) were selected to analyze the data, and control for initial differences (Keppell, 1982).

All assumptions for the MANCOVAs were met (including normality, independence, and homogeneity of the slopes of the covariates). To test for homogeneity of the slopes, a univariate ANOVA procedure was performed to examine potential interactions among treatments and preintervention scores. None were significant, and thus, equivalency of slopes could be assumed (see Table 11).

MANCOVAs then were performed on each dependent variable (i.e., the change in the scores for each nutrient and dollar expenditure from the mean preintervention score across the 7 weeks for each subject, to the mean intervention score), using the preintervention scores as covariates. Thus, there were 7 dependent variables (i.e., change scores on the nutrients and dollar amounts) and 7 covariates (i.e., each preintervention score). Consultants at the Virginia Tech Statistical Consulting Lab indicated that from the above analyses, the most significant covariate for each dependent variable should be selected, and ANCOVAs performed. Because of the nature of the data, the covariates typically were different for each dependent variable, and thus, MANCOVAs could not be used for this analyses. Due to the number of ANCOVAs that were undertaken (i.e., six), the Bonferroni correction (Neter & Wasserman, 1974) was employed to adjust for multiple significance tests (selecting an alpha of .05). The Bonferroni formula is the selected alpha level divided by the number of statistical tests employed. The computation for this study was $.05 / 6 = .008$. Thus, in order to be significant at the .05 level, a $p < .008$ would be needed for the dependent variable.

From the ANOVAs, a significant treatment effect emerged for total fats, $F(3, 22) = 6.30, p < .008$. A post hoc analysis using the Scheffe method for multiple comparisons (i.e., for unequal-sized samples) was selected to make comparisons among sample means. Note that the Scheffe method (i.e., a conservative post hoc analysis) automatically con-

Table 11. An Examination of Homogeneity of Covariates (Prescores on Nutrient Levels)

Variables	N	Sum of Squares	DF	F	P < 0.05
Complex Carbohydrates	23	5.91	2	0.12	0.89
Simple Carbohydrates	23	7.33	2	0.21	0.76
Protein	23	0.28	2	0.02	0.98
Total Fats	23	102.18	2	2.11	0.15
Saturated Fats	23	0.89	2	0.07	0.93
Dollars	23	118.07	2	0.56	0.58

trols for the possibility of a Type I error when multiple comparisons are undertaken. This analysis revealed a significant difference between the means of the control group and the video/personal-interactive group, $F(3, 22) = 7.71, p < .05$. No other significant differences were noted with the Scheffe test for multiple comparisons on this dependent variable.

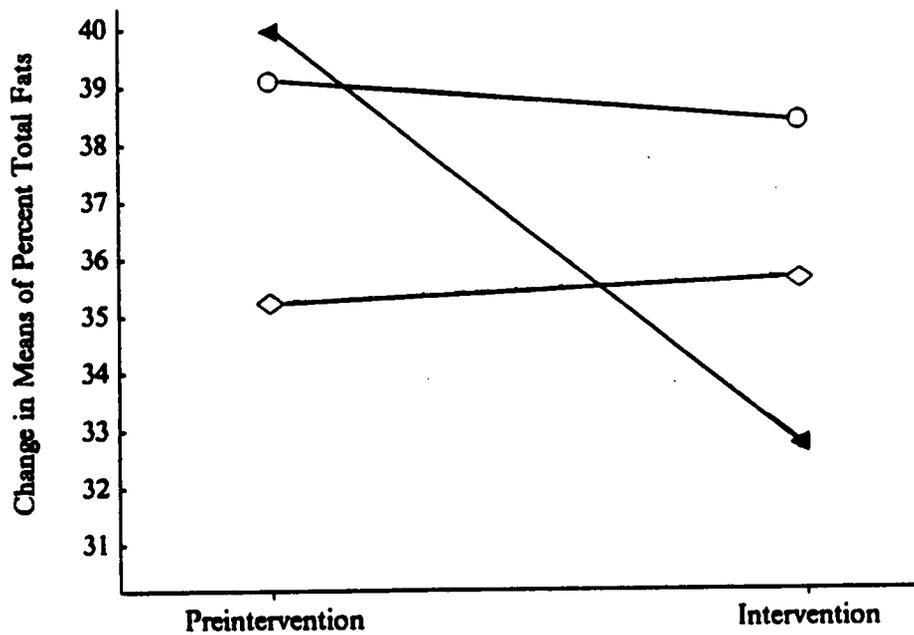
The other treatment differences that approached significance were the saturated fat levels, $F(3, 22) = 3.89, p < .04$, and the simple carbohydrate levels, $F(3, 22) = 2.98, p < .08$. However, neither of these comparisons were significant when adjustments were made for experiment-wise error rate using the Bonferroni correction formula. Inspection of the data indicated that the video/personal interactive group exhibited the greatest reduction in saturated fat levels across the groups. In addition, it was noted that the simple carbohydrate increase could be accounted for partially by an increase in fruits and vegetable purchases.

Table 12 lists the percentage of subjects that changed in the desired direction on the dependent variable, total fat (i.e., decreased mean total fat content from preintervention to intervention). From the video/personal-interactive group, 100 percent of the subjects ($n = 6$) moved in the desired direction. In the attention-control procedure ($n = 6$), 33 percent changed in the desired direction, while 36 percent achieved this in the control group ($n = 11$). Using Yates correction for small sample sizes, a Chi-square test showed no significant differences among the groups with regard to the percentage of subjects who changed in the desired direction ($\chi^2(2) = 4.26; p < .05$). Although not significantly significant, the differences among the groups were of substantial interest.

The total fat data were also examined graphically. Figure 4 shows the weekly mean of percent total fat during baseline and intervention weeks for the control and treatment

Table 12. Percentage of Subjects Who Changed in the Desired Direction on Total Fats from Preintervention to Post-intervention

Condition	Percentage in Desired Direction	Decreased Fats	No Change or an Increase of Fats
Control (n = 11)	36%	n = 4	n = 7
V/PI (n = 6)	100%	n = 6	n = 0
V/AC (n = 6)	33%	n = 2	n = 4



Legend	
▲—▲	V/PI
◇—◇	V/AC
○—○	Control

Figure 4. Change in Means of Percent Total Fats from Preintervention to Intervention

conditions (n = 23). The data were graphed as mean percent of total fat per calories for preintervention to intervention for each condition. Using each condition's baseline mean, subjects in the control condition increased total fat by 2 percent during intervention, while subjects in the video/personal-interactive condition reduced total fat by 18 percent, and the video/attention-control subjects reduced fat only by 2 percent (see Table 13).

Analyses of Questionnaire Data

As previously discussed, the following independent variables were selected to analyze data for descriptive purposes: 1) readiness to change (including a measure self-perceived adequacy of nutrition), 2) present nutrition behaviors, 3) process of change, 4) knowledge, 5) nutrition beliefs, 6) perceived obstacles to change, 7) attention to the video content, 8) self-efficacy, 9) personal health risks, 10) family history of disease, and 11) health locus of control. Please refer to Appendix M for a listing of the frequencies, standard deviations, and means for each variable.

As noted, the self-report measures used in this study have been used in various health-related research. However, since most of these scales were adapted for the present research (i.e., targeting nutrition behaviors), the psychometric properties of the scales were of interest. In order to examine whether the factors selected for this study were indeed measuring unified constructs, reliability and validity estimations were calculated.

Table 13. Mean Percent Change in Percentage of Total Fat Content for Each Condition

Condition	Preintervention	Intervention	\bar{X} % Change
Control	35.27%	35.81%	+ 2%
V/PI	39.83%	32.66%	-18%
V/AC	39.00%	38.33%	-2%

Reliability

Internal consistency calculations (using Kuder-Richardson's formula) were undertaken for most of the measures. Reliabilities for measures which included only one question (e.g., readiness to change, obstacles to change, personal risk factors, and family history of disease) could not be calculated, since internal consistency is assessed via inter-item correlations. Each measure for which reliabilities could be estimated are listed in Table 14.

Based on an acceptable criterion range for internal consistency of .70 to .90 (Ary, Jacobs, & Razavieh, 1979), three measures were considered the most reliable indices from those selected. These included process of change ($r = .93$), beliefs ($r = .70$), and self-efficacy ($r = .73$). Although somewhat lower, health locus of control also had a relatively high coefficient alpha ($r = .65$).

Optimally, one would want higher coefficients for the other measures. For example, nutrition behaviors ($r = .25$), attention ($r = .21$), and knowledge ($r = .24$) each had relatively low coefficient alphas. There are several factors which can account for low internal consistency reliabilities. These issues will be discussed in the last chapter.

Validity

Another psychometric consideration is estimation of the validity of the scales. Two methods for inferring the validity of an instrument are: 1) significant positive correlations between variables which appear to be different measures of a similar construct (i.e.,

Table 14. Internal Consistency Estimates for the Independent Variables

Variable	Coefficient Alpha
Process of Change	0.93
Beliefs	0.70
Self-Efficacy	0.73
Knowledge	0.24
Behaviors	0.25
Attention	0.21
Health Locus of Control	0.65

convergent validity), and 2) non-significant or negative correlations between measures of dissimilar constructs (i.e., discriminant validity) (Campbell & Fiske, 1959).

In order to determine convergent and discriminant validity for the measures used in this study, correlations were calculated. These correlations are reported for the variables in Tables 15-18. Since personal health risks, family history of disease, and obstacles to change were presumed valid listings from which subjects' were asked to check all that applied to them, the face validity of these measures were accepted, and thus, these variables are not included in the analyses.

As predicted, readiness to change and process of change were significantly and positively correlated (see Table 15), although modestly. Also, neither readiness to change or process of change were positively correlated with a measure of appropriate nutrition behaviors subjects' were engaged in. These relationships were also expected. For example, if someone reportedly is actively engaged in appropriate nutrition behaviors, they would not necessarily respond to items on the readiness to change and process of change scales to suggest a willingness to change those behaviors. Thus, some evidence for the validity of these measures can be noted.

In Table 16, relationships among beliefs, self-efficacy, and a self-reported statement that the subject thinks his or her nutrition practices are "okay" are reported. Convergent validity can be found among these variables. Significant and positive relationships are demonstrated; although, modest correlations were noted. Discrimination validity estimations were not expected among these variables and the others used in this study and, therefore, were not calculated.

Table 15. Convergent and Discriminant Validity Relationships for Readiness to Change and Process of Change

Variable	Correlations
<u>A. Convergent</u>	
Process of Change & Readiness to Change	$r = 0.49$ $p < 0.0005$
<u>B. Discriminant</u>	
Behaviors & Readiness to Change	$r = 0.12$ $p < 0.38$
Behaviors & Process of Change	$r = 0.17$ $p < 0.22$

Table 16. Convergent Validity Relationships for Beliefs, Self-Efficacy, and Nutrition is Okay

Variable	Correlations
Self-Efficacy & Beliefs	$r = 0.50$ $p < 0.0001$
Self-Efficacy & Nutrition is Okay	$r = 0.38$ $p < 0.01$
Beliefs Nutrition is Okay	$r = 0.41$ $p < 0.002$

Table 17. Discriminant Validity Relationships for Knowledge and Attention

Variable	Correlations
Knowledge & Attention	-0.19 p < 0.16

Table 18. Discriminant Validity Relationships for Health Locus of Control with Process of Change and Beliefs

Variable	Correlations
Health Locus of Control and Process of Change	r = -0.37 p < 0.02
Health Locus of Control and Beliefs	r = -0.22 p < 0.13

Discriminant validity, however, was assessed for: 1) knowledge and attention, and 2) for health locus of control and process of change and beliefs. In Table 17, it can be shown that for those who demonstrated a high level of nutrition knowledge, lower scores on attention to the video were noted. Also, as shown in Table 18, those who tended to be labeled external on the health locus of control scale, were low on the process of change scale (i.e., more in the precontemplative stage of the process of change).

Factor Analysis

To examine the relationships among the independent variables, with the exception of the dichotomous self-reported measure of adequacy of nutrition practices (i.e., nutrition is "okay"), a factor analysis was employed using prior communality estimates and varimax rotation. Factor loadings for each variable are presented in Table 19, with only factor loadings greater than .40 being offered. As depicted in Table 19, 3 factors were retained. These 3 factors accounted for 32 percent of the common variance. Using the varimax rotation, two variables (i.e., nutrition behaviors and obstacles) were missed. All other variables were captured in three factors.

The three factors are described below:

Factor I The first factor had relatively large loadings (loadings > .40) for 4 of the 11 variables, and these variables included measures of readiness to change (.78), process of change (.56), nutrition beliefs (.53), and self-efficacy (.60). The variance explained by this factor was 20 percent.

Table 19. Factor Analysis of Selected Independent Variables

Variables	F₁	F₂	F₃
Readiness to Change	0.78		
Nutrition Behaviors			
Process of Change	0.57		
Knowledge			-0.44
Obstacles			
Nutrition Beliefs	0.54	0.41	
Attention			0.51
Self-Efficacy	0.60		
Personal Risks		0.47	
Family History of Disease		0.48	
Health Locus of Control		-0.40	

- Factor II** The second factor included 4 of the 12 variables and these were nutrition beliefs (.41), personal health risks (.47), family history of disease (.48), and health locus of control (-.40). The variance explained by this factor was 8 percent.
- Factor III** The third factor included 2 variables and these were knowledge (-.45) and attention to the video content (.51). The variance explained by this factor was 4 percent.

Correlations among independent and dependent variables

Correlations among the 12 independent variables and the nutrition and dollar expenditures for the 3 treatment groups ($n = 23$) are reported in Table 20.

Only correlations greater than .50 are listed. Significant relationships were found between attention to the video and dollar expenditures ($r = -.74, p < .02$), between attention to the video and protein levels ($r = -.86, p < .003$), and between self-efficacy and simple carbohydrate intake ($r = -.67, p < .05$). Although not significant, it is of interest to note that appropriate nutrition behaviors was negatively correlated with total fat intake ($r = -.60, p < .09$).

Due to the number of independent variables and the relatively small sample size, a regression analysis was not appropriate for this study. However, the treatment groups from this study were combined with Dr. Winett's treatment groups and separate regression analyses were performed. The results of the analyses combining treatment groups from the 2 studies are to be reported elsewhere. However, the regression analyses

Table 20. Correlation Among the Independent and Dependent Variables for the Three Treatment Groups

Variables	Simple Carbo.	Complex Carbo.	Saturated Fats	Total Fats	Protein	Dollar Expend.
Readiness to Change		0.53				
Behaviors				-0.60 0.09		
Process of Change						
Knowledge	-0.50 (0.16)					0.59 (0.09)
Obstacles						
Beliefs		0.62 (0.07)				
Attention		0.57 (0.11)			*-0.86 (0.003)	*-0.74 (0.02)
Self-Efficacy	*-0.67 (0.04)					
Personal Risks		-0.55 (0.12)	0.50 (0.17)			
Family Health Hx.	-0.57 (0.11)		0.51 (0.16)		0.51 (0.16)	
Health Locus of Control			-0.52 (0.19)			-0.16 (0.11)

*Indicates Significance at the 0.05 level.

demonstrated no significant relationships among the independent and dependent variables.

Discussion

The purpose of this study was two-fold. First, the primary research question was to experimentally assess the differential impacts of a combined media and personal interaction (V/PI) condition to a condition that combined media and personal attention (V//AC). A no treatment condition was also used to control for threats to internal validity (e.g., history and maturation). Second, for descriptive purposes, it was of interest to examine the interrelationships of commonly used independent variables in the health literature (e.g., self-efficacy, beliefs, knowledge, health locus of control, and process of change) and their relation to outcome.

In this chapter, the experimental portion of the study (i.e., the primary research issue) will be discussed first. Next, a discussion of the descriptive portion of the study will ensue. In addition, other relevant methodological issues will be addressed. This discussion will include comments about future research directions. Last, concluding remarks will be offered.

Experimental Findings

The effectiveness of media (i.e., a multimedia campaign) and face-to-face interaction in the area of nutrition had been documented in the literature. Proponents of this type of large scale public health programming had suggested that this combined package was more effective than a media alone strategy (Alcalay, 1983; Griffiths et al., 1980; Meyer et al., 1980; Stern et al., 1977). Certainly, one would expect a more intensive program with personal contact to have more salient effects. However, one question remained. Were the more robust and desired changes noted in the literature due to the personal attention provided to subjects in these video and personal interactive procedures or to the instruction, modeling, and feedback offered in the procedures themselves? To address this, the following hypothesis was offered:

Changes in the desired direction for the V/PI condition will result from the component strategies of video programming (including symbolic modeling) and personal interaction (including face-to-face instruction, participant modeling, goal setting, and written and verbal feedback) and not to the personal attention provided in a combined media and personal interaction package.

The above hypothesis was supported by the data in this study. Those persons in the V/PI condition did demonstrate significant changes in the desired direction in the percentage of total fat content in foods purchases. A comparable change was not noted in either the control condition or the V/AC condition. Thus, it was concluded that some strategy, in addition to the instruction and symbolic modeling provided in the video and the personal attention provided, was necessary and responsible for this change.

Recall that the behavioral systems framework incorporates psychological concepts of behavior analysis and social cognitive theory and uses principles of modeling, reinforcement, feedback, and goal setting. From this study, it was not possible to determine which of these psychological principles were most effective. It can only be said that some combination of factors, in addition to the procedures used in the video and the personal attention provided in the participant modeling, were responsible for the dramatic decreases in total fats. However, analysis reported elsewhere demonstrated that feedback and goal setting were most likely the significant components (Winett, Kramer, Walker, Malone, & Lane, in press). In addition, in the analyses combining the treatment groups from this study and Dr. Winett's, there were no significant differences between video conditions with personal contact, verbal feedback, and goal setting and those without the personal interaction (i.e., with written feedback and goal setting). Thus, feedback and goal setting were effective with or without personal contact. This is an important finding since personal contact presumably could be costly in terms of time and money. Based on arguments against the cost-effectiveness of the procedure, one could call into question the practicality of participant modeling procedures.

Although the above hypothesis was supported, the significant differences only were noted with one dependent variable, total fat. This finding was a very important one, nonetheless. Clear experimental data support the benefits to health from reducing dietary fat (Puska et al., 1985). However, the second hypothesis was thus, only partially supported, since an increase in complex carbohydrates and a decrease in dollar expenditures were, at best, minimally achieved. Between group differences on these variables apparently were offset by within-group differences.

Furthermore, the behavioral systems framework attempts to determine the most salient issues or needs in a target population and then incorporates psychological and communication strategies to appropriately address those needs through the content and the procedures. From the pilot data and the formative research, it appeared that the most salient nutritional and economic issues included a decrease in total and saturated fats, an increase in complex carbohydrates, and a decrease in dollar expenditures. However, since total fat content was the area with the statistically significant decreases, one could argue that among the nutritional and economic issues that were determined salient, total fat content in the diet is the primary concern of the sample, and thus, enhanced the attention to the content or the responsiveness of the sample to the treatment procedures. Note however, that the behavioral systems framework attempts to maximize the interaction of person variables and environmental procedures to result in desired changes. Generally, a several stage process of "fine tuning" the procedures which target the needs is necessary to maximize efficacious results. This has been the case in other experimental applications of the behavioral systems framework (Winett et al., 1985).

Recall the following hypothesis:

Those in the V/PI condition will show greater improvements in nutritious and economical food purchases than those in either of the other 2 conditions (i.e., the no treatment control group or the (V/AC) group). Specifically, those in the V/PI condition will show greater:

- a) decreases in total fats,
- b) decreases in saturated fats,
- c) increases in complex carbohydrates, and
- d) decreases in dollar expenditures.

Although data were collected on six dependent variables (total fats, saturated fats, complex carbohydrates, simple carbohydrates, protein, and dollar expenditures for food purchases), predictions were made only for the above four. The content of the video primarily focused on these four nutrients (with total fats being much more of the focus than saturated fats). It should be noted that protein was discussed, but only to assure people that increasing complex carbohydrates and decreasing fats could be accomplished by eating less meat and without a danger of a protein deficiency. In addition, the video did not address other typical nutrition messages, such as, decreasing intake of processed sugars, decreasing sodium intake, or moderation in alcohol intake. Therefore, although it was of interest to track protein and simple carbohydrate intake, the changes in the other variables were much more of a concern.

An interrelated set of changes in nutrient composition was expected. The initial expectation was that total fat intake would decrease. Furthermore, a comparable increase in complex carbohydrates also was anticipated. Since complex carbohydrates typically are less expensive foods (e.g., beans, rice, potatoes, and bread), a decrease in dollar expenditures was expected to result. Also, there was a suggestion that high fat animal sources of proteins be substituted with fish and poultry (e.g., chicken) or eaten in smaller quantities. Again, the expectation was that dollars spent on food should decrease along with total fats. Thus, it was this interrelated set of changes that was anticipated and which led to the above hypothesis.

As can be demonstrated from the results, the changes among the subjects were rather selective, focusing primarily on fat content of foods. In retrospect, this is not surprising. Subjects may have, for example, substituted more expensive and lower fat protein sources (i.e., fish), while at the same time, not making notable changes in other areas

of nutrition. Certainly the recent data from the Economic Review Service (1987) supports this rather incongruent selection of foods among the general population. As previously discussed, changes *between* product classes is a seemingly more difficult task than changes *within* product classes. For example, within product class changes (e.g., switching from one brand of cereal to another) are often attempted through ad campaigns. (Engel & Blackwell, 1982). In other words, although the nutrient changes would be expected to covary, in actuality, they may not, since changes primarily may be occurring within product classes.

However, there is another explanation for the differential impacts on the nutrient levels and dollar expenditures. That is, selective attention to material may be an important factor. Although an increase in complex carbohydrates was recommended and a concerted effort was made to model such behavior, subjects may not have attended to those messages as much as to the fat content dialogue and feedback. However, the V/PI condition did show the greatest increase in simple carbohydrates, with data approaching significance. As mentioned, inspection of the data indicated that this increase was partially due to increases in fruit and vegetable purchases.

Interestingly, during the personal contact, most of the verbal questions from subjects pertained to dietary fat (particularly saturated fat). Unfortunately, there is no data on this observation. Certainly, the personal interaction and focus on fat content may have contributed to the differential effects, with the most dramatic change coming in the total fat category. Although not significant, the V/PI condition did exhibit the greatest decrease in saturated fats across all conditions.

The selective attention also may be related to perceived vulnerability. The deleterious effects of fat in the diet are well known, and I would conjecture that perceived vulner-

ability to this threat is relatively strong (at least among this well educated sample). However, the same level of vulnerability may not be perceived for eating too few complex carbohydrates. Subjects may like complex carbohydrates and feel confident in their ability to purchase them (i.e., self-efficacy), but their actions may not lead to an adjustment on this nutrient if they do not perceive a need to change or do not feel their changes would have a significant impact on their health. This, of course, is suggested by the Health Belief Model (Janz et al., 1984) and is, in and of itself, an interesting empirical question. A further discussion of the relationships of beliefs and self-efficacy to outcome will be undertaken in a later section of this chapter.

An examination of the individual food check-list data, which entailed tabulating foods purchased during preintervention and intervention and comparing the frequencies, was undertaken by a person blind to experimental conditions. The findings yielded the following general impressions:

- Subjects seemed to be more successful at reducing "negative" foods (e.g., whole milk and red meat) than they were at increasing "positive" foods (e.g., pasta and beans).
- Subjects appeared to focus on one message in the video and adjust changes accordingly. Most subjects made some positive changes, although the changes seem to be specific to that household and varied across households.
- On the whole, students were the greatest outliers in terms of dollar amounts spent.
- Most frequent positive changes included increases in grains, fruits, and vegetables and decreases in red meat, oil, and high fat dairy products.

In addition to the above general impressions, the following households made these specific changes following the video showings:

Household A: Switched from frosted flakes to Cheerios.

Household B: Decreased whole fat dairy products and increased fish and chicken consumption.

Household C: Cut snack food consumption in half (e.g., Little Debbie Snacks).

Household D: Immediately switched from whole milk to 1% milk.

Household E: Immediately bought 5 pounds of rice and 3 pounds of macaroni, doubled fresh fruit purchase, and tripled fresh vegetable purchases.

The above observations would suggest that some participants selectively attended to specific and possible salient messages in the video.

While examining the statistical results from the study, one perplexity was the different results found in the pilot study. Recall that substantial changes in the desired direction were also found for total fats; but in addition, saturated fats, and dollar expenditures also changed. Furthermore, there did not appear to be appreciable differences between the feedback and no/feedback conditions. Certainly, a replication of these results was hoped for. There are several potential explanations for the observed differences:

- Any time different samples are used, different results may be found;
- The feedback and goal setting procedures were changed (presumably improved) for the "real" study, and this could have account for the differences; and

- The parameters (e.g., time frame) of the two studies did vary, and this could have contributed to the different findings.

An examination of the data showed that following the initial presentation of the intervention, both studies showed desired changes. With the longer time frame of the formal study, however, the variability in week-to-week shopping and dollar expenditures could be noted. From this data, it was observed that improvements occurred just after the intervention and again later in the study. Again, this variability made it difficult to achieve significance (as noted in this study and Dr. Winett's). For example, across the two studies, it was noted that for the video, symbolic modeling, and feedback condition, reductions in dollar amounts spent were considerable, although not significant (Winett et al., in press). Again, test variability was too great for statistical significance.

One could speculate that with a larger sample size and similar response sets, statistical significance might have been achieved with the other variables. Although the limitations of not having an adequate sample size and the increased difficulty in achieving statistical significance (i.e., inadequate power) is always a concern in research, results from Winett et al. (in press) suggested that sample size may not have been problematic in our studies. For example, treatment results were the same and there were no initial differences in demographics or nutritional breakdowns between two samples ($n = 62$ and $n = 87$).

One optimistic observation is that the changes in total fats is a very important finding and actually may not be as minimal as they appear at first glance. For example, a change in mean percent total fat from preintervention to intervention for the V/PI condition was an 18 percent reduction. However, the preintervention mean percent total fat for that group was approximately 40 percent (10 percent above the National Cancer Institute's guideline of 30 percent). During intervention the percent total fat reduced to

approximately 33 percent (a decrease of approximately 7 percentage points). This represented achieving 70 percent of the goal level (i.e., $7 / 10 = 70\%$). From this vantage point, shifts in nutrient content were appreciable.

Due to the length of the study (approximately 12 weeks) and the response cost required in adhering to the recording procedures, adequate follow-up was not feasible. Therefore, long-term maintenance of the procedures cannot be addressed.

Questionnaire Findings

As in individual treatment planning and evaluation, public health program planning and evaluation seek to determine which interventions work best for which individuals and under which conditions. In order to assess this, predictors of change are often examined in relation to outcome. However, it is typical for researchers to assess one independent variable (e.g., either health beliefs, process of change, or self-efficacy). Therefore, it was of interest to explore the interrelationships among these different variables. To address this, the following hypothesis was given:

An assessment of independent variables (e.g., knowledge, beliefs, attention, self-efficacy, health locus of control, family history of disease, personal risk factors, process of change, readiness to change, and obstacles to change) will be interrelated.

Given that data was collected on ten primary variables, it was necessary to have a large enough sample to explore the interrelationships. Thus, the subjects ($n = 126$) were pooled across all conditions (from this study and Dr. Winett's). This hypothesis, though not surprisingly, was supported. Given this, it was of interest to observe how the variables appeared to be interrelated.

Recall that this study employed the factor analysis method for communalities estimates, not the principle components method. This procedure examines covariation among the independent variables (not individual items on a scale). The factor loadings in the communalities method are correlations, not regression weights (as in principle component analysis).

From the factor analysis, Factor I contained four variables (listed in order of factor loadings): 1) readiness to change, 2) self-efficacy, 3) process of change, and 4) nutrition beliefs. Although the reliability of the readiness to change measure could not be assessed, the other three variables represented the most psychometrically sound among the ten surveyed. Therefore, there can be a greater degree of confidence in the relationships noted among the variables in Factor I.

Intuitively, one would expect a pattern of covariation among the variables in Factor I. Certainly those who are attempting to make behavioral changes or are trying to maintain them, would score high on either the readiness to change or process of change scales. Also, the nutrition belief items used in this study were adapted from the Health Belief Model, one which has a self-efficacy component. In addition, as Stretcher, et al. (1986) noted, the self-efficacy framework addresses both efficacy and outcome expectations, yet few studies examine efficacy expectations in conjunction with outcome expectations. Outcome expectations are also a major component of the Health Belief Model

(Janz et al., 1984). For example, both perceived vulnerability and the perceived beneficial effects of the prescribed health behavior change are outcome expectancies. Thus, the items on the questions for nutrition beliefs and self-efficacy may be capturing similar or related constructs, (i.e., efficacy expectations and outcome expectations).

Certainly, efficacy and outcome expectations may play a large role in the decision to make health behavior changes. If so, it is not surprising that these variables would covary with those measuring process of change. In other words, those who are confident in their ability to make the necessary health behavior changes, also believe that their actions will lead to desirable health benefits, and are the ones most likely to be attempting to make those changes (i.e., scoring high on the process of change and readiness to change measures).

Factor II also contained four variables: 1) family history of disease, 2) personal health risks, 3) nutrition beliefs, and 4) health locus of control. Although a somewhat lower reliability was obtained for health locus of control than for beliefs, some interesting relationships can be seen in Factor II. Those individuals with higher scores on family history of disease, personal health risks, and nutrition beliefs also had low scores on the health locus of control measure (i.e., an indication that they are characterized by an internal locus of control). Indeed, a higher frequency of family history of disease and personal health risks could demonstrate a relation with perceived vulnerability, a component of the Health Belief Model. In addition, those who characteristically exhibit an internal health locus of control, would seemingly believe that their actions could potentially have beneficial results.

Factor III contains two variables: 1) knowledge and 2) attention. The loadings on this factor have a negative relationship. This suggests that those who have considerable

knowledge about nutrition, may have attended less to the video and symbolic modeling. Thus, for these individuals the opportunity for exposure to the behavior change strategies in the video was diminished. Therefore, it would be premature to conclude that the video was ineffective for these individuals. Note that it took a few studies by Dr. Winett in the energy area to be able to do effective videos. For effective change strategies, one has to understand the behaviors and the context in which they occur. Thus, in the area of nutrition, what may be necessary is further refinement of the video to capture the attention of these subjects.

As previously noted, some researchers are not interested only in how the independent variables are interrelated, but also how they are related to outcome. This led to the final hypothesis:

A constellation of variables resulting in high levels of knowledge, beliefs, attention, self-efficacy, process of change, and readiness to change, high frequencies of personal risk factors, high frequencies of family history of disease, low frequencies of obstacles to change, and an internal locus of control will relate positively to desired changes in nutritional and economical food purchases.

This hypothesis was not supported by the data. However, it was interesting to note some significant findings from the correlation matrix. For instance, subjects with a high percentage of simple carbohydrates (possibly processed sugars) reported low confidence in their abilities to make nutrition changes. Processed sugar is certainly a nemesis for many individuals in our society. Some folks would not even consider, for example, giving up their 5 pieces of chocolate per day. For those who have tried to reduce their sugar intake, it may be as difficult a task as quitting smoking. Thus, a low degree of

confidence in their ability to make changes in their simple carbohydrate intake may generalize to other nutrients as well.

Another relationship that was seen in the correlation matrix was among high levels of protein intake and dollar expenditures and low scores on attention to the video. This is somewhat difficult to interpret, however, this could relate to the "meat and potatoes" person who has no desire to make change in their menus. Also, one of the messages of the video was that the recommendations could help one save money on dollar expenditures for food. Some individuals can afford to buy anything they want, and may not have been concerned about the money saving features of the video. For those individuals who signed up for the program, their interest in the program and attention to the video content may have been minimal.

A more powerful statistic (such as regression analysis) could not be employed with the small sample size ($n = 23$) of this study. Although the reported correlations are of interest, they should be interpreted *cautiously* and not generalized beyond the sample. Furthermore, for total fats (the dependent variable where significant change was noted from preintervention to intervention), only the measure assessing appropriate nutrition behaviors approached a significant relationship with total fats (i.e., $r = -.60, p < .09$). This would imply that those who typically do not engage in appropriate nutrition behaviors tend to consume more dietary fats.

The fact that the interrelationships among the variables was noted, while the lack of predictive ability found, was not surprising. The lack of consistent predictive ability, particularly for more "trait-like" measures, is quite common in the literature. As Bandura (1986) noted, "As is generally the fate of global trait measures, they have not enjoyed much success in predicting adoption of new products or fashions" (p.170). Also,

there is evidence that many frequently used independent measures (e.g., the Health Belief Model) may not be measuring unitary constructs (Stretcher et al.,1986) and thus, the resulting interrelationships.

The lack of predictive ability of the independent variables may have been due to several factors:

- the measures were too "trait-like";
- the measures were not specific enough; or
- the measures should have been administered closer to the behavioral action and measured repetitively.

The above observations have several implications. First, one could argue for a continuation of research which searches for a general model (i.e., variables) that predict behavior. If so, many measures developed for such use would have to be adapted for the topic at hand. Therefore, considerable time and effort would be required to ensure the use of reliable and valid measures. The time and cost it would take for the development of such measures is not a luxury always afforded to researchers. On the other hand, one could opt to use standardized measures. However, sound psychometric measures designed to target one behavioral domain (i.e., designed to predict change) may not be applicable to another (e.g., phobic behaviors versus nutrition behaviors). Therefore, a search for a model of *general* predictors of behavior may be futile, particularly in light of the specificity of behavior within particular environmental contexts.

On the other end of the continuum, one could argue that principles of public health program development should be followed. Here, the purpose of formative research is to

determine and conduct the most cost-effective procedures for positively influencing the greatest number of individuals. Often the procedures are passive strategies (i.e., water fluoridation). Here desired changes are more at an institutional level and for the common good. In this model, one does not need to consider person variables as extensively, if at all.

However, many public health interventions cannot be achieved feasibly through institutional level or passive interventions alone. Many require changes at the individual level as well (e.g., reducing dietary fat to prevent certain types of cancer or changing sexual behavior to prevent transmission of AIDs). Therefore, there is a need to assess the knowledge, beliefs, skills, and self-efficacy (i.e., mediating factors) of individuals being targeting. The objective, however, is to more clearly understand the needs of the population being targeted and the environmental constraints and inducements on that population. The information is used for more effective (and cost-effective) program development (as in applications of the behavioral systems framework or the PRECEDE model). Since specificity of behavior across individuals and contexts is acknowledged, the impetus is not necessarily a search for a *general* model which predicts all health behavior change, but for specific procedures and structures of change (Bandura, 1986). The use of a model or framework (based on theories, concepts, and principles) is a process of repeated application to increase effectiveness and specificity of procedures.

Other Relevant Issues

In the presentation of results and discussion, some methodological issues were broached. One concerned the low reliabilities of some of the independent variables (e.g., knowledge, attention, and behaviors). There are two potential explanations for the lower reliabilities:

1. There were only a few items in each scale. Generally, the longer the test, the greater the reliability.
2. There was not a lot of variation on some of the responses. The more heterogenous the group is, the greater the reliability (Ary et al., 1979).

Another issue concerned the relatively low reliabilities of the food check-list data. In future research, higher reliabilities may be achieved using large numbers of subjects if they could be recruited from stores that provide detailed grocery receipts. These receipts then could be used directly to input individual data and then supplemented with self-report data from food check-lists. This method might increase reliability of the data and minimize the response cost to subjects. Presently, the number of supermarkets offering detailed receipts is limited. It is likely that this will change as more supermarkets switch to computerized check-out. Also, the present receipts still categorize some items (e.g., produce) and thus, some self-monitoring would still be necessary. It is hoped that more complete detailed receipts in a larger number of stores would be offered in the future. This would increase the number of supermarkets in which this kind of research could be undertaken.

Another concern, and a common one in this type of research, was the self-selection characteristics of the sample. Since participation was voluntary, this affected the external validity of the study. Furthermore, since shoppers with purchases less than \$25 dollar were eliminated from the study in order to obtain more stable and checkable data, no conclusions can be drawn about this subsample. Overall, replication of this study with other populations will be needed to assess the generality of the procedures.

In addition to using other samples and data collection strategies, the variability of the data in this study was problematic. In order to compensate for the within subject variability, shoppers should be followed for longer periods of time (e.g., six months to a year). Also, it would be beneficial to examine aggregate store data to assess product changes over time in an area (as in the Greene et al., 1984 study). However, aggregate store data is difficult to obtain, and if one ultimately can get reliable individual data, then that would likely be preferred.

Based on the findings from this study and Dr. Winett's, modeling, feedback, and goal setting factors were effective with or without personal contact. In addition, Dr. Winett compared video formats (i.e., symbolic modeling versus lecture format, with both formats containing the same dialogue). There was evidence that the symbolic modeling video, feedback, and goal setting procedure was more effective than lecture video, feedback, and goal setting. Based on these findings, future research will embark on in-store procedures which will incorporate modeling, feedback, and goal setting strategies, while continuing to steer away from typical information tactics which tend to do no more than enhance knowledge.

Research typified in this study, Dr. Winett's research program, and studies by other colleagues at Virginia Tech (e.g., see Wagner, 1987) continues the search for effective

communication and behavior change strategies in environmental settings. Such a behavioral/environmental focus is often dictated by the nature and urgency of many public health issues (e.g., nutrition, teenage pregnancy and suicide, and AIDs).

Concluding Remarks

Given the threat of dietary fat to the health of the American public, the reduction in total fat found in this study was an important finding. The application of the behavioral systems framework provided the necessary information to enable the message of the video and the modeling, feedback, and goal setting components to be targeted in this direction. It is premature to assume that the behavioral systems framework was ineffective in targeting the other nutrients. Although not statistically significant, the results were substantially interesting. Other factors, such as behavioral contexts, person variables, family dynamics, and decision processes are relevant. The conceptual framework does have utility, as has been shown in past research by Dr. Winett. However, the framework is dependent upon the appropriate questions being asked to the subjects. Certainly, further refinement of the video and on-going evaluation of process issues must be carried out through replication stages in extensive public health programming. Given this, the results of this study are promising.

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Appendix A. Initial 100 Item Survey on Nutrition and Food Purchases

Survey of Nutrition and Food Purchases

**Psychology Department
Virginia Tech
and
The National Science Foundation**

Spring, 1985

Purpose: The purpose of this survey is to provide current data about nutritional information, beliefs, food shopping practices, and meal preparation. The data will be part of our formative, preliminary research in the development of our consumer-oriented, media project on nutrition and food purchases.

Instructions: Please write directly on the survey form. It is not necessary to include your name.

Thank you for your help.

Background Information

In order to better use the information from this questionnaire, it is important to know some things about your background. However, there will be no way to identify you from this information. We do not want your name on this questionnaire.

1. Age:
(a) 10-20
(b) 21-30
(c) 31-40
(d) 41-50
(e) 51-60
(f) 61-70
(g) 71 or over
2. Sex:
(a) female
(b) male
3. Education:
(a) finished grade school
(b) finished junior or high school
(c) finished high school
(d) some college
(e) finished college
(f) some postgraduate education
(g) graduate degree
4. Family income for last year:
(a) less than \$10,000
(b) \$10,000 to \$15,000
(c) \$15,001 to \$20,000
(d) \$20,001 to \$25,000
(e) \$25,001 to \$30,000
(f) \$30,001 to \$35,000
(g) \$35,001 to \$40,000
(h) More than \$40,000
5. How many people are in your household? _____
6. List the ages of family members. _____

7. Write in your present occupation: _____
8. Do you exercise regularly (by regularly, we mean about 30 minutes three times a week or about 20 minutes four times a week)?
(a) Yes _____ (b) No _____
9. Your height is: _____ ft. _____ inches
10. Your weight is: _____ lbs.
11. In your family, is there any history of heart disease?
(a) Yes _____ (b) No _____
12. History of high blood pressure? (a) Yes _____ (b) No _____

13. History of diabetes? (a) Yes ____ (b) No ____
14. History of cancer? (a) Yes ____ (b) No ____
15. Do you presently have any known diseases? (a) Yes ____ (b) No ____
16. If yes, note here: _____
17. Write in your spouse's present occupation: _____
18. Does your spouse exercise regularly (by regularly, we mean about 30 minutes three times a week or about 20 minutes four times a week)?
(a) Yes ____ (b) No ____
19. Your spouse's height is: _____ ft. _____ inches
20. Your spouse's weight is: _____ lbs.
21. In your spouse's family, is there any history of heart disease?
(a) Yes ____ (b) No ____
22. History of high blood pressure? (a) Yes ____ (b) No ____
23. History of diabetes? (a) Yes ____ (b) No ____
24. History of cancer? (a) Yes ____ (b) No ____
25. Does your spouse presently have any known diseases?
(a) Yes ____ (b) No ____
- If yes, note here: _____

Nutrition Information Questions

26. Which fast food comes closest to being a good meal because of its ideal proportion of protein, fats, and carbohydrates, and relatively low calories?
(a) Big Mac, fries, and shake
(b) Kentucky Fried Chicken dinner
(c) plain pizza
(d) pizza with some meat topping
27. Which has the most calories?
(a) two pieces of bread
(b) three spoons of peanut butter
(c) a glass of whole milk
(d) a 12-oz. Coke

28. The best way to make sure your diet has enough vitamins and minerals is to:
- take megavitamins
 - take small-dosed vitamins at least several times per day
 - eat two or three apples a day
 - eat a varied diet
 - exclusively shop for your food in health food stores
29. Suppose you are really dragging and decide to have a candy bar for "quick energy". The most likely result is:
- a short time of increased energy followed quickly by feeling dragged out again
 - a fairly long-time (about 90 minutes) of increased energy, followed by a gradual return to normal
 - craving in 10 minutes for another candy bar
 - quick energy lasting for about an hour, just like the ads say
30. Which cereal has the lowest sugar content?
- Post Raisin Bran
 - Cheerios
 - Life
 - Rice Krispies
31. Which of the following has the least calories and is the least "fattening"?
- large order of french fries
 - Snickers candy bar
 - small (2 oz.) hamburger
 - two large bananas
32. Which of the following has the most calories and is the most "fattening"?
- one, large baked potato
 - an average serving of sirlion
 - two large pieces of bread
 - three frankfurters
33. Here is a list of grams of protein in different products or servings: Two peanut butter sandwiches (20); one glass of milk (8); two large eggs (12); ham, 4 oz. (20); lean hamburger (20); tuna fish, 4 oz. (30); spaghetti with cheese topping (about 15). How many grams of protein per day are needed by the average adult female (130 lbs) and adult male (180 lbs)?
- 130 grams and 180 grams
 - 50 grams and 65 grams
 - 200 grams and 150 grams
 - 30 grams and 45 grams

34. Which of the below shows the correct order for the least to most expensive sources of protein? (By this we mean, where can you get the best protein for your dollar?)
- chicken breasts, pork chops, lamb chops
 - ham, eggs, peanut butter
 - liverwurst, tuna fish (canned), turkey (whole)
 - sardines, lean ground beef, beef liver
35. If a bread package says, "Refined, bleached, and enriched flour", it means that:
- the bread contains a great deal of vitamins and minerals since it is "enriched"
 - the bread is highly nutritious since the "refining" gets rid of impurities
 - it is highly processed and hence, quite dangerous to your health
 - the processing of the grains for the bread destroys certain elements, vitamins and minerals in the grain and some of the vitamins and minerals are put back into it
36. Which is the most nutritious combination?
- complex carbohydrates, corn, high fiber
 - simple carbohydrate, milk, high fiber
 - simple carbohydrate, white bread, high fiber
 - complex carbohydrate, orange juice, high fiber
37. If a new product comes on the market and it is called "Blue Ridge Natural Fruit Drink", you know that:
- it only can use juice from fruit grown in the "Blue Ridge" area
 - it contains pure juice because of the term "natural"
 - it must contain at least 50% juice because of the term "fruit drink"
 - it is probably 85% - 90% sugar and water because of the term "drink"
38. A label on a cereal box says the following: sugar, honey, corn syrup, NATURAL WHOLE WHEAT, fructose. This means that:
- the main ingredient is natural whole wheat since it is in the largest letters
 - the cereal contains alot of sugar, but at least it also contains honey as a sweetner which is much healthier than sugar
 - sugar is the largest percentage ingredient because it is listed first
 - corn syrup and fructose are natural sugars that balance the processed sugars in the cereal
39. Every year millions of Americans often go on extreme diets to try to lose weight. What percentage is successful on a long-term basis in keeping their weight down?
- about 30%
 - about 2%
 - about 15%
 - about 5%

40. Most experts agree that increased life expectancy and quality of life during this century is mostly attributable to:
- public health measures such as improved sanitation, immunization, and higher quality food and water
 - high technology medicine such as now involved in organ transplants
 - the gradual improvement in air quality through regulations such as clean air standards
 - the increased use of yearly check-ups and physician visits
41. To really eat well following the latest nutritional guidelines, you need to:
- do most of your shopping in a health food store
 - be prepared to spend much more money for food
 - only make changes in the proportion and balance of foods most people eat
 - greatly increase your protein intake and try to eliminate carbohydrate foods such as bread, pasta, and potatoes
42. According to the most current nutritional knowledge, which of the meals below would be the best for an adult's dinner?
- steak, a small piece of fish, salad, and no dessert
 - potatoes, a small salad, fruit, and a small dessert
 - steak, potatoes, vegetables, and a small dessert
 - spaghetti with grated cheese, a salad, and small dessert
43. According to the most current nutritional knowledge, if you want to be healthy you really must:
- become a vegetarian
 - eliminate all sweets from your diet
 - stick to a high protein diet
 - somewhat decrease fats and somewhat increase carbohydrates
 - gradually increase your consumption of chicken, fish, and lean meats
44. Saturated fats:
- are mostly from vegetables and plant sources (for example, peanuts and olive oil)
 - are mostly from animal sources (for example butter, cheese, meat)
 - are necessary to sustain human life
 - do not raise cholesterol level; monosaturated fats do
45. The type of fat most associated with an increased cholesterol level is:
- saturated fats
 - monosaturated fats
 - polyunsaturated fats
46. To be sure that your sodium (salt) intake was not too high, it would be a good idea to frequently eat:
- different kinds of canned soup
 - a Kentucky fried chicken dinner (in place of some regular dinners)
 - a "Big Mac" for lunch since it is filling and low in sodium
 - none of these
 - a and b

47. A diet high in sodium (salt) is most associated with:
- increased risk of high blood pressure and heart disease
 - increased risk of cancer
 - increased risk of obesity
 - increased risk of diabetes
48. For the most nutritious, inexpensive diet, you should try to frequently purchase these items:
- cheese, bologna, pork, and canned goods
 - bread, pasta, fruits and vegetables
 - mostly prepared frozen foods and dinners
 - fish, chicken, and hamburger
49. For optimal nutrition, most people should have meat in their meals:
- twice a day
 - at least once a day
 - as often as possible
 - perhaps as little as a few times a week
50. Which is the recommended balance of carbohydrates, proteins, and fats in your diet?
- about 60% carbohydrates, 10% protein, 30% fat
 - about 30% carbohydrates, 40% protein, 30% fat
 - about 70% carbohydrates, 20% protein, 10% fat
 - about 33% carbohydrate, 33% protein, 33% fat
51. The best way to control your weight or lose weight is:
- to periodically fast;
 - eliminate as many carbohydrate foods from your diet (for example, bread, pasta, cereals, potatoes)
 - slightly decrease the amount of calories you take in every day and moderately increase your activity
 - eat a very high protein diet and exercise at least 60-90 minutes a day.
52. If you were interested in controlling your weight, or losing weight, your diet could most healthfully emphasize:
- protein and water
 - potatoes and bread
 - steak and grapefruit
 - no carbohydrates
53. Which of the below is the best source of inexpensive protein?
- hot dogs
 - granola cereal
 - pasta (for example, spaghetti)
 - bologna

Nutritional Attitudes, Beliefs, Intentions Questions

54. Suppose you had a "brown bag" lunch with some of your co-workers. Your lunch consisted of yogurt, two rolls, and two pieces of fruit. Your co-workers would probably?
- not comment on your lunch because that's often the kind of thing they bring
 - not comment on your lunch because they really don't care one way or the other
 - make some funny or cute remarks, but that's about it
 - really give you a hard time about your lunch

55. The people in my family most difficult to change toward good nutrition are:
- spouse/partner
 - child/children
 - spouse/partner and child/children
 - myself
 - all of the above

56. If in your family meals were prepared with the major emphasis on good nutrition, it is likely that?
- most of the food would be leftover
 - most of the food would be eaten, but the meal would be unpleasant
 - a lot of arguments would result
 - nothing negative would happen
 - unsure

57. If you shopped for optimal nutrition compared to your present food shopping, effort-wise it would probably take

Much	Somewhat	About		Much
Less	Less	The Same	Somewhat	More
Effort	Effort	Effort	More Effort	Effort
1	2	3	4	5

58. If you food shopped for optimal nutrition compared to your present food shopping, time-wise it would probably take?

Much	Somewhat	About		Much
Less	Less	The Same	Somewhat	More
Time	Time	Time	More Time	Time
1	2	3	4	5

59. If you food shopped for optimal nutrition, compared to your present food shopping, it would probably cost?

Much	Somewhat	About	Somewhat	Much
Less	Less	The Same	More	More
1	2	3	4	5

60. How much do you want to change your current nutritional practices?
(Check here, if you feel your current practices are OK: ())

Not Very				Very
Much	Somewhat	A lot	Much	Much
1	2	3	4	5

61. How important do you feel is good nutrition for good health and preventing disease?

Not Very Important	Somewhat Important		Important	Very Important
1	2	3	4	5

62. Finding out more about good nutrition and eating nutritionally is _____ priority in my life (pick the best number for you).

Not Very Important	Somewhat Important		Important	Very Important
1	2	3	4	5

63. Eating the most nutritious foods for me is (pick the best number for you).

Not Very Important	Somewhat Important		Important	Very Important
1	2	3	4	5

64. Which statement best describes why you would change (or have changed) your nutritional practices?

- I want to avoid certain diseases
- I don't want to be overweight
- I want to improve my health
- It seems to be the "in" thing these days
- I'm not interested in changing or improving my nutritional practices

65. Which of the below is most likely to motivate you to change your nutritional practices?

- give me correct, simple information
- a bad health check-up
- when my family says they are interested in changing
- if I knew I could stay thin that way
- none of these - I eat very nutritionally already
- none of these - I'm not interested in improving my nutrition

Many people would like to change their nutritional practices, but find there are certain difficulties in doing so. Which difficulties do you have?

66. I have no time to prepare nutritious meals.

- yes
- no

67. I must eat out very often.

- yes
- no

68. My family will not eat most nutritious foods.

- yes
- no

69. I'm not really sure what is good and not good nutrition.
 a. yes
 b. no
70. I don't have enough money to shop for good nutrition.
 a. yes
 b. no
71. I can't get myself to eat nutritionally balanced meals, I don't like them.
 a. yes
 b. no
72. Each of us can identify with one or more ethnic groups. Do you identify with a particular ethnic group?
 a. yes
 b. no

If 'yes', note which ethnic group here _____.

73. Often particular ethnic groups because of culture and habit prefer to eat certain foods. Which of the following applies to you?
 a. Do not identify with an ethnic group
 b. Identify with an ethnic group, but do not prefer certain ethnic foods
 c. Identify with an ethnic group, and prefer certain ethnic foods

If you answered 'c', note which ethnic foods you prefer _____.

74. Think about the time you socialize with friends, neighbors, and relatives. Which statement best describes this socializing?
 a. socializing involves doing many different things in different situations, but does not usually involve eating
 b. socializing involves doing many different things in different situations, but almost always also involves eating
 c. most of my socializing takes place in the kitchen (or another favorite place) and almost always involves eating
 d. socializing takes place in the kitchen (or another favorite place) but does not usually involve eating
75. Which statement best describes you?
 a. I don't really care about nutrition and changing what I eat
 b. I want more information about good nutrition
 c. I'm considering changing my nutritional practices
 d. I really want to change my nutritional practices
 e. I've tried to change my nutritional practices before, but have not kept it up

76. Nutritionally good eating for most people means decreasing fatty foods (eggs, meat, dairy products), increasing complex carbohydrates (potatoes, certain cereals, breads, pasta), increasing fresh fruits and vegetables, and decreasing sugary foods (certain snacks, certain cereals, and certain desserts).

a. How confident are you that you may be able to make these changes in your eating habits for a long time?

Not Very Confident	Somewhat Unconfident	Not Sure	Somewhat Confident	Very Confident
1	2	3	4	5

b. How much do you intend to change your eating habits in this way for a long time? (If you already eat this way, check here ())

No Intention At All	Somewhat, No Intention	Not Sure	Some Intention	A lot of Intention
1	2	3	4	5

Food Shopping Questions

77. Who usually shops for groceries in your household?

78. What store do you shop at most of the time?

79. How many times do you grocery shop each week? _____

80. Approximately how many minutes do you spend each time you go grocery shopping? _____

81. How many people do you grocery shop for? _____

82. Do you use a list when shopping for food?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

83. Do you shop for food at convenience stores (e.g., 7-Eleven or Hop-In)?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

84. Do you plan weekly meals and then shop for the items you need for those meals?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

85. When grocery shopping, do you compare prices of brands and then make a selection based on price?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

86. Do you buy food products as you wish with no attention to the price of the product?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

87. Do you use food coupons (e.g., from newspapers and magazines)?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

88. Do you base your food purchase decisions on weekly advertised sale items?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

89. Do you wait for a food item to go on sale and then buy it in quantity?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

90. Do you search for foods which require minimal preparation time?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

91. Do you read the nutritional information on food labels prior to a food purchase?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

92. Do you read the food label to determine what ingredients the food contains?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

93. Do you try to purchase foods with minimal or no additives or preservatives?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

94. Do you buy snack foods (e.g., cookies, candy, potato chips or cakes)?

Never	Seldom	Occasionally	Frequently	Always
1	2	3	4	5

Additional Questions

95. Who typically prepares the family dinner?

- a. I do
- b. Spouse/partner
- c. Older child
- d. Myself & spouse partner share or alternate
- e. All of the above share or alternate

96. When you think of the family dinner, which statement best describes it?

- a. Very quick; there's just not much time in our busy schedule
- b. Leisurely and a chance for family conversation
- c. People eat at different times on their own schedule.

97. In this space, list the total content of last or this night's dinner. If the dinner was not typical, or you ate out, please list the total content of the last typical home dinner:

98. Note below the one major thing you would like to learn about nutrition and less expensive food purchase practices:

Nutrition _____

Food Purchases _____

THANK YOU FOR COMPLETING THIS SURVEY

Food Purchase Tracking

As part of the larger project, we will be tracking participants' food purchases over time. This tracking will be one kind of information that will be analyzed and regularly "fed back" to participants. It will also be a way to see if the program has helped people to shop more nutritiously and economically.

To be quite frank, we do not know the best way to do this tracking. People can choose from thousands of items and change their purchases based on taste, availability, advertising, word-of-mouth, seasons, and other factors. So, it can be pretty complicated.

We need a number of families who are willing to track their food purchases over several weeks. We will provide one or more forms to record your purchases. We will also ask you to keep your food shopping receipts.

A staff person will deliver the forms to your home and call you every week and discuss your purchases and how hard or easy it was to keep track of your purchases. After you have tracked for awhile, we will try to repay you for your efforts by providing you with some tips on nutrition and shopping.

If you are interested in helping with the food purchase tracking, please complete the box below and return it with your survey. Thanks!

Name:

Address:

Telephone #:

Nutrition and Health

(Publications from the Virginia Cooperative Extension Service)

Please circle the number to the left of the publication of your choice. We will mail that publication to you, or if not available, one that is as close to the topic as possible.

- 352-854 Plan Your Way to Fitness
- 352-447 Food, Hands & Bacteria
- 352-002 Walking Your Way to Fitness
- 352-001 Health Style, a Self-Test
- 348-912 Fiber in the Diet
- 348-911 Potassium in the Diet
- 348-910 Sodium in the Diet
- 348-909 Cholesterol in the Diet
- 348-908 Fat in Your Diet
- 348-907 Herbs and Spices
- 348-906 The Four Food Groups - Food for Fitness
- 348-893 Food Faddism - Nutrition Nonsense and Sense
- 348-761 Minerals
- 348-535 How Much Money For Food
- 348-534 Smart Food Shopping
- 348-533 Bread Basics
- 348-532 It's On The Label
- 348-531 How Well Do You Eat?
- 348-530 Buy More - Pay Less
- 348-529 An Easy Supper
- 348-521 Freezing Fish
- 348-516 Biscuit Making Tips
- 348-515 Meat & Meat Alternate Group
- 348-514 Bread & Cereal Group
- 348-513 Milk Group
- 348-512 Cheese
- 348-511 Fruit & Vegetable Group
- 348-288 Snacking
- 348-286 Fast Foods
- 348-278 Calorie Equivalents of Activities
- 348-255 Weight Program
- 348-251 Do You Need to Lose Weight?
- 348-250 Ideal Weight in Relation to Body Build
- 348-212 Analyze Your Eating Habits

Name _____

Address _____

City _____ State _____ Zip _____

Appendix B. Knowledge Questions for Pilot Study

Knowledge

1. In general, Americans consume too much
 - a. protein
 - b. complex carbohydrates
 - c. water
 - d. fiber

2. List 5 examples of foods which contain saturated fats:
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____

3. List 5 examples of foods which contain complex carbohydrates:
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____

4. In order to eat more nutritiously, you would have to
 - a. eliminate steak from the diet
 - b. eat smaller proportions of animal proteins
 - c. eat less bread, potatoes, and rice
 - d. eat more cheese and dairy products

5. For the most nutritious and inexpensive diet, you should try to frequently purchase the following items:
 - a. cheese, bologna, pork, and canned goods
 - b. bread, pasta, fruits, and vegetables
 - c. mostly prepared frozen foods and dinners
 - d. fish, chicken, and hamburger

6. For optimal nutrition, most people should have meat in their meals:
 - a. twice a day
 - b. at least once a day
 - c. as often as possible
 - d. perhaps as little as a few times per week

Appendix C. Food Check-List

ATTACH RECEIPT AND/OR SHOPPING LIST HERE

SHOPPER'S NAME _____
DATES OF SHOPPING _____ TO _____

FOOD NOT BOUGHT THIS WEEK

PLEASE LIST BELOW ANY FOOD ITEMS EATEN WHICH WERE CANNED OR FROZEN AND NOT BOUGHT THIS WEEK. BE SPECIFIC AND FOR EXAMPLE, TELL US IF THE MEAT WAS LEAN OR NOT. ALSO, CHECK WHETHER YOU GREW OR BOUGHT THE FOOD IN PREVIOUS WEEKS.

<u>FOOD ITEM</u>	<u>SIZE</u>	<u>QUANTITY</u>	<u>CODE #</u>	<u>BOUGHT</u>	<u>GREW</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

SPECIAL PURCHASES

LIST BELOW YOUR SPECIAL FOOD PURCHASES AND THE REASON PURCHASED. FOR EXAMPLE, IF YOU BOUGHT EXTRA FOOD AND FED GUESTS (E.G., FOR A DINNER PARTY), WRITE THE NUMBER OF PEOPLE SERVED IN THE COLUMN LABELED "# OF GUESTS". ON THE OTHER HAND, IF YOU BOUGHT FOOD ITEMS THAT ARE TO BE EATEN IN WEEKS TO COME, WRITE THE NUMBER OF WEEKS YOU EXPECT THE FOOD TO LAST IN THE COLUMN LABELED "TIME".

<u>FOOD ITEM</u>	<u>REASON PURCHASED</u>	<u># OF GUESTS</u>	<u>TIME</u>	<u>CODE #</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

THANK YOU FOR YOUR TIME!

	STD SZ	OTHER SZ	QUANTITY	CODE		STD SZ	OTHER SZ	QUANTITY	CODE
FRANKFURTER	8 BUNS			489		REGULAR	1 LB		172
HAMBURGER	8 BUNS			489		SIRLOIN			
FRENCH/VIENNA	1 LB			328		LEAN	1 LB		171
ITALIAN	1 LB			331		REGULAR	1 LB		170
ROLLS						COLD CUTS			
BRWN & SRV	1 LB			487		BOLOGNA	12 OZ		198
RVE	1 LB			335		SALAMI	1 LB		205
WHITE	1 LB 4 OZ			339		CHICKEN			
WHOLE-WHEAT	1 LB			357		WHOLE	1 LB		212
BREAKFAST CEREALS						BREASTS	1 LB		210
BRAN W/RAISINS	15 OZ			370		MUSSETS	1 LB		210
CHEERIOS	15 OZ			375		PARTS	1 LB		210
CORN FLAKES	15 OZ			371		POT PIE	1 PIE		218
CORN FLAKES/SUB	15 OZ			372		CHILI/CHD	15 OZ		179
GRANOLA	12 OZ			887		CHOP SUEY	10 OZ		180
GRITS/CORN	1 LB			363		FRANKFURTERS	1 LB		202
OATMEAL	1 LB			366		FRZN DINNERS			
PUFFED RICE/SUB	15 OZ			377		CHICKEN/PARM	11.3 OZ		890
PUFFED WHT/SUB	15 OZ			388		CHICKEN	11.3 OZ		891
SHREDDED CORN	15 OZ			374		SALISBURY STK	16.5 OZ		893
WHEAT FLAKES	15 OZ			378		TURKEY	18.5 OZ		892
CORNMEAL	8 OZ			429		LAMB			
CRACKERS						CHOP	1 LB		182
GRAHAM/PLAIN	1 LB			438		LBS	1 LB		184
SALTINES	1 LB			432		SHOULDER	1 LB		186
DANISH PASTRY/PLN	1 OZ			433		LIVER	1 LB		188
DOUGHNUTS/PLN	1 DOZ			436		PORK			
DOUGHNUTS/GLSD	1 DOZ			437		SAUSAGE			
GRAINS						REGULAR	10 LINKS		204
RICE	1 LB			463		BRN & SRV	1 LB		200
BULGUR	1 LB			384		CHOP/LOIN	1 LB		192
HUFFINS/CORN/MIX	10 OZ			447		HAM			
PANCAKE MIX	1 LB			452		CANNED	1 LB		189
PASTA (NOODLES)						LUNCHEON	1 LB		190
EGG	16 OZ			468		TURKEY			
LAGASHA	10 OZ			895		LIGHT MEAT	1 LB		220
MACARONI	16 OZ			438		DARK MEAT	1 LB		219
RAVIOLI	10 OZ			898		LT & DK MEAT	1 LB		222
SPAGHETTI	16 OZ			493		POT PIE	1 PIE		218
PIZZA/CHEESE	1 PIE			473		NUTS & SEEDS			
TOASTER PASTRIES	6 PAST			499		ALMONDS	12 OZ		308
WAPPLES/MIX	16 OZ			301		CASHNWS	12 OZ		318
WHEAT FLOUR	5 LBS			303		PEANUTS	12 OZ		323
WHITE FLOUR	5 LBS			303		PECANS	8 OZ		326
MEATS						SUNFLOWER SEEDS	1 LB		328
BACON	1 LB			161		WALNUTS	8 OZ		329
BEEF						OILS, FATS, & DRESSINGS			
HAMBURGER						BUTTER	1 LB		103
LEAN	1 LB			164		LARD	1 LB		111
REGULAR	1 LB			168		MARGARINE	1 LB		113
POT PIE	1 PIE			178		MAYONNAISE			
ROUND						REGULAR	32 OZ		138
LEAN	1 LB			173					

	STD SZ	OTHER SZ	QUANTITY	CODE 9
LOW CAL	32 OZ			140
OILS				
CORN	24 OZ			120
OLIVE	8 OZ			122
SAFFLOWER	24 OZ			126
SOY/COTTONSEED	24 OZ			130
VEGETABLE	24 OZ			131
SALAD DRESSINGS				
REGULAR	8 OZ			132
LOW CAL.	8 OZ			133
VEG. SHORTENING	1 LB			109

VEGETABLES & LEGUMES

ASPARAGUS				
RAW	4 OZ/8 BPS			346
CND	10 OZ			346
BEANS				
CANNED				
LINAS	10 OZ			
KIDNEY	10 OZ			314
PINTOS	10 OZ			
PORK & TON	8 OZ			312
PORK & SW SCE	10 OZ			313
LENTILS/DRY	1 LB			322
LINAS				
DRY	1 LB			315
FRZN	1.5 OZ			349
PEAS				
SPLT/DRY	1 LB			325
GREEN/CND	1.5 OZ			639
GREEN/FRZN	1.5 OZ			641
PINTOS/DRY	1 LB			310
SNAP				
FRESH	1 LB			371
CANNED	10 OZ			377
FROZEN	10 OZ			376
BEETS				
BLKEYE PEAS/DRY	2 (.2 LB)			388
BROCCOLI				
FRESH	1 LB/3 STK			387
FROZEN	10 OZ			389
CABBAGE				
1 HEAD				393
CARROTS				
1 LB				608
CAULIFLOWER				
FRESH	1 LB/3 STK			606
FROZEN	10 OZ			607
CELERY				
1 LB/11 STK				608
CORN				
FRESH	4 EARS			612
CANNED	16 OZ			616
FROZEN	10 OZ			613
CUCUMBERS				
1 LB/8 CUC				618

	STD SZ	OTHER SZ	QUANTITY	CODE 9
KALE	15 OZ			622
LETTUCE	1 HEAD			626
MUSHROOMS/RAW	8 OZ			630
OKRA	1 LB			632
ONIONS	3 LB/12 ON			633
PEPPERS/BELL	1 LB/3 PEP			643
POTATOES				
RAW	10 LB/20 PO			645
FRZN	1 LB			649
DEHYDRATED	3.5 OZ			653
RADISHES	1 LB/8 RAD			657
SAUERKRAUT/CND	16 OZ			658
SPINACH/FRZN	1.5 OZ			661
SQUASH	1 SQA			664
SWEET POTATO	1 LB/3 PO			667
TOMATOES				
CANNED	16 OZ			672
CATSUP	16 OZ			673
JUICE/CND	24 OZ			676
RAW	1 LB/3 TOM			671
VEGETABLES				
MIXED/FRZN	10.5 OZ			680
JUICE/CND	48 OZ			899

SOUPS & SAUCES (CANNED)

BEEP & VEG STEW	10 OZ			177
SAUCES				
CHEESE	8 OZ			834
SWEET & SOUR	1.5 OZ			839
TERIYAKI	1.5 OZ			840
TOMATO	1.5 OZ			889
SOUPS				
BEEP BROTH	10.5 OZ			712
CHICKEN BROTH	10.5 OZ			826
CHICKEN NOODLE	10.5 OZ			827
CLAM CHOWDER	10.5 OZ			828
CRN OF ASPAR	10.5 OZ			823
CRN OF CELERY	10.5 OZ			824
CRN OF CHICKEN	10.5 OZ			708
CRN OF MUSHROOM	10.5 OZ			716
MINESTRONE	10.5 OZ			717
MUSHROOM	10.5 OZ			716
ONION	10.5 OZ			725
OYSTER STEW	10.5 OZ			830
TOMATO	10.5 OZ			719
SPLIT PEA	10.5 OZ			718
VEG BEEP	10.5 OZ			720

OTHER FOODS

BEER				
REGULAR	12 OZ			886
LIGHT	12 OZ			889
CAKE				
ANGEL FOOD	1 CAKE			385

	STD SZ	OTHER SZ	QUANTITY	CODE 0		STD SZ	OTHER SZ	QUANTITY	CODE 0
COFFEE	1 CAKE	_____	_____	387	PEANUT BUTTER	18 OZ	_____	_____	324
DEVILS FOOD	1 CAKE	_____	_____	391	PICKLES/SWT	12 OZ	_____	_____	703
GINGER BREAD	1 CAKE	_____	_____	394	PIES				
WHITE/YELLOW	1 CAKE	_____	_____	396	APPLE	1 PIE	_____	_____	453
CAKE ICING					BLUEBERRY	1 PIE	_____	_____	457
WHITE	8 OZ	_____	_____	332	LEMON MERINGUE	1 PIE	_____	_____	463
FUDGE	8 OZ	_____	_____	335	MINCIE	1 PIE	_____	_____	465
CANDY					PUMPKIN	1 PIE	_____	_____	471
CARAMELS					POPCORN	1 LB	_____	_____	476
PLN/CHOC	8 OZ	_____	_____	337	POTATO CHIPS	11 OZ	_____	_____	654
CHOC CTED PNUTS	8 OZ	_____	_____	340	PRETZELS	12 OZ	_____	_____	479
CHOCOLATE	8 OZ	_____	_____	338	PUDDING/INSTANT	8 OZ	_____	_____	91
COFFEE/INSTANT	18 OZ	_____	_____	732	BODAS				
COOKIES					COLA TYPE	12 OZ	_____	_____	693
BROWNIES	12	_____	_____	413	COLA TYPE	2 LITERS	_____	_____	896
CHOC CHIP	24	_____	_____	415	FRUIT/FLVRD	12 OZ	_____	_____	694
OATMEAL	24	_____	_____	420	FRUIT/FLVRD	2 LITERS	_____	_____	897
SANDWICH TYPE	24	_____	_____	422	SUGAR	5 LBS	_____	_____	360
VANILLA MAPERS	24	_____	_____	423	SYRUP	1 QT	_____	_____	358
GELATIN/DESSERT	8 OZ	_____	_____	699	TEA/INSTANT/SWT	8 OZ	_____	_____	900
HONEY	1 LB	_____	_____	347	TANG/INSTANT	8 OZ	_____	_____	899
NOLASSES	8 OZ	_____	_____	350	WINE	750 ML	_____	_____	691
MUSTARD	8 OZ	_____	_____	700					

PLEASE LIST ITEMS FROM "SMALL" SHOPPING TRIPS BELOW

<u>FOOD ITEM</u>	<u>SIZE</u>	<u>QUANTITY</u>	<u>CODE #</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Appendix D. Sample Feedback Sheet

NUTRITION COMMUNICATION REPORT

DEAR FAMILY,

BASED ON YOUR RECORDS, FOR LAST WEEK'S SHOPPING (WEEK ENDING 03/17/86), OUR COMPUTER NUTRITION ANALYSIS OF YOUR PURCHASED FOOD, COMPARED TO YOUR BASELINE FIGURES, PRODUCED THIS PERCENTAGE BREAKDOWN (BY CALORIES):

```

*****
*           THIS   YOUR   CHANGE   YOUR   HOW   *
*           PAST   BASE   LAST    GOAL   FAR   *
*           WEEK   LINE  WEEK    -----  TO GO *
*           -----  -----  -----  -----  ----- *
* TOTAL CARBOHY:  29%  34%  -5%    51%   22%  *
* COMPLEX CARBOHY: 27%  21%   6%    41%   14%  *
* SIMPLE CARBOHY:  2%  13% -11%   10%    8%  *
* PROTEIN:        17%  15%   2%    13%   -4%  *
* TOTAL FATS:     53%  49%   4%    31%  -22%  *
* SATURATED FAT:  11%  17%  -6%    10%   -1%  *
* UNSATUR'ED FAT: 42%  32%  10%    21%  -21%  *
*****
    
```

* YOUR GOAL IS TO INCREASE TOTAL CARBOHYDRATES BY 17%, RAISE COMPLEX CARBOHYDRATES BY 20%, REDUCE SIMPLE CARBOHYDRATES (SUGAR) BY 3%, REDUCE PROTEIN BY 2%, REDUCE TOTAL FATS BY 18%, REDUCE SATURATED FAT BY 7%, AND REDUCE YOUR AVERAGE WEEKLY DOLLARS FOR FOOD PURCHASED BY 10%.

HERE'S THE MONEY YOU'VE SPENT:

	THIS PAST WEEK	BASE LINE AVERAGE	CHANGE LAST WEEK	YOUR GOAL
	-----	-----	-----	-----
DOLLARS:	\$ 104	\$ 53	\$ 51	\$ 47
CALORIES:	90592	50003	39709	-----

YOUR PROGRESS HAS BEEN FAIR IN INCREASING YOUR COMPLEX CARBOHYDRATES, NEGATIVE IN REDUCING YOUR PROTEIN, NEGATIVE IN REDUCING YOUR TOTAL FATS, AND EXCELLENT IN REDUCING SATURATED FAT. OVERALL, YOU'RE MAKING LITTLE PROGRESS IN YOUR EFFORT TO EAT MORE NUTRITIOUSLY, AND YOU ARE FAR FROM YOUR GOALS.

ALSO, YOU MADE NEGATIVE PROGRESS IN REDUCING YOUR \$ SPENT ON FOOD AND YOU ARE MOVING AWAY FROM YOUR GOAL. (AT LEAST FOR THIS WEEK.)

REMEMBER YOUR NUTRITIONAL GOALS (LISTED ABOVE) WHEN PREPARING YOUR SHOPPING LIST (AND WHEN USING IT AT THE STORE).

```

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NOTES: 'STANDARD' \$ AMOUNTS ARE USED, AND NON-FOOD PURCHASES ARE NOT INCLUDED. IF YOU FEEL THIS PROGRESS REPORT IS NOT ACCURATE, CALL US. WE'LL REVIEW NEW DATA YOU HAVE AND REVISE THE REPORT. -HEALTH ACTION GROUP-

Appendix E. Contact Information Pamphlet and Consent Form for Pilot

VIRGINIA TECH

Communication, Nutrition, Health and
Food Purchase Pilot Project

Summer, 1985

Richard A. Winett, Ph.D.
Kathryn D. Kramer, M.S.
William B. Walker, M.S.
Steven W. Malone, M.S.

Department of Psychology



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

DEPARTMENT OF PSYCHOLOGY

Summer, 1985

Dear Citizen:

Since 1979, with support from the National Science Foundation and other sources, we have conducted many projects in this area that focus on different ways to develop and deliver informative and motivational media to consumers. In these projects, we have been concerned with how to effectively use media, particularly television, and how to help consumers with some of their pressing concerns. We typically try out different methods and see which ones work best and are most helpful.

It is possible that you were involved in one of our projects before. For example, we did several on home energy conservation, and you may have seen one of our television programs.

Now we have started work in a new field of interest and importance to many consumers — nutritious and economical food purchases. We have already done a considerable amount of what is called "formative research." For example: we have reviewed a lot of the most recent information on nutrition and health to convey to people what are and what are not good nutritional practices; we have tried to find the most simple and effective ways to help people save money on food shopping and we have conducted surveys and small groups to find out people's knowledge, beliefs, attitudes, and practices in nutrition and food shopping. All this background research is necessary so that information is accurate, up-to-date, and geared to the interests of consumers.

We are now up to a final stage in our formative research. We will be conducting a pilot study in this area. In a nutshell, we have developed some very short, prototype videotapes and what we call "computer-based information feedback systems" along with some other approaches. Each procedure and approach will provide you with accurate, up-to-date nutrition, health, and shopping information. We want to see which information and communication approach is most helpful and effective for improving nutrition and saving money.

This pilot study is a kind of "minature" version of a much larger study we are planning. Obviously, it is a very necessary first step. We would very much appreciate your participation in this pilot study. To find out what is involved, please see the next page.

Thank you.

Sincerely,

Project Staff:

Kathryn D. Kramer, M.S.
William B. Walker, M.S.
Steven W. Malone, M.S.

Richard A. Winett, Ph.D.
Professor
Associate Department Head and
Director of Graduate Studies
(703-961-6275 & 703-961-6581)

OUTLINE AND DETAILS OF THE PILOT PROJECT

WHO WILL BE IN THE PROJECT? A relatively small number of households in this area will participate.

HOW LONG WILL THE PROJECT RUN? The project will cover about a 5-6 week period.

WHAT IS THE PURPOSE? The purpose of the project is to pilot test the helpfulness and effectiveness of different information/communication approaches for nutritious and economical food purchases. Which approach will most help you change toward more nutritious and economical food purchases?

WHAT ARE THE PROCEDURES? Everyone will see one of two very brief (5-7 minutes) videotape programs in their home. We will set up a time to meet with you and bring in our own VCR and tape. In addition, some people will receive special feedback about shopping and nutrition (other people won't) or special personal help (other people won't).

HOW MUCH DOES IT COST? There is no charge.

WHAT ARE MY OBLIGATIONS? We want you to do the following:

- A. Fill out questionnaires we will give you now and again in several weeks. If possible, all adults in the household should fill out questionnaires. This will take 30-40 minutes each time.
- B. Keep track each week of all your food purchases on special forms we will give you. The form involves checking off some items, but also writing in things such as quantity.
- C. Keep and hand in all your food shopping receipts.

All questionnaires will be hand delivered and hand retrieved from you at prearranged times convenient to you.

WHAT'S YOUR SCHEDULE AND TIMETABLE? After you fill out the questionnaires, we want you to keep track of your food purchases (and keep your receipts) for 3 weeks. (Each week, the forms and receipts will be delivered and retrieved.) Next, you will see one of the videotapes in your home and possibly start receiving some nutrition shopping feedback or special help. During the next 3 weeks you will complete the questionnaires again (once), but keep track of three more food shoppings. A few weeks later, you will receive a brief report on the project.

ARE ALL THESE QUESTIONNAIRES AND DATA CONFIDENTIAL? All information collected in this project is confidential. Your name will not be associated with any report about the project.

Any additional questions can be answered personally by a staff person who will return at the time he/she indicated to you.

If you would like to participate in this project, please see the next page.
Thank you.

WHAT WILL I GAIN? You will receive up-to-date nutrition information and ways to save money shopping for food?

WHO WILL BE IN THE PROJECT? A number of households in your neighborhood.

HOW LONG WILL THE PROJECT RUN? 5 to 6 weeks

WHAT IS THE PURPOSE? The project tests the helpfulness and effectiveness of different information approaches for nutritious and economical food purchases.

WHAT ARE THE PROCEDURES? Everyone will see one of two very brief (5-7 minutes) videotape programs in their home. We will set up a convenient time to meet with you and will bring our own VCR equipment. In addition, some people will receive special feedback about shopping and nutrition (other people won't) or special personal help (other people won't).

HOW MUCH DOES IT COST? No charge.

WHAT WOULD I DO?

A. Fill out brief questionnaires we will give you now and again in several weeks. If possible, all adults in the household should fill out the questionnaires. This will take approximately 30 minutes each time.

B. Keep and hand in all of your grocery receipts.

C. Keep track each week only of certain food purchases on special forms we will give you.

For your convenience, all forms will be delivered and picked-up from you at prearranged times. It will not be necessary for you to be home for the deliveries and pick-ups.

WHAT'S THE SCHEDULE? After you fill out the questionnaires, we want you to keep your grocery receipts and record a few food items for 3 weeks. Next, a short videotape will be shown in your home at a convenient time and other brief questionnaires will be completed. Some people will also receive some personalized nutrition and shopping feedback. You will then continue to keep your food receipts, keep track of certain food purchases, and at the end of the program, fill out the last questionnaires.

All information provided by you is CONFIDENTIAL.

Any additional information you may now need will be answered personally by a staff person who will return at the time s/he told you.

If you would like to participate, please see the next page.

CONSENT FORM

I have read and understood the material about the nutrition and food shopping program. I agree to participate in this program.

YOUR NAME (Adult #1)	_____	_____
	Print	Age
	_____	_____
	Signature	Date
YOUR NAME (Adult #2)	_____	_____
	Print	Age
	_____	_____
	Signature	Date
YOUR NAME (Adult #3)	_____	_____
	Print	Age
	_____	_____
	Signature	Date

	Address	

	Telephone Number	

List other members of your household:

NAME	AGE
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Which grocery store do you shop at most frequently?

We can be contacted at (703)961-6275 or (703)961-6581.

THANK YOU!

Appendix F. Contact Information Pamphlet and Consent Form for Study

VIRGINIA TECH

STARTS IN JANUARY

**HEALTH ACTION:
THROUGH IMPROVED EATING AND SHOPPING**

Winter, 1985



Richard A. Winett, Ph.D.
Kathryn D. Kramer, M.S.
W. Bruce Walker, M.S.
Steven W. Malone, M.S.
Mary K. Lane, B.A.

Department of Psychology



A LAND-GRANT UNIVERSITY

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

Fall, 1985

Department of Psychology

Dear Blacksburg Resident,

Since 1979, our group at Virginia Tech has conducted many projects in Southwest Virginia with funding from the National Science Foundation. Our next project focuses on a topic that is probably of interest to you-- purchasing nutritious, yet economical foods.

You, like many others, may have found that it is difficult to keep up with all of the current nutritional information. Therefore, we have done the following:

- compiled the most recent information on nutrition;
- found the most effective ways to save money on food shopping.

By joining our program, you will gain by improving your nutrition and health while saving money. To find out what is involved, please see the next page.

Sincerely,

Richard A. Winett, Ph.D.
Professor
Associate Department Head and
Director of Graduate Studies

Project Staff:

Kathryn D. Kramer, M.S.
W. Bruce Walker, M.S.
Steven W. Malone, M.S.
Mary K. Lane, B.A.

WHAT WILL I GAIN? You get the most up-to-date nutrition information and you learn ways to save money while shopping for food.

WHO IS IN THE PROGRAM? People in your neighborhood.

WHAT IS THE COST? It's free.

HOW LONG WILL THE PROGRAM RUN? It starts in January and continues for about 10 weeks.

HOW DOES IT WORK?

- 1) Everyone sees a brief (20-30 minutes) videotape program on nutrition. We set up a convenient time to bring our VCR equipment into your home.
- 2) Some people receive special feedback about shopping and nutrition.
- 3) Some people receive assistance during one grocery shopping trip.

WHAT WOULD I DO?

- 1) Complete a brief questionnaire sometime soon, another after seeing the videotape, and a final one at the end of the program. We ask all adults in your household to complete questionnaires. This will take approximately 30 minutes each time.
- 2) Keep and hand in all of your grocery receipts.
- 3) Keep track of food purchases on forms we will give you.
- 4) That's it! For your convenience, we will deliver and pick-up the forms at your home at the same time each week. If you are not at home, we can leave the forms by your door.

WHAT'S THE SCHEDULE?

- 1) After you fill out the first questionnaires, you record food items and give us your grocery receipts for about 5 weeks.
- 2) Next, you see a videotape and complete the second brief questionnaire.
- 3) Some people go on one shopping trip with a nutrition and shopping advisor.
- 4) Some people receive individualized nutrition and shopping feedback.
- 5) You continue to keep your food receipts, keep track of certain food purchases, and at the end of the program, fill out the last questionnaires.

WHAT IS THE PURPOSE? We are testing to see how effective different information approaches are in helping you improve your nutritious and economical food purchases.

All information provided by you is CONFIDENTIAL. Any remaining questions you have can be answered by the staff person when s/he returns to your home.

If you wish to join the program, please turn to the next page.

Appendix G. Information Flyer



**Do you want to eat the right foods,
but don't think you have the time
or money it would take to
improve your diet?**

**Our group at Va Tech can help by providing clear
information and easy to understand
strategies for:**

- **SAVING \$ WHILE SHOPPING
NUTRITIOUSLY**
- **REDUCING FOODS IN YOUR DIET
THAT ENDANGER YOUR HEALTH**
- **EATING FOODS THAT ARE TASTY,
GOOD FOR YOU, AND ALSO
LOW IN CALORIES**

Members of our group
will be in your neighborhood
in the next few days with
more details about how you
can join the program.

HEALTH ACTION:
through Improved Eating & Shopping

Virginia Tech
Department of Psychology

- a project funded by the
National Science Foundation

Appendix H. Newspaper Article Announcing the Program

Wednesday, November 27, 1985, The News Messenger

Shopping, health project set for area

A large consumer-oriented project on food shopping and nutrition will be conducted in the Blacksburg area during the next six months. The overall director of the project, Dr. Richard Winett, professor of psychology at Virginia Tech, said: "This project continues the series of projects we have done here and in Roanoke since 1978. We've been fortunate in our projects to be able to put together consumer and scientific concerns". All the projects have been supported by the National Science Foundation, Dr. Winett noted.

"Basically, our research is about communication. We try to find out which approaches with TV and other information media are most helpful to consumers. Which approaches are best for increasing a consumer's knowledge and motivating them to make certain behavior changes. In or different projects, we try out these different approaches with different groups of consumers. I think what's really good about the project is that participants get information they want, often make some important behavior changes, and end up saving money. At the

same time, we can find out what are the best information approaches". The first series of projects was in home energy conservation. "In our different energy conservation projects, people saved about 20 percent on their energy use," Dr. Winett said.

In order to prepare for their current project, Dr. Winett and his staff have been studying nutrition and shopping for a year. They have consulted with nutrition experts and have done various market-basket analyses, surveys, and pilot studies here and in Roanoke. "We feel that

we can now present the most up-to-date information to people about shopping and nutrition in a way that people will find interesting and useful. I think what also is really terrific is that its very clear that the most healthful nutrition is often a less expensive way to eat for most people", Dr. Winett explained.

Later in the month, project staff will be in certain neighborhoods doing person-to-person recruitment. At that point, people will get a full description of the project and decide if they want to participate. Dr. Winett said: "There's no charge to participate. Of course, because its a research project, people will have to complete some forms. That will average about 30 minutes per week, slightly more at the beginning and end of the project". Commenting on the time involved, Dr. Winett said: "It seems to be a good tradeoff for a lifetime of savings and good nutrition". Besides Dr. Winett, the staff includes Kathryn Kramer, Bruce Walker, Steve Malone, and M.K. Lane, all graduate students in the department of psychology.

Appendix I. Appointment Notes



Sorry I missed you at our scheduled appointment on _____ . I will return tomorrow at _____ to answer any questions you might have and to find out what you have decided.

Thank you!



JUST A REMINDER:

Please take a few minutes to review the brochure I left with you on _____. I will stop by your house again on _____ to get your response.

Thank you.

Appendix J. Reminder Letter of Start-Up Date



A LAND-GRANT UNIVERSITY
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

December, 1985

Department of Psychology

Dear Participant,

We would like to thank you for joining this nutrition and food shopping program. We think you will find it helpful in your efforts to maintain optimal health.

Since the Holiday season is such a busy time, we will not be starting the program until the second week of January. We will contact you again at that time.

Happy Holidays!

Sincerely,

Richard A. Winett, Ph.D.
Professor
Associate Department Head and
Director of Graduate Studies

Project Staff:

Kathryn D. Kramer, M.S.
W. Bruce Walker, M.S.
Steven W. Malone, M.S.
Mary K. Lane, B.A.

Appendix K. Background Information Sheet

BACKGROUND INFORMATION

In order to better use the information from the questionnaires, it is important to know some things about your background. All information is confidential and will only be used for research purposes.

1. Name: _____

2. Address: _____ Zip: _____

3. Phone: _____

4. Age: _____

5. Sex: _____ Male _____ Female

6. Education:

a) finished grade school

b) finished junior high

c) some high school

d) finished high school

e) some college

f) finished college

g) some postgraduate work

h) graduate degree

7. Occupation: _____

8. Check One: _____ Single _____ Married
_____ Divorced _____ Widowed

9. How many people are in your household? _____

10. Do you exercise regularly (by regularly, we mean 30 minutes 3 times a week or about 20 minutes 4 times a week)?

_____ Yes _____ No

11. In your family is there any history of:

YES	NO	
_____	_____	heart disease
_____	_____	high blood pressure
_____	_____	diabetes
_____	_____	cancer
_____	_____	colitis or ulcers

12. Do you presently have any known diseases?

_____ Yes _____ No

13. If yes, please explain: _____

14. Your height is: _____ feet _____ inches

15. Your weight is: _____ pounds

If there is another adult in your household (e. g., a spouse), have him or her answer questions 17 through 26:

16. Age: _____

17. Sex _____ Male _____

18. Education:

- a) finished grade school
- b) finished junior high
- c) some high school
- d) finished high school

- e) some college
- f) finished college
- g) some postgraduate work
- h) graduate degree

19. Occupation: _____

20. Do you exercise regularly (by regularly, we mean 30 minutes 3 times a week or about 20 minutes 4 times a week)?

_____ Yes _____ No

21. In your family is there any history of:

YES	NO	
_____	_____	heart disease
_____	_____	high blood pressure
_____	_____	diabetes
_____	_____	cancer
_____	_____	colitis or ulcers

22. Do you presently have any known diseases?

_____ Yes _____ No

23. If yes, please explain: _____

24. Your height is: _____ feet _____ inches

25. Your weight is: _____ pounds

26. Is anyone in your household pregnant?

_____ Yes _____ No

27. Does anyone else in your household have any known diseases?

_____ Yes _____ No

28. Is anyone in your household on a restricted diet?

_____ Yes _____ No

29. If you answered yes to numbers 28 and/or 29, please describe:

30. What was your total gross family income for last year? (Confidential)

- | | |
|-------------------------|-------------------------|
| a) Less than \$10,000 | f) \$30,000 to \$35,000 |
| b) \$10,001 to \$15,000 | g) \$35,001 to \$40,000 |
| c) \$15,001 to \$20,000 | h) \$40,001 to \$45,000 |
| d) \$20,001 to \$25,000 | i) \$45,001 to \$50,000 |
| e) \$25,001 to \$30,000 | j) More than \$55,000 |

31. Who usually shops for groceries in your household?

32. Which stores do you shop at?

32. Which stores do you shop at most frequently?

34. Approximately how much money do you spend each week for family food purchases?
(Do not include money spent when dining out.)

Appendix L. Questionnaire Items

Knowledge

1. In general, Americans consume too much
 - a. protein
 - b. complex carbohydrates
 - c. water
 - d. fiber

2. List 5 examples of foods which contain saturated fats:
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____

3. List 5 examples of foods which contain complex carbohydrates:
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____

4. In order to eat more nutritiously, you would have to
 - a. eliminate steak from the diet
 - b. eat smaller proportions of animal proteins
 - c. eat less bread, potatoes, and rice
 - d. eat more cheese and dairy products

5. For the most nutritious and inexpensive diet, you should try to frequently purchase the following items:
 - a. cheese, bologna, pork, and canned goods
 - b. bread, pasta, fruits, and vegetables
 - c. mostly prepared frozen foods and dinners
 - d. fish, chicken, and hamburger

6. For optimal nutrition, most people should have meat in their meals:
 - a. twice a day
 - b. at least once a day
 - c. as often as possible
 - d. perhaps as little as a few times per week

Readiness for Change

1. When you really think about it, how ready are you to make changes in order to improve your nutrition practices?

1
Not at
all ready

2

3

4

5
Completely
ready

6
Doing it
now

Obstacles to Change

1. What are the obstacles to your making nutritional and dietary changes? (circle all that apply)

- a. excessive demands on your time
- b. not enough money
- c. not enough personal motivation
- d. poor health habits
- e. spouse/partner will not change
- f. children will not change
- g. none of the above
- h. other

Process of Change

Please indicate how frequently you use each of the following to help you improve your nutrition. Use the scale below for all statements:

- | 1 | 2 | 3 | 4 | 5 |
|-------|--------|--------------|-------|------------|
| Never | Seldom | Occasionally | Often | Repeatedly |
1. I associate less often with people who do not have similar eating habits.
 2. I see indications in some public places of others trying to help people improve their nutrition.
 3. I read about people who have successfully changed.
 4. I can be open with at least one special person about my desire to improve my nutrition.
 5. I tell myself I can choose to change or not.
 6. I seek out people who support my changing.
 7. I try to understand the historical causes of my eating habits.
 8. I notice that some eating establishments are designed to help people eat more nutritiously.
 9. I struggle to alter my view of myself as an unhealthy person.
 10. I use will power to keep from eating poorly.
 11. I recall information people have personally given me on the benefits of eating nutritiously.
 12. I have someone who understands my problems with eating inadequately.
 13. I think about information from articles and advertisements on how to eat more nutritiously.
 14. Remembering studies about illnesses related to diet upsets me.
 15. Other people in my life try to make me feel good when I take steps to improve our nutrition.
 16. I try to express my feelings related to diet and health.
 17. I tell myself I am able to change my dietary habits if I want to.

18. I have someone who listens when I need to talk about nutritional concerns.
19. I tell myself that if I try hard enough, I can improve my nutrition.
20. I make commitments not to eat poorly.
21. I reward myself for not eating poorly.
22. I can expect to be rewarded by others if I buy foods that are more nutritious.
23. I take some type of drug to help control my diet.
24. I stop to think that my dietary habits and nutritional purchases are hurting others.
25. I find that society is changing to help people purchase foods that are more nutritious.
26. When I am tempted by foods that aren't nutritious, I think of something else.
27. I am considering that my friends and family deserve to eat more nutritiously.
28. I remove things at home that make me think of eating foods that are not good for me.
29. I look for information on nutrition.
30. I consciously struggle with the issue that my poor eating habits conflict with my view of myself as a healthy person.
31. Warnings about health hazards related to nutrition upset me emotionally.
32. I wish that I could change my nutritional habits.
33. I criticize or lecture myself about eating more nutritiously.
34. I realize that I am responsible for my family's eating habits.

Self-Efficacy

1. In order to improve nutrition, many people need to decrease fatty foods in their diet and increase complex carbohydrates. How confident are you that you would be able to do this on an ongoing basis?

1	2	3	4	5
Not at all confident				Very confident

2. In order to save money on grocery food items, many people need to resist impulse buying at the supermarket. How confident are you that you would be able to do this on an ongoing basis?

1	2	3	4	5
Not at all confident				Very confident

3. In order to reduce impulse buying, many people need to use a complete grocery list. How confident are you that you would be able to do this on an ongoing basis?

1	2	3	4	5
Not at all confident				Very confident

4. In order to save money on grocery food items, many people need to buy more store brands and seasonal foods. How confident are you that you would be able to do this on an ongoing basis?

1	2	3	4	5
Not at all confident				Very confident

5. If in order to improve your family's nutrition you would have to overcome family resistance to change, are you confident that you would be able to do this on an ongoing basis?

1	2	3	4	5
Not at all confident				Very confident

Behaviors

1. Do you use a list when shopping for foods?

1
Never

2

3

4

5
Always

2. Do you buy store brands when shopping for foods?

1
Never

2

3

4

5
Always

3. Do you choose to buy vegetables and fruits mainly when they are grown in abundance (i.e., seasonal foods)?

1
Never

2

3

4

5
Always

Health Locus of Control

The following questions have to do with beliefs that people have about their health. Next to each statement circle the number that most closely agrees with your own beliefs. The higher the number, the more you agree with the statement. Please answer every item, and do not spend much time thinking about any one. Since this is a measure of belief, there is no right or wrong answer.

	Strongly Disagree			Strongly Agree		
1. If I take care of myself, I can avoid illness.	1	2	3	4	5	6
2. Whenever I get sick it is because of something I've done or not done.	1	2	3	4	5	6
3. Good health is largely a matter of good fortune.	1	2	3	4	5	6
4. No matter what I do, if I am going to get sick I will get sick.	1	2	3	4	5	6
5. Most people do not realize the extent to which their illnesses are controlled by accidental happenings.	1	2	3	4	5	6
6. I can only do what my doctor tells me to do.	1	2	3	4	5	6
7. There are so many strange diseases around that you can never know how or when you might pick one up.	1	2	3	4	5	6
8. When I feel ill, I know it's because I have not been getting the proper exercise or eating right.	1	2	3	4	5	6
9. People who never get sick are plain lucky.	1	2	3	4	5	6
10. People's ill health results from their own carelessness.	1	2	3	4	5	6
11. I am directly responsible for my health.	1	2	3	4	5	6

Attention to the Video

1. During the nutritional review of the shopping list, hot dogs were marked off and replaced with:
 - a. turkey
 - b. ham
 - c. tuna fish
 - d. wheat bread

2. In the video, how many children did the couple seeking nutritional information have?
 - a. one
 - b. two
 - c. three
 - d. four

Appendix M. Descriptive Statistics for Independent Variables

Variables	\bar{X}	SD	Range	Max Response
Readiness to Change	3.9	1.7	1-6	6
Nutrition Behaviors	10.8	1.7	6-13	15
Process of Change	89.9	19.8	45-141	170
Knowledge	10.3	3.4	1-14	14
Obstacles	0.7	0.5	0-3	6
Nutrition Beliefs	24.7	3.1	15-30	45
Attention	1.5	0.7	0-2	2
Self-Efficacy	18.7	3.3	11-25	25
Personal Risks	0.9	1.9	0-6	6
Family History of Disease	2.9	2.0	0-7	7
Health Locus of Cont.	32.6	6.0	18-48	66

Note: (n = 21) 17.4 percent reported that their nutrition was "okay".

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