

Chapter 3: Materials and Methods

Study Design

The experimental design of this study utilized two groups: an experimental group that received video lessons with follow-up phone calls and intermittent home visits (Video Instruction Group) and a control group that received instruction via traditional face-to-face or small group methods (Traditional Instruction Group). Both groups were involved in the following three phases:

1. A pre-intervention baseline assessment phase during which face-to-face interviews were conducted by Program assistants (PAs) to collect demographic data and dietary recalls and complete the Pennsylvania State Behavior Checklist.
2. A four month intervention phase during which subjects received either video or traditional instruction.
3. A post-intervention phase during which face-to-face interviews were conducted by the PAs to collect demographic data and dietary recalls, and complete the Pennsylvania State Behavior Checklist. In addition, the Video Instruction Group answered questions on a Video Perception Survey.

At the end of the study, the participating PAs completed a short questionnaire regarding their perceptions of the effectiveness of using video lessons with low-income homemakers and the relative “ease of administration.” The cost of video lessons was also calculated upon completion of the intervention. The timeline for the study is illustrated in [Appendix K](#).

Study Population and Sample Selection

Permission to conduct this study was obtained from the Virginia Polytechnic Institute & State University’s Institutional Review Board for Research Involving Human Subjects. Homemakers newly enrolled in EFNEP or SCNEP that met eligibility criteria were asked to participate in the study. Eligibility criteria for this study were:

- eligible for the Food Stamp Program (FSP)
- non-pregnant
- newly enrolled in EFNEP or SCNEP
- current access to a telephone

- current possession of a functional VCR in the home

Since lessons on maternal and infant feeding were not appropriate for all participants, these lessons were not included in the study. Considering the importance of these lessons to maternal and infant health, pregnant homemakers were excluded. In order to specifically look at differences in the amount of change in food behaviors and dietary intake due to lesson delivery method, the content of each lesson was identical for all participants and only the delivery method of the lessons (traditional or video) differed between groups. Based upon the typical time required to deliver lessons in EFNEP, it was determined that no more than twelve lessons could be delivered in a four-month period (one lesson per week).

In order to eliminate the potential differences between groups as a result of VCR ownership and telephone access that could make interpretation of the impact of video lessons on dietary intake and food behaviors difficult, all participants were required to have a working VCR in the home and access to a telephone. Homemakers with access to a public telephone or a friend or family's telephone, which believed they could make contact with the PA in this manner, were included in the study. Only homemakers that had not received any previous lessons via EFNEP or SCNEP and were eligible to participate in the FSP were allowed to participate in the study.

From October 1, 1996 to February 28, 1997, 105 homemakers were recruited from five rural and five urban areas: Charlotte, Washington, Wise, Scott, Appomattox, Lynchburg, Suffolk, Virginia Beach, Richmond, and Prince William County respectively. These areas were chosen by looking at a map of Virginia (see [Appendix A](#)) and, then, selecting counties/cities that (1) had not recently taken part in another research study; (2) were believed to be representative of the state's population (both geographically and demographically); and (3) had an existing EFNEP or SCNEP program in operation within the area. During this time period, PAs kept track (see [Appendix L](#)) of the number of enrolled homemakers that owned VCRs and had telephone access in order to better gauge the prevalence of VCR ownership and telephone access in these areas. During recruitment, the objectives of the study were explained by PAs to the participants and the participants were asked to sign an informed consent form (see [Appendix M](#)). The participants were assured that all information relating to him/her, specifically, would be confidential.

Study participants were randomly assigned to either the Traditional Instruction Group (n = 54) or Video Instruction Group (n = 51). As homemakers agreed to participate in the study, they were assigned consecutive numbers. All participants assigned even numbers were placed in the Traditional Instruction Group and all participants with odd numbers were placed in the Video Instruction Group.

Intervention

Each group received a series of twelve lessons over a four-month period. While efforts were made to deliver one lesson per week to all participants, environmental and personal (didn't reasons (e.g., snow, illness, didn't have time to watch the video lesson) resulted in rescheduling and adjustment of the timeline accordingly. However, this is consistent with the delivery patterns of lessons in the EFNEP program.²⁰

The Traditional Instruction Group received twelve lessons via face-to-face instruction in the home or small groups that were held at area EFNEP or SCNEP offices, Head Start, or community rooms in housing complexes. Traditional lessons utilized a pictorial flip chart with an accompanying script that guided the discussion. Optional hands-on activities were included in the lesson based upon the participant's interest and need.

The Video Instruction Group received twelve video lessons combined with follow-up telephone discussions and intermittent home visits. PAs left three videos with the participants during the initial assessment visit. The participants receiving video instruction were asked to watch one video lesson per week and then discuss the lesson by telephone with the PA. The PA and the study participant arranged times during which the participant could be contacted or (if no telephone was available in the home) the participant could call the PA. During the phone discussions, PAs answered the participant's questions regarding the video lesson, encouraged hands-on experiences typically done during the traditional face-to-face visit, and asked questions to ensure the participant's understanding of the material. Standard sets of prepared questions were used by the PAs to guide the telephone discussions (see [Appendix N](#)). The standardized question sets were developed by examining the dialogue accompanying videos and flip charts for questions asked in the scripts which would facilitate discussion of a topic with the homemaker. Printed materials provided to EFNEP clients during traditional instruction were distributed with the videos. The PAs visited the homes of participants receiving video lessons at: (1) the initial assessment visit, (2) following the viewing of every third lesson, and (3) at the final assessment visit. Visits following the viewing of three lessons enabled the PA to leave the next three video lessons, retrieve previous lessons, and allowed the PA and participant to engage in a hands-on activity (e.g., preparing a recipe) designed to reinforce principles taught in one of the previous three lessons. These hands-on activities were the same as those normally completed during the traditional home visits.

Compliance

In order to determine if videos were actually watched, each participant was asked to record the date they viewed each video on the video labels (see [Appendix O](#)). The PA then recorded these dates in the participant's lesson log (see [Appendix P](#)). Attendance of a participant in the Traditional Instruction Group at either small group meetings or home-visits was also

recorded by the PA in the lesson logs. A compliance score was then generated for each participant by totaling the number of lessons received.

Lessons

Participants in the Video Instruction Group and the Traditional Instruction Group received twelve lessons. The content of the lessons was identical for each group, and lessons differed only in the means of delivery (via flip chart or videotape). The traditional instruction employed the *Eating Right Is Basic*, 3rd edition (ERIB-3), lesson series,⁷⁵ developed by Michigan State Extension, which is the current curriculum used in Virginia's EFNEP. This lesson series enlisted the PA to discuss the lesson topic aided by a scripted flip chart with pictures corresponding to the lesson. The video lessons consisted of a video version of the ERIB-3 lesson series,⁷⁵ also designed by Michigan State Extension. The video version portrayed a video picture of the flip chart illustrations and was narrated by a female voice (speaker is not pictured in the video). The script for the video lessons were identical to that provided for use with the flip chart. The lessons that were covered in both groups included:

1. **Starting With the Basics: Food Equipment and Knowledge-** Discusses planning a meal, using available foods, identifies pieces of equipment for preparing food and common household items that can be substituted for certain pieces of equipment, how to follow a simple recipe, measure dry and liquid ingredients accurately, and ways to prevent accidents in the kitchen.
2. **The Food Guide Pyramid-** Focuses on the five food groups of the Food Guide Pyramid, foods from plants as sources of dietary fiber, nutrients in each food group, and why fats oils & sweets should be used sparingly in the diet.
3. **Understanding Food Labels-** Shows and explains nutrition labels on food products, the amount of one serving in common household measures using Nutrition Facts on a food label, how to compare food values using the Percent Daily Value, using the food label to tell the ingredients in the food, and explains definitions for nutrient claims on the label.
4. **Planning Makes a Difference-** Describes the benefits of planning menus, including a variety of foods in daily and weekly menus, planning to cook extra food for lunches and meals on busy days, incorporating grocery specials in menus, planning to have healthy snacks for children and adults in menus, and making shopping lists for foods on menus.
5. **Making the Most of Your Food Dollars-** Discusses reasons for making shopping lists, ways grocery stores tempt buyers to purchase goods, comparing prices and identifying the best buys, and how some items (condiments, spices) can affect a food budget.

6. **Keeping Food Safe-** Identifies two common symptoms of food borne illness, the role of heat and cold in keeping foods safe, safe ways to keep baby formula, safe ways to thaw meat, poultry and fish, describes signs of thoroughly cooked meat poultry and fish, ways to keep food from being contaminated, ways to store food safely, and what to do with spoiled food.
7. **The Bread, Cereal, Rice, and Pasta Group-** Focuses on foods in this group as sources of carbohydrates and fiber, the recommended number of servings needed daily, ways to incorporate these foods into daily menus, ways to save money when buying breads and cereals, and preparing and storing these foods safely.
8. **The Vegetable Group-** Identifies vegetables as good sources of fiber and vitamins, states the recommended number of vegetable servings need daily, ways to save money when buying vegetables, and planning and storing vegetables for optimal quality.
9. **The Fruit Group-** Discusses fruits as good sources of fiber and vitamins, the recommended number of servings in this group needed daily, incorporating fruits into menus, ways to save money when buying fruits, and storing fruit properly.
10. **The Milk, Yogurt and Cheese Group-** Gives examples of foods in this group, identifies these foods as good sources of calcium and protein, states the recommended servings in this group needed daily, ways to incorporate at least two servings from this group into daily menus, storing these foods safely, and ways to save money when buying milk, yogurt, and cheese.
11. **The Meat, Poultry, Fish, and Eggs Group-** Identifies foods in this group as good sources of iron and protein, state the recommended number of servings needed daily, ways to incorporate two servings from this group into daily menus, identifies beans as a low-cost protein and iron source, how to prepare dry beans, preparing and storing foods in this group safely and ways to save money when buying these foods.
12. **Breakfast- A Healthy Way to Start the Day-** states why breakfast is important, identifies a variety of foods from the five food groups that can be eaten for breakfast, describe quick breakfast ideas for busy mornings.

The video lessons had a run-time ranging from approximately five to eight and a half minutes. Handouts, designed at a 5th grade reading level, accompanied both video and traditional lessons.

Program Assistants (PAs)

Twelve PAs administered both the traditional instruction and video lessons. All PAs had participated in Virginia EFNEP's or SCNEP's standardized PA training programs.²⁰ PAs were also trained by the investigator in the use of video lessons, conducting follow-up phone discussions, the use of the Pennsylvania State Family Behavior Checklist, 24-hour recalls, and the Video Perception Survey during a one-day session at local EFNEP offices or via telephone conferencing. Demographic information was collected from all PAs so that their similarity to the study participants could be evaluated (see [Appendix Q](#)). Names were not directly associated with the demographic information. This information was used to validate the assumption that PAs, employed by EFNEP, are indigenous to the community in which they work.²²

Assessment

Pre and post assessment interviews were conducted in face-to-face visits so that the participant could become familiar with the PA and to ensure accurate collection of dietary and behavior information. This face-to-face contact also enabled the PA to learn more about the participant's home environment. Knowledge about the participant's home environment enabled the PA to target telephone discussions to the needs and interests of the participants.

Evaluation tools routinely used in EFNEP/ SCNEP were used in the study when appropriate since PAs were familiar with these means of data collection and to reduce potential errors due to inexperience with the assessment tool. In addition, these instruments had been used successfully in the past with low-income, low-literacy populations.¹⁹⁻²²

The EFNEP Family Record (Parts A and C) was used at pre and post interviews to collect demographic information and 24-hr recalls ([Appendix F](#)). The PA coded foods recorded on the 24-hour recall by using the Food Dictionary included in the EFNEP Evaluation/Reporting System (ERS).⁷⁹ The EFNEP unit secretary then entered information obtained via the Family Record into the ERS. The ERS was then used to calculate the number of food group servings consumed and generated the nutrient analysis in a Diagnostic Report ([Appendix E](#)) for each participant. Each participant received an identification number when their data was entered into the ERS. The unit secretaries then omitted the participant's name from all records forwarded to the investigator in order to maintain confidentiality. The participant's identification number was then used to identify all records. The secretary forwarded copies of all assessment tools and the participant's generated Diagnostic Report to the investigator. The investigator then re-coded all foods and re-entered all demographic and dietary information into the ERS. Information on the Diagnostic Report sent by the secretary was cross-checked with that generated by the investigator in order to eliminate data entry errors and to ensure uniformity in food coding.

Demographic Information

Demographic information pertaining to race, age, sex, income, education level, household size, programs from which the homemaker was currently receiving assistance (e.g. food stamps), and residence was recorded on Part A of the Family Record. This form is currently used nationwide in EFNEP to collect demographic information and is used in Virginia to collect such data for SCNEP.⁷⁹

Assessment of Dietary Intake

Dietary intake was collected by the PAs using 24-hour food recalls (Part C of the Family Record). The 24-hour recall has traditionally been used in EFNEP to assess dietary intake because of its ease of administration, low-cost and usefulness with low literacy groups.²² In addition, it has been shown to be a valid assessment of dietary intake when used on the group level.⁸⁶⁻⁸⁹ The 24-hour recall was chosen over other methods of dietary assessment (e.g. food records) for this study because of its current use for evaluation in EFNEP and its appropriateness for a low literacy subject group and field study. To reduce the effects of limitations associated with use of the 24-hour recall,⁸⁶⁻⁸⁹ PAs were instructed to collect recall data on a typical day (e.g. not on a sick day) when the participant had consumed their usual diet. They were also instructed to probe for information concerning portion sizes and method of food preparation. A food recall kit consisting of food models, pictures and household measurement items (see Appendix I) was used by the PAs to estimate food quantities as described in the *Procedures for Collecting a 24-hr Recall* (see Appendix H).

Assessment of Food Behaviors, Locus of Control, and Cooking Reinforcement Values

The Pennsylvania Behavior Checklist was used to assess food-related behaviors, reinforcement values (RVs) about cooking, and locus of control (see Appendix G). The first fourteen questions assessed food-related behaviors on a four point likert scale. These questions are “core questions” adapted from the Behavior Checklist that is currently apart of the ERS which was previously developed through focus groups, expert panels and pilot tested across the nation.^{80,81} Questions 15 through 21 assessed locus of control and RVs for cooking, two possible mediating variables adapted from Rotter's Social Learning Theory. These questions were developed and tested in an earlier study by Houts and Warland.⁷⁰ The unidimensional, domain specific locus of control scale relating to food and health contained five items designed to assess expectancies, on a three-point scale. Questions inquired about the relationships between future and current behavior, willingness to try food recommended by health care professionals, ability to prevent illness, concern about what one eats, and the relationship between healthy eating and disease prevention. The two questions pertaining to RVs were designed to ascertain how the participant feels about cooking and why they feel this way. Question 22 inquired about topics the participant may wish to learn more about, and question 23 provided room for additional

comments. The Pennsylvania Food Behavior Checklist was used in this study, instead of the EFNEP Behavior Checklist from ERS, because of its inclusion of the locus of control scale and questions concerning RVs. The Pennsylvania State Behavior Checklist has been used in previous studies with low-income homemakers.⁸³

Assessment of Video Perceptions

A short questionnaire was also administered to the Video Instruction Group during the post assessment interview to gather feedback regarding the use and perceived effectiveness of the video lessons ([Appendix R](#)). The questionnaire assessed how many videos were watched, barriers associated with watching the video lessons at home, if the videos were shared with family or friends, relevancy of lesson topics, and perceived aesthetics related to the video (length, clarity, interesting, etc.). In order to prevent bias (i.e. the participant making replies they believed would please the PA), the PA was instructed to emphasize the importance of honest replies to help improve the effectiveness of future video lesson usage.

Participants were also asked to rate each video after viewing using a simple hedonic scale printed on the video label ([Appendix O](#)). The PA then recorded the participant's response for each video in their lesson log ([Appendix P](#)).

Assessment of Feasibility and Administrative Ease

A short survey was administered to participating PAs to ascertain their perceptions regarding the effectiveness and the administrative ease of the video instruction method ([Appendix S](#)). This survey also collected information regarding any technical, organizational or communication difficulties associated with the Video Instruction Method.

Assessment of Relative Cost

The relative cost of delivering lessons was calculated based upon a typical caseload (in Virginia) of 144 families per PA during the fiscal year. Only additional expenses incurred due to the delivery of each particular lesson type were included in the cost calculation. In-kind costs such as: rent and base utilities, salaries of support and supervisory staff, etc. were not included since these costs would not differ according to lesson delivery method. Expenses included in the cost calculation for each group are listed in Table 1.

Cost of PA time

The amount of time the PAs spent delivering lessons (home visits plus telephone discussions) and traveling to lesson sites was recorded by the PA during the study ([see Appendix P](#)). Ruby Cox,

Table 1.- Expenses included in cost calculation for each lesson delivery method		
Costs	Video Instruction	Traditional Instruction
PA time	X	X
Travel	X	X
One complete set of Flip Charts (includes handouts)		X
Twelve sets of video lessons	X	
Replacement videos	X	
Camera-ready handouts alone	X	
Drop-off envelopes	X	
Additional unlimited business telephone service per year	X	

the Virginia EFNEP and SCNEP Coordinator, cited in conversation that the annual salary plus benefits for a full-time PA in Virginia was currently \$21,666.00 (personal communication, June 1997). This number was then divided by the number of full-time equivalent hours (2,080 hrs) to determine the cost per PA per hour (\$10.42). The total cost of PA time per participant was then calculated for the Video Instruction and Traditional Instruction groups by multiplying the cost per PA per hour by the mean number of hours spent with participants in each group. The cost of PA time incurred during lesson delivery to 144 families was then calculated by multiplying the total cost of PA time per participant by 144.

Cost of travel

The cost of transportation for the PA was calculated by multiplying the mean number of miles traveled per participant per group by the state reimbursement rate of \$0.24 per mile. The travel cost per participant was then multiplied by a factor of 144 to determine the total travel costs associated with delivering each type of instruction to 144 families.

Costs of lesson materials, supplies and additional services

The cost of purchasing one complete set of ERIB-3 flip charts and camera ready handouts from Michigan State Extension (East Lansing, MI) as listed in their Material Order Form was \$138.00. The cost of making duplicate videos from a master set was used rather than the cost of the actual videos since future videos used in the state would be furnished in this manner. Virginia Polytechnic Institute & State University's Video Broadcast Services (Blacksburg, VA) charged \$1.25 per fifteen-minute videotape. The number of videos required to provide lessons to 144 families per fiscal year was determined in the following manner. Since videos are given to the homemaker in sets of three, at least twelve sets of videos were deemed necessary to deliver lessons to twelve families per month. The cost of furnishing replacement videos was calculated based upon the total number of videos that were lost or damaged during the study divided by the total number of participants receiving video lessons. The cost of purchasing one set of the camera-ready handouts for those receiving video instruction from Michigan State Extension (East Lansing, MI) was listed at \$20.00. The cost of purchasing 144 12 x 15" clasp envelopes from Boise Cascade (Chesapeake, VA) which to package videos and handouts was calculated at \$13.82. The cost of paying for additional unlimited business telephone service for follow-up phone discussions was cited in conversation with Bell Atlantic as being \$48.00 per month (June 1997).

Data Analysis

All statistical analysis was conducted using the SAS program (version 6.03, 1988, SAS Institute, Cary, NC). Experiment-wise significance was set at $p \leq 0.05$ with correction using the

the RDA is undesirable, the total kilocalories consumed per day were subtracted from the RDA and the absolute value used as the kilocalorie difference from the RDA. In addition, this prevented extremely high intakes from compensating for low intakes when the data for groups was averaged.

Since research data were not available on the use of the Resource Management, Food Safety and Nutrition question categories previously defined by the Pennsylvania State EFNEP, the internal consistency of these a priori factors was determined using Cronbach's alpha. A priori factor groupings were as follows: Resource Management (included behavior checklist questions 1, 2, 9, 11 and 13); Nutrition (behavior checklist questions 3, 6, 7, 8, 10, 12); and Food Safety (behavior checklist questions 4, 5, 14). In addition, exploratory factor analysis using the VARIMAX procedure¹²⁴ with six and four factor extractions was conducted with the pre-intervention data. The alpha coefficient of all fourteen items scored as one factor (Total Behavior Checklist Factor) was also determined. The distribution of scores and the alpha value was determined for the locus of control scale to verify earlier findings and scoring methods.⁷⁰

The characteristics of participants in each group were compared at baseline in order to identify any preexisting differences and to assess diet quality prior to the intervention. A two-tailed *t*-test was used to compare the pre-intervention means of: dietary data, behavior checklist scores, locus of control, RV, grade level, number of children, participation in assistance programs, and income. Categorical demographic and lesson-type variables were compared between the Video and Traditional Instruction groups using the chi-square (χ^2) test of association.

Pre-intervention data were also used to compare participants that were excluded or who withdrew (dropouts) with those that completed the study (graduates). A two-tailed *t*-test was used to compare the pre-intervention means between drop-outs and graduates on: dietary data, behavior checklist scores, locus of control, RV, grade level, number of children, participation in assistance programs, and income. Categorical demographic and lesson-type variables were compared between dropouts and graduates using the chi-square (χ^2) test of association.

To assess the effect of traditional instruction and video instruction on dietary intakes and food behaviors, a two-tailed *t*-test was used to compare the amounts of change from pre to post interventions to zero change. The amount of change for the Video Instruction Group and Traditional Instruction Group in dietary intakes and the extracted behavior checklist factor scores was then compared using two different models with the Multivariate Analysis of Variance (MANOVA) option of the general linear model (GLM) procedure.¹²⁴ Analysis of Variance (ANOVA) was used to compare the amount of change in the Total Behavior Checklist Factor score. The number of behavior checklist items that improved from pre to post were counted and ANOVA was used to compare the number of items improved between the two groups.

Exploratory analysis was conducted using the MANOVA option of the GLM procedure to determine the effect of locus of control, the cooking RV, race, residence, lesson, age and

(ANOVA) was used to compare the amount of change in the Total Behavior Checklist Factor score. The number of behavior checklist items that improved from pre to post were counted and ANOVA was used to compare the number of items improved between the two groups.

Exploratory analysis was conducted using the MANOVA option of the GLM procedure to determine the effect of locus of control, the cooking RV, race, residence, lesson, age and compliance on the amount of change in dietary intake. A second model was used to examine the impact of these variables on the factors extracted from the behavior checklist. ANOVA was used to determine the effect of race, residence, locus of control, age and the cooking RV on the Total Behavior Checklist Factor score. A second ANOVA model was used to determine if these variables affected the number of behavior checklist items that improved from pre to post intervention. Since only one individual in the sample was not white or African American, the data for this one participant was dropped and analysis on the race variable involved only the two race groups. Compliance scores were categorized into two groups: perfect scores of twelve (compilers) and scores less than twelve (non-compilers). Locus of control scores were categorized into three groups as previously described by Houts⁷⁰: externals, low-internals and high internals.

Frequency distributions were generated to describe responses on the Video Perception and PA Evaluation Surveys. Additional frequency distributions and means were generated to describe lesson characteristics (number of telephone discussions, length of home visits, etc.) and compliance scores.