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Testing Two Food Frequency Questionnaires and Stage-based Newsletters with Economically Disadvantaged Young Adults

Beth J. Williams

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**TESTING TWO FOOD FREQUENCY QUESTIONNAIRES AND STAGE-BASED
NEWSLETTERS WITH ECONOMICALLY DISADVANTAGED
YOUNG ADULTS**

By

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A THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

(in Food Science and Human Nutrition)

The Graduate School

The University of Maine

May, 2003

Advisory Committee:

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Thesis Advisor: Dr Adrienne A. White

An Abstract of the Thesis Presented
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May, 2003

One of the most important ways to decrease risk of chronic disease development is to consume ample portions of fruit and vegetables. However, less than one-third of young adults meet “5-A-Day” servings, and variety is limited. Economically disadvantaged young adults may be especially vulnerable and are a hard to reach audience. Many of the Cooperative Extension programs are designed to reach low-income audiences and assist them in making changes in knowledge, skills, attitudes, and dietary choices for nutritional well-being. The objectives of this study were, in Phase I, to test two food frequency instruments for feasibility of use as a telephone survey for economically disadvantaged young adults; collect fruit and vegetable intake data; and, in Phase II, to conduct in-depth interviews to elicit feedback about stage-based newsletters as a method of delivering nutrition education intervention to increase fruit and vegetable consumption. The Transtheoretical Model was used to provide a framework for determining readiness to change fruit and vegetable consumption. The key components of the model are the

stages of change, identifying *when* behavior change occurs, and the processes of change, identifying *how* people make behavior changes. In Phase I thirty (30) subjects were young adults, one male, and the remainder female, between the ages of 18-29 years of age who were, had been, or could qualify as participants in the programs for the economically disadvantaged of Cooperative Extension. Both food frequency instruments were feasible for use by telephone. Mean time for administration of the North Central (NC) 219 Food Frequency was about two and one-half minutes longer than the National Cancer Institute (NCI) SCAN ($p<.000$). Intakes of fruits and vegetables were higher as reported on NC219 Food Frequency compared to the NCI SCAN. The comparison of the mean fruit intake of NC219 Food Frequency and NCI SCAN was 3.2 ± 2.0 and 2.0 ± 1.4 servings, respectively. Similarly, higher total vegetable serving intakes were reported when the NC219 Food Frequency was used (3.4 ± 1.8) versus the NCI SCAN (1.9 ± 1.2). In Phase II, subjects for the in-depth interview were thirty (30) females, 18-24 years of age, who qualified for programs for the economically disadvantaged. The subjects' responses to the newsletters were characteristic of their stages of change. Subjects in pre-action stages expressed more barriers to consuming fruits and vegetables, while subjects in action/maintenance expressed benefits. Self-efficacy was most often expressed in subjects in action/maintenance. Nine of the ten processes of change were observed, with the subjects in pre-action using fewer processes than those in action/maintenance. In this study, the collaboration between a Cooperative Extension nutrition aide and a nutrition researcher resulted in meeting research objectives and gathering important data for the development of more effective nutrition education interventions for low-income young adults.

DEDICATION

This thesis is dedicated to John, whose patience, love and support have made possible the best and most important aspects of my life.

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INTRODUCTION

One of the most important ways to decrease risk of chronic disease development is to consume ample portions of fruit and vegetables (Hertzog et al., 1993, Block et al., 1992, Weisburger, 1991, Gerster, 1991). Fruits and vegetables are low fat, high fiber sources of vitamins, minerals and disease fighting chemicals. Based on epidemiological evidence, increasing intake of fruit and vegetables is related to lower risk of certain types of cancer (National Research Council, 1989). Unfortunately, the typical American diet commonly lacks not only sufficient servings but also variety from these two food groups (Glanz, 1997, Cleveland, 1997, Variyam et al., 1995, Krebs-Smith et al., 1995, Butrum et al., 1988). Organizers of national campaigns, such as the National Cancer Institute's "5-A-Day," have focused extensive efforts on encouraging greater consumption of fruits and vegetables but have had limited success (Georgiou et al., 1997). Consumption is especially low for adolescents and young adults (Evans et al., 2000). Researchers found not only that less than one-third of young adults meet "5-A-Day" servings (Georgiou et al., 1997) but also that variety is limited from these two food groups (Glanz, 1997, Cleveland, 1997, Variyam et al., 1995, Krebs-Smith et al., 1995, Butrum et al., 1988). While many adults, young and old, understand the dietary recommendations, they simply choose not to follow them (Glanz et al., 1998, Keim et al., 1997, Georgiou, 1997, Treiman et al., 1996, Block, 1992). Since campaigns to promote five daily servings clearly have had limited success, more effective methods of promoting increased fruit and vegetable intake among this age group are needed.

Young adulthood is a critical period of development. It is during this time of developing independence that habits with long-term health effects are formed. Of all the stages of

adulthood, it is the young adults who have the least healthy lifestyle. Based on data from the United States National Center for Health Statistics (2002), young adults have the highest rates of poor health habits, including skipping breakfast, drinking to excess, smoking and low fruit and vegetable consumption. Economically disadvantaged young adults are hard to reach and may be especially vulnerable. Access to health care is limited (Office of Women's Health, 2000) and purchases of fruits and vegetables are lower than for other adult age groups (Knol and Haughton, 1998, Havas et al., 1998).

Cooperative Extension Aides are particularly well equipped to reach economically disadvantaged young adults because of the many Extension programs targeted toward limited income audiences, as well as their training as peer educators. Cooperative Extension is designed to assist low-income audiences in acquiring the knowledge, skills, attitudes, and behavior changes necessary for nutritionally sound diets, and to contribute to their personal development and the improvement of the total family diet and nutritional well-being. Nutrition education staff provide hands-on, learn-by-doing programming to individuals, families and communities to help them make informed choices about food, to promote healthy lifestyles, and to support economic and social well being. This approach allows the participants to gain the practical skills necessary for positive behavior changes.

Determining readiness to change is the basis of the Transtheoretical Model (TTM) or Stages of Change. TTM is one of the most promising current models for accelerating the rate of change for problem behaviors and has been recently tested with food intake behaviors, specifically fruit and vegetable consumption. The key components of the model are the stages of change and the processes of change, with the stages identifying

when behavior change occurs and the processes identifying *how* people make behavior changes.

This study was designed to interview two groups of economically disadvantaged young adults, one by telephone and one through in-depth interviews. Phase I of this study was designed to assess the feasibility of conducting a food frequency questionnaire by telephone. In Phase II of the study, stage-based newsletters were distributed to economically disadvantaged women based on their stages of change, or readiness to increase fruits and vegetables. Recipients were interviewed about the usefulness, appeal, and their comprehension of the newsletters. The objectives of this study were to test two food frequency instruments for feasibility of use as a telephone survey for economically disadvantaged young adults (18-24 years); collect fruit and vegetable intake data; and conduct in-depth interviews to elicit feedback about stage-based newsletters as a method of delivering nutrition education intervention to increase fruit and vegetable consumption.

LITERATURE REVIEW

Influences on Food Selection

It is now accepted that dietary choices have an important impact on health; therefore any positive changes in the diet can have great impact on the future prevention of chronic diseases (Margetts et al., 1998). It is also clear that there is immense variety in the way people eat. Why people choose the foods they do is influenced by numerous factors: individuals, organizations, professional groups, and the interaction of sociological, nutritional, biological, and psychological factors (Blades, 2001). Socio-economic factors include availability, price and culture; biological factors include energy and nutrient requirements; and psychological factors include behavior, mood, and attitudes toward eating. The qualities of the foods themselves such as flavor, appearance, texture and odor influence food choice, with taste rated as the most important influence on food choice (Kilcast and Fillion, 2001, Glanz et al., 1998). Nutrition and weight control are secondary concerns for most people (Glanz et al., 1998). Margetts et al. (1998) found that low-income families and adults who were younger and who smoked were the groups least likely to be eating healthy diets. Researchers have found the factors influencing food selection of young adults to include taste, appearance, variety, health and nutrition, calories, additives, convenience, and issues of time (Betts et al., 1997, Keim et al., 1997, Betts et al., 1995). Non-students were less likely than young college students to report nutrition as an important factor (Betts et al., 1997). As a specific group, economically disadvantaged young adults have not been studied with respect to fruit and vegetable consumption.

It is thought that young adults have difficulty seeing connections between present behavior and long-term consequences of that behavior. Human behavior is not completely rational, and decisions are often made on immediate gratification as opposed to long-term rewards. Immediate, though transitory, pleasure easily outweighs knowledge about long-term risks (Bee, 1996).

Young Adult Perceptions of Vegetables and Fruits

For many 18-24 year old young adults, this stage of life is the first chance to make decisions regarding food choices. Orange and grapefruit juice, French and home-style fried potatoes, and salads have been found to be the most frequently eaten fruits and vegetables (Keim et al., 1997). Evans et al. (2000) found that, among Mexican-American college students, vegetables were consumed less often than fruits. Betts et al. (1997) found young adults viewed foods in terms of physical/social aspects, whether they were healthful or fattening and the required shopping, storing, preparation and cooking facilities. College students viewed convenience as more important than health benefits, while non-students viewed satiety as the most important variable in food selection. Interestingly, habit was the individual variable showing the highest correlation with frequency of consumption. Therefore, the eating habits developed during young adulthood may have nutritional, health and physiologic consequences later in their lives, as well as in the development of the food habits of their children (Betts et al., 1997).

Horacek and Betts (1998) evaluated college students' dietary intakes according to the Myers Briggs Type Indicator (MBTI) personality preference. Students from three

nutrition classes completed food frequencies from the National Cancer Institute's Health Habits Questionnaire and the MBTI. Dietary intake was compared using an adapted version of the Diet Quality Index (DQI). Differences were determined by grouping students by personality preferences. Students who displayed characteristics of *intuitives*, *judgers*, and *extroverts* showed evidence of better diets than the other personality types. Determining type preference may help nutrition educators to adjust teaching and communication methods to promote healthy habits.

Travers (1997) argued for nutrition education that empowers its recipients. When society is the source of nutrition problems, the solutions to the problems lie in social change. The current practice of placing primary emphasis on changing individuals, without consideration of their social context, results in fostering a sense of inadequacy and guilt among those who cannot meet the standard. As a proponent of emancipatory nutrition education that allows exploration of the root cause of nutrition problems and, she stated that nutrition education should be scientific enough to explain situational problems, sufficiently critical to allow for evaluation of the situation, and have the practicality to stimulate action to change the problem.

Devine et al. (1998) conducted semi-structured in-depth interviews with eighty-six ethnically diverse adults about their life course, food choices, and influences on fruit and vegetable consumption. Major influences on choices included food upbringing, roles, health, ethnic traditions, resources, location and the food system. Life course transitions such as parenthood and health events were found to have shaped food choices. They

suggested that future research on food choice expand beyond individual psychosocial characteristics to examine the interaction of significant life course events and personal characteristics along with psychosocial elements.

Interviews

In-depth interviews allow subjects to express personal feelings or information privately that might not be revealed in a group setting (Johnson, 2001). Interviews, while a rewarding form of measurement, are, however, among the most challenging methods of data collection in that they require planning, recruiting, moderating, analyzing and reporting data (Krueger and Casey, 2000).

The quality of the interview is dependent upon the skills of the interviewer. One of the most important aspects of any interview study is the training of the interviewers, who should be very familiar with the entire interview before facing a subject. Therefore, it is important to organize and rehearse the interviewing process before beginning the formal study, including several rehearsal sessions with the interview team. Memorization of the questions makes reading the instrument unnecessary and facilitates making eye contact and establishing rapport.

The first thing the interviewer must do is gain entry. According to Krueger and Casey (2000), respect for the participants may be one of the most influential factors in establishing a rapport with the respondent. Morrison-Beedy et al. (2001) and Edmunds (1999) suggested that interviewers be similar to the participants in dress and appearance,

dressings professionally, but in a way that will be comfortable to the respondent. Cultivating a manner of professional confidence is a difficult but critical skill. The interviewer should appear non-threatening and should communicate integrity. Although a skilled interviewer of either sex may be acceptable, participants tend to answer sensitive questions more openly when the moderator is the same gender (Edmunds, 1999).

Questions should be unstilted, clear, short, and open-ended (Krueger and Casey, 2000). They should move from general to more specific, with the later questions being of most relevance to the study. Johnson (2001) presented five categories of questions to guide interviewers: the opening question helps participants get acquainted; introductory questions begin the topic of discussion; transition questions move the conversation toward substantive questions that provide insight into the main objective of the study; and the ending question closes the interview. The most effective way to encourage someone to elaborate on a response is to give "wait-time". Known as the "silent" probe, this method encourages more information. A request for clarification may also elicit greater detail, as may a direct request for elaboration.

The first step in analyzing data is recording and transcription (Betts et al, 1996). Interviews are normally recorded in two ways: by a tape recorder and with written notes. Written notes need not be recorded verbatim, but it is advisable to record precisely certain key phrases or quotes. The researcher examines the transcript to identify major themes or topics related to the research objectives (Stewart and Shamdasani, 1990). Although repeated themes are sought, a key insight might be stated only once (Krueger

and Casey, 2000). The work of generating themes and code words may be done by hand using the Grounded Theory Approach (Glaser, 1977). Computer analysis of themes can be done using an ethnographic program.

Adult Learners

Havighurst (1970) delineated developmental tasks for the stages of adulthood related to physical maturation, cultural expectations, personal values and aspirations. The tasks for the early adulthood period include selecting a mate, starting a family, bringing up children, managing a home and employment, and taking of civic responsibilities. Adult learning can take place either formally, in the context of institutions or informally as self directed learning, but either type should assist those engaged in them in performing better the roles and functions already assumed as adults. Self-directed learning, rather than learning that progresses along a linear path, may occur by design, chance or a combination of both (Merriam and Cafarella, 1991). As independent and self-directed beings, adults are capable of assisting in the planning, execution, and evaluation of their learning. Interwoven with the roles and functions are physical, sociocultural, and psychological variables (Darkenwald and Merriam, 1982).

Learning on one's own, being self-directed in one's learning, is itself a context in which learning takes place. The key to placing a learning experience within this context is that the learner has the primary responsibility for planning, carrying out and evaluating his or her own learning. Participation in self-directed learning seems almost universal. In fact approximately 90 percent of the population is involved with at least one self-directed

learning activity per year (Tough, 1979, Merriam and Cafarella, 1991). Much of adult learning is utilitarian in nature, in that it is built upon prior knowledge and skills. Other learning can be developmental; that is, learning, especially from life experiences, can lead to self-change.

Learning is also a function of personal and social factors that make up our lives, and rarely occurs in isolation. Jarvis (1992) wrote that “the process of learning is located at the interface of people’s biography and the sociocultural milieu in which they live, for it is at this intersection that experiences occur.” The sociocultural milieu influences what we learn and how we learn it. How we are socialized as males or females affects learning, as does social class. Since learning activities promote middle class values, those from lower socioeconomic classes are at a disadvantage (Baumgartner and Merriam, 2000). The family in which one grows up not only creates an economic and social class climate, it also teaches attitudes toward work and self, fosters or inhibits confidence, and encourages or discourages achievement. These attitudes can have lasting effects on the pathway the young adult may follow (Bee, 1996).

Transtheoretical Model

Prochaska and Velicer (1997), authors of the Transtheoretical Model, based their work on the assumption that people choose to change. From that perspective, researchers began to study the techniques used by people to solve their problems. Research on self-changers provided information for development of the Transtheoretical theory, in which Stages of

Change integrates processes and principles of change from across major theories of intervention. The Transtheoretical model includes the four key constructs.

Stages of Change

According to the theory, behavior change progresses through five stages. *Precontemplation* characterizes a young adult who may be uninformed, under-informed, or in denial. It also includes those who have tried to change and failed. These people are not expecting to make changes in the near future, usually identified as six months. An awareness of the benefits as well as the drawbacks of change marks *contemplation*, a limbo-like stage where people remain until the pros of change outweigh the cons. Individuals who begin to plan to take action, usually within a month, are in the *preparation* stage. When people have made specific overt changes in behavior that meet criteria and have been doing it within the past six months, they can be characterized as being in the *action* stage. *Maintenance* is the stage in which people strive to adhere to changes made and avoid relapse. Individuals in this stage, which is estimated to last from six months to five years, are more confident of continued success, but less likely to implement more changes. Finally, in *termination* individuals experience no temptation and are certain of their continued success.

Decisional Balance

Decisional balance, another construct of the TTM, is simply weighing the pros and cons of changing behavior.

Self-efficacy

Self-efficacy, is the confidence an individual has that s/he can cope with high-risk situations without relapsing to the unhealthy behavior (AbuSabha and Achterberg, 1997). Self-efficacy determines the amount of effort invested and the level of perseverance used in making a positive change. People with self-doubts imagine failure scenarios, while people with an optimistic sense of self-efficacy visualize success. It has been found that self-efficacy operates best in concert with general life-style changes (Schwarzer and Fuchs, 1995). *Temptation*, the second part of self-efficacy, is the intensity of the urge to engage in unhealthy behavior.

Processes of Change

Processes of change are the internal and external activities used by individuals as they progress through the stages of change. Ten processes of change have been identified (Prochaska et al., 1991). *Consciousness-raising* involves increased awareness about a problem behavior. Techniques that move people emotionally provide *dramatic relief*. When individuals engage in cognitive and affective assessments of themselves (*self-reevaluation*) they can be moved to change a behavior. *Environmental reevaluation* moves the individual to examine the effects of actions on others. *Self-liberation* or will power is the belief and commitment to change. *Helping relationships* can support the individual through the change process. *Counter-conditioning* is learning healthy behaviors. *Reinforcement management* provides rewards and consequences for specific behaviors. *Stimulus control* removes cues for unhealthy behaviors, supports change, and

reduces risks of relapse. *Social liberation* requires increased social opportunities and includes advocacy and empowerment.

In summary, behavioral habits adopted during adolescence and young adulthood and continued throughout adulthood influence the development of obesity and chronic disease (Rossi et al., 2001). Because of the important long-term implications of dietary choices, and because behavior change is rarely a discrete, single event, it is important that public health interventions aimed at changing dietary behavior be multifaceted, with nutrition education occurring in conjunction with other intervention strategies (Harnack et al., 1997). Change interventions can be useful in promoting lifestyle modification, i.e. increased fruit and vegetable consumption, for disease prevention, and helping to implement changes in behavior is an important role of nutrition educators. Understanding readiness to change and the barriers to change can improve individuals' success (Zimmerman et al., 2000). TTM is an integrative and comprehensive framework with which to view multiple behaviors (Herrick et al., 1997). Brief, validated, and reliable theory-based measures designed for use in large survey research are needed to assess attitudes and behaviors about fruit and vegetable intakes (Rossi et al., 2001).

The objectives of the study were the following:

Phase I

- 1) Test two food frequency instruments for feasibility of use as a telephone survey for economically disadvantaged young adults (18-24 years).
- 2) Collect fruit and vegetable intake data.

Phase II

3) To elicit feedback about the usefulness, appeal, and readers' comprehension of stage-tailored newsletters as a method of delivering the nutrition education intervention to increase fruit and vegetable consumption.

METHODOLOGY

Study Design

This study was composed of both quantitative and qualitative components. In Phase I, a telephone survey of fruit and vegetable intake was conducted using two food frequency instruments. In addition to collecting intake data, cognitive testing, a qualitative technique, was conducted. Cognitive testing included recoding comments and questions the researcher and subjects had in completing the instruments. The amount of time needed for completion of the phone-administered instruments was assessed. In Phase II, qualitative one-on-one in-depth interviews were conducted. These subjects, screened for stage of change for vegetable intake, reviewed stage-based newsletters for such things as content, appeal, and usefulness. All procedures and questionnaires for this study were reviewed and approved by the University of Maine Review Board for the Protection of Human Subjects.

Phase I: Surveys

Subjects for Telephone Survey

Thirty (30) young adults, male or female, between the ages of 18-29 years of age were recruited by a Cooperative Extension nutrition aide in the Portland, Maine area. Subjects had participated, or were eligible to participate in, Cooperative Extension programs for the economically disadvantaged.

Instruments

The two instruments were the *NC219 Food Frequency* (Appendix A), fruit: $r = .43$, $p < 0.04$; vegetables: $r = 0.065$, $p < 0.001$; internal consistency coefficients 0.77 for fruits and 0.82 for vegetables), (Ma et al., 2002, in press) and the *NCI SCAN* (Appendix B). Past use of the *NC219 Food Frequency* was as a mailed, not telephone, survey with young adults. The *NCI SCAN* has been identified as an instrument that may be easier to administer over the telephone than the other instrument, although it was not developed specifically for young adults as was the *NC219 Food Frequency*.

Protocol for Administration of Survey Instruments via Telephone

The nutrition aide contacted persons to request participation in the study and to determine times that were convenient to be contacted by telephone (Nutrition aide telephone protocol, Appendix C). To allay fears of receiving a call from an unknown number, subjects were told the telephone numbers from which the researcher would be calling. The Educator recorded the names, phone numbers and best times to call the subjects (Tracking form, Appendix D). She gave the information to the researcher, who called the subjects and administered the surveys and a demographic form (Appendix E) over the telephone. A \$10.00 stipend was mailed to subjects.

The researcher made the phone calls during January-February, 2002, following a protocol for the telephone interview (Appendix F). To account for the fatigue factor, presentation order of the two instruments was reversed with every other person. Based on pretesting,

time on the telephone was expected to be approximately 30 minutes. The time taken to complete each of the instruments was strictly observed using a stopwatch.

The focus of the testing was to determine agreement between the two instruments in identifying fruit and vegetable intake; to provide data on fruit and vegetable intake of economically disadvantaged young adults; and to perform cognitive testing, i.e., to determine questions researchers and subjects had in the delivery of the instruments, including such things as confusing items and time needed to administer the instruments. The researcher summarized the qualitative data collected as part of the cognitive testing.

Statistical Analysis

Food frequency instruments were copied and the original forms were mailed to a research collaborator in Nebraska for data analysis. A data disk was returned to the researcher for analysis. General descriptive statistics were generated. Comparison of the data obtained from the two survey instruments was made by analyzing the differences in mean fruit and vegetable servings per day and serving size. Dr. Philip Pratt (University of Maine) was the consulting statistician. Using a data entry software program (SPSS release 4), general descriptive statistics were generated. Data were analyzed for statistical significance using Student's t-test. Pearson Product Moment Correlation Coefficients were used to correlate continuous variables. The probability level selected for this study was $p \leq .05$.

Phase II: In-depth Interviews

Subjects for the In-depth Interviews

The subjects were twenty (20) females, 18-24 years, who were either current participants or eligible to participate in a verifiable program serving limited income individuals in the Portland, ME area. Some participants had previously participated in the telephone survey. Subjects were chosen based on their stages of change so that about equal numbers were distributed in three categories: precontemplation/contemplation, preparation, and action/maintenance. Subjects received a \$25.00 stipend for their participation.

Protocol for the In-depth Interviews

In-depth interviews were conducted during the spring and summer, 2002 to provide qualitative data for tailoring of newsletters to an economically disadvantaged young adult audience. Training in interviewing was conducted at the end of January, 2002 via videotapes. The trainer, who wrote the interview protocol, was a skilled interviewer from Nebraska. The researcher, her major advisor, and the nutrition aide viewed and used the videotape and accompanying materials, which was followed by a teleconference question and answer period.

The nutrition aide telephoned persons to elicit participation, set up interview appointments, and recorded pertinent information for the interview (Interview protocol; Appendix G). If the contact was willing to participate, the aide administered the staging algorithm (Appendix H) to determine the stage of change of each subject. Subjects were

staged based on vegetable consumption to determine which stage-based newsletter they would receive. The nutrition aide then made an appointment for the interview and forwarded the information to the researcher. Consistent with the stage of change, the researcher mailed the newsletter prototypes for review prior to the scheduled in-depth interviews (Appendix I).

The interview sessions involved reviewing newsletters for acceptability, usefulness, appeal, and comprehension. Interviews were conducted in the subject's home unless the subject expressed a preference to be interviewed at the County Cooperative Extension office. The aide and the researcher met and traveled together to the interview site. Introductions were made and the equipment was set up. Interviews were recorded in two ways: 1) by a tape recorder placed in full view of all participants, and 2) with written notes. Sessions were audio taped for later transcription and analysis by the researcher.

The nutrition aide conducted the individual in-depth interview, which began with questions about the newsletter's general appeal. Each subject was asked the interview questions pertinent to her stage of change (Appendix J). The subject was then given a second stage-based newsletter. When she had finished reading it, she was asked to provide a *free recall* of its content, followed by the questioning route. Subjects were asked about preferred methods to receive information other than newsletters. Subjects completed demographic information following the interview (Appendix E). All in-depth interviews included the same stage-based questions and were expected to last approximately 30 minutes.

Statistical Analysis

The researcher made typed transcriptions of the notes and mailed copies of the tapes and hard copy transcriptions to the research collaborators in Nebraska. All information obtained and questions raised underwent systematic categorical analyses, using an ethnographic analysis (Ethnograph Version 5.0). Researchers from Nebraska examined the transcript to identify the emergence of major themes or topics related to the research objectives. Common themes were bracketed and coded. When coding was finished, the statements were sorted according to codes. This researcher reviewed transcripts identifying statements made by the subjects supporting the major themes and specifically the processes of change used by the subjects at each stage of change grouping. Findings were confirmed by reviewing a similar process conducted by four other researchers within the NC219 technical committee.

PHASE I: RESULTS OF SURVEYS

Demographic Characteristics of the Sample

Subject characteristics are presented in Tables 1 through 3. Thirty young adults participated in the study. Due to improbable data, three were eliminated from inclusion in data evaluation. Of the remaining 27 subjects, one was male, an 18 year old. The mean age \pm standard deviation of the females was 23.8 ± 2.7 years. The majority of subjects was white (85%), unmarried (74%) and lived in an urban area (74%). Most (74%) had children in the household. Twenty-three of the 27 subjects had earned at least a high school degree. Of those, ten were currently full-time or part-time students. The male was a full-time student, single and without children, living in a suburb of Portland, Maine. His height and weight were 77 inches and 215 pounds, respectively, giving him a BMI of 25.5, classified as overweight.

Table 1. Physical Characteristics of Females
(n = 26)

	Mean \pm S.D.
Age	23.8 ± 2.7 years
Height	64.8 ± 2.5 inches
Weight	154 ± 35.7 pounds

Table 2. Demographic Characteristics of Subjects (n = 27)

<i>Characteristic</i>	<i>n</i>	<i>%</i>
Sex		
Male	1	3.7
Female	26	96.3
Race		
White	23	85.2
American Indian	2	7.4
Asian/Pacific Islander	1	3.7
Other	1	3.7
Education Level		
Elementary/some high school	4	14.8
High school graduate/GED	13	48.1
Post high school training/no degree	8	29.6
College graduate	2	7.4
Student Status		
Full time	7	25.9
Part time	3	11.1
Not currently a student	17	63.0
Marital Status		
Married	7	25.9
Unmarried	20	74.1
Locale		
City	20	74.1
Suburb	3	11.1
Rural	4	14.8
Number of Persons in Household		
1	4	14.8
2	10	37.0
3	4	14.8
4	4	14.8
5	4	14.8
9	1	3.7
Number of Children in Household		
0	7	25.9
1	13	48.1
2	4	14.8
3	2	7.4
7	1	3.7

Table 3. BMI (n = 27)

<i>BMI</i>	<i>n</i>	<i>%</i>
<18.5 (Underweight)	1	3.7
18.5-24.9 (Normal)	13	48.1
25.0-29.9 (Overweight)	9	29.6
≥30.0 (Obese)	5	18.5

The mean BMI of the females was 25.6±5.3, classified as overweight. Of the subjects, 48.1% were overweight or obese. Two of the five obese subjects could be characterized as having Class II obesity, or a BMI between 35.0 and 39.9. Consistent with these findings, 14 (51.8%) were either unsatisfied or very unsatisfied with their weight. Eight of the 13 normal weight subjects expressed satisfaction with their weight.

Table 4. BMI and Weight Satisfaction (n = 27)

<i>Weight Satisfaction</i>	<i>n</i>	<i>%</i>
Very satisfied	3	11.1
Satisfied	5	18.5
Neutral	5	18.5
Unsatisfied	9	33.3
Very Unsatisfied	5	18.5

Time

As can be seen in Table 5, the NC219 Food Frequency took about two and one-half minutes longer than the NCI SCAN ($p < .000$) to administer. There was a significant correlation between the administration times of the two instruments ($r = .46$; $p = .05$).

Table 5. Comparison of Mean (±SD) Administration Times of the NC219 Food Frequency and the NCI SCAN (n = 27)

<i>Instrument</i>	<i>Time</i>	<i>(±SD)</i>
NC219 Food Frequency	9 min 32 sec*	1 min 32 sec
NCI Scan	6 min 59 sec.	1 min 15sec

*Significantly different $p < .000$, paired t test; significantly correlated $p = .05$, Pearson Product Correlation Coefficient

Fruit and Vegetable Intakes

Mean daily intakes of fruits and vegetables by food frequency, as reported using the two instruments are presented in Tables 6 through 8. When using the NC219 Food Frequency, subjects reported a mean daily fruit intake of 3.2 ± 2.0 servings. In comparison, when the SCAN was administered, mean fruit intake was assessed at 2.0 ± 1.4 servings a day. For fruits (Table 6), subjects' responses to the NC219 Food Frequency were that orange juice was eaten most frequently and in the largest amounts, followed by bananas and other 100% juices. Mean intake for orange juice was slightly over two times per week and 100% juice over one time, but less than two times, per week, about the same as bananas. Subjects administered the NCI SCAN indicated that fruit and fruit juices were consumed more frequently than vegetables (Table 7). For both instruments, a mean serving size of medium was reported for most fruits, except for dried fruits (on the NC219 Food Frequency), which were reported as consumed in a small serving size. Peaches were eaten infrequently, and the mean serving size was reported as less than a medium. The reported frequency of most of the vegetables on the NC219 Food Frequency was one to two times per week. The top vegetables cited on the NC219 Food Frequency were green salad, eaten in the greatest frequency, the group category of pickles, onions, cucumber, celery, olives, followed closely by carrots and the grouping broccoli, cauliflower, spinach and greens. However, when responding to the NCI SCAN, subjects indicated that other vegetables (defined as excluding lettuce, white potatoes, dried beans, vegetables in mixtures and including all other raw, cooked, canned, or frozen vegetables) were consumed in greatest frequency, followed by vegetable mixtures and white potatoes other than fries. Similarly, higher total vegetable intake was reported

when the NC219 Food Frequency was used (3.4 ± 1.8) versus the NCI SCAN (1.9 ± 1.2).

When intake of French fried potatoes was excluded from the data, mean vegetable servings dropped only slightly, to 3.3 ± 1.7 (NC219) and 1.8 ± 1.2 (NCI SCAN) servings.

Table 6. Mean (\pm SD) Frequency¹ and Amount² of Fruit and Vegetable as Determined by the NC219 Food Frequency

Item	Frequency (\pm SD)	Amount (\pm SD)
100% orange juice	3.3 \pm 2.7	2.8 \pm 0.5
Banana	2.6 \pm 1.9	2.1 \pm 0.5
100% other fruit juices	2.4 \pm 1.9	2.6 \pm 0.7
Apples, applesauce	2.2 \pm 1.8	2.0 \pm 0.6
Berries, in season	2.1 \pm 1.8	2.3 \pm 0.6
Grapes, pears, pineapples	2.1 \pm 1.8	2.4 \pm 0.6
Oranges, grapefruit	1.7 \pm 1.8	2.2 \pm 0.6
Watermelons	1.6 \pm 1.7	2.1 \pm 0.7
Fruit salad, canned fruits, fruit cocktail	1.5 \pm 1.7	2.3 \pm 0.6
Peaches	1.1 \pm 1.5	1.8 \pm 0.4
Raisins, prunes, apricots	1.0 \pm 1.9	1.3 \pm 0.6
Cantaloupes	0.7 \pm 1.3	2.2 \pm 0.9
Green salad, lettuce	2.8 \pm 1.8	2.2 \pm 0.8
Pickles, onions, cucumber, celery, olives	2.6 \pm 2.0	1.8 \pm 0.7
Carrots	2.5 \pm 1.8	2.0 \pm 0.7
Broccoli, cauliflower, spinach, greens	2.5 \pm 2.0	2.3 \pm 0.7
Baked or mashed white potatoes or sweet potatoes	2.3 \pm 1.4	2.3 \pm 0.6
Tomato sauce, spaghetti/barbecue sauce	2.2 \pm 1.5	2.2 \pm 0.7
Peas, green beans, lima beans	2.1 \pm 1.5	2.0 \pm 0.7
Tomatoes	2.1 \pm 2.0	1.5 \pm 0.5
Mixed vegetables, frozen or canned, or in mixed foods	2.0 \pm 1.7	2.2 \pm 0.6
Other vegetables (corn, peppers, coleslaw)	2.0 \pm 1.3	1.9 \pm 0.6
Catsup, salsa	2.0 \pm 1.5	1.7 \pm 0.7
French fries, fried potatoes, hash browns	1.2 \pm 1.3	2.0 \pm 0.8
Vegetable soup/stew, vegetable juice	1.1 \pm 1.1	2.3 \pm 0.8
Refried beans, chili beans, etc.	0.4 \pm 1.0	1.7 \pm 0.7

¹0 = 1 time/month or less; 1 = 2-3 times/month; 2 = 1 time/week; 3 = 2 times/week;

4 = 3-4 times/week; 5 = 5-6 times/week; 6 = 1 time/day; 7 = 2 times/day or more

²1 = Small 2 = Medium 3 = Large

Table 7. Mean (\pm SD) Frequency¹ and Amount² of Fruits and Vegetables as Determined by the NCI SCAN

Item	Frequency(\pm SD)	Amount(\pm SD)
Fresh, canned, frozen fruit	3.8 \pm 2.0	2.2 \pm 0.4
100% fruit juices	3.7 \pm 2.2	2.1 \pm 0.6
Other vegetables	3.1 \pm 1.5	2.2 \pm 0.6
Vegetable mixtures	2.3 \pm 1.5	
Other white potatoes	2.1 \pm 1.0	2.1 \pm 0.8
Lettuce salad, with or without vegetables	2.0 \pm 1.5	2.5 \pm 0.9
Tomato sauce	1.9 \pm 1.1	2.3 \pm 1.0
Vegetable soups	1.0 \pm 0.8	2.0 \pm 0.7
French fries	1.0 \pm 0.7	1.5 \pm 0.9
Dried beans	0.8 \pm 0.9	2.4 \pm 0.8

¹0 = Never; 1 = 1-3 times/month; 2 = 1-2 times/week; 3 = 3-4 times/week; 4 = 5-6 times/week

5 = 1 time/day; 6 = 2 times/day; 7 = 3 times/day; 8 = 4 times/day; 9 = 5 or more times/day

²1 = Small; 2 = Medium; 3 = Large; 4 = Extra large

To compare the NC219 Food Frequency and the NCI SCAN, all juices, all fruits, and all vegetables were combined. When using the NC219 Food Frequency, greater frequency of intake was reported than when using the NCI SCAN (Table 8). There was, however, correlation between each of the two instruments ($r = .56$; $p = .01$). Table 9 presents the correlation coefficients; the highest correlation between the two instruments was in assessing salad intake.

Table 8. Comparison of Mean (\pm SD) Daily Fruit and Vegetable Intakes* Derived from the NC219 Food Frequency and the NCI SCAN (n = 27)

	NC219 FFQ(\pm SD)	NCI SCAN(\pm SD)
Juice	1.3 \pm 1.2	0.9 \pm 0.9
Fruit	1.9 \pm 1.4	1.1 \pm 1.2
Juice and fruit	3.2 \pm 2.0	2.0 \pm 1.4
Total vegetable	3.4 \pm 1.8	1.9 \pm 1.2
Vegetable excluding French fries	3.3 \pm 1.7	1.8 \pm 1.2

*servings per day

Table 9. Correlations between the NC219 Food Frequency and the NCI SCAN

	Juice	Fruit	Juice/Fruit	Vegetables	Vegetables, no Fries	Salad	Sauce	SCAN
Juice	.60*							
Fruit		.69*						
Juice/Fruit			.51*					
Vegetables				.62*				
Vegetables, no Fries					.66*			
Salad						.80*		
Sauce							.68*	
FFQ								.56*

*Significant at $p=.01$ for Pearson Product Correlation Coefficient

As is indicated in Table 10, there was a significant negative correlation between BMI and fruit intake, indicating the more fruit eaten, the lower the BMI tended to be ($r = -.43$; $p = .05$). There was a highly significant positive correlation between weight satisfaction and BMI ($r = .62$; $p = .01$).

Table 10. Correlation of Body Mass Index with Fruit Intake¹ and Weight Satisfaction

	<i>Fruit Intake</i>	<i>Weight Satisfaction</i>
<i>BMI</i>	-.43*	.62**

* $p=.05$

** $p=.01$

¹Based on NC219 Food Frequency

In Table 11, the correlations between frequency of breakfast eating and total vegetable intake and total vegetable intake exclusive of French fries are presented. There were positive correlations between frequency of breakfast eating and total vegetable intake and total vegetable intake exclusive of French fries, and a highly significant correlation between breakfast consumption and total fruit and vegetable intake, based on NC219 Food Frequency. There was a highly significant negative correlation between frequency of breakfast eating and weight satisfaction.

Table 11. Correlation of Factors¹ Related to Frequency of Eating Breakfast

	<i>Total Vegetable</i>	<i>Total Vegetable (no fries)</i>	<i>Total Fruit and Vegetable</i>	<i>Weight Satisfaction</i>
<i>Breakfast Frequency</i>	.47*	.46*	.57**	-.58**

¹Fruit and vegetable intake based on NC219 Food Frequency

*p = .05

**p = .01

Cognitive Testing

Questions raised by the researcher or the subjects were few for both the NC219 Food Frequency and the NCI SCAN. Sixteen of thirty subjects (53%) asked questions of the researcher. More questions were generated from administration of the NCI SCAN than the Food Frequency. Subjects' questions indicated some confusion with seasonality, as well as the need for a "never" category for the FFQ. Questions during administration of the NCI SCAN pertained to the inclusiveness of juice and methods of processing fruits and vegetables.

PHASE II: RESULTS OF IN-DEPTH INTERVIEWS

Demographic Characteristics of the Sample

Thirty interviews with economically disadvantaged females were conducted by the Cooperative Extension nutrition education aide. The audiotape from one subject was unusable due to background noise, leaving a sample size of 29. Of those, nineteen were transcribed, with this researcher transcribing four for the experience. Because the Nebraska researchers found the same data was being collected, transcription was discontinued. The mean age of the subjects was 21.0 ± 1.4 . The mean BMI of the group was 28.4 ± 6.12 , classified as overweight. Most subjects were white and unmarried with children. Table 12 is the distribution by stage of change of the nineteen subjects whose interviews were transcribed.

Table 12. Subjects by Stage of Change (n=19)

<i>Stage</i>	<i>n</i>	<i>%</i>
Precontemplation/Contemplation	7	36.84
Preparation	5	26.32
Action/Maintenance	7	36.84

Responses to Newsletters

The newsletters were very well-received by all subjects within the three stage groupings. As requested, most subjects had read the newsletters that had been mailed to them prior to the interview. Positive comments were given regarding the newsletters' visual appeal and content. Subjects reported that they were pleased with the recipes, which had provided new ideas, and would share both recipes and newsletters with family and friends

and would likely save the newsletters for reference. Subjects in all stages of change expressed the desire for further information. Minor criticisms were noted. Some did not care for the dialogue between the two featured characters in the story line format. There was negative response to a recipe for a tomato juice based remedy for excessive alcohol consumption that was found in a newsletter for precontemplators/contemplators. When subjects were given a second newsletter to read, they responded appropriately to answers and identified the main ideas, indicating they comprehended the information.

Results from the grounded theory analysis that took place in Nebraska are presented in Table 13. Overall, the comments from the in-depth interviews were categorized into eight groups. Each grouping was titled and code words were categorized within the following list of headings: *appearance*, *benefits*, *core constructs*, *recipes*, *barriers*, *readability*, *content*, and *second newsletter*. Using the transcripts and the code words, the researcher identified specific information about the newsletters.

Table 13. List of Code Words Generated from In-depth Interviews¹ (n=19)

Appearance	Benefits	Core Constructs	Recipes
Color	Health	Processes of change	Health
Pictures/graphics	Convenience	Self-efficacy	Taste
Heading	Taste	Decisional balance	Ingredients
Layout	Nutrients	I feel	Nutrition Information
Recipes		Got me thinking	Familiar foods
		I've heard	More suggestions
		Scared	
Barriers	Second Newsletter	Readability	Contents
Cost	More information	Easy to read	Facts
Preparation time	More questions	Length	Tips
Convenience	More tips	Two columns	Quizzes
Time	Good ideas		Questions
Availability	Explains		Examples
			Lists
			More information

¹Based on Grounded theory Analysis; Ethnograph 5.0

Most subjects were pleased with the newsletters' appearance. Comments about the color, picture and graphics were positive. Pictures included with the recipes made them more enticing.

Recipes were simple, relatively inexpensive, and made with familiar ingredients, and subjects in all stages of change were receptive to them. When queried about the characteristics that make a recipe appealing, cost, taste, and ease of preparation were almost universally identified. Flavor, appearance, and texture influenced recipe selection, as did nutrition and weight control, which were repeatedly mentioned as primary reasons for increasing fruit and vegetable recipes. With the exception of the recipe for the "hangover helper," in the *precontemplation/contemplation* newsletter, the recipes were well received, and readers stated they would try them. There were differences among the subjects by stage of change. Subjects in *precontemplation/contemplation* were more comfortable with familiar foods, needed the recipes to be usable in their presented format, and were less likely to try a recipe with ingredients they did not like. Those in *action/maintenance*, who exhibited the most enthusiasm and engagement with the recipes, were able to make mental adaptations to their personal tastes. These women were also more eager for more information regarding the health benefits and nutrition of each recipe. All subjects wanted more recipes in each newsletter.

When subjects were given the opportunity to read the second newsletter, many felt it offered repetitive information. A genuine interest in more substantive information being provided was expressed. Subjects in all stages wanted more specific information.

Respondents in *action/maintenance* wanted more in-depth information about the specific nutrients and their relationship to disease prevention and wellness. For those in *precontemplation/contemplation*, practical information about selection, purchasing and preparation was desired, but they wanted the information given in a quick and easy format. *Preparers* wanted both: the same practical information as well as specific nutrient content of fruits and vegetables.

Responses to Newsletters Organized by the Transtheoretical Model

Results of the individuals' responses are organized according to the Transtheoretical Model to identify evidence of decisional balance, self-efficacy, and processes of change expressed by the subjects.

Decisional Balance

To assess the pros and cons of consuming fruits and vegetables, subjects were asked to describe the benefits and barriers to fruit and vegetable consumption.

Benefits: When subjects were asked what the benefits would be, or what they are, all subjects knew that fruits and vegetables improved health and well being. Those in *action/maintenance* were aware of specific health claims for increased fruit and vegetable consumption. They also commented on the enjoyment provided by eating fruits and vegetables.

They [fruits and vegetables] keep you healthy. (precontemplation/contemplation)

They [fruits and vegetables] give you energy, vitamins and minerals. (preparation)

They taste good and they are doing something for you. The vitamins or whatever is in them, they do something for each part of your body. Some are good for preventing cancer. (action/maintenance)

Barriers: Several factors were identified as barriers to increased fruit and vegetable intake.

Cost: Predictably cost was cited as a major factor in low consumption:

Part of the reason we don't all eat fruits and vegetables is because they're so expensive. If I buy them I like them fresh. I don't like it when fruits and vegetables go bad so quick. I won't use them. (precontemplation/contemplation)

Convenience: For many, food needed to be available fast and without effort:

It takes too long to prepare them, to peel or cut them. I'll notice if I have a day that's real busy, it's much easier to go and grab a cookie than go grab a piece of fruit. It's easier to grab a handful of crackers. (precontemplation/contemplation)

Availability: For *precontemplators/contemplators*, lack of availability played a great role in inadequate intake:

I eat them when I can, but they aren't always in the house. They're not available at convenience stores-only markets, so you grab chips, soda, or whatever else is available. (precontemplation/contemplation)

Time/Preparation Time: For some subjects, it was not a lack of availability that presented the barrier, but a lack of time. Subjects in *precontemplation* or *contemplation* stages felt they lacked the time required to prepare fruits and vegetables. This was especially common among those women with small children:

I'm busy all the time. I have them here. It's just that the kids are crying or they are hungry and I have to take care of them. I've been busy with the baby and don't have time to make myself a meal anymore. Life gets a little hectic and you don't always have time to sit and think about meals today. I don't have time to sit down and eat what I'm supposed to. (precontemplation/contemplation)

Working mothers across all stages of change reported finding it especially challenging to prepare a meal. Several compared their lives to those of their mothers.

I don't have as much time to eat them when I work. My mother was an at home mother, so it was a lot easier for her to be home and get things ready. Today everyone is on the run. Everyone has a ton to do and not enough time. (action/maintenance)

Eating habits: As one might expect, subjects in pre-action were the least likely to meet dietary recommendations. Subjects offered a variety of explanations:

Over the last few years I've gotten into the junk food craze. I have a really sweet tooth and a lot of the time fruits don't do it for me the way a candy bar would. (preparation)

My own mind. I have a habit of not eating very much during the day at all. By the time I can get to eat, I'm so hungry that nothing looks good. I'll go and grab a snack, and instead of getting a healthy one, an orange, I'll grab a cookie or a brownie. (preparation)

I don't eat a lot. I only eat one meal a day. I eat supper. (precontemplation/contemplation)

A common complaint among both precontemplators and preparers was the limited number of acceptable vegetables and the boredom that ensued from frequent consumption of the same vegetables.

There are a lot of vegetables I don't like. It's hard eating the same ones over and over. I get tired of them. I think there are three or four I eat. (preparation)

There's only a few that I like. We eat them every single day, all the time. It gets boring. (precontemplation/contemplation)

Other family members' preferences: In addition to their own preferences, subjects were sensitive to the needs of other members of the household.

I like tomatoes but my boyfriend doesn't. I'm not going to cook a dinner or a meal and put tomatoes on if he's not going to eat it. (precontemplation)

Self-efficacy

Self-efficacy was observed most frequently in *action/maintenance* and only occasionally in the pre-action stage of change. For many subjects, the new role as mothers gave further impetus to maintain change:

I have to get myself cooking again. Do some grocery shopping. I know I have to feed my son. I know I have to eat good stuff. Before him I probably didn't eat the things I do now. (action/maintenance)

Other women accepted that there were some days when they were more successful eating well than others, but they had strategies for regaining control

I get back on track. I decide to eat more fruits and vegetables. (action/maintenance)

I get back on track. I make a salad. (action/maintenance)

In every case, the subjects had found ways to make it easy to obtain fruits and vegetables.

I make myself eat them, knowing that they're doing something for me. I make them convenient. I have a bowl in the refrigerator with celery and carrots all cut up in water in the refrigerator. (action/maintenance)

One subject demonstrated practicality in solving the problem of cost of ingredients:

If it has things in it that cost way too much, that I know I can't buy, I try and compromise. If it has skinless, boneless chicken breast, I'll buy chicken with the bone and cook it and peel it off myself. (action/maintenance)

Processes of Change

The interviews provided the researcher insight into the *processes of change*, the internal and external activities and behaviors used by individuals at different stages of change. Nine of the ten processes were identified as used by subjects. The identified processes are delineated below by comments made by the subjects.

Consciousness Raising: Subjects in every stage of change expressed a desire to seek new information and to gain greater understanding about the importance of increasing intake of fruits and vegetables. Subjects in *precontemplation/contemplation* stage of change

expressed that the newsletters increased their thinking about increasing fruits and vegetables:

It made me think more about fruits. I think I should eat more.

Subjects in the *preparation* stage of change were reminded to eat more:

What made me think about eating more fruits and vegetables was having someone else ask me, making me stop and think. It made me realize that I'm not eating enough.

Dramatic Relief: One *precontemplative* mother was especially distressed over potential health problems due to her poor diet and low fruit and vegetable intake:

I don't feel like eating them. I know I have to eat them. I have to feel better. I don't want to be unhealthy. I have a daughter now. I feel different. I have to live for her. Before I didn't care that much. I just lived from today to tomorrow. I didn't care. I'm thinking I should live long. So I do want to help myself.

Self-Reevaluation: Subjects in *pre-action* more often displayed ambivalence and negative self-talk in decision making than subjects in the other stages of change; for instance saying such things as:

Do you want to do it or do you not care? (preparation)

Action/maintenance subjects expressed certainty regarding health benefits of fruits and vegetables:

They make you feel better about yourself.

Vegetables are good for your organs. I think I'm doing something good for myself. Even if I don't know its full benefits, I'll eat it anyway.

Environmental reevaluation: Several subjects demonstrated the examination of the effects of their actions on others. When asked what was most important in their lives, all subjects who were mothers stated that their children were most important. From *precontemplation/contemplation* to *action/maintenance*, the subjects' understanding of their roles as models of behavior was frequently articulated. However, their statements were clear indications of their stages of change:

I probably should start eating them so my kids will. (precontemplation/contemplation)

They copy their parents. I should definitely start eating more fruits and vegetables so I can tell my sons to. They copy their parents. (preparation)

With me eating them, my sons will see that I'm eating them. (action/maintenance).

One subject in action/maintenance was pleased with the dietary change she had influenced in her boyfriend:

He never really ate fruits and vegetable until we started going out. He never ate a salad before. Now he eats them, because I eat them all the time. I got him into eating fruits and vegetables.

Self-liberation: Statements demonstrating an empowered attitude were observed more frequently in action/maintenance subjects but began to emerge as subjects committed to change:

Just do it. Just get in the process to eat five a day. (preparation)

I tell myself I'll try to eat more, and this is how I'll do it. (preparation)

*I make myself eat them, knowing they're doing something good for me.
(action/maintenance)*

Helping Relationships: Subjects demonstrated seeking and accepting support from others, usually a significant other in their lives:

My boyfriend is a vegetable eater. He eats fresh and frozen vegetables. It makes it easy. (action/maintenance)

My fiancé is always eating vegetables and he makes me eat vegetables. He tells me it's good for me. (preparation)

Counter-conditioning: The substitution of healthful dietary behaviors was observed in many subjects:

*Having it [fruits and vegetables] in the house makes it easier. If I have it in the house, I'll want it, but if it isn't I probably won't think about it so much-unless I have a craving. I go to the store and always buy the canned fruits and vegetables and I buy the fresh fruits and vegetables. I make sure I have them available.
(action/maintenance)*

*I go to the grocery store more times and buy less. I have them [fruits and vegetables] around. One big thing is I keep my fruit in the refrigerator. If the bowl's on the table, it's the first thing you notice when you come into the kitchen.
(action/maintenance)*

Subjects told of strategies for increasing fruit and vegetable intake. In addition to having fruits and vegetables available, many subjects also noted the value of prior preparation:

I make them convenient. I have a bowl in the refrigerator with celery and carrots all cut up in water in the refrigerator. I will automatically cut them up so it's not like a task. I try to get things prepared before I go. Then I can just grab them in my snack bags and go. (action/maintenance)

Those in *action/maintenance* were much more confident in their choices, derived a sense of satisfaction from making healthier choices, made positive self-statements, and were more forgiving of lapses.

You haven't just gone and grabbed a cookie and say "I really shouldn't have eaten that." If you start to slip, go right back that day and start eating correctly.

Stimulus Control: In addition, subjects spoke of social events where they could experiment with unfamiliar fruits and vegetable. This activity was most likely to occur at an ethnic restaurant or at an occasion with culturally diverse participants:

If I get bored, I don't go out and get chips, I get an apple. (action/maintenance)

I like to try new foods, so I'm going to try to go out to lunch with someone who enjoys trying new foods. (action/maintenance)

Social Liberation: Subjects in *action/maintenance* reported an interest in trying new foods and welcomed opportunities for doing so:

The fact that I like to try new foods, the store advertising. They have recipes and I want to try that. Go out to lunch with someone who enjoys trying new foods.

DISCUSSION

Phase I: Fruit and Vegetable Intake

It is generally accepted that dietary choices have an important impact on health; therefore any positive influence on the diet can have great impact on the future prevention of chronic diseases (Margetts et al., 1998). The goals of this research were to compare two instruments in identifying fruit and vegetable intake; to provide data on fruit and vegetable intake of economically disadvantaged young adults and to elicit responses to stage-tailored newsletters. This study was designed to be inclusive of both males and females, but only one male participated in Phase I of the study. No males responded to requests for interviews in Phase II.

The subjects were a convenience sample who were currently participating or eligible to participate in programs for economically disadvantaged young adults and were reflective of the general population of Maine, only in that most subjects were white and close to 50% were overweight or obese (Maine Bureau of Health, 2000). Compared to data from NHANES (1999), where 64% of the surveyed population was overweight or obese and 30% were obese, this group was slightly better. Still, these subjects were very young and have ahead of them a lifetime of challenges to maintaining or achieving a healthy weight.

Although it was not developed specifically for young adults, the *NCI SCAN* had been previously identified as an instrument that may be easier to administer over the telephone than the *NC219 Food Frequency*, originally a paper and pencil instrument. A primary objective of this study was to test the *NC219 Food Frequency* to see if it could be put into

a format for use as a telephone questionnaire. Therefore considerable effort was put into its adaptation for telephone use. Based on the data collected, it appeared to be successful. Although the instrument took about two and one half minutes longer to administer, it was due to the comprehensiveness of the instrument. Administration was not slowed down by subjects' needing to ask clarifying questions. In fact, the clarity and completeness of the survey resulted in less need for clarification than did the *NCI SCAN*, about which there were more questions pertaining to inclusion of unspecified fruits and vegetables and their form. Thus, it appears that, with minor modifications, either instrument could be used as a telephone survey with economically disadvantaged young adults.

Using the *NC219 Food Frequency*, subjects reported greater fruit and vegetable consumption compared to the *NCI SCAN*. Even though the instruments were administered consecutively, the *NC219 Food Frequency* captured more of the foods eaten. Krebs-Smith et al. (1995) reported that the more foods that are placed on a food frequency questionnaire, the more fruits and vegetables will be captured. Because of its greater number of fruits and vegetables, the instrument would logically require more time for administration. If a researcher wants to look at the intake of a larger variety of specific fruits and vegetables, the *NC219 Food Frequency* is the better instrument, but when time and cost of personnel are considerations, the greater time required for its administration could influence instrument selection.

The subjects in this group differed from most young adults in their low consumption of French fries as well as in their infrequent patronage of fast food restaurants (Horacek and

Betts, 1998). Participation in nutrition education programs offered by Cooperative Extension could have positively affected their intake of French fries and use of fast food restaurants. Therefore, vegetable intakes were minimally affected regardless of whether French fries were included or excluded in the analysis.

Mean intakes (6.5 servings, excluding French fries) of total fruits and vegetables as reported on the *NC219 Food Frequency* exceeded the recommended five servings a day. Surprisingly, this group exceeded recommended vegetable intake as well as fruit intake. However, vegetable and fruit consumption as reported on the *NCI Scan* (3.9 servings, including French fries) failed to meet recommendations, a finding reported previously (Georgiou et al. 1997). The discrepancy between the two instruments may be attributed to the fact that the *NC219 Food Frequency* probes for consumption of seasonal fruits and more vegetables, as well as condiments that may not traditionally be recognized as contributing to vegetable intake.

Consistent with previous research, both instruments confirmed that orange juice, other juices, and salads were frequently eaten fruits and vegetables (Quan et al., 2000, Keim et al., 1997). Juice consumption may have been high due to its growing popularity as a beverage, its perception as a healthful drink, regardless of quantity, and its availability through the WIC program, a program typically used by low income women with children. It is interesting that the second most popular vegetable was the grouping of vegetables that may normally be put on a hamburger. The fact that subjects reported

consuming *other vegetables* with higher frequency than the other vegetable choices may indicate that vegetables are eaten alone more often than as part of a dish.

Phase II: In-depth Interviews

Phase II of this study involved in-depth interviews, critical to the process of tailoring newsletters for the young adult population. In order to increase participation and reduce costs of transportation and child care, most interviews were conducted in the subjects' homes. Ideally, interviews would have been conducted in a more neutral location (Edmunds, 1999), but the likelihood of being granted an interview was increased when the previously mentioned barriers were reduced by the researcher.

Subjects in the newsletter sample were not randomized. Instead they were recruited from lists of recipients of programs for low-income individuals or from referrals from previous interviewees. Based on the demographic information obtained during the interviews, the sample, with only two women without at least one child, can be characterized as mostly unemployed, white and single, although some had live-in partners. Most had finished high school and were not currently enrolled in any classes.

The effectiveness of in-depth interviews depends in large part upon the skills of the interviewer. Both the nutrition aide and the researcher dressed casually to avoid making the subjects feel uneasy. Subjects appeared to feel comfortable and were open and communicative. The nutrition aide projected warmth, friendliness, and a sense of being comfortable in the subjects' homes. She listened attentively with sensitivity, and

conveyed genuine interest in their responses. The nutrition aide was able to keep the discussion on track and draw out the opinions of all interviewees. She was able to probe for greater depth of responses and did so without reacting to, and thereby influencing, opinions of participants. Because the nutrition aide had an adequate background of the subject matter under discussion, she was able to place comments in perspective and follow-up on critical areas of concern, often answering subjects' questions as they arose.

Determining subjects' *stages of change* was a requirement prior to sending the newsletters. We were successful at getting an even distribution of subjects among the three stages of change, with the *precontemplation/contemplation* and *action/maintenance* groups having two fewer subjects than the *preparation* group. It is interesting that the women in this sample were unlike the young adults in several other studies (Glanz et al., 1998, Betts et al., 1997, Keim, 1997, Block, 1991) in that they were very aware of the implications of dietary recommendations, and were willing to make changes. Even among the subjects staged in the *precontemplation/contemplation* stage of change, there was clearly expressed interest in the information set forth in the newsletters. Their interest in nutrition was inconsistent with research done by Betts et al. (1997). The importance subjects placed on increasing fruit and vegetables for assistance in weight management was counter to previous research by Glanz et al., (1998). However, current findings are in agreement with Georgiou et al. (1997) who reported young adult college students were interested in the health benefits of fruits and vegetables, food qualities like appearance and taste, and socioeconomic factors of availability and price. This result was

unexpected and may have been a result of their participation in Cooperative Extension nutrition programs.

This interest in health is also consistent with research on adult learners (Devine et al., 1998, Travers, 1997, Havighurst, 1970). Health events, the assumption of adult responsibilities, and parenthood propelled these women through the young adult stage quickly and influenced their food choices. The interaction of motherhood and nutrition education raised their levels of awareness to the consequences of inadequate nutrition. This group of women was also cognizant of their responsibility in shaping their own children's food habits (Treiman et al., 1996), and because of their expressed understanding of the importance of modeling, they were willing to modify fruit and vegetable intake. Their stated desire to be good role models supports adult learning theory that adult learning should help individuals conduct their responsibilities at a higher level of performance (Havighurst, 1970).

The purpose of the interviews was to elicit feedback regarding appearance and content of newsletters. The researcher and aide received favorable responses to the appearance of the newsletters and to the recipes. Occasional objections were voiced regarding some of the photographs of the characters chosen to represent different stages. Subjects also expressed negative feelings about a recipe created to minimize the after-effects of excessive alcohol consumption, reflective of their roles as mothers. There were, however, differences among the groups' informational needs. *Precontemplators/contemplators* and *preparers* expressed a desire for more practical knowledge, such as

purchasing and preparation information. It was almost as though they realized they required further nudging to make the required changes. Women in the *action/maintenance* group wanted more scientific information regarding benefits and disease prevention. Both groups supported Travers (1997) research that nutrition education be scientific, yet practical. It is important to note that the newsletters sent were based on staging for vegetables, which were observed to have numerous barriers, and not for fruits, which were perceived as being easier to purchase, prepare and eat.

Barriers notwithstanding, as the primary caretakers of their families, these women were interested in ways to nourish them. A favorite feature of each newsletter was its recipe. The characteristics these subjects found that made a recipe appealing like cost, taste, and ease of preparation were consistent with previous reports (Kilcast and Fillion, 2001, Glanz et al., 1998). While qualities such as flavor, appearance, and texture influenced recipe selection, those qualities were no more important than nutrition and weight control, which were repeatedly mentioned as primary reasons for increased fruit and vegetable consumption. Glanz et al. (1998) found taste to be the most important influence on food choice, and that nutrition and weight control were only secondary concerns. It is obvious that these young adults are responsible for food selection and preparation for themselves and, in most cases, children. These factors, combined with past food experiences, support Blades (2001) in the view that food selection is multifactorial.

Decisional balance, or the pros and cons of change, was also observed throughout the interviews. Consistent with previous research (Ling, 2000, Herrick et al., 1997) those in *precontemplation/contemplation* expressed more cons to increasing fruit and vegetable intake. Unlike those in *action/maintenance*, who could provide specific reasons for eating fruits and vegetables and shared numerous problem solving tips, *precontemplators/contemplators* acknowledged the benefits, but were unable to get past barriers.

Goal setting is a strategy frequently used in the change process (Cullen et al., 2001). The goal in the action stage is the prevention of relapse, and a key element in prevention is availability of alternatives. The substitution of healthful dietary behaviors for less healthy choices, a marker of the *action/maintenance* stage, was observed in many subjects (Greene et al., 1999). Some subjects used advanced planning and had substitutes prepared. Others acknowledged avoidance of situations where unhealthy choices were likely to be available. Subjects in *action/maintenance* had numerous strategies for successfully maintaining intake, avoiding pitfalls, and expressed greater interest in experimentation and the aesthetics of food preparation, especially when their actions resulted in a change of eating habits of a family member. Not surprisingly, women in the *action/maintenance* stage of stage, especially those with high vegetable consumption, recalled positive vegetable eating experiences in their upbringing. This positive attitude toward vegetable consumption combined with learned habits contributed to success. It was interesting to note that although all subjects were highly receptive to reminders to eat more vegetables, subjects in the *precontemplation/contemplation* stage more often

verbalized negative self-talk. Failure to meet goals was more deleterious to their progress, in contrast to those in *action/maintenance*, who accepted occasional lapses and were confident in their ability to regain control. Thus, *self-efficacy*, a core construct of TTM was observed most often in subjects in *action/maintenance*. When people recognize they are able to make choices, use self-control, and begin making commitments to eating more fruits and vegetables, they become empowered and progression through the stages of change can take place.

Finding that the subjects were exhibiting the *processes of change*, articulated throughout the in-depth interviews, was interesting and confirmed that these processes are used by young adults within the different stages of change. Previous researchers have found process use is low in *precontemplation* and increases with progress through the stages of change, peaking at *action* and then diminishing in *maintenance* (Prochaska et al. 1991). Consistent with previous research, fewer processes were used in the *precontemplation* stage (Greene et al., 1999). Subjects receiving *action/maintenance* newsletters made statements indicating they were using all of the processes of change.

While in-depth interviews provided an opportunity for the gathering of rich information, they were labor intensive. Travel to and from the subjects' homes frequently took considerable time, but was a format with which the nutrition aide was familiar. Because the nutrition aide was paid an hourly wage, the cost of the project was effected. Because the ideal location would have been quiet and separated from outside distractions, the researcher was at a disadvantage in going into subjects' homes. While subjects may have

felt very comfortable, there were frequent distractions caused by television, children, and other adults. In fact, one taped interview was indecipherable due to background noise. On one occasion, the interviewee appeared reluctant to let the nutrition aide and researcher in. Only through excellent interpersonal skills and persistence on the part of the nutrition aide did the interview occur. In addition, several trips were fruitless, with the subjects not at home. When called, they often rescheduled, only to be absent at the next appointed time. When time became a concern, the researcher and nutrition aide were required to seek referrals from other subjects. This challenge in getting respondents is not unlike that which occurs with focus groups, another qualitative method used to get this type of data (Betts et al., 1996).

CONCLUSIONS

Both food frequency instruments were feasible for use by telephone. The NC219 Food Frequency took longer to administer and resulted in higher reported intakes of fruits and vegetables than the NCI SCAN, both attributable to the differences in the survey instruments. Intakes of fruits and vegetables were higher as reported on NC219 Food Frequency compared to the NCI SCAN, but reported intakes from both surveys were higher than that typically reported by young adults. The most frequently eaten fruits and vegetables were fruit juice, salads, and a variety of vegetables, excluding French fries. Unlike other most other young adults, all subjects demonstrated an awareness of the health benefits of increased intakes of fruits and vegetables. Whatever their stages of change, subjects expressed a readiness to move forward. Feedback regarding the use of newsletters as an intervention for this population was highly positive. Subjects characterized them as being useful, appealing, and highly readable. In addition, subjects expressed a strong interest in gaining more information.

Based on these findings, it is important to remember that economically disadvantaged young adults with children are not displaying typical characteristics of 18-24 year old young adults. Instead, they have made a rapid transition into adulthood. The major impetus for these women was their desire to be good care-takers and role models for their children. Therefore, this perspective should be emphasized when developing nutrition education materials for economically disadvantaged young women.

In this study, the collaboration between a Cooperative Extension nutrition aide and a nutrition researcher resulted in meeting research objectives and gathering important data for the development of more effective nutrition education interventions for low-income young adults.

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APPENDICES

Appendix A

NC219 Food Frequency

Code # _____

Fruit and Vegetable Food Frequency

Time Start _____

- As you answer these questions about fruits and vegetables, think back over the PAST YEAR. Tell me HOW OFTEN, on average you eat each food. If you never eat a food, tell me *one time a month or less*. Using the list you wrote down, HOW OFTEN do you eat oranges and/or grapefruit? *(Mark answer)*
- For HOW MUCH, think about a tennis ball, which is about a medium serving. Is your usual serving closer to a medium, ½ medium or 1 ½ medium? *(Mark answer)*
- HOW OFTEN do you eat apples and/or applesauce? *(Mark answer)*
- HOW MUCH? closer to a medium, ½ medium or 1 ½ medium? *(Mark answer)*
- Bananas, HOW OFTEN? *(Mark answer)*
- HOW MUCH? *(Mark answer)*
- Peaches, nectarines, plums. *(Pause, mark answers; prompt with response options, as needed)*

Fruits	1 time a month or less	2-3 times a month	1 time a week	2 times a week	3-4 times a week	5-6 times a week	1 time a day	2 times a day or more	Your serving size		
									Small	Medium	Large
Orange, grapefruit									¼ medium	1 medium	1 ½ medium
Apple, applesauce									½ medium	1 medium	1 ½ medium
Banana									½ medium	1 medium	1 ½ medium
Peaches, nectarines, plums									½ medium	1 medium	1 ½ medium
The next two fruits have different amounts. HOW OFTEN do you eat _____? Is your usual serving size _____?											
Cantaloupe, honeydew melon									1/8 medium melon	¼ medium melon	½ medium melon
Watermelon (in season)									Small slice or wedge	Medium slice or wedge	Large slice or wedge
Think about a tennis ball, which is about a half-cup serving. Is your usual serving size 1/4 cup or less, about 1/2 cup or 3/4 cup or more? First tell me HOW OFTEN, using the list you wrote down and then HOW MUCH.											
Berries-strawberries, blueberries (in season)									¼ cup or less	About ½ cup	¾ cup or more
Other fresh fruits-grapes, pears, pineapple									¼ cup or less	About ½ cup	¾ cup or more
Dried fruits-raisins, prunes, apricots									¼ cup or less	About ½ cup	¾ cup or more
Fruit salad, canned fruits, fruit cocktail									¼ cup or less	About ½ cup	¾ cup or more
The last two fruits are 100% juices. Do not include drinks like Sunny D, Tang, Hi C, Koolaid, Lemonade, Snapple.											
100% orange juice									4 oz glass	6 oz glass	8 oz glass
Other 100% fruit juice-apple, grapefruit, cranberry									4 oz glass	6 oz glass	8 oz glass

Next, I'll ask you about vegetables. First tell me HOW OFTEN, using the list you wrote down. For HOW MUCH, is your usual serving size ¼ cup or less, about ½ cup or ¾ cup or more?

Vegetables	1 time a month or less	2-3 times a month	1 time a week	2 times a week	3-4 times a week	5-6 times a week	1 time a day	2 times a day or more	Your serving size		
									Small	Medium	Large
French fries, fried potatoes, hash browns									¼ cup or less	About ½ cup	¾ cup or more
Other potatoes (baked, mashed) and sweet									¼ cup or less	About ½ cup	¾ cup or more
Peas, green beans, lima beans									¼ cup or less	About ½ cup	¾ cup or more
Kidney beans, chili beans, etc.									¼ cup or less	About ½ cup	¾ cup or more
Carrots									¼ cup or less (5 mini)	About ½ cup (10 mini)	¾ cup or more (15 mini)
³ Broccoli, cauliflower, spinach, greens									¼ cup or less	About ½ cup	¾ cup or more
⁴ Pickles, onions, cucumber, celery, olives									¼ cup or less	About ½ cup	¾ cup or more
⁴ Tomato sauce, spaghetti sauce, barbecue sauce									¼ cup or less	About ½ cup	¾ cup or more
Some of the following vegetables have different amounts. Tell me HOW OFTEN, then I'll give choices of HOW MUCH.											
Green salad, lettuce									½ cup or less	About 1 cup	1 ½ cups or more
Tomatoes									½ medium	1 medium	1 ½ medium
Catsup, salsa									1/8 cup or less	About ¼ cup	½ cup or more
Vegetable soup/stew, vegetable drinks (V8)									½ cup or less	About ¾ cup	1 cup or more
Mixed veggies (frozen, canned, or in mixed foods such as pizza, taco, stir fry)									¼ cup or less	About ½ cup	¾ cup or more
Other vegetables (corn, peppers, coleslaw)									¼ cup or less	About ½ cup	¾ cup or more

1 If questioned, say, "Would the banana fit into a tennis ball?"

2 If questioned, say, "Think about a tennis ball, which is about a half-cup serving. Is your serving size smaller or larger?"

3 If questioned, say, "These include cooked greens like collard, beet, and kale."

4 If questioned, say, "Base your choice on the food you eat most."

Time Stop _____

Appendix B

NCI SCAN

NIH/NCI Fruit and Vegetable Scan

Instructions

Think about what you usually ate last month.
 Please think about all the fruits and vegetables that you ate last month. Include those that were:
 -raw and cooked,
 -eaten as snacks and at meals,
 -eaten at home and away from home (restaurants, friends, take-out); and
 -eaten alone and mixed with other foods.

- Tell me how many times per month, week or day you ate each food, and if you ate it, how much you usually had.

1. Over the last month, how many times per month, week or day did you drink **100% fruit juice** such as orange, apple, grape or grapefruit juice? **Do not count** fruit drinks like Kool-Aid, lemonade, Hi-C, cranberry juice drink, Tang and Twister. Include juice you drank at all mealtimes and between meals.

Never (Go to Question 2)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
-----------------------------------	-------------------------	-----------------------	-----------------------	-----------------------	-------------------	--------------------	--------------------	--------------------	-------------------------------

- 1a. Each time you drank **100%** juice, how much did you usually drink?

less than $\frac{1}{4}$ cup (less than 6 ounces)	$\frac{1}{4}$ to $1\frac{1}{4}$ cup (6 to 10 ounces)	$1\frac{1}{4}$ to 2 cups (10 to 16 ounces)	more than 2 cups (more than 16 ounces)
---	---	---	---

2. Over the last month, how many times per month, week or day did you eat **fruit**? Count any kind of fruit-fresh, canned, and frozen. **Do not count** juices. Include fruit you ate at all mealtimes and for snacks.

Never (Go to Question 3)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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- 2a. Each time you ate **fruit**, how much did you usually eat?

Less than one medium fruit	1 medium fruit	2 medium fruits	More than 2 medium fruits
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OR

Less than $\frac{1}{2}$ cup	About $\frac{1}{2}$ cup	About 1 cup	More than 1 cup
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3. Over the last month, how often did you eat **lettuce salad (with or without other vegetables)**?

Never (Go to Question 4)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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3a. Each time you ate **lettuce salad**, how much did you usually eat?

Less than ½ cup	About 1 cup	About 2 cups	More than 2 cups
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4. Over the last month, how often did you eat **French fries or fried potatoes**?

Never (Go to Question 5)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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4a. Each time you ate **French fries or fried potatoes**, how much did you usually eat?

small order or less (about 1 cup or less)	Medium order (About 1 ½ cups)	Large order (About 2 cups)	Super size order or more (About 3 cups or more)
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5. Over the last month, how often did you eat **other white potatoes**? Count **baked, boiled, and mashed potatoes, potato salad, and white potatoes that were not fried**.

Never (Go to Question 6)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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5a. Each time you ate **these potatoes**, how much did you usually eat?

1 small potato or less (1/2 cup or less)	1 medium potato (1/2 to 1 cup)	1 large potato (1 to 1 ½ cups)	2 medium potatoes or more (1 ½ cups or more)
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6. Over the last month, how often you eat **cooked dried beans**? Count **baked beans, bean soup, refried beans, pork and beans and other bean dishes**?

Never (Go to Question 7)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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6a. Each time you ate **these beans**, how much did you usually eat?

Less than ½ cup	½ to 1 cup	1 to 1 ½ cup	More than 1 ½ cups
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7. Over the last month, how often did you eat **other vegetables**?

- DO NOT COUNT:**
- Lettuce salads
 - White potatoes
 - Cooked dried beans
 - Vegetables in mixtures, such as sandwiches, omelets, casseroles, Mexican dishes, stews, stir fry, soups, etc.

- COUNT:**
- All other vegetables—raw, cooked, canned, frozen

Never (Go to Question 8)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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7a. Each of these times that you ate **other vegetables**, how much did you usually eat?

Less than ½ cup	½ to 1 cup	1 to 2 cups	More than 2 cups
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8. Over the last month, how often did you eat **tomato sauce**? Include **tomato sauce on pasta or macaroni, rice, pizza, and other dishes**.

Never (Go to Question 9)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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8a. Each time you ate **tomato sauce**, how much did you usually eat?

About ¼ cup	About ½ cup	About 1 cup	More than 1 cup
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9. Over the last month, how often did you eat **vegetable soups**? Include **tomato soup, gazpacho, beef with vegetable soup, minestrone soup, and other soups made with vegetables**.

Never (Go to Question 10)	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
------------------------------------	-------------------------	-----------------------	-----------------------	-----------------------	-------------------	--------------------	--------------------	--------------------	-------------------------------

9a. Each time you ate **vegetable soup**, how much did you usually eat?

Less than 1 cup	1 to 2 cups	2 to 3 cups	More than 3 cups
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10. Over the last month, how often did you eat **mixtures that included vegetables**? Count such foods as **sandwiches, casseroles, stews, stir-fry, omelets, and tacos**.

Never	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
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Appendix C

Nutrition Aide Telephone Protocol for Recruitment for Telephone Surveys

Nutrition Aide's Protocol for Telephone Surveys

Hello, this is Julie Prevost-Lucci, Nutrition Aide for Cooperative Extension,

May I speak to _____.

(If not at home, ask for a convenient time to call and record date/time _____).

(When the person is on the line)

I am calling to ask for your participation in a research study. We in Cooperative Extension and researchers at the University of Maine are working together on a project to improve nutrition education materials. If you are willing to participate, you will be called on the phone and asked to complete a survey about the fruits and vegetables you eat. The researchers want to test two different survey forms to find out which works better over the phone.

The caller will ask you questions like "How often and how much on the average do you eat apples?" There will also be some questions about you and your health habits.

Your name will be kept confidential. When the information you give is reported, it will be combined with information received from other young adults like you. The survey will take approximately 30 minutes and you will be paid \$10.00 for your participation. Except for your time, no risks are likely. Are you willing to participate in the study?

(If no) Thank you. Good bye.

(If yes) I will give your name, address and telephone number to the researcher. When will be a convenient time for her to call?

(Record dates/times) _____

You can expect a call from 581-3301 or 829-3077.

Thank you.

Appendix D

Food Frequency Survey Tracking Form

Food Frequency Survey Tracking Form

Name	Telephone Number	Calling Time	1st survey to be used	Time Begun	Time Ended	Time Begun	Time Ended

Appendix E
Demographic Form

Demographic Form

Code # _____

1. Current height _____ ft. _____ in.

2. Current weight? _____ lb

3. How satisfied are you with your current weight?

_____ very satisfied _____ satisfied _____ neutral _____ unsatisfied _____ very unsatisfied

4. How old are you? _____ years

5. Do you live in a _____ city _____ suburb _____ rural area?

6. What is your gender? _____ male _____ female

7. Total number in your household or living space including yourself _____

8. Are you married/living with a partner? _____ No _____ Yes

9. Are there any children in your household? _____ No _____ Yes. If yes, how many children _____?

10. Are you currently enrolled as a student?

_____ full time student _____ part time student _____ not currently a student

11. What is the highest level of education that you have **completed**?

_____ elementary school or some high school

_____ high school graduate/GED

_____ some technical, business or vocational school or college, but no college degree

_____ college graduate

12. What is your race or ethnic group?

_____ White (not of Hispanic origin)

_____ Black (not of Hispanic origin)

_____ Hispanic/Latino

_____ American Indian/Alaska Native

_____ Asian/Pacific Islander

_____ Other

13. Times a week you eat breakfast? _____

14. Times a week you eat a meal or snack at a fast food restaurant? _____

15. Do you smoke cigarettes? _____ No _____ Yes. If yes, how many a day _____?

16. Do you drink alcoholic beverages? _____ No _____ Yes.

If yes, how many drinks per week? _____ (one drink = 12 oz beer, 5 oz wine, 1 shot liquor)

Appendix F

Researcher's Telephone Survey Protocol

Researcher's Protocol for Telephone Administration of Food Frequencies

Hello, may I speak to _____? (When on line) My name is Beth Williams, and I'm calling from the Food Science and Human Nutrition Department at the University of Maine. Julie Prevost-Lucci, the Nutrition Aide, gave me your name because you indicated you were willing to participate in a survey we are conducting. Is this a convenient time for you to speak with me?

(If no) May I call you at another time?

_____ **If No.**

Thank you, good bye.

_____ **If Yes**

What would be a good time? _____ (date, time to return call)

Thank you, good bye.

(If yes) Let me review that the purpose of this phone call is to test two different surveys about fruits and vegetables. I'm testing these forms to see which works better for use over the phone. I am also interested in the fruits and vegetables you eat. I'll also ask you some questions about yourself and your health habits, such as the number of times each week you eat breakfast, whether you smoke cigarettes, and whether there are children in your household. It will take approximately 30 minutes to complete both surveys.

Your participation is voluntary. You may skip any questions you do not wish to answer or you may stop at any time. When the information you give is reported, your name will not be used and the information will be combined with that of other young adults like yourself. Except for the time involved, there is no risk to you. For your protection, the information you give will be stored in a locked cabinet and destroyed at the end of the study in five years. You'll receive a \$10.00 check in the mail within the next three weeks for completing the survey.

Do you have questions about what Julie told you about our research project?

Wait, respond to questions.

Please get paper and a pencil handy to write down the choices of answers.

Wait for the person to get paper and pencil.

Start the timer.

Let's begin. I'll mention a fruit or vegetable. I'd like to know how often you eat the food and the usual amount you eat. The items have many categories. Please write down these different choices as I say them.

Alternate the order of the instruments; check the form completed first.

_____ Fruit and Vegetable Food Frequency

_____ Fruit and Vegetable SCAN

There are 8 categories.

There are 10 categories.

Read the following phrases corresponding to the survey form, pausing to give the person time to write them down.

Fruit and Vegetable Food Frequency	SCAN
	<i>Never</i>
<i>1 time a month or less</i>	<i>1-3 times last month</i>
<i>2-3 times a month</i>	<i>1-2 times per week</i>
<i>1 time a week</i>	<i>3-4 times per week</i>
<i>2 times a week</i>	<i>5-6 times per week</i>
<i>3-4 times a week</i>	<i>1 time per day</i>
<i>5-6 times a week</i>	<i>2 times per day</i>
<i>1 time a day</i>	<i>3 times per day</i>
<i>2 times a day or more</i>	<i>4 times per day</i>
	<i>5 or more times per day</i>

Please read the list back to me so I am sure we have everything correct.

Thank you.

Go to selected survey instrument. *Begin Survey*

Upon completion of the first instrument:

Stop timer and record time _____.

(Time is recorded on this laminated form and erased after it is transferred to tracking/data form for record keeping.)

Start timer.

For the second survey the frequency choices are similar, but you'll notice slight differences. Write down these choices.

There are 8 categories.

There are 10 categories

Fruit and Vegetable Food Frequency	SCAN
	<i>Never</i>
<i>1 time a month or less</i>	<i>1-3 times last month</i>
<i>2-3 times a month</i>	<i>1-2 times per week</i>
<i>1 time a week</i>	<i>3-4 times per week</i>
<i>2 times a week</i>	<i>5-6 times per week</i>
<i>3-4 times a week</i>	<i>1 time per day</i>
<i>5-6 times a week</i>	<i>2 times per day</i>
<i>1 time a day</i>	<i>3 times per day</i>
<i>2 times a day or more</i>	<i>4 times per day</i>
	<i>5 or more times per day</i>

Please read the list back to me so I'm sure we have everything correct.

Go to selected survey instrument. *Begin Survey*

Stop timer and record time_____.

Now I would like to ask you some information about yourself and your health habits.

Go to demographic form.

We are finished with the surveys. Thank you for participating in this study. May I please confirm your address (review tracking form for accuracy)? You should receive your check within three weeks. If you have any questions about this survey, please contact me at beth.williams@umit.maine.edu or at (207) 581-3301.

Appendix G

Nutrition Aide Protocol for Recruitment for Interviews

Nutrition Aide Protocol for Recruitment for Interviews

Hello, this is Julie Prevost-Lucci, Nutrition Aide for Cooperative Extension,

May I speak to _____.

(If not at home, ask for a convenient time to call and record date/time _____).

(When the person is on the line)

I am calling to ask for your participation in a research study. We in Cooperative Extension and researchers at the University of Maine are working together on a project to improve nutrition education materials. Our specific interest is fruit and vegetables. We want our newsletters to be designed with you and young adults like you in mind. If you are willing to take part in the project, I will send you a newsletter to review and set up a time for you to come to the extension office for an interview. The interview will take about 40 minutes and you will be paid \$25.00 for your time and effort.

I will ask you questions such as “What was your initial reaction to the newsletter?” and “What kinds of barriers keep you from eating more fruits and vegetables?” Here are a few specific things about how I will save the information you give me. I will audiotape the session, but your name will not be recorded and your identity will be kept confidential. Copies of the tapes will be kept at the University of Maine in a locked cabinet and destroyed at the end of our project which is in five years. When the information you give is reported, it will be combined with that of other young adults.

Your comments will be helpful as we design newsletters about fruits and vegetables for young adults. In order to know which newsletter to send you for review, I will ask you a few questions to find out how ready you are to start eating more vegetables.

Are you willing to participate?

(If No) Thank you.

(If YES) That's great. Thank you.

Read Staging Algorithm

Thank you. Let me confirm your address. (Make changes on the Tracking Form for Subjects of In-depth Interview)

My research partner at the University of Maine is Beth Williams. She and I will be at the interview with you. I would like Beth to send you the newsletter. May I give your name and address to her, please? You should receive the newsletter in the mail within the week. Reading the newsletter before you come to the interview may help you answer the questions I will ask. I will give you time to read through the newsletter again when you come to the session.

What will be a convenient date and time for you to come the Extension office for the interview?

Do you need directions? (Give directions).

If you need to change your appointment or if you change your mind, please contact me at the Extension office (1-800-287-1471) or contact Beth at beth.williams@umit.maine.edu or at (207) 581-3301.

Appendix H

Staging Algorithm

Staging Algorithm for Vegetables

All subjects will be staged on vegetables to determine which stage of change newsletter they will receive.

Directions: Ask the subject the following questions. Mark the appropriate boxes.

How many servings of vegetables do you usually eat each day?	
<input type="checkbox"/> Zero <input type="checkbox"/> One <input type="checkbox"/> Two	<input type="checkbox"/> Three <input type="checkbox"/> Four <input type="checkbox"/> Five or more
(If you answered between "zero" or "two" above, go to the question below)	(If you answered between "three" and "five or more" above, go to the question below.)
<div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">↓</div> <div style="text-align: center;">↓</div> </div>	
Do you intend to start eating 2 or more servings a day of vegetables?	Have you been eating 3 or more servings a day of vegetables for more than 6 months?
<input type="checkbox"/> No, I do NOT intend to in the NEXT 6 MONTHS <input type="checkbox"/> Yes, I intend to in the NEXT 30 DAYS <input type="checkbox"/> Yes, I intend to in the NEXT 6 MONTHS	<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <input type="checkbox"/> Less than 6 months <input type="checkbox"/> More than 6 months </div> <div style="flex: 1; text-align: center; font-size: 2em; margin: 0 10px;">➔</div> <div style="flex: 2;"> Do you intend to eat more vegetables in the next 6 months? <input type="checkbox"/> No <input type="checkbox"/> Yes ➔ In the next 30 days? <input type="checkbox"/> No <input type="checkbox"/> Yes </div> </div>

Stage classification

0-2 servings of vegetables

No, I do NOT intend to in the NEXT 6 MONTHS --- Precontemplation

Yes, I intend to in the NEXT 30 DAYS --- Preparation

Yes, I intend to in the NEXT 6 MONTHS --- Contemplation

3-5 or more servings of vegetables

Less than 6 MONTHS --- Action

More than 6 MONTHS --- Maintenance

Subject's Stage _____.

Appendix I

Newsletter Prototype



MAINE

AL IA KS ME MI NE NY OR RI SD WI

Ready to Eat More Fruits and Vegetables

Eating healthy means eating 5 or more servings of fruits and vegetables a day (at least 2 servings of fruit and 3 of vegetables). Based on your answers in your recent survey, you're planning to start eating five servings of fruits and veggies a day very soon. That's great!

Meet Jake and Lauren

Lauren is going to a community college and living at home with her parents.



Jake is a sales representative who is always on the go.

Lauren: "I've thought about why I should eat more fruits and vegetables and I've already started drinking a glass of 100% fruit juice at breakfast. I think I can do this."

Jake: "I want to eat healthy. I've tried eating more vegetables here and there, but I just don't have the time. Can't talk, gotta run."

FVP I

Experimenting... One Step at a Time

An important part of making a change, no matter how small, is to set a realistic goal. Start by answering this question:

Right now, I usually eat ___ servings of fruits and veggies a day.

The Goal of the Month...



JUST DO IT!!!

The goal this month is to increase that number by one. That is, if you are eating only 2 servings a day, boost it to 3 servings of fruits and vegetables a day. Make a promise to yourself.

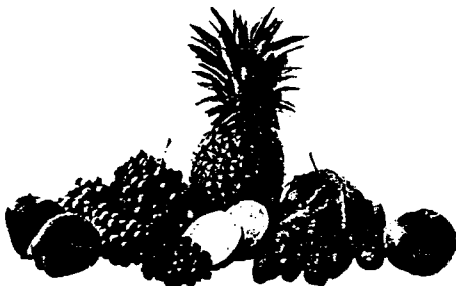
Today I will eat ___ servings of fruits and vegetables.

Next, we'll show you some ways to meet, even exceed this goal!

The Four Steps...

There are 4 Steps for Eating More Fruits and Vegetables that you can use:

1. Drink at least one glass of 100% fruit juice each day.



Sounds simple enough doesn't it? But don't be fooled by something that says 100% natural. Guess what - sugar is 100% natural! So is dirt!

Learn to read the labels! You may think that you're drinking fruit juice, but if you read the label you will find you have been drinking water, sugar and other additives with a little fruit juice thrown in. Experiment with different kinds of juices. Try grape, orange, apple, and cranberry. Drink a little more of your favorite juice each day. Just make sure it's 100% juice.



2. Eat at least 2 vegetables with your main meal.

- Plan to add a favorite vegetable as a side dish.
- Try a small salad with lettuce and at least one other vegetable.
- Eat a potato.
- Get a recipe from a friend for a vegetable dish that you enjoyed or search the web for one that looks good to you.

3. Eat at least 1 vegetable or fruit as a snack at least once a day.

- Try applesauce or carrots.
- Combine your favorite fruit with milk in the blender for a fruit smoothie!

4. Add fruits and vegetables to other foods.

- Add an extra carrot, celery or onion to soup or stew.
- Add fruits and extra vegetables to a salad.
- Add some vegetables into foods like macaroni and cheese.
- Order a pizza with vegetables.

Try this easy recipe:

Macaroni and Cheese with Broccoli

- 1 box of Mac and Cheese
 - 1 package (10 oz) chopped frozen broccoli
- (Any of your favorite veggies can work)

Prepare macaroni and cheese according to directions on the box. Cook broccoli in microwave in covered bowl for about six minutes until done. Stir both together and enjoy!

It's that simple to prepare a meal that is packed with vitamins and minerals!



Make a small change this week! Small changes add up to commitment. Make a promise to yourself. "I will start eating one more serving a day this week, two more next week until I reach 5 a Day."

Appendix J

Consent and Interview Questions

Consent and Interview Questions

The purpose of this interview is to have you read and to answer some questions about the newsletters. The purpose of this project is to learn what is acceptable, appealing, and useful to you in a newsletter. Your suggestions for improving the newsletters will be considered for use in other newsletters that we hope will provide information that will make it easier for people like you to eat more fruits and vegetables.

Participation is voluntary. If you choose to take part in this survey, you may stop at anytime during the interview, without loss of benefits. You may skip any questions you do not wish to answer. You will be paid \$25.00 for your participation in this project. Your voluntary participation in this interview implies consent.

If you have any questions about this survey, please contact Beth at beth.williams@umit.maine.edu or at (207) 581-3301. You may also reach her faculty advisor, Adrienne White, Ph.D., at (207) 581-3134. If you have any questions about your rights as a research participant, please contact Gayle Anderson, Assistant at the University of Maine's Protection of Human Subject Review Board at (207) 581-1498. When we are finished with the interview, Beth will leave you a printed sheet with all this information on it.

(Based on the subject's previously determined stage of change, begin the interview, asking the appropriate set of questions.)

Precontemplation/Contemplation Stage

- | | |
|-------------------|--|
| Key | <p>1. What was your initial reaction to the newsletter?</p> <p style="padding-left: 20px;">Probe: Did you read it?</p> <p>2. What caught your eye when you first opened the newsletter?</p> <p>3. What part or parts of the newsletter did you find interesting?</p> <p style="padding-left: 20px;">• Probe: How did you feel about the overall design?
 How did you feel about the length of the newsletter?
 Too much, not enough?
 How about the recipes? What do you look for in a recipe?
 (i.e., easy to prepare, 5 or less ingredients, etc).
 How about any of the quizzes?</p> <p>4. What part or parts of the newsletter did not seem interesting or important?</p> <p>5. Did the information in this newsletter <i>motivate</i> you to think differently about eating more fruits and vegetables?</p> |
| Transition | <p>6. If you wanted to find out more about fruits and vegetables because you are <i>thinking</i> about including them in your diet, what would <i>you</i> like to know?</p> <p>7. What would be the best way to get this information to you?</p> <p style="padding-left: 20px;">Probe: How do you feel about getting a newsletter in the mail?
 Where do you normally go to find nutrition information?
 Do you look for information at the grocery store?
 What about the fruit and vegetable section.</p> |
| Key | <p>8. What kinds of barriers keep you from eating more fruits and vegetables? (i.e., cost, taste, convenience, habit, availability)</p> <p style="padding-left: 20px;">Probe: Think back when you were growing up, what do you remember about eating fruits and vegetables? What's different today?</p> <p>9. What might be some reasons to include more fruits and vegetables in your diet?</p> |
| Ending | <p>We are trying to learn more about ways to provide nutrition information on fruits and vegetables to your age group that will be helpful. What additional advice do you have for us?</p> <p>If we needed to follow up with you in a few months, what would be the best way to reach you?</p> |

Preparation Stage

- | | |
|-------------------|---|
| Key | <p>1. What was your initial reaction to the newsletter?</p> <p>Probe: Did you read it?</p> <p>2. What caught your eye when you first opened the newsletter?</p> <p>4. What part or parts of the newsletter did you find interesting?</p> <p>Probe: How did you feel about the overall design?
 How did you feel about the length of the newsletter?
 Too much, not enough?
 How about the recipes? What do you look for in a recipe?
 (i.e., easy to prepare, 5 or less ingredients, etc.)
 How about any of the quizzes?</p> <p>4. What part or parts of the newsletter did not seem interesting or important?</p> <p>5. Did the information in this newsletter <i>motivate</i> you to think differently about eating more fruits and vegetables?</p> |
| Transition | <p>6. If you wanted to find out more about fruits and vegetables because you are <i>seriously thinking</i> about including more in your diet, what would <i>you</i> like to know?</p> <p>7. What would be the best way to get this information to you?</p> <p>Probe: How do you feel about getting a newsletter in the mail?
 Where do you normally go to find nutrition information?
 Do you look for information at the grocery store?
 What about the fruit and vegetable section?</p> |
| Key | <p>8. What kinds of barriers keep you from eating more fruits and vegetables? (i.e., cost, taste, convenience, habit, availability)</p> <p>Probe: Think back when you were growing up, what do you remember about eating fruits and vegetables? What's different today?</p> <p>10. What are reasons why you believe fruits and vegetables are important in the diet?</p> |
| Ending | <p>We are trying to learn more about ways to provide nutrition information on fruits and vegetables to your age group that will be helpful. What additional advice do you have for us?</p> <p>If we needed to follow up with you in a few months, what would be the best way to reach you?</p> |

Action/Maintenance Stage

Key	1. What was your initial reaction to the newsletter?
	Probe: Did you read it?
	2. What caught your eye when you first opened the newsletter?
	5. What part or parts of the newsletter did you find interesting?
	Probe: How did you feel about the overall design? How did you feel about the length of the newsletter? Too much, not enough? How about the recipes. What do you look for in a recipe? (i.e., easy to prepare, 5 or less ingredients, etc.) How about any of the quizzes?
Transition	4. What part or parts of the newsletter did not seem interesting or important?
	5. Did the newsletter provide any information about fruits and or vegetables that you hadn't heard before?
	6. If you wanted some <i>extra tips</i> on eating fruits and vegetables what would you like to know?
	7. What would be the best way to get this information to you?
	Probe: How do you feel about getting newsletters in the mail? Where do you normally get nutrition information? Do you look for information at the grocery store? What about the fruit and vegetable section?
Key	8. What <i>makes it easy</i> for you to eat fruits and vegetables everyday?
	Probe: Think back when you were growing up, what do you remember about eating fruits and vegetables? Is anything different today?
	9. What do you think are the benefits of eating fruits and vegetables everyday?
Ending	We are trying to learn more about ways to provide nutrition information on fruits and vegetables to your age group that will be helpful. What additional advice do you have for us? If we needed to follow up with you in a few months, what would be the best way to reach you?

BIOGRAPHY OF THE AUTHOR

Beth Williams was born in Bar Harbor, Maine, raised in Rumford, Maine and is now living in Cumberland Center, Maine. She graduated from Stephens High School, and attended Boston University before marriage and the birth of three children, Erin, Stephen, and David. She subsequently earned undergraduate and graduate degrees in education at the University of Southern Maine and taught elementary school for twelve years before returning to the University of Maine to study human nutrition. Since beginning the program, she has become the grandmother of Annabelle, Natalie, and Christopher. She is a member of Phi Kappa Phi, Kappa Omicron Nu, and Phi Tau Sigma Honor Societies. Professional organizations include the American Dietetic Association, Maine Dietetic Association, Society for Nutrition Education, and Maine Nutrition Council. She is a candidate for the Master of Science degree in Food Science and Human Nutrition from The University of Maine in May, 2003.