Measuring the Impact of Youth EFNEP: Questionnaire Development and Validation

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MEASURING THE IMPACT OF YOUTH EFNEP: QUESTIONNAIRE DEVELOPMENT AND VALIDATION

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Food Technology

by
Yenory María Hernández-Garbanzo
August 2011

Accepted by:
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ABSTRACT

MEASURING THE IMPACT OF YOUTH EFNEP: QUESTIONNAIRE DEVELOPMENT AND VALIDATION

Yenory Hernández-Garbanzo

Background: Given the problem of childhood obesity and food insecurity among low-income children, the Youth Expanded Food and Nutrition Education Program (EFNEP) needs an appropriate, valid and reliable evaluation tool to determine the program effectiveness.

Purpose: To describe the development and preliminary validation of EFNEP Youth Quest questionnaire, an impact assessment tool designed for Youth EFNEP program.


Targeted audience: Low income-ethnically diverse children, in third, fourth and fifth grade.

Design: The development of the questionnaire included six phases: preliminary curricula content analysis, conceptualization, construction, expert reviews, cognitive interviews, and revisions. The selected measures were: outcome expectations, self-efficacy, intentions and knowledge related to nutrition, physical activity and food safety. Each measure was assessed with different topics that emerged from a content analysis of multiple Youth EFNEP curricula. Items were selected through the literature review and/or existing instruments; new items were created as necessary.
**Evaluation:** Content validity and face validity were assessed through expert reviews (n=5) and cognitive interviews (n=14), respectively. Data from 452 children was collected for factor analysis, internal consistency and item difficulty analysis. Test-retest reliability was also assessed (n=75). Predictive validity of the nutrition and physical activity scales were assessed using direct measures of food intake (n=62) and physical activity (n=47).

**Results:** Content analysis, expert reviews and cognitive interviews were used to develop the questionnaire and to confirm the content and age appropriateness of the questionnaire. Factor analysis revealed interpretable factors for each of the content domains and served as strategy for item reduction. Item difficulty for knowledge items ranged between 6-92%. Internal consistency for most of the final psychosocial scales was acceptable. Kappa statistics for test-retest reliability ranged between 0.06-0.70. For predictive validity, only 3 out of the 12 hypothesized correlations were significant.

**Conclusion and Implications:** Although further work is needed, the preliminary results of this study suggest that EFNEP Youth Quest could be used for evaluating Youth EFNEP programs. This study could serve as framework for designing similar assessment tools for different age groups.
DEDICATION

To my dear mom whose love, sacrifice and prayer provided me with the strength and endurance throughout all these years. To my dad, up in heaven, whose love and example showed me the way to become the woman I am today. To my brothers, Fernando and Alejandro, and to my sister Jenny whose guidance and support have been the constant light in this path I started to travel some years ago. To my beloved nephews, here and in heaven, and to my beautiful niece whose love, admiration and tenderness have helped me endure the hardship of being far away from my family and from my country, Costa Rica. To Jorge González, whose love, advice and support proved to be invaluable to make it this far; and to all those who, in an endless number of ways helped me throughout this process, I will be forever grateful and I pray that I may have the chance to give back, at least in a small amount all that you have given me.

Los amo mucho!
ACKNOWLEDGMENTS

First, I would like to thank God, for giving me the serenity, courage and wisdom to live this dream.

Dr. Katherine Cason, I would like to thank you for your mentorship. You have been an outstanding advisor and you have gone out of your way to show me the path to excellence. I will always be grateful to you!

Dr. Lippert, thank you because you provided me with the opportunity to come to this prestigious academic institution. You had faith in me as Clemson material and I will be forever indebted to you.

Dr. Williams, Dr. Griffin, Dr. Coffee and Dr. Baker, committee members, all of you gave me your support in every way you could. Your expertise and willingness to teach me and lead me throughout this process made my learning and researching experience even more professional, joyful and successful.

A special thanks to my students and team members from the Creative Inquiry FDSC 450 Section 03: Ginger Thomas, Laura Johnson, Trisha Hall, Melissa Ikerd, Victoria Hayden, Amelia Gannon, Hannah Clark and Kathryn Lybran. All your energy, enthusiasm, dedication and perseverance were my constant motivation to keep on going with this project. I appreciate your loyalty to my project and me and I hope we all keep in touch in the future.

To all the recruitment team: Tarana Khan, Kristen Welch, Arelis Moore, Debheror Walker, Patsy Smith, Sandee Blankenship, Jonathan Pitts, Susan Haury, Trevor Boggs and Nicholle Bulow. Your patience and willingness during the recruitment
process was invaluable. Without your contribution, I would not have been able to conclude one of the most important parts of this dissertation project.

Maci, Mechi, Cata and Jermain thank you so much for your help and for taking time from your daily activities to collect data and help me take this project to an end.

Lori Fager thanks for your dedication and help during the designing of EFNEP Youth Quest questionnaire.

To Joanne Brosh, Elena Serrano and George Davis from Virginia Tech University, I will forever cherish the opportunity of working with all of you.

To all the participants and schools (Dacusville Elementary, Tigerville Elementary, Slater-Marietta Elementary, R.E. Davis Elementary, Shell-Point Elementary and Hall-Fletcher Elementary) to accept being part of this study.

To Clemson University and to the MICIT/CONICIT Government of Costa Rica to support this research study, and my academic studies during all these four years.

Finally, thank you to the U.S. Expanded Food and Nutrition Education Program (EFNEP); it was an honor and a wonderful experience to be part of this national treasure.
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CHAPTER I
INTRODUCTION

This chapter presents an overview of relevant aspects related to the measurement and evaluation of the Youth Expanded Food and Nutrition Education Program (EFNEP) in order to justify the purpose and specific aims of this study. The chapter is organized in the following sections: a) background information related to childhood obesity, health disparities, nutrition education, and the youth component of the Expanded Food and Nutrition Education Program (EFNEP); followed by the b) problem statement/significance of the study; c) purpose of the study; d) specific aims of the study; e) research questions; f) definition of terms; g) delimitations; h) limitations; and i) assumptions of the study.

Background

Childhood obesity and the severity of the problem

More than nine million children in the United States over the age of six are already overweight or obese (Koplan, Liverman, & Kraak, 2005). Results from the National Health and Nutrition Surveys (NHANES) indicate that since the 1980’s the prevalence of childhood obesity for American children aged 2 through 19 years, has more than tripled and it has remained high at approximately 17% (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010).
The national concern is that overweight and obese children are more likely to become obese adults, and to experience psychosocial problems such as: depression, low self-esteem, low academic achievement and low social interaction; as well as many health risks of cardiovascular adult diseases including: type-2 diabetes, sleep apnea, hypertension, dyslipidemia and metabolic syndrome (Daniels et al., 2005; Freedman, Dietz, Srinivasan, & Berenson, 1999).

Health disparities

While throughout the years, children from lower socioeconomic families and from minority groups (mainly Blacks and Hispanics) have been more likely to experience food insecurity\(^1\), paradoxically, evidence has demonstrated that today these audiences present the highest rates of overweight and obesity as well (Lutfiyya, Garcia, Dankwa, Young, & Lipsky, 2008; Nord, & Parker, 2010; Troiano, & Flagel, 1998).

One hypothesis related to the coexistence of food insecurity and obesity among low-income children, is that when compared with food secure-high-income children, the risks of poor diet and physical inactivity, well known as potential risk factors of childhood obesity, are greater in food-insecure low-income children.

One study conducted by Widome et al. (2009), in Minneapolis-Minnesota, found that a group of food-insecure children compared with a group of food-secure children, reported to have greater eating-related risk factors associated with obesity. Specifically,

\(1\) Food insecurity is defined as “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (Anderson, 1990).
food insecure children indicated greater perceived barriers to eat healthfully, greater consumptions of fast food and calories from fat, less food availability of both healthy and unhealthy foods, and fewer family meals and breakfast per week (Widome, Neumark-Sztainer, Hannan, Haines, & Story, 2009).

Additionally, several studies have shown that children living in low-income food- insufficient households spent more time watching television, live in neighborhood environments that lack the opportunities to promote physical activity or that are perceived by parents as not safe to allow children to play outside (Casey, Szeto, Lensing, Bogle, & Weber, 2001; Lutfiyya, Garcia, Dankwa, Young, & Lipsky, 2008).

Moreover, several researchers have identified that low-income parents in order to minimize hunger and to cope with limited financial resources, often buy inexpensive, high-fat energy dense and low-nutrient quality foods to their children (Cason, Cox, Wenrich, Poole, & Burney, 2004; Dietz, 1995; Drenoswski, & Specter, 2004); rather than exhibiting abilities to wisely know how to get and prepare quality nutritious foods within limited budgets (Guthrie, Lin, Ploeg, & Frazao, 2007).

**Nutrition education**

The problem of childhood obesity and food insecurity undoubtedly highlights the importance to develop and evaluate interventions, especially among low-income children. Several federal and non-federal programs often used nutrition education strategies to promote healthier lifestyles among this vulnerable population. Specifically, nutrition education is defined “as any combination of educational strategies, accompanied by
environmental supports, designed to facilitate voluntary adoption of food choices and other food-and nutrition-related behaviors conducive to health and well-being and delivered through multiple venues at the individual, institutional, community and policy levels” (Contenko, 2011).

According to the literature, an effective school-based nutrition education intervention should be: 1) accurate, basic and updated (i.e. based on dietary guidelines and physical activity guidelines); 2) research and behavioral based; 3) theory-based with inclusion of individual, behavioral and environmental factors that influence behavior change; 4) sequential, with sufficient duration and intensity; 5) user-friendly to the implementers; and include 6) instructional strategies, materials and activities that are age-appropriate, developmentally-appropriate and cultural-appropriate to meet the specific needs of the targeted audience; 7) interactive and experiential strategies to engage students; and 8) a comprehensive evaluation to assess the program outcomes, impact and quality of its implementation (Contenko, 2011; Lytle, & Perry, 2001; Lohrmann, & Wooley, 1998; Roseman, Riddell, & Haynes, 2011).

More research is needed to evaluate the effectiveness of nutrition education interventions. Indeed, the “Institute of Medicine Committee on Prevention of Obesity in Children and Youth” stated that the evaluation of childhood obesity prevention interventions is a research priority to understand how to best achieve changes in children’s physical activity, diet, and/or weight (Koplan, Liverman, & Kraak, 2005). However, the evaluation measures to accurately and consistently assess this type of interventions remain unclear. Particularly, researchers have found that most of the
nutrition evaluation measures used with school-based interventions have important limitations in terms of validity, reliability and utility (Contento, Randell, & Basch, 2002; Hernández-Garbazo, Brosh, Serrano, & Cason, in preparation); additionally few of these instruments have been tested with low-income audiences (Contento, Randell, & Basch, 2002; Hernández-Garbazo, Brosh, Serrano, & Cason, in preparation).

**The Youth Expanded Food and Nutrition Education Program**

*EFNEP general characteristics*

The Expanded Food and Nutrition Education Program (EFNEP), is one example of a federally funded program established in 1969, that aims to “assist limited resource audiences in acquiring the knowledge, skills, attitudes, and changed behavior necessary for nutritionally sound diets” (USDA-NIFA, 2010). EFNEP operates in all 50 states and U.S. territories, under the guidance of the United States Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA) and Land-grant Universities.

EFNEP provides nutrition education to two main audiences: low-income children (Youth EFNEP) and low-income families with children (Adult EFNEP) (USDA-NIFA, 2010). The implementation of the program includes a series of nutrition education lessons, in which the participants are encouraged to learn and practice essential elements related to nutrition, physical activity, food safety, food preparation and food shopping practices.
Youth EFNEP

Annually, Youth EFNEP reaches more than 400,000 low-income youth, age 3 years through high-school students, from traditional classroom settings, after-school programs, day camps and youth group activities during the summer. Specifically, in 2010, 42% of the total participants were between 3rd and 5th grade. On gender 50% were male and 50% were female. The largest racial minority were African American children (31%); 28% were of Hispanic origin; and the majority live in central cities over 50,000 people (43%) and in towns under 10,000 people and rural non-farms (29%) (USDA-NIFA, 2010).

Youth EFNEP delivery

Paraprofessionals are recruited from the community, and they are trained by State Coordinators and/or extension specialists to teach the nutrition education lessons. In EFNEP, nutrition education curricula are the core educational resource used by paraprofessionals to teach the nutrition education lessons. State EFNEP Coordinators can develop new or utilize existing curricula to meet the national outcomes of the program, and also to meet the specific needs and/or characteristics of the diverse audiences in their state (i.e. age range, ethnicity, location). If a state EFNEP coordinator chooses to use an existing curriculum, it is typically one developed by other land grant universities. Some examples of curriculums currently used with Youth EFNEP school-aged audiences are: Jump into Food and Fitness (developed by Michigan State University Extension); Exploring my Pyramid with Professor Popcorn (developed by Purdue University)
Extension); Show me Nutrition (developed by University of Missouri Extension); Food and Fun for Everyone (developed by Oklahoma State University Extension); Grazin’ with Marty Moose (developed by University of Wyoming Extension); and Healthy Weight for Healthy Kids (developed by Virginia Cooperative Extension).

National Youth EFNEP outcomes

National guidelines established that Youth EFNEP programs should address the following outcomes across their curricula: 1) youth choose foods according to MyPlate recommendations; 2) youth improve their physical activity practices; 3) youth use safe food handling practices; 4) youth acquire the skills to prepare nutritious, affordable foods; and 5) youth make good choices when spending money.

Youth EFNEP evaluation

The Evaluation/Reporting System (ERS) is software developed to capture the positive effects of EFNEP at the unit, state and federal levels. Essentially, the ERS exports data from certain instruments that each state is required to collect, and it generates reports for management purposes, for assessing specific needs of participants and for assessing national and state program’s impacts (USDA-NIFA, 2009). In the particular case of EFNEP adult program, to evaluate the nutritional component, the 24-hour food recall and the food behavior checklist (FBC) are the two main instruments used. However, quite opposite to EFNEP adult program, today there is not a standard, valid or reliable outcome evaluation tool for Youth EFNEP; and likewise the curricula selection process, State EFNEP Coordinators select or develop an evaluation instrument
to assess the effects of Youth EFNEP program in their state, but there are no standardized expectations for the selection of evaluation instruments. Overall, there is a wide variety of evaluation instruments used for Youth EFNEP, most of them focus on measuring food and nutrition-related knowledge and behaviors, and have limited psychometric properties (Youth Evaluation Website, 2011).

**Problem Statement/Significance of the Study**

Nutrition education programs, as it is Youth EFNEP, need to improve the quality of their evaluation methods and measurements to demonstrate the benefits and public value of its educational efforts. Indeed, the foundation of a good evaluation is to have good measures (Dignan, 1995). Good measures for Youth EFNEP program must be valid and reliable, but also brief-practical to respond and administer (Townsend, 2006). Moreover, they need to be age-and-developmentally appropriate, cultural sensitive and developed upon the program’s goal, objectives, content, duration and intensity (Contento, 2011; Townsend, & Kaiser, 2007). However, despite the work that many states have done in this regard, there are many gaps that still need to be filled. Some of the reasons for this are outlined below.

**Results from the literature**

When the literature was reviewed, numerous studies of nutrition education intervention research with school-aged children were available, but only three studies were related to the effectiveness of Youth EFNEP (Rabe, Ohri-Vachaspati, & Sheer,
2006; Townsend, John, Shilts, & Farfan-Ramirez, 2006; White, & Boone, 1976). Table 1.1 is a summary table of the main characteristics of the reviewed evaluation Youth EFNEP studies. It is important to note that, comparable conclusions from these studies were difficult to draw because they were different in terms of: location; theoretical frameworks (i.e. “experiential learning model” and “knowledge, attitudes and behavior (KAB) model”); type of intervention (i.e. diverse nutrition education curriculums/materials); duration of the implementation (i.e. different number of educational lessons); type of research designs (i.e. two were quasi-experimental designs and one was randomized controlled field trial); type of unit of analysis (i.e. groups of youth or individual youth); and type of selected measurements to assess the effects of the interventions. Moreover, the reviewed studies reported that further research was needed to improve the psychometric properties of the evaluation tools used during the Youth EFNEP evaluation studies.

**Results from the EFNEP/FNP Children and Youth Evaluation Project**

Given the importance of Youth EFNEP evaluation and measurement, a workgroup of EFNEP and SNAP-Ed\(^2\) coordinators from the North Central region created the “EFNEP/FNP Children and Youth Evaluation Project” (Phillips, & Vandergraff, 2006; Willis, Phillips, Vandergraff, Seremba, & Merrill, 2005). The overall goal of this project “was to develop a process and system for collecting, reviewing, and sharing quality evaluation tools for use with EFNEP, and with similar nutrition education programs”

\(^2\) SNAP-Ed stands for Supplemental Nutrition Assistance Program Education
In 2009, results of this project, led by University of Wisconsin-Cooperative Extension, showed that only six states (Indiana, Wisconsin, Nebraska, New York, Wyoming, and Kansas) submitted evaluation tools to the “Children/Youth Evaluation tools and documentation webpage” (http://www.uwex.edu/ces/wnep/ncyouth/). Currently, five evaluation tools are posted and available in the webpage (from Indiana, Wisconsin, Nebraska, Wyoming, and Kansas). These evaluation tools were reviewed using established criteria for validity and reliability (Vandergraff, Townsend, & Guion, 2006), and were categorized with “level 1”. Level 1, is the minimum criteria to share the evaluation tools in the webpage, and it means that the instruments were tested only for content and face validity (Vandergraff, Townsend, & Guion, 2006). Particularly, the results of this project suggest that there is still, the need of pursuing more rigorous methods to improve the validity and reliability of Youth EFNEP evaluation instruments.

**Results of a survey sent to EFNEP State Coordinators**

As part of this dissertation project, a web-based survey (“Survey Monkey”) was sent to EFNEP State Coordinators (n=75, response rate 44%), during July 2009-August 2009, to identify ways to improve the evaluation of Youth EFNEP. Results indicated that State EFNEP coordinators most frequently reported the need of consistency for Youth EFNEP evaluation, in both within states and across the nation. Other needs reported were: more research to be able to have “one”, generic, age-appropriate, theory driven and most importantly a valid evaluation tool for Youth EFNEP.
Review of Youth EFNEP evaluation instruments

Also, as part of this dissertation project, Clemson University researchers (n=5) during the period of March 2009-August 2009 reviewed twelve different Youth EFNEP evaluation instruments (Table 1.2 included the list of the reviewed instruments). The evaluation instruments were primarily obtained from the “EFNEP/FNP Children and Youth Evaluation Project”; and from EFNEP State Coordinators, EFNEP websites and EFNEP curricula. As a result of this review, researchers identified some important aspects/opportunities for improvement. For example:

- Need of a theoretical foundation and/or measurement framework to guide the instrument development.
- Need to include theoretical constructs/mediating variables to have a better understanding of how behavior change occurs.
- Need to use more rigorous validity and reliability methods.
- Need to reach a consensus of what is important to measure from each core content area (i.e. nutrition, physical activity, food safety, food preparation and food shopping choices).
- Need to consider age-appropriateness and age-development during the instrument design. Focus on one age group at the time.
- Need to consider duration, intensity and common contents of different curricula used by different states.
**Purpose of the Study**

To contribute to the enhancement of the evaluation instruments of Youth EFNEP programs, the purpose of this study was to utilize behavioral-theories, curricula content analysis and rigorous psychometric procedures to develop a self-report questionnaire with the following characteristics: theory-driven, content-appropriate, age-appropriate, appropriate for low-income audiences, with acceptable-high levels of reliability and validity; and practical to respond and administer (no more than 20 minutes).

**Specific Aims of the Study**

- Identify the contents and mediators of behavior commonly taught in different Youth EFNEP curricula.
- Use the information obtained in aim 1 to build a core questionnaire for measuring the effect of Youth EFNEP on knowledge and psychosocial measures related to changes in nutrition, physical activity and food safety behaviors.
- Establish the content and face validity of the questionnaire items.
- Assess the psychometric properties of the questionnaire items: factor structure, internal consistency, test-retest reliability stability, item difficulty and predictive validity.
**Research questions**

The research questions addressed in this study were the following:

**Curricula content analysis research questions**

1. Which contents and mediators of behavior addressed across Youth EFNEP curricula should be considered the target of evaluation?
   a. To what degree are the content areas of nutrition, physical activity and food safety employed across the selected Youth EFNEP curricula?
   b. What theory-based strategies (mediators of behavior) are most prevalent across these Youth EFNEP curricula?
   c. How are theory-based strategies incorporated in these Youth EFNEP curricula?

**Content validity research question**

1. To what extent does the questionnaire reflect the content/domains of Youth EFNEP Program?

**Cognitive Interviews research question**

1. To what extent is the questionnaire understandable by the targeted audience?

**Psychometric analysis research questions**

1. What is the factor structure of the questionnaire?

2. To what extent does each of the items contribute to the total questionnaire?

3. What is the degree of difficulty of the knowledge items included in the questionnaire?

4. To what extent does the questionnaire generate the same responses when administered to the same group at two different points in time?

5. To what extent are the nutrition-related psychosocial constructs included in the
questionnaire correlated with dietary behaviors?

6. To what extent are the physical activity-related psychosocial constructs included in the questionnaire correlated with physical activity behavior?

**Definition of Terms**

*Content analysis:* content analysis is an appropriate research method for the systematic review and analysis of written educational materials (Neuendorf, 2002).

*Content validity:* extent to which a specific set of items reflects a content domain (DeVellis, 1991).

*Construct validity:* extent to which a hypothesized association between the questionnaire measure and the measure of the same concept (convergence validity) or a different concept (discriminant validity) is confirmed (Aday, 1996).

*Convergent validity:* extent to which the questionnaire measure predicts (predictive validity) or agrees (concurrent validity) with some criterion of the “true” value (or “gold standard”) for the measure (Aday, 1996).

*Exploratory factor analysis:* a multivariate technique for identifying whether correlations between a set of observed variables stem from their relationship to one or more latent variables in the data (Field, 2005).

*Face validity:* extent to which a particular instrument measures what it is intended to measure (Nunnally, & Bernstein, 1994).

*Internal consistency:* correlation between answers to different questions about the same concept (Aday, 1996).
Item difficulty: proportion of people completing the questionnaire who answered the item correctly (Dignan, 1995).

Test-retest reliability: degree of correspondence between answers to the same question asked to same respondents at different points in time (Aday, 1996).

Title 1 schools: schools with high numbers of poor children that receive federal funds to help ensure that all children meet challenging state academic standards (USDE, 2010)

Zest Quest®: is a school-based program administered by the Youth Learning Institute of Clemson University that provides opportunities for students to improve their health and wellness (Zest Quest, 2011).

Delimitations

This study was delimited to the following:

1. Content analysis was conducted only in the curricula that had the following inclusion criteria: curriculum content must include all EFNEP core content areas and must be implemented in more than one state with school children from 3rd through 5th grades.

2. The questionnaire development and testing was delimited to Youth EFNEP participants in 3rd, 4th and 5th grades from low-income-ethnically diverse families.

3. The timeline of the study was from March 2009 to July 2011.
Limitations

The results of this study were limited due to the following factors:

1. The questionnaire was administered only to school-aged children in 3rd, 4th and 5th grade.
2. Convenience sampling.
3. The study was conducted only in five counties in South Carolina and in one county of North Carolina.
4. Self-report measures were used (EFNEP Youth Quest questionnaire and the Block Kids Food Screener).
5. Curricula content analysis was conducted only with three curricula.

Assumptions

1. Knowledge and psychosocial mediating variables may be the most appropriate impact measures for the type, duration and intensity of Youth EFNEP programs.
2. Participants understood the questions and answered them with the truth.
3. Research staff followed the research protocols during data collection.
Table 1.1. Characteristics of evaluation studies made with Youth EFNEP participants

<table>
<thead>
<tr>
<th>Characteristics/Study</th>
<th>White et al. 1976</th>
<th>Rabe et al. 2006</th>
<th>Townsend et al. 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research design</td>
<td>Quasi-experimental</td>
<td>Quasi-experimental</td>
<td>Randomized control field trial</td>
</tr>
<tr>
<td>Sample size (n)</td>
<td>1368 individuals</td>
<td>299 individuals</td>
<td>229 groups</td>
</tr>
<tr>
<td>Curriculum name</td>
<td>Nutrition lesson series</td>
<td>Exploring MyPyramid with Professor Pop Corn</td>
<td>Eat Right is Basic</td>
</tr>
<tr>
<td>Taught lessons (#)</td>
<td>6</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Outcome evaluation</td>
<td>Knowledge: 34 Q Attitudes: 21 Q Behaviors: 8 Q</td>
<td>Knowledge: 10 Q Behaviors: 5 Q</td>
<td>Knowledge: 17 Q Behaviors: 2 Q</td>
</tr>
<tr>
<td>Process evaluation</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Validity of the questionnaire</td>
<td>Content validity</td>
<td>Content Validity</td>
<td>Content and face validity</td>
</tr>
<tr>
<td>Reliability of the questionnaire</td>
<td>Test-retest reliability (α=0.83)</td>
<td>Test-retest reliability (α=0.63)</td>
<td>Test-retest reliability (α=0.62)</td>
</tr>
</tbody>
</table>

Note: Q=questions
Table 1.2. List of identified and reviewed Youth EFNEP instruments

<table>
<thead>
<tr>
<th>Name of the Youth EFNEP Instrument</th>
<th>Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tell us About You</td>
<td>Purdue University Cooperative Extension</td>
</tr>
<tr>
<td>2. JIFF Sound Survey</td>
<td>Michigan State University Cooperative Extension</td>
</tr>
<tr>
<td>3. Show me Nutrition</td>
<td>University of Missouri Cooperative Extension</td>
</tr>
<tr>
<td>4. Youth Evaluation Tool-Youth Curriculum Sourcebook</td>
<td>University of Wisconsin Cooperative Extension</td>
</tr>
<tr>
<td>5. Grazin’ with Marty Moose</td>
<td>University of Wyoming Cooperative Extension</td>
</tr>
<tr>
<td>6. NEP-Know how. Know now</td>
<td>University of Nebraska Cooperative Extension</td>
</tr>
<tr>
<td>7. Modified version of “Tell us About You” + list questions*</td>
<td>Kansas State University Cooperative Extension</td>
</tr>
<tr>
<td>8. SNAP-Ed Youth Evaluation Instrument</td>
<td>New Mexico State University Cooperative Extension</td>
</tr>
<tr>
<td>9. What do you do?</td>
<td>Oklahoma State University Extension</td>
</tr>
<tr>
<td>10. Kids Kartoon</td>
<td>University of California Cooperative Extension</td>
</tr>
<tr>
<td>11. Healthy Weights for Healthy Kids</td>
<td>Virginia Cooperative Extension</td>
</tr>
<tr>
<td>12. Food Fun and Me</td>
<td>Ohio State University Cooperative Extension</td>
</tr>
</tbody>
</table>

* List of questions that EFNEP paraprofessionals have available to design their own questionnaire.
References


CHAPTER II

METHODS

Overview

This study involved the development and psychometric testing of EFNEP Youth Quest questionnaire. The main goal was to develop a self-report questionnaire for the impact evaluation of Youth EFNEP program with the following characteristics: theory-driven, content-appropriate, age-appropriate, appropriate for low-income audiences, with acceptable-high levels of reliability and validity; and practical to respond and administer (no more than 20 minutes). This chapter will describe in detail, the respective methods and procedures used in this study to accomplish the research goal; which for the most part were based on literature related to scales and questionnaire development (Chatterji, Sentovich, Ferron, & Randina-Gobioff, 2002; DeVellis, 1991; Dignan, Steckler, & Goodman, 1989; Townsend, 2006). Specifically, this chapter is divided in the following sections: study location, population and sample, protection of human subjects, research team, theoretical and conceptual framework, instrument development, and testing and analysis procedures.

Study location

The questionnaire development took place primarily at Clemson University, South Carolina. The questionnaire testing and validation was conducted in five rural counties of South Carolina (SC) (Pickens, Greenville, Anderson, Sumter and Beaufort)
and in Buncombe County, North Carolina. Specifically, cognitive interviews were conducted during June 2010 through August 2010 at three summer camps located in Anderson, Simpsonville and Pickens, SC. The psychometric testing of the questionnaire (i.e. testing for factor analysis, reliability, item analysis and predictive validity) was conducted during September 2010 through November 2010, and the following six schools were invited to participate in the study: Dacusville Elementary (Easley, SC), Tigerville Elementary (Taylors, SC), Slater-Marietta Elementary (Marietta, SC), R.E. Davis Elementary (Sumter, SC), Shell-Point Elementary (Beaufort, SC) and Hall Fletcher Elementary (Asheville, NC).

Population and sample

The target population for this study consisted of low-income, ethnically diverse children (both genders: females and males), in 3rd, 4th, and 5th grade from low-income-Title 1 schools. Researchers worked with EFNEP, Zest Quest®, and community and school leaders, who already worked with pre-existing groups of school-aged children to recruit participants who met the inclusion criteria (screening for eligibility).

Protection of human subjects

Approval was obtained from the Clemson University Institutional Review Board (IRB) prior to the recruitment of participants (Appendix A). Since this project involved children, a parental informed consent (Appendix B) and child assent (Appendix C) were obtained for each participant. Also, to protect participants’ confidentiality the
questionnaires did not contain any information that reveals the child’s identity. Participants received an incentive worth two or five-dollars after participation. 

**Research team**

Two nutrition students, one at the doctoral level and one at the undergraduate level, coordinated the development and validation of EFNEP Youth Quest. Also, an advisory committee of three Clemson University faculty members provided feedback during all the questionnaire development process. These faculty members had combined research experiences with EFNEP, Cooperative Extension, nutrition education, physical activity, public health, health disparities, behavioral theories, evaluation and measurement. Moreover, one EFNEP program specialist, three master students and ten undergraduate students from the Clemson University Food, Nutrition and Packaging Science Department were trained to collaborate with different elements of data collection and data registration under the direction of the Principal Investigators.

**Theoretical and conceptual framework**

To have a better understanding of Youth EFNEP program and incorporate meaningful measurements in the program questionnaire, this research was based on four essential components: 1) the Community Nutrition Education Logic Model (CNE, Medeiros, Butkus, Chipman, Cox, Jones, & Little, 2005), adapted by this study with constructs of Social Cognitive Theory (SCT, Bandura, 1986) and Theory of Planned Behavior (TPB, Ajzen, 1991) (Appendix D); 2) the National Youth EFNEP core areas
and behavioral outcomes (Table 2.1, USDA, 2009)); 3) the National guidelines from MyPlate and Fight BAC campaign (PFSE, 2010; USDA, 2011); and 3) the content analysis of multiple Youth EFNEP curricula (Hernández-Garbanzo, Griffin et al., in preparation).

**Instrument development, testing and analysis procedures**

The questionnaire development and testing process involved the following phases: a preliminary curricula content analysis phase, conceptualization of the questionnaire, construction of the questionnaire, expert reviews of the drafted instrument-revisions, pilot testing of refined instrument and final revision, and psychometric testing/analysis.

**Preliminary phase. Curricula review/content analysis**

As a preliminary phase, multiple curricula used with youth EFNEP audiences in 3rd, 4th and 5th grade were content analyzed. The purpose of using this methodology was to explore and understand the common topics and theory-based strategies addressed across youth EFNEP curricula in order to recommend appropriate evaluation measures for the Youth EFNEP program evaluation.

The methods and procedures for this content analysis was an adaptation of proposed content analysis methods reported in the literature (Graneheim, & Lundman, 2004; Holdford, 2008; Neundorf, 2002), and it included the following five steps: 1) research
questions & theoretical framework; 2) selection of curriculums; 3) coding instrument; 4) data collection and 5) analysis.

Research questions & theoretical framework

The following evaluation questions (EQ) were examined:

1. To what degree are the content areas of nutrition, physical activity and food safety employed across the selected Youth EFNEP curricula? (EQ1)
2. What theory-based strategies (mediators of behavior) are most prevalent across these Youth EFNEP curricula? (EQ2)
3. How are theory-based strategies incorporated in these youth EFNEP curricula? (EQ3)

Social Cognitive Theory was the guiding theoretical framework for this content analysis. SCT was selected because it is one of the most widely used and accepted theories with school-based nutrition education interventions (Auld et al., 1998; Baranowski et al., 2000; Liquori, Koch, Contento, & Castle, 1998; Reynolds et al., 2000). In general terms, SCT proposes that behavior is the result of personal, behavioral, and environmental factors that influence each other within a dynamic and reciprocal determinism (Bandura, 1986; Bandura, 2004; Contento, 2011). Examples of constructs (mediators of behavior) of this theory are: outcome expectations/beliefs about outcomes, self-efficacy, knowledge- behavioral skills, goal-setting skills/self-regulation skills, and social/environmental influences (Contento, 2011).
Curricula selection

During the period of July 2009 through August 2009, a web-based survey (Survey Monkey, 2009) (Appendix E) was sent to state EFNEP coordinators (n=75) at land grant universities in 50 states and 6 U.S. territories, with the purpose of identifying nutrition education curricula to be considered for content analysis. Thirty-three State Coordinators responded to the web-based survey (response rate 44%). In total, they reported seventeen different curriculums used with school-aged EFNEP participants.

Four inclusion criteria were established for selecting curricula. First, the curriculum had to be implemented in more than one state. Second, the curriculum had to include all Youth EFNEP core content areas (diet quality, physical activity, food safety, food preparation and food choices). Third, the curriculum had to be developed for school-aged children, in grades 3rd through 5th. Fourth, the curriculum had to be readily available (i.e. easily purchased). Only three curriculums met the inclusion criteria. Table 2.2 presents the list of curriculums included in the analysis and their general characteristics.

Coding instrument development

Coding tools and corresponding coding guide were developed by this study to review the selected curricula (Appendix F). Also, an adapted version of the “General Curriculum Information Form” from the Health Education Curriculum Analysis Tool (HECAT) (CDC, 2007) was incorporated into the data collection materials to help
reviewers become familiar with the curriculum content, and to register general information from the curriculum (i.e. name, developer, intended audience).

Specifically, the coding guide included variables that were based on theories of behavior change (Bandura, 2004), literature review (CDC, 2007; Doshi, Patrick, Sallis & Calfas, 2003; Hansen, Dusenbury, Bishop & Derzon, 2007) and on a preliminary reading of each curriculum’s lessons. The format of the coding guide was organized as follows:

First, the coding guide was divided into three core content areas: nutrition, physical activity and food safety. Then, each core content area was divided into five broad theory-based strategy categories that were labeled as information, materials and/or activities incorporated in the curriculums that focused on changing participants’: 1) motivation; 2) cognitive knowledge; 3) perceived social and environmental influences; 4) goal-setting/self-regulation skills; and 5) personal self-efficacy and behavioral skills (Hansen et al., 2007). Additionally, each category sorted by core content area, included a list of ideal indicators (theme codes) to facilitate the data collection process (Alshamrani, 2008). Instructional strategies codes (type of learning and application experiences) were also used to assess how theory-based strategies were incorporated across curricula. The first draft of the coding guide was reviewed for content validity by two experts in the areas of health promotion and education, nutrition and physical activity; and pilot-tested by ten trained nutrition undergraduate students. Results from the expert reviews and pilot test were used to modify the codebooks.
Research team

Under the supervision of one health promotion and education expert, ten trained nutrition students (one doctoral student and nine nutrition undergraduate students) from the Food, Nutrition, and Packaging Science Department at Clemson University, carried out the curricula review. Trainings involved learning about Youth EFNEP, behavioral theories, and qualitative and quantitative techniques for content analysis and how the data collection materials work.

Coding procedure

Three curricula that met all inclusion criteria were content analyzed through an iterative process, initiating on October 2009 and ending on April 2010. The units of data collection were all written messages, information and activities included in the lesson plans, except the lesson titles, objectives and background information for the teachers. Because some curriculums were very extensive or had a separated book per grade, at least three undergraduate students were assigned per curriculum. Each reviewer first read each lesson to get familiarize with the curriculum. Secondly, one “HECAT General Curriculum Information Form” was completed per curriculum. Third, by using the coding guide each reviewer independently content analyzed an assigned section of the curriculum and inserted the results on the coding forms. The research team met biweekly to discuss and agree about the process and classification of the codes (Cassata & Cox, 2009). A doctoral student coordinated all the process, reviewed the accuracy of the codes
and updated the coding guide as many codes were added, modified, and/or deleted during the analysis process (Neundorf, 2002).

Analysis

All materials associated with one curriculum were analyzed as an individual unit, even if they were separated by grade. Descriptive and comparative analyses were performed for all the variables of interest in several ways.

First, to examine the degree to which each content area was employed across curricula, a mean percentage was calculated for the three core content areas. For example, the prevalence of nutrition content across curricula was calculated based on all the ideal indicators that comprised nutrition themes (codes) found in each curriculum.

Second, to examine the prevalence of theory-based strategies across curricula, theory-based strategies were grouped into the three core content areas, and a mean percentage was computed for each theory-based strategy with the following formula:

\[
\frac{\text{Sum of occurrence of all separate theory-based strategies}}{\text{total occurrence of all theory-based strategies}} \times 100
\]

(Doshi et al., 2003; Paek, Bae, Hove & Yu, 2011).

Third, to examine how these theory-based strategies were incorporated across curricula, the specific nutrition, physical activity and food safety themes commonly addressed by all curricula were identified by each theory-based strategy. Additionally, these common themes across curricula were rated according to the type of instructional strategy used to address the themes. Ratings were from 1=only information is provided
to 3= information and more than one opportunity or activity to apply and practice learned knowledge and/or skills are provided (CDC, 2007).

**Phase 1. Conceptualization of the questionnaire**

The aim of this phase was to identify and provide a clear description of the content domains to be measured (DeVellis, 1991).

Identifying content domains, measures and item topics to include in the questionnaire was particularly a challenging task for the research team. Because Youth EFNEP programs target a variety of behaviors (i.e. diet quality, physical activity, food choices/shopping practices, food safety and food preparation) - through a wide variety of educational materials - there were many variables to organize and define for this stage. For this reason, and to make the process more systematic, comprehensive and efficient, we integrated empirical findings from the literature review and guidelines of scale development with the respective theoretical and conceptual framework of this study.

As a result, the research team identified three relevant content domains for inclusion in the development of the instrument: 1) nutrition (dietary quality, food preparation and food choices were combined in this category), 2) physical activity and 3) food safety. Item topics for potential inclusion were: whole grains, fruits, vegetables, dairy, meats, fat, sugar, dairy, breakfast, physical activity, and the “Fight BAC rules” (i.e. clean, separate, cook and chill). In addition to that, an emphasis was placed on measuring knowledge and psychosocial mediating variable rather than behaviors (Brug, Oenema, & Ferreira, 2005; Dzewaltowski, Noble, & Shaw; 1990; Townsend & Kaiser, 2007). There are several
reasons supporting this methodological decision: 1) data from the content analysis study revealed that knowledge and psychosocial mediators of behavior change were the main target of the program educational objectives and instructional activities (Hernandez-Garbanzo, Griffin et al., in preparation); and 2) the theoretical framework of this study and additional literature hypothesize that in the short-term, knowledge and psychosocial mediating variables are the most appropriate measures to impact; and that changes on these mediators may explain future behavior change (Contento, Randell, & Basch, 2002). Furthermore, multiple investigators have found that measuring behavioral change among children is quite complex; compared to adults, children are less likely to have direct responsibility for their actions and/or behaviors (Bere, van Lenthe, Klepp, & Brug, 2008; Van Der Horst et al., 2007). Table 2.3 displays a summary of the conceptualization of the questionnaire.

**Phase 2. Construction of the questionnaire**

This phase aimed to generate a large pool of items for the construction of the first draft of the EFNEP Youth Quest questionnaire. Additionally, this phase aimed to establish the format and layout of the questionnaire (i.e. sections, response format, directions format, appearance). Overall, the initial pool of items derived primarily from existing questionnaires used by Youth EFNEP, and/or from other scales/questionnaires used by school-based nutrition education programs; for specific topics new questions had to be created (i.e. food safety self-efficacy).
As far as the procedures, first, the item generation included the development of a list of inclusion criteria for items in developing a preliminary questionnaire. Potential items had to be theory based and clearly represent the knowledge and psychosocial constructs this study attempted to measure. Items had to reflect objectives/content of commonly used Youth EFNEP curricula. Finally, items had to be age-appropriate (for children in 3rd, 4th and 5th grades) and had to be tested for content and/or face validity.

Next, an extensive literature review was conducted to identify Youth EFNEP instruments as well as other instruments used for measuring knowledge and psychosocial measures related to nutrition, physical activity and food safety among school-aged children. After a preliminary review of more than 200 potential items (76 food safety items, 41 physical activity items and 83 nutrition items), the first version of the questionnaire consisted of 68 items (Baranowski et al., 2000; Burgess-Champoux, Rosen, Marquart, & Reicks, 2008; Glanz, & Steffen, 2008; Kelder et al., 2005; Potter, Judkins, Piesse, Nolin, & Huhman, 2008; Saunders et al., 1997; Stevens et al., 1999; Trost et al., 1997; Wilson, Margarey, & Matterson, 2008). Items that did not meet the list of specifications or were considered to be repetitive or ambiguous were excluded.

Once the items were selected, the research team worked on designing the format of the questionnaire. The questionnaire was designed to be administered using a paper-pencil format before and after Youth EFNEP interventions. The selected items were organized according to the following ten sections: nutrition knowledge, nutrition outcome expectations, nutrition intentions, nutrition self-efficacy, physical activity outcome expectations, physical activity social influences, physical activity self-efficacy,
food safety knowledge, food safety outcome expectations and food safety self-efficacy. The rule of thumb was a decision made about having at least three items per measure, mainly to ensure that the scale’s length was long enough for reliability purposes but short enough to reduce response burden (DeVellis, 1991). Then, the questionnaire’s wording style, instructions, response options and layout were designed according to the experiences, development and cognitive level of children in 3rd, 4th and 5th grades. For instance, lengthy and negative worded items were avoided; and response options were reduced to three-point or binary scales (Saunders et al., 1997). Finally, to make the questionnaire visually attractive and enjoyable for kids, a graphic designer was consulted regarding child-appropriate images, fonts and layout. The drafted questionnaire is included in Appendix G.

**Phase 3. Expert reviews/content validity**

Content validity is a term used to describe the degree to which items on an instrument adequately reflect a desired domain of content (DeVellis, 1991; Grant, & Davis, 1997). This phase, in particular, aimed to determine the content validity of the questionnaire from the experts’ point of view. The specific methods of this phase are described as follows.

Five experts with backgrounds in EFNEP, nutrition, physical activity, education, psychology, evaluation, public health, and health promotion & education, were invited to rate and review items of the draft questionnaire (Appendix H). Experts received a content validity rating form (Appendix I). This form included an inventory of potential items to
be included in the questionnaire as well as the instructions for conducting the revision and rating of questions. Experts rated with a four-point Likert scale, each of the items in terms of relevancy, clarity, ambiguity, and adequacy of response options. They also provided qualitative suggestions to revise, and/or delete and/or add new items.

Experts’ ratings were analyzed by the calculation of item-level content validity index (I-CVI) and scale average content validity index CVI (S-CVI/Ave). While I-CVI (proportion of experts who scored an item as relevant with either a 3 or 4) measures validity for each item, S-CVI/Ave (average of I-CVIs divided by the total number of items) measures the validity for the questionnaire as a whole. In this study, values of I-CVI less than 1 indicated the need for item revision or deletion. A S-CVI/Ave of 0.80 was the minimum acceptable value for the content validity of the questionnaire (Grant, & Davis, 1997; Lynn, 1986; Polit, & Beck, 2006). Both the values of content validity index as well as the comments given by experts served as the basis to modify, delete and/or add new items to the questionnaire before it was pilot-tested.

**Phase 4. Pilot-testing/cognitive interview**

This phase aimed to conduct cognitive interviews with a sample of children with similar characteristics of the targeted audience in order to assess the wording, clarity, adequacy of response options and the physical layout of the questionnaire (Bowen, 2008).

A convenience sample of low-income-minority children (n=14; 6 males, 8 females; 5 African-Americans, 9 Hispanics) from grades 3rd to 5th were recruited from summer camps in Simpsonville and Anderson, South Carolina. The Institutional Review Board
(IRB) of Clemson University granted approval for this study. Consent forms were directly handed out to parents, one week before the cognitive interviews; and the assent forms were given to the children the day of the interview. Participants received an incentive valued at five dollars (gift bag with one snack bar and nutrition related magnets, book marks and pens).

The cognitive interview guide was developed based on existing cognitive interviews protocols found in the literature (Shafer, & Lohse, 2010; Willis, 1999). An undergraduate and a doctoral student from the Food, Nutrition and Packaging Sciences Department at Clemson University, were trained and used the interview guide to implement the cognitive interviews. The cognitive interview guide is included in Appendix J.

Cognitive interviews took place in a private classroom and lasted approximately one hour. All interviews were tape-recorded and were facilitated by an interviewer while a second staff member recorded notes and observations. The interviewer provided and practiced simple examples of think-aloud techniques before starting the testing process (de Leeuw, Borges, & Smits, 2004). The interviewer first read the question aloud; the child followed along and was asked to select a response. Next, the child was asked to say what they were thinking when they answered the question. Probes to elicit additional information were: “Could you tell me in your own words, what you think this question is asking?” “What does the term “whole milk” mean to you?” “Was this question easy or hard for you” “Is this how you would ask your friend this question?”
The analysis included several steps to identify problems associated with the questionnaire design. Researchers reviewed the recorded notes, observations and tape-recorded transcripts of each interview. To summarize and analyze the data, the researchers coded each problem into categories that were both mutually exclusive and exhaustive. To insure the reliability of the results the two researchers discussed the qualitative data to come to an agreement in regards to the classification of the problems (Conrad, & Blair, 2004).

**Phase 5. Questionnaire revisions**

This phase included revisions and improvements of the questionnaire based on the expert reviews and cognitive interviews. For example, the original questionnaire had to be modified for the following reasons: to improve the adequacy of the instructions (i.e. shorter and more visually appealing); to simplify the length and wording of questions; to clarify vague terms, consistency and style of response options; to enhance data quality (i.e. put an “I don’t know option”); and to improve the appropriateness of the pictures and layout of the questionnaire (i.e. put knowledge questions at the end, use a booklet format).

Overall, as a result of this phase, the questionnaire was designed using a booklet format, contained eleven sections. The first two sections included respectively three personal questions (grade, age and gender) and the general instructions for completing the questionnaire. The following sections had in total 57 questions organized in the following sections: food choice intentions, nutrition outcome expectations, physical
activity outcome expectations, nutrition self-efficacy, physical activity self-efficacy, food safety self-efficacy, nutrition knowledge and food safety knowledge. Appendix K included the revised questionnaire after expert reviews and cognitive testing.

**Phase 6. Psychometric testing and analysis**

**Protocol and participants**

This phase was divided in three steps: Step 1, consisted on the administration of EFNEP Youth Quest to a large number of participants (Sample 1, n=454) for exploratory analysis (EFA), and internal consistency of the psychosocial scales; and to determine the item difficulty of the knowledge items. Specifically, for factor analysis a sample size a minimum of 285 participants was needed, because factor analysis is a large sample procedure, which requires at least five participants per item in order to reduce the error variance (DeVellis, 1991; Hatcher, 1994). In Step 2, for test-retest analysis, EFNEP Youth Quest was administered on two different occasions three weeks apart (without nutrition education intervention) to seventy-five participants randomly chosen from sample 1. Step 3 assessed the predictive validity of EFNEP Youth Quest’s nutrition and physical activity psychosocial scales, using direct measures of food intake (food screeners) and physical activity (accelerometers). The sample was also randomly selected from sample 1 and was different from the sample of step 2. Specifically, 62 participants completed the food screeners and 56 wore an accelerometer for a week. The Institutional Review Board (IRB) of Clemson University granted approval for the study.
design, procedures and instruments. Informed consent, consent form and assent forms were obtained respectively from parents and students. Participants from sample 1 and 2 received an incentive worth two dollars (gift bag with nutrition related magnets, book marks and erasers), and participants from sample 3 received an additional incentive worth around five-dollars (water bottle).

**Staff training**

Under the direction of the Principal Investigator, the data collection team consisted of one EFNEP specialist and thirteen trained students (three masters’ students and ten undergraduates) from the Food, Nutrition and Packaging Science Department at Clemson University. Trainings included several activities such as: getting the IRB certification; learning and practice the EFNEP Youth Quest’s protocol (Appendix L); the accelerometers’ protocol (Appendix M) and the protocols of the Block Kids Food Screener (BKS) (Appendix N). The goal was to be as consistent as possible when administering all the instruments and procedures included in the study.

**Instruments and procedures**

**Administration of EFNEP Youth Quest questionnaire.** First, the EFNEP Youth Quest was administered to all the participants (n=454; 50.6% male, 49.4% female). An attempt was made to get a large sample size, but also with similar number of students from each grade (35.8% third grade, 22.8% fourth grade and 30.5% fifth grade) and from diverse
ethnic groups (47.4% Whites, 37.9% African-Americans; 10.9% Hispanics; 1.1% Asian-Americans, 2.4% Other). Seventy-five participants responded to the questionnaire for a second time for the test-retest reliability. The second administration was three weeks after the first with no nutrition education on between the tests.

The administration of EFNEP Youth Quest was in a classroom setting. To protect the participants’ anonymity the booklets were pre-labeled with an ID number. This ID numbers were used to avoid using the participants’ name. For the administration of the questionnaire, the research staff emphasized three important aspects: 1) the questionnaire was not a test; 2) there were no right or wrong questions; and 3) it was very important to always answer with the truth. At least two data collectors were present in the classroom, one administered the questionnaire and the other circulated the room to observe if the participants were completing each question. The instructions, questions and answer options were read aloud, participants followed along and then responded to each question. Moreover, to reduce the response burden and make the administration of the questionnaire more interactive, the questionnaire included a stop sign at the end of each section. This stop sign meant two things: first that everybody had to stop before starting the next section and second that it was time to do one minute of physical activity (e.g. stretching, dancing). The total time to complete the questionnaire was approximately 20 minutes.
**Demographics measures.** EFNEP Youth Quest included a demographic section, in which each participant responded to three questions about age, gender and grade level. Race and ethnicity was obtained from the classroom teachers.

**Block Kids Food Screener.** The Block Kids’ Food Screener (BKFS) (Appendix N) was used to measure the food intake of participants (n=62). BKFS is a short food questionnaire designed for children ages 12-17 and was developed by the Block Dietary Data Systems (NutritionQuest, Inc., Berkeley, CA). The screener includes 39 items to assess food intake, food choices, and quantity of foods from “yesterday”. This screener was chosen not only for its reported validity and reliability, but also because it included the assessment of food groups relevant to EFNEP Youth Quest’s items (Cullen, Watson, & Zakeri, 2008). The screener was administered in a classroom setting during weekdays (mostly Fridays). Data collectors read the instructions and questions out loud, and used food models to help students estimate food quantity. Completion time was less than 15 minutes. Block Dietary Data Systems (NutritionQuest, Inc., Berkeley, CA) analyzed the data obtained from the Block Kids Foods Screeners. The variables of interest included: mean daily intake of fruits, vegetables, saturated fat and added sugars.

**Accelerometers.** Children’s physical activity steps counts was assessed for seven consecutive days by using an Actical accelerometer (Mini Mitter Company Inc., 2003). Validity and reliability of Actical accelerometers with school-aged children has been reported in other studies (Puyau, Adolph, Vohra, & Butte, 2002). The previous day of
data collection, the accelerometers were calibrated, set to measure activity counts in an epoch time of 60 seconds and attached on an elastic belt (Robertson, Brown, Wilcock, Oldfield, & Thorogood, 2011). Trained staff met with the participants (n=56) in their respective schools and fitted the accelerometers on their anterior right hip. The participants were asked to always wear the accelerometer, only taking it off during bathing and swimming.

After data collection, raw accelerometer data was downloaded and saved. Then, the Monitor Data Analysis Assistant Software developed by Danhlos Computer Consulting, LLC that runs on a Windows platform (Microsoft.NET 1.1) was used to prepare the raw accelerometer data for analysis. This program reduced the raw accelerometer activity counts to time spent in sedentary, light, moderate and vigorous physical activity based on Actical-cutpoints used in calibration studies with children. The specific counts cut-points were: 0-11= sedentary, 12-507=light, 508-718=moderate and 719 or more= vigorous (Evenson, Catellier, Gill, & Ondrak, 2008); because these counts were per 15 seconds they were adapted for 60 second epochs (multiply the cut-points counts by 4).

For accelerometer analysis, the first and seventh day of data collection were omitted because the children did not have the opportunity to wear the accelerometers all day. Secondly, participants who had at least 4 complete days of data (3 week days and 1 weekend day) were included in the study. A complete day was defined as ≥ 7 hours of data (Robertson, Stewart-Brown, Wilcock, Oldfield, & Thorogood, 2011). Third, participants who had 20 or more consecutives counts of zeros, and/or had high counts per
minutes (>15 000) were excluded (Cliffs, Reilly, & Okely 2009). Based on this criteria accelerometer data from 47 participants were included in the analysis. The variables of interest included: mean daily minutes spent in moderate, vigorous and moderate to vigorous physical activity.

Statistical analysis

Demographic characteristics. Demographic characteristics of the factor analysis sample were analyzed with IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010), by using descriptive statistics (frequencies and percentages).

Treatment of Missing Data. First, all missing data was specified with the character of “-9” (Muthén & Muthén, 2010). Then, the level of missingness for each item was computed and ranged between 0.2%-1.5 percent. Because data was categorical with no covariates (only factors indicators), and the level of missingness was minimal (less than 5%), missing data was deleted pairwise with Mplus Software (version 6.1, Muthen & Muthen) (Muthén & Muthén, 2010). Pairwise “means that if a participant has a score missing for a particular variable, then their data are excluded only from calculations involving the variable for which they have no score” (Field, 2005); “with this method the maximum amount of variables available is retained” (Schlomer, Bauman, & Card, 2010).

Exploratory factor analysis. EFA was conducted on the psychosocial scales with Mplus
Software (version 6.1, Muthen & Muthen). This software was selected because it includes tetra-choric correlations for the factor analysis of non-normal and categorical data (Woods, 2002). The primary aim of EFA was to determine the number of factors underlying the nutrition, physical activity and food safety items; and the secondary aim was to use factor analysis as an item reduction strategy to keep only those items that best measure each factor (DeVellis, 1991).

The analysis was performed for each content domain: nutrition, physical activity and food safety. All variables were determined as categorical (8 were binary, 35 were 3-point ordinal). The weighted least squares with mean and variance (WLSMV) was the estimator used for the analysis (Muthén, du Toit, & Spisic, 1997).

With regard to the rotation criterion, because it was expected for factors to be correlated, both Geomin and CF-Equamax oblique rotations were considered; but CF-Equamax was consistently more interpretable, especially to detect items that cross-loaded or that had higher cross-loadings. Therefore, the following analyses were done only with CF-Equamax rotation, which “minimizes variable and factor complexity and spread variances more equally across factors” (Sass, & Schmitt, 2010).

A four-factor solution was indicated for the EFA of nutrition items (three theorized factors: food choice intentions, nutrition outcome expectations and nutrition self-efficacy); a three-factor solution for physical activity items (two theorized factors: physical activity outcome expectations and physical activity self-efficacy) and a two-factor solution for food safety items (one theorized factor: food safety self-efficacy).

The factor identification was based on scree plots, eigenvalue-one criterion, and
content interpretability. Also, the goodness-of-fit for each content domain (estimation of models or number of factors that best fit the data) was assessed with the following statistics: Root Mean Square Residual (RMSEA= recommended value ≤ 0.06), Comparative Fit Index (CFI= recommended value ≥ 0.95), Tucker-Lewis Index (TLI= recommended value ≥ 0.95) and Standardized Root Mean Square Residual (SRMR= recommended value ≤ 0.08) (Hu, & Bentler, 1999).

Items were deleted if: 1) factor loadings were <0.40; 2) loaded on the incorrect theorized factor; and 3) loaded in more than one factor (cross-loading). In general, after item deletion, factor analysis was run again until the “best” factor structure for each content domain was obtained.

Finally, the reduced psychosocial measures or factors for each content domain were scored (final items within each factor were summed) to obtain a new variable. Mean scores and standard deviations for the new variables were also calculated with IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010).

Internal consistency. The internal consistency of each psychosocial scale was measured with Cronbach’s alpha using IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010). Those scales with Cronbach’s alpha between 0.5 and 0.70 were consider acceptable (Bowling, 2002; Cortina, 1993; Nunnally, & Bernstein, 1994)

Item analysis. The item difficulty for each knowledge item was assessed in this study. For each item, the frequency of correct and incorrect answers was calculated, and results
where then used for calculating the percentage of correct answers for a given item (item difficulty index). Items with a difficulty index of 80% (too easy) > X < 20% (too hard) were considered for revision and possible deletion (Kline, 1993). SPSS software (version 19, IBM Corporation, Somers, NY, 2010) was employed for these calculations.

**Test-retest reliability.** Test-retest reliability was calculated on the individual items, excepting knowledge items by using kappa (κ) statistics (weighted κ for ordinal items and un-weighted κ for binary items) (Sim, & Wright, 2005). Kappa statistics were significant at ρ values less than .05, and the relative agreement between scores of individual items from time 1 to time 2 was interpreted with the following classification scales for the kappa coefficient: 0=poor, .01–.20 = slight, .21–.40 = fair, .41–.60 = moderate, .61–.80 = substantial, and .81–1 = almost perfect (Landis, & Koch, 1977). IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010) was employed for the data analysis.

**Predictive validity.** Two different analyses were employed for predictive validity. The first analysis correlated the nutrition-related psychosocial scales with the mean intake of cups of fruits and vegetables, grams of saturated fat and teaspoons of added sugar. It was hypothesized that the nutrition related psychosocial scales would be positively correlated with cups of fruits and vegetables, and negatively correlated with grams of saturated fat and teaspoons of added sugar. The second analysis correlated the physical activity related psychosocial scales with mean of MPA, MVPA and VPA. A positive correlation between these variables was expected. All these associations were calculated with IBM
SPSS software (version 19, IBM Corporation, Somers, NY, 2010) using Spearman correlation coefficients and ρ values less than .05.
Table 2.1. National Youth EFNEP core areas and outcomes

<table>
<thead>
<tr>
<th>Core Areas</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nutrition</td>
<td>Youth choose food according to MyPlate Recommendations</td>
</tr>
<tr>
<td>2. Physical Activity</td>
<td>Youth improve their physical activity practices</td>
</tr>
<tr>
<td>3. Food Safety</td>
<td>Youth use food safe handling practices</td>
</tr>
<tr>
<td>4. Food Shopping</td>
<td>Youth make good choices when spending food for money</td>
</tr>
<tr>
<td>5. Food Preparation</td>
<td>Youth acquire the skills to prepare nutritious, affordable foods</td>
</tr>
</tbody>
</table>

Source: EFNEP/FSNE Youth Evaluation Workgroup (USDA, 2009)

Table 2.2. General Characteristics of Curriculums Included in the Content Analysis

<table>
<thead>
<tr>
<th>Name of curriculum</th>
<th>Developer</th>
<th>Theoretical Framework</th>
<th>Age Range</th>
<th>Format/# lessons</th>
<th>Evaluation Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump into Food and Fitness</td>
<td>Michigan State University Extension</td>
<td>Experiential Learning Model</td>
<td>Grade 3 to 5</td>
<td>One general curriculum for all grades/8 lessons</td>
<td>Questionnaire to assess knowledge, attitudes and behaviors</td>
</tr>
<tr>
<td>Show me Nutrition</td>
<td>University of Missouri Extension</td>
<td>Experiential Learning Model</td>
<td>Pre-kindergarten to 8th grade</td>
<td>Specific curriculum for each grade/# of lessons varies</td>
<td>Knowledge-based questionnaire</td>
</tr>
<tr>
<td>Exploring My Pyramid with Professor Popcorn</td>
<td>Purdue University Extension</td>
<td>Experiential Learning Model</td>
<td>Grade 1 to 6</td>
<td>Specific curriculum for each grade / 5 lessons each</td>
<td>Questionnaire to assess knowledge and behaviors</td>
</tr>
<tr>
<td>Core Area and Key Measures</td>
<td>Purpose of the Measure</td>
<td>Potential items’ thematic categories</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nutrition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>To determine if youth EFNEP participants improve intentions to select healthy foods/beverages.</td>
<td>Intentions for choosing whole foods, lean or low-fat meats, low-fat or fat free calcium rich foods and low fat and sugar alternatives.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outcome Expectations</td>
<td>To determine if youth EFNEP participants enhance their understanding about health benefits of eating healthy food.</td>
<td>Benefits and importance of eating a variety of foods, breakfast, calcium rich foods, fruits and vegetables.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>To determine if youth EFNEP participants enhance their self-confidence and skills necessary to select or ask for healthier food options.</td>
<td>Skills for reading food labels or to choose or ask for: whole-grain foods, lean or low-fat meats, low fat or fat free calcium rich foods, low fat and sugar alternatives and more fruits and vegetables.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>To determine if youth EFNEP participants know essential nutrition concepts/information, specifically about My Pyramid food groups.</td>
<td>Cognitive knowledge of MyPlate food groups and recommended daily intake of each food group.</td>
<td></td>
<td></td>
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<tr>
<td><strong>Physical Activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outcome Expectations</td>
<td>To determine if youth EFNEP participants enhance their understanding about the health benefits of being physically active</td>
<td>Benefits and importance of physical activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>To determine if youth EFNEP participants enhance their self-confidence and skills necessary to be physically active.</td>
<td>Skills related to increase ways to be physically active and overcome barriers.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Food Safety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>To determine if youth EFNEP participants enhance their self-confidence and skills necessary to improve food safety practices.</td>
<td>Skills for improve practices related to washing hands and surfaces often; cooking foods properly; refrigerating foods promptly; and avoiding cross-contamination.</td>
<td></td>
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<td></td>
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<tr>
<td>Knowledge</td>
<td>To determine if youth EFNEP participants know essential food safety concepts/information (i.e. Fight BAC Rules)</td>
<td>Cognitive knowledge about washing hands and surfaces often; cooking foods properly; refrigerating foods promptly; and avoiding cross-contamination.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
References


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CHAPTER III
PSYCHOSOCIAL MEASURES USED TO ASSESS SCHOOL-BASED NUTRITION EDUCATION PROGRAMS: REVIEW AND ANALYSIS OF SELF-REPORT INSTRUMENTS

In Preparation to Journal of Nutrition Education and Behavior

ABSTRACT

Objective: To identify and describe self-report evaluation instruments that measure mediators related to dietary behaviors in school-aged children; and to assess the psychometric properties of such evaluation instruments.

Methods: Self-report instruments that measure mediators related to dietary behaviors in school-aged children (8-12 years old) were identified using electronic databases. Instruments that met the inclusion criteria of this study were tabulated and reviewed for psychometric properties. The psychometric properties reviewed were related to the methodological development and testing of the identified instruments.

Results: Fifteen instruments met the inclusion criteria. Most of the studies used a theoretical framework to guide the development of the instruments. The psychosocial measures most commonly used were knowledge and self-efficacy. Most of the studies utilized existing items, focused on specific nutrition-related behaviors, included over 40 items and utilized age-appropriate response formats (multiple choice, 3-point and 4-point ordinal). Acceptable reliability properties were most commonly reported for attitudes and self-efficacy measures. Although most of the instruments were reviewed by experts
and/or pilot-tested, few were tested for more rigorous type of validity. Few instruments were tested with ethnically diverse, low-income youth.

**Conclusion and implications:** Results from this review suggest that more research in needed to develop more robust psychosocial measures related to dietary intake, especially for youth from low-income-ethnically diverse audiences.

**Key words:** nutrition, mediators, school-aged children, review, validity, reliability.
**INTRODUCTION**

Childhood obesity, stemming from unhealthy eating and physical activity patterns, is a serious public health issue in the United States. Statistics indicate that among youth ages 2 to 19, the prevalence of obese and overweight is 16.9% and 31.7% respectively.\(^1\) Overweight and obese children are more likely to have an increased risk of cardiovascular adult diseases such as type 2-diabetes, sleep apnea, hypertension, dyslipidemia, and metabolic syndrome.\(^2\) In the United States, rates of overweight and obese tend to be higher among minority children and/or children from low-income families.\(^3\)

School-based nutrition education programs are crucial opportunities to promote healthy eating and/or physical activity behaviors, and ultimately, reducing rates of childhood obesity.\(^4\) Effective school-based nutrition programs have two components – they must be behaviorally focused and they must include theory-driven educational strategies.\(^5,6\) Essentially, research suggests that in addition to knowledge, nutrition intervention components should target essential mediators of behavior change (psychosocial constructs) such as outcome expectations, behavioral skills, habits, self-efficacy and environmental and social support.\(^6,7,8\)

Furthermore, in order to produce consistent and correct information about the quality, accountability, and effectiveness of nutrition education, nutrition interventions need a comprehensive evaluation component with appropriate, valid, and reliable measures.\(^9,10\) Despite this need, a review conducted by Contento et al.\(^9\) in 2002, found that overall, nutrition evaluation measures used and reported in the literature had
significant limitations. Specifically, the analysis revealed that measures either lacked one or more adequate psychometric properties and/or the scope or focus of the measure was often mismatched with the program’s objectives, duration, and intensity and/or the sample sizes were not large enough to report validity and reliability by ethnicity or other factors.

Aside from the inadequacies of nutrition instruments and measures, there is an added level of complexity when it comes to examining the impact of nutrition education programs targeting low-income, multi-ethnic youth audiences. Choosing nutrition education measures for these audiences is a critical step, since they are at greatest risk for unhealthy eating and physical activity patterns. Indeed, the literature suggests that measurement approaches for these audiences, besides being valid and reliable, need to be culturally-, age-, and developmentally appropriate, and practical to avoid response burden.

Having evaluation instruments with the characteristics just mentioned can enable researchers, health professionals, parents and policy makers to identify and compare different nutrition education approaches to promote healthy lifestyles, and determine what type of approach is more effective for the prevention of childhood obesity.

The goal of this paper is to update the previous review and analysis of nutrition evaluation instruments and measures conducted by Contento et al., focusing on psychosocial measures (measures of potential mediators of behavior change) used with school-aged children audiences. The specific aims are: 1) identify and describe self-report evaluation instruments that measure mediators related to dietary behaviors in
school-aged children and 2) assess the psychometric properties of such evaluation instruments. Results from this study attempt to inform nutrition educators and researchers about quality measures and useful evaluation instruments to be considered for the evaluation of school-based nutrition education programs.

METHODS

Identification of Instruments. Instruments were identified through a literature search using the following electronic databases: Ebsco, Pubmed, GoogleScholar, PsycINFO, and Web of Knowledge. Searches included combinations of the following terms: children, youth, school, intervention, nutrition, diet, nutrition education, evaluation, measures, psychosocial constructs, mediators of behavior, questionnaire, survey, instrument, questionnaire development, psychometric, validity, reliability, theory, survey development, instrument development. The reference lists of included papers and relevant published reviews were also searched.

Criteria for Inclusion/Exclusion. Instruments were selected for review if they met all of the following inclusion criteria: 1) published in a peer-reviewed journal; 2) written in English; 3) measured potential mediators of dietary behavioral change for children ages 8 to 12 years old; 4) designed for measuring the effectiveness of nutrition education programs; 5) paper-pencil self-report instruments completed by youth (not parents); 6) reported psychometric properties; 7) published between 1999 and 2010. Excluded from this review were those instruments used for descriptive studies of correlates of dietary intake, and for the evaluation of overweight and obesity treatments, clinical studies or
physical activity interventions. In particular, those evaluation instruments or measures that had multiple publications were counted as one study.

**Data Extraction.** Descriptive information from each instrument/measure was extracted and tabulated. The variables of interest included: name of the instrument, name of the school-nutrition program associated with the instrument, details about how the instruments were conceptualized (including type of selected outcome measures, theoretical framework used to design the instrument, and whether or not it was curriculum-based); details about the instruments’ construction (whether the items/instruments were new or adapted, type of topics covered, number of items, response options format and completion time); and information on reliability, validity, whether or not the instruments were pilot-tested among the targeted audience (i.e. cognitive interviews), and general characteristics of the participants (i.e. sample size, age group, gender, socioeconomic status, race-ethnicity).

Specifically, for reliability, researchers reviewed those studies that reported acceptable internal consistency and test-retest reliability. Internal consistency was considered acceptable if the Cronbach’s alpha was higher than 0.6.\(^{13}\) Test-retest reliability was considered acceptable if the intra-class correlation (ICC), Kappa statistics (κ) or either Pearson’s or Spearman’s correlation (r) were higher than 0.6.\(^{14}\) For validity, researchers reviewed if the instrument was tested for content and face validity, which are less rigorous types of validity (designated as Type 1 validity in the current study); and/or for construct, convergent, concurrent, and predictive validity, which are more rigorous
types of validity (designated as Type 2 validity in the current study). The definitions of
the types of validity and reliability are explained in the Table 3.1.

RESULTS

Fifteen instruments (20 studies associated-Table 3.2) met the selection criteria of
this review paper. More than twenty types of psychosocial measures related to dietary
intake were identified (Table 3.2), ranging from individual, social and environmental.
Besides nutrition related concepts, content areas such as physical activity and food safety
were also included in some of the reviewed instruments (Table 3.2). Moreover, it was
evident that several approaches were used either to develop and/or test the reviewed
evaluation instruments (Table 3.3).

Methodological Practices to Develop the Identified Instruments/Measures. Table 3.2
is a summary of the conceptualization and construction characteristics of the reviewed
instruments. In terms of conceptualization of the instrument, results indicated that most
of the authors designed their evaluation instruments based on a theoretical framework
(n=10). \textsuperscript{16-19, 22, 23, 25, 27-29, 32-35} Social Cognitive Theory was the theoretical framework
most commonly used. Others theories used were Theory of Planned Behavior and
Transtheoretical Model. The instruments attempted to assess several theoretical
components, however, the individual-level mediating variables of knowledge (n=12) \textsuperscript{16-29,}
\textsuperscript{31-33} and self-efficacy (n=11) \textsuperscript{16-19,22, 24-25, 27-32,34-35} were the most frequently assessed
individual-level mediating variables. Only three instruments reviewed included
curriculum specific-content (Table 3.2). \textsuperscript{16,20,33}
To examine nutrition-related psychosocial measures, most of the studies either developed new items for their evaluation instruments (n=6) or included a combination of new items with items from other questionnaires (n=5). In terms of topics covered, the majority of the instruments included psychosocial scales/items that focus on specific nutrition-related behaviors rather, than general nutrition. Particularly, psychosocial measures related to fruits and vegetables were the common targets of most of the reviewed instruments (Table 3.2).

Most of the questionnaires included over 40 items, and several types of response options. Overall, multiple choice was the response option most frequently used, followed by 3-point and 4-point ordinal scales. Among those studies that reported the estimated questionnaire completion time, the length varied widely, with half reporting between 30-60 minutes, whereas the other half reporting less than 20 minutes (Table 3.2).

**Methodological Practices to Test the Identified Instruments/Measures.** Table 3.3 provides information regarding instrument reliability and validity. Specifically, the table includes information on subscales with acceptable reliability and validity, pilot-testing information, sample size, and participants’ characteristics such as age or grades, gender, race/ethnicity and socio-economic status.

In terms of reliability, results indicated that the majority of instruments had several subscales with an adequate level of internal consistency and test-retest reliability. Overall, acceptable levels of internal consistency (Cronbach’s alphas >.60) were most commonly reported for attitudes (n=5) and self-efficacy (n=7).
scales. Similarly, scales testing attitudes\textsuperscript{22-23, 26, 30} and self-efficacy\textsuperscript{22,24-25,32,35} most frequently reported acceptable test-retest reliability.

In terms of validity, the majority of instruments were tested for type 1 validity (experts review), but only 7 out of 14 instruments were tested and/or had established type 2 validity (more rigorous types of validity).\textsuperscript{21,22-23,27-29,30,32,34} In addition, there was little specific information on type 2 validity analysis (specific associations between mediators and topics are noted in Table 2). Overall, type 2 validity analysis employed inconsistent methods and analyses, and as a result, trends were not evident (Table 3.3).

Moreover, most of the reviewed instruments were pilot-tested\textsuperscript{19, 20, 21, 22, 24-25, 26,30,31,33} and intended with use for third to sixth graders, or 8 to 11 year olds. Seven instruments were tested with ethnic groups other than White boys and girls\textsuperscript{16-19, 21, 23,32,34,35}, and four of the instruments were tested with low-income participants.\textsuperscript{20,31,33,34} It is important to note that for both of these characteristics, less than half of the instruments were tested with ethnically diverse, low-income samples (Table 3.3).

**DISCUSSION**

This review demonstrated that although a wide variety of self-report instruments have been developed by school-based interventions to assess psychosocial mediators related to dietary intake, few were tested with rigorous psychometric procedures and/or with youth from low-income, ethnically diverse families. Key strengths and limitations regarding the methodological development and testing, as well as the validity and reliability of the instruments, were noted in this review and are discussed in greater detail.
in the current section. This is important because when selecting an instrument, it is necessary for nutrition educators and program administrators to understand the properties associated with these instruments, thus allowing them to select the most appropriate instrument and adapt it to their purposes.

**Strengths.** One of the major strengths of most of the studies was that the researchers used a theoretical framework to guide the instrument development process. Specifically, social cognitive theory\(^\text{37}\) was the theoretical framework most commonly reported. Although there is not one “gold standard” behavioral theory upon which nutrition education programs and interventions should be based, a review of nutrition intervention literature has shown that self-efficacy/perceived control, outcome expectations/attitude, habit, and behavioral intention are significant correlates of dietary behavior in children.\(^\text{7}\) Social cognitive theory incorporates multiple mediators mentioned, including self-efficacy and outcome expectancies, and is therefore a strong framework upon which to build nutrition education programs and evaluations, particularly for children and youth.

A second strength of the reviewed studies was that most of the instruments provided evidence of content validity and/or face validity through expert reviews and pilot-studies (i.e. cognitive interviews), respectively. Cognitive interviews are particularly important when developing instruments for low-income, ethnically diverse populations, because they allow the researcher to identify language and wording that is not developmentally appropriate. Overall, both approaches are considered fundamental aspects of the instrument development process, as they help to assess the quality of the
items (i.e. content appropriateness and age-appropriateness) and to address limitations of the instrument before it is rigorously tested for psychometric properties.\textsuperscript{38,39}

The third strength of most of the reviewed studies included using age-appropriate response formats. For example, some instruments measuring food choice intentions paired food choices with pictures of the food. Additionally, in general, for the other type of psychosocial measures, most of the instruments reduced the typical number of Likert scale items from 5+ to 3 or 4-point scales. More response options create a larger burden for children because of cognitive demands, whereas more response options are desirable for adult populations in order to increase reliability.\textsuperscript{40}

**Weaknesses.** There are several weaknesses of the reviewed studies that should be noted. In terms of methodological development, evaluation instruments should include items or scales that reflect individual, social and environmental mediating variables based on social cognitive theory. In the reviewed studies, however, only knowledge and self-efficacy (both individual mediating variables) were identified as the psychosocial measures most commonly incorporated into the instruments. This is an important limitation because although knowledge and self-efficacy are necessary and important for nutrition education interventions, they may not provide sufficient information to evaluate and understand the complex process of how, and to what extent, behavior change occurs. This may be due to the fact that measures did not completely match with the theoretical framework; frequently, measures tested mediating variables that were not a part of their proposed theoretical framework.
Moreover, very few studies reported whether or not their psychosocial measures were curriculum-based. Studies should report this information more often since instruments should not only be theory-driven, but also incorporate the program or curriculum’s goal, objectives, intensity, duration, and content.\textsuperscript{6,11}

Furthermore, there is an important concern in relation to the practicality of the reviewed instruments. Overall, results indicated that most instruments did not have a reported completion time, and for those that did, only half had an acceptable completion time (less than 20 minutes). Additionally, most of the reviewed instruments included over 40 items. These two properties, completion time and number of items, are very important to consider, particularly when programs targeting children and youth are being evaluated. Lengthy, time-consuming questionnaires create a response burden on participants, and this burden becomes compounded when dealing with children respondents. The majority of these instruments are intended for use with children who have just developed the ability to engage in formal thought, or who are still only capable of concrete operations. Children in the concrete operational stage have been found to have difficulties with motivation and concentration and those who have recently entered the formal thought stage may still have residual difficulties. For a subgroup of the population who already has difficulty staying motivated and concentrating, a substantially large number of questions may lead to poorer data quality.\textsuperscript{41}

In terms of reliability, it was concerning the results for test-retest reliability; only 4 of 14 instruments had acceptable test-retest reliability scores for the instrument as a whole or the subscales. Additionally, it was difficult to draw conclusions or comparisons
across studies, because there was not a standard parameter to establish acceptable levels of test-retest reliability. Some studies reported using Spearman or Pearson coefficients, while others used intra-class correlations (ICC) and/or Cohen’s Kappa coefficient. Since the purpose of test-retest reliability is to assess the temporal stability of measures between test-retest and not associations, researchers suggest that ICC is the most appropriate reliability parameter for continuous measures, weighted Kappa coefficient for ordinal measures and un-weighted Kappa coefficient for categorical measures.42

FUTURE STUDIES

The process of nutrition behavior-change, particularly among children, is still not well understood. As mentioned previously, a review of nutrition intervention literature has shown that self-efficacy/perceived control, outcome expectations/attitude, habit, and behavioral intention are significant correlates of dietary behavior in children.7 These results underscore the fact that pieces and components of behavioral health theories are applicable to nutrition behavior change, but no theory can adequately explain behavior.

One possible explanation for this is that the field of nutrition is very broad and complex, and cannot be reduced to singular activities and behaviors. For example, social cognitive theory, a theoretical perspective used frequently in the instruments reviewed, has been widely used in public health campaigns related to smoking cessation and HIV prevention. Both HIV prevention and smoking cessation, from a health promotion perspective, involve both a limited number, as well as targeted behaviors. Nutrition
behavior change, however, encompasses a vast scope of behaviors, and the efficacy of the behaviors themselves

Future studies should continue to be more precise in parsing out behaviors that fall under the umbrella of nutrition behavior change and then testing them in terms of a psychosocial theory. Fruit and vegetable intake is one nutrition behavior that has frequently been tested with psychosocial theories. Reducing fat, sodium, calories, or increasing low-fat sources of calcium, whole grains or water, however, have not been frequently tested with psychosocial theories, yet these behaviors are encouraged by the federal dietary guidelines. Parsing nutrition behavior as a whole into more testable behaviors may lead to more accuracy in determining how these psychosocial theories really lead to behavior change in the nutrition field, which in turn, would allow researchers to develop more accurate instruments to test their programs.

IMPLICATIONS

The current study has important implications for national nutrition education programming in the US, such as Youth EFNEP. EFNEP stands for the Expanded Food and Nutrition Education Program and is one of the USDA-NIFA’s first nutrition education programs. The goal of EFNEP is to assist limited resource audiences to “acquire the knowledge, skills, attitudes, and changed behavior necessary for nutritionally sound diets, and to contribute to their personal development and improvement of the overall family diet and nutritional well-being” by using a peer-education or paraprofessional model. The age range for Youth EFNEP programs differs
among states and counties. For example, Los Angeles County (California) serves youth ranging in age from 2 to 18, whereas Massachusetts serves youth ranging in age from five to 19.\textsuperscript{45,46} In addition, Youth EFNEP participants come from both rural and urban areas. Mirroring the differences in geographic location and age range, the delivery of Youth EFNEP program takes on various forms. EFNEP provides nutrition education at schools as an enrichment of the curriculum, in after-school care programs and through 4-H EFNEP clubs, day camps, residential camps, community centers, neighborhood groups, and home gardening workshops. No consistent methods or instruments are employed for evaluating Youth EFNEP programs. Perhaps because of their specificity, state EFNEP coordinators usually identify, create, or adapt instruments, which reflect program-specific curriculum. Results of the current study indicate that there is no clear instrument upon which Youth EFNEP should be evaluated; instead, a new instrument targeted towards general nutrition guidelines and common contents taught across different curricula used by different states should be developed.
<table>
<thead>
<tr>
<th>Type of Validity or Reliability</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Content validity</td>
<td>Extent to which items in an instrument are reasonably representative of a larger domain or subject being measured</td>
</tr>
<tr>
<td>Face validity</td>
<td>Extent to which a particular instrument measures what it is intended to measure</td>
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<tr>
<td><strong>Criterion validity</strong></td>
<td>Performance of a measurement instrument against an independent standard for the same entity at the same time</td>
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<tr>
<td>Concurrent</td>
<td>The extent to which futures events are in line with the prediction of these tests</td>
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<tr>
<td>Predictive</td>
<td>Performance of a measurement instrument against an independent standard for the same entity at the same time</td>
</tr>
<tr>
<td><strong>Construct validity</strong></td>
<td>Positive correlations between the construct of interest and other concepts to which it is theoretically related in the same direction</td>
</tr>
<tr>
<td>Convergent</td>
<td>Negative correlations between the construct of interest and other concepts to which it is theoretically related in opposing directions.</td>
</tr>
<tr>
<td>Test-retest reliability</td>
<td>The consistency of the score from one time to another.</td>
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<tr>
<td>Internal consistency</td>
<td>The degree of interrelatedness among the items.</td>
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<tr>
<td>ID#</td>
<td>Name of the Instrument/Program</td>
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<td>---------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>After School Student Questionnaire (ASSQ)/CATCH Kids Club&lt;sup&gt;16,17&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge, Attitudes and Behaviors Questionnaire (KAB)/Pathways&lt;sup&gt;18,19&lt;/sup&gt;</td>
</tr>
<tr>
<td>3</td>
<td>Kids Kartoon/California Expanded Food and Nutrition Education Program (EFNEP)-Eating Right is Basic&lt;sup&gt;20&lt;/sup&gt;</td>
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<td>ID#</td>
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<tr>
<td>4</td>
<td>Nutrition Knowledge, Attitudes and Practices (KAP) questionnaire/Healthy Lifestyle in Children (HELIC)&lt;sup&gt;22&lt;/sup&gt;</td>
</tr>
<tr>
<td>5</td>
<td>Questionnaire to measure personal, social and environmental correlated of fruit and vegetable intake/Pro Children Project&lt;sup&gt;22&lt;/sup&gt;</td>
</tr>
<tr>
<td>6</td>
<td>Measures of Psychosocial Constructs Associated with Adolescents' Calcium Intake/Adequate Calcium Today Study&lt;sup&gt;23&lt;/sup&gt;</td>
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<tr>
<td>7</td>
<td>Psychosocial Measures for Whole-Grain Intake among Children/NR&lt;sup&gt;24,25&lt;/sup&gt;</td>
</tr>
<tr>
<td>8</td>
<td>Nutrition Questionnaire for Students in Years 5,6,7/Eat Well be Active&lt;sup&gt;36&lt;/sup&gt;</td>
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<td>9</td>
<td>Mediating Variables of a School-Based Nutrition Intervention/ High 5&lt;sup&gt;27,28,29&lt;/sup&gt;</td>
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<td>Name of the Instrument/Program</td>
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<td>------------------------------------------------------------------------------------------------</td>
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<tr>
<td>10</td>
<td>Fruit and Vegetables Attitudes, Self-efficacy and Social-Environmental Influences/NR³⁰</td>
</tr>
<tr>
<td>11</td>
<td>Questionnaire to Assess Applied Nutrition Knowledge/After School Cookery Club³¹</td>
</tr>
<tr>
<td>12</td>
<td>FJV Children’s Psychosocial measures/ Gimme 5 Fruit, Juice and Vegetables for Fun and Health Program³²</td>
</tr>
<tr>
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<td>Name of the Instrument/ Program</td>
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<tr>
<td>13</td>
<td>Nutrition Knowledge Questionnaire &amp; Food Preference Survey/ Nutrition to Grow on&lt;sup&gt;33&lt;/sup&gt;</td>
</tr>
<tr>
<td>14</td>
<td>Dietary psychosocial scales/Weight Gain Prevention Study&lt;sup&gt;34&lt;/sup&gt;</td>
</tr>
<tr>
<td>15</td>
<td>Self-efficacy questionnaires/After-school program for urban Native American youth&lt;sup&gt;35&lt;/sup&gt;</td>
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</table>

F & V indicates fruits and vegetables; FJV indicates fruits, juices and vegetables; SCT, Social Cognitive Theory; SLT, Social Learning Theory; TPB, Theory of Planned Behavior; TTM, Trans theoretical Model; NR, not reported
<table>
<thead>
<tr>
<th>ID#</th>
<th>Reliability Assessment</th>
<th>Validity Assessment</th>
<th>Testing</th>
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<tr>
<td></td>
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<td>Test-retest reliability (ICC, κ or r &gt;0.6)</td>
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<tr>
<td>1</td>
<td>NR¹</td>
<td>NR</td>
<td>NR</td>
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<tr>
<td>2</td>
<td>Subscales: Diet self-efficacy, diet intentions, attitudes towards attempts at weight loss</td>
<td>Subscales: Body image attitudes, diet intentions</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Instrument as a whole</td>
<td>NR</td>
<td>Yes</td>
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<tr>
<td>4</td>
<td>Subscale: nutrition knowledge</td>
<td>NR</td>
<td>Yes</td>
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<tr>
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<td>Reliability Assessment</td>
<td>Validity Assessment</td>
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<td></td>
<td>Cronbach’s α (α &gt; 0.6)</td>
<td>Type 1 Test-retest reliability (ICC, κ or r &gt;0.6)</td>
<td>Type 2 Predictive validity</td>
</tr>
<tr>
<td>5</td>
<td>Subscales: F&amp;V self-rated intake, F&amp;V attitudes, F&amp;V liking, F&amp;V active parental encouragement, V perceived barriers, V subjective norm, V availability at home, F knowledge</td>
<td>Subscales: F&amp;V Self-rated intake, V knowledge, F attitudes, F&amp;V liking, F&amp;V subjective norm, F&amp;V parental encouragement, V self-efficacy, F&amp;V intention, F&amp;V habit, F&amp;V preferences, F&amp;V availability away from home, F&amp;V perceived barriers</td>
<td>NR Predictive validity assessed with Spearman correlations between the F&amp;V subscales and vegetable and fruit intake. Correlations with intake were significant except for allow family rule with fruit intake. In general, correlations were moderate to good (r=0.16-0.54) for personal determinants, lower predictive validity for social and environmental determinants.</td>
</tr>
<tr>
<td>6</td>
<td>Subscales: attitudes &amp; preference factor, social and environmental factor, knowledge factor</td>
<td>Subscales: attitudes &amp; preference factor, social and environmental factor</td>
<td>Yes Factor structure assessed with cluster analysis. Results yielded 3 broad psychosocial constructs (attitudes &amp; preference factor; social and environmental factor; knowledge).</td>
</tr>
<tr>
<td>7</td>
<td>Subscale: self-efficacy to choose whole grain foods</td>
<td>Subscales: availability of whole grain foods in the home, self-efficacy to choose whole grain foods, whole grain food</td>
<td>NR</td>
</tr>
<tr>
<td>ID#</td>
<td>Subscales: vegetable attitude, fruit attitude</td>
<td>Subscales: healthy behavior, vegetable attitude, sweetened beverages intake, fruit intake, vegetable intake</td>
<td>NR</td>
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<tr>
<td>9</td>
<td>Subscales: availability, positive outcome expectancies, self-efficacy, peer norms, family norms, teacher norms</td>
<td>Subscales: NR</td>
<td>NR</td>
</tr>
<tr>
<td>10</td>
<td>Subscales: F &amp; V general attitudes, F &amp; V health and physical ability outcome expectancy, F &amp; V preferences, F &amp; V self-efficacy in difficult situations, self-efficacy for selecting F &amp; V over other items, F &amp; V perceived parental behavior, F &amp; V socialization-encouragement, permissive eating practices, F &amp; V obligation rules</td>
<td>Subscales: F &amp; V preferences, F &amp; V general attitudes, selecting F &amp; V over other items, V perceived peer behavior, F parental behavior, F &amp; V availability, F &amp; V obligation rules</td>
<td>NR</td>
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<td></td>
<td>Cronbach’s α (α &gt;0.6)</td>
<td>Test-retest reliability (ICC, κ or r &gt;0.6)</td>
<td>Type 1</td>
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<tr>
<td>11</td>
<td>Subscale: knowledge of food preparation</td>
<td>Assessed, but subscales were not above threshold</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>Subscales: F&amp;V knowledge, F&amp;V preference, snack preference, F&amp;V positive outcome expectations, eating F&amp;V self-efficacy for asking and shopping self-efficacy, social norms, asking behaviors</td>
<td>Subscales: outcome expectancies and self-efficacy</td>
<td>NR</td>
</tr>
<tr>
<td>13</td>
<td>NR</td>
<td>Instrument as a whole</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>Subscale: healthy eating self-efficacy and outcome expectancies</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>ID#</td>
<td>Reliability Assessment</td>
<td>Validity Assessment</td>
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<td>Cronbach’s α (α &gt; 0.6)</td>
<td>Test-retest reliability (ICC, κ or r &gt; 0.6)</td>
<td>Type 1</td>
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<tr>
<td>15</td>
<td>Subscale: self-efficacy scale</td>
<td>Subscale: self-efficacy scale</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*This instrument was based on the School-Based Nutrition Monitoring Student Questionnaire and the Health Behavior Questionnaire, which have validity and reliability tests associated with them. Test-retest for nutrition knowledge questions, which the ASSQ covers, ranged from 0.14- to 0.52 for all items for 4th grade, which is part of the targeted audience of ASSQ. In addition, content validity was established through an expert panel.

NR= Not Reported

b= It is important to note that there is a parent component to this instrument, but only the youth component was reviewed.

F= fruits, V= vegetables, F&V= fruits & vegetables, ICC= intra-class correlation, κ= Kappa statistics, r= Spearman or Pearson correlation.
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29 Domel, SB; Baranowski, T.; Davis, HC; Thompson, WO; Leonard, SB; Baranowski, J. Psychosocial predictors of fruit and vegetable consumption among elementary school children. Health Education Research 1996,11, 299–308


36 Baranowski, T. “Advances in basic behavioral research will make the most important contributions to effective dietary change programs at this time.” Journal of the American Dietetic Association 106 (2006): 808-11.


CHAPTER IV
A CONTENT ANALYSIS OF NUTRITION EDUCATION CURRICULA USED WITH LOW-INCOME YOUTH AUDIENCES: IMPLICATIONS FOR QUESTIONNAIRE DEVELOPMENT

In Preparation to Health Promotion Practice

ABSTRACT

In developing recommendations for core measures/items for the evaluation of the Youth Expanded Food and Nutrition Education Program (EFNEP), three nutrition education curricula, implemented by land grant universities, were content analyzed. Selection criteria included: curriculum content must include all EFNEP core content areas and must be implemented in more than one state with school children in 3rd through 5th grades. Content analysis strategies were employed to identify and describe common areas/themes and mediators of behaviors addressed across the selected curricula. Content analysis coding was based on a list of behavioral mediators, which have empirical associations with nutrition, physical activity and food safety. The most evident approaches identified across the three curricula were to enhance motivation, teach cognitive knowledge and practice behavioral skills. The presence of self-regulation and environmental theory-based strategies was limited in all three curricula. In addition, multiple themes for nutrition, physical activity and food safety were commonly addressed across curricula with multiple educational strategies. Based on these findings, recommendations for developing content appropriate measures and items for an outcome evaluation tool for Youth EFNEP are provided.

Key words: nutrition education; youth; EFNEP; content analysis; evaluation
BACKGROUND

School-based nutrition education programs promote healthy lifestyles among children and contribute to the prevention of childhood obesity (Sharma, 2011; Veugelers & Fitzgerald, 2005; Zenzen & Kridli, 2009). The youth component of the Expanded Food and Nutrition Education Program (EFNEP), operated through the land grant university cooperative extension system, and is one example of a federally funded program that provides nutrition education each year to more than 400,000 low-income youth across the United States (USDA-NIFA, 2010). The goal of Youth EFNEP is to enable ethnically diverse low-income children and youth to “acquire the knowledge, skills, attitudes, and changed behaviors necessary for nutritionally sound diets” (USDA-NIFA, 2010). To accomplish this goal, Youth EFNEP-through an experiential learning model-provides a series of nutrition education lessons in the following core areas: diet quality, physical activity, food safety, food preparation and food choices. State EFNEP Coordinators can develop new or use existing education curricula to meet the specific needs and/or characteristics of the diverse audiences in their state (i.e. age range, ethnicity, location) (Guthrie, Stommes & Voichick, 2006). If a state EFNEP coordinator chooses to use an existing curriculum, it is typically one developed by other land grand universities. Paraprofessionals, from the community, are recruited and trained to teach the nutrition education lessons.

In EFNEP, nutrition education curricula are the core educational resource used by paraprofessionals to teach the nutrition education lessons, and as mentioned above a wide
variety of curricula is used. Yet, there is still a need for standard and robust evaluation measures that are based on national goals as well as to the curricula objectives, content, and learning experiences used by this program to address changes on mediators of behavior and/or behavior change (Contento, 2011; Townsend & Kaiser, 2007).

A standardized, theory-driven, valid and reliable outcome evaluation measure is critical for Youth EFNEP at a national level across all the curriculums for several reasons. First, given the public health problem of childhood obesity and food insecurity among low-income audiences, Youth EFNEP needs to measure and compare the effectiveness and quality of states’ approaches. Secondly, in 2011, EFNEP was appropriated $68.70 million dollars (Cornerstone Team, 2011); therefore a standard outcome evaluation tool will help for accountability purposes and to determine if the funds and resources are use efficiently. Lastly, an outcome evaluation tool in conjunction with process evaluation methods will provide useful information to improve the program delivery, staff trainings and the overall program.

In an attempt to begin the process of developing core measures/items for the outcome evaluation of Youth EFNEP, this study focuses on the content analysis of several common nutrition education curricula used with youth EFNEP audiences in grades three through five. According to the literature, content analysis is an appropriate research method for the systematic review and analysis of written educational materials (Neuendorf, 2002). Thus, the goal of this study was to explore and understand the common topics and theory-based strategies addressed across youth EFNEP curricula in
order to recommend appropriate outcome evaluation measures for the Youth EFNEP program.

**THEORETICAL FRAMEWORK**

Social Cognitive Theory was the guiding theoretical framework for this content analysis. SCT was selected because it is one of the most widely used and accepted theories with school-based nutrition education interventions (Auld et al., 1998; Baranowski et al., 2000; Liquori, Koch, Contento, & Castle, 1998; Reynolds et al., 2000). In general terms, SCT proposes that behavior is the result of personal, behavioral, and environmental factors that influence each other within a dynamic and reciprocal determinism (Bandura, 2004; Contento, 2011). Examples of constructs (mediators of behavior) of this theory are: outcome expectations/beliefs about outcomes, self-efficacy, knowledge-behavioral skills, goal-setting skills/self-regulation skills, and social/environmental influences (Contento, 2011).

**METHODS**

*Curricula selection*

During the period of July through August 2009, a web-based survey (Survey Monkey, 2009) was sent to state EFNEP coordinators (n=75) at land grant universities in 50 states and 6 U.S. territories, with the purpose of identifying nutrition education
curricula to be considered for content analysis. Thirty-three State Coordinators responded to the web-based survey (response rate 44%). In total, they reported seventeen different curriculums used with school-aged EFNEP participants.

Four inclusion criteria were established for selecting curricula. First, the curriculum had to be implemented in more than one state. Second, the curriculum had to include all Youth EFNEP core content areas (diet quality, physical activity, food safety, food preparation and food choices). Third, the curriculum had to be developed for school-aged children, in 3rd through 5th grades. Fourth, the curriculum had to be readily available (i.e. easily purchased). Only three met the inclusion criteria. Table 4.1 presents the list of curriculums included in the analysis and their general characteristics.

**Coding Instrument Development**

Coding tools and corresponding coding guide were developed to use in a curriculum content analysis that would answer the following evaluation questions (EQ):

**EQ1:** “To what degree are the content areas of nutrition, physical activity and food safety employed across the selected Youth EFNEP curricula?” **EQ2:** “What theory-based strategies (mediators of behavior) are most prevalent across these Youth EFNEP curricula?” **EQ3:** “How are theory-based strategies incorporated in these Youth EFNEP curricula?” Also, an adapted version of the “General Curriculum Information Form” from the Health Education Curriculum Analysis Tool (HECAT) (CDC, 2007) was incorporated into the data collection materials to help reviewers become familiar with the
curriculum content, and to register general information from the curriculum (i.e. name, developer, intended audience).

Specifically, the coding guide included variables that were based on theories of behavior change (Bandura, 2004), literature review (CDC, 2007; Doshi, Patrick, Sallis & Calfas, 2003; Hansen, Dusenbury, Bishop & Derzon, 2007) and on a preliminary reading of each curriculum’s lessons. The format of the coding guide was organized as follows:

First, the coding guide was divided into three core content areas: nutrition, physical activity and food safety. Then, each core content area was divided into five broad theory-based strategy categories that were labeled as information, materials and/or activities incorporated in the curriculums that focused on changing participants’: 1) motivation; 2) cognitive knowledge; 3) perceived social and environmental influences; 4) goal-setting/self-regulation skills; and 5) personal self-efficacy and behavioral skills (Hansen et al., 2007). Additionally, each category sorted by core content area, included a list of ideal indicators (theme codes) to facilitate the data collection process (Alshamrani, 2008). Instructional strategies codes (type of learning and application experiences) were also used to assess how theory-based strategies were incorporated across curricula. The first draft of the coding guide was reviewed for content validity by two experts in the areas of health promotion and education, nutrition and physical activity; and pilot-tested by ten trained nutrition undergraduate students. Results from the expert reviews and pilot test were used to modify the codebooks.
Research team

Under the supervision of one health promotion and education expert, ten trained nutrition students (one doctoral student and nine nutrition undergraduate students) from the Food, Nutrition, and Packaging Science Department at Clemson University, carried out the curricula review. Trainings involved learning about Youth EFNEP; behavioral theories; qualitative and quantitative techniques for content analysis; and how the data collection materials work.

Coding procedure

Three curricula that met all inclusion criteria were content analyzed through an iterative process, initiating on October 2009 and ending on April 2010. The units of data collection were all written messages, information and activities included in the lesson plans, except the lesson titles, objectives and background information for the teachers. Because some curriculums were very extensive or had a separated book per grade, at least three undergraduate students were assigned per curriculum. Each reviewer first read each lesson to get familiarize with the curriculum. Secondly, one “HECAT General Curriculum Information Form” was completed per curriculum. Third, by using the coding guide each reviewer independently content analyzed an assigned section of the curriculum and inserted the results on the coding forms. The research team met biweekly to discuss and agree about the process and classification of the codes (Cassata & Cox, 2009). A doctoral student coordinated all the processes, reviewed the accuracy of the
codes and updated the coding guide as many codes were added, modified, and/or deleted during the analysis process (Neundorf, 2002).

**Analysis**

All materials associated with one curriculum were analyzed as an individual unit, even if they were separated by grade. Descriptive and comparative analyses were performed for all the variables of interest in several ways.

First, to examine the degree to which each content area was employed across curricula, a mean percentage was calculated for the three core content areas. For example, the prevalence of nutrition content across curricula was calculated based on all the ideal indicators that comprised nutrition themes (codes) found in each curriculum.

Second, to examine the prevalence of theory based strategies across curricula, theory based strategies were grouped into the three core content areas, and a mean percentage was computed for each theory-based strategy with the following formula:

\[
\frac{(\text{Sum of occurrence of all separate theory-based strategies/total occurrence of all theory-based strategies}) \times 100}{100}
\]

(Doshi et al., 2003; Paek, Bae, Hove & Yu, 2011).

Third, to examine how these theory-based strategies were incorporated across curricula, the specific nutrition, physical activity and food safety themes commonly addressed by all curricula were identified by each theory-based strategy. Additionally, these common themes across curricula were rated according to the type of instructional strategy used to address the themes. Ratings were from 1=only information is provided.
to 3= information and more than one opportunity or activity to apply and practice learned knowledge and/or skills are provided (CDC, 2007).

RESULTS

The content analysis results of this study yielded information regarding the common theory based strategies (i.e. motivational, cognitive, socio-environmental, self-regulation and behavioral) employed across all the curricula for the content core areas of nutrition, physical activity and food safety. Nutrition, physical activity and food safety themes addressed by each theory-based strategy were also identified, as well as their level of application or learning strategy.

EQ1: To what degree are the content areas of nutrition, physical activity and food safety employed across the selected Youth EFNEP curricula?

Nutrition, physical activity and food safety were the three core content areas that emerged from a preliminary qualitative review of the curricula. Figure 4.1 presents the degree to which the content areas of nutrition, physical activity and food safety were included across youth EFNEP curricula (EQ1). The largest core content area addressed in all curricula was nutrition (70%), followed by physical activity (17%) and food safety (13%).
**EQ2: What theory-based strategies are most prevalent across the selected Youth EFNEP curricula?**

Figure 4.2 displays the mean presence of theory-based strategies employed across all curricula and sorted by core content area. Findings suggest that the most common approach for promoting behavioral change across curricula and within core content areas was to enhance motivation, teach cognitive knowledge and practice behavioral skills. The mean presence of self-monitoring and environmental theory-based strategies was limited across curriculums, therefore within core content areas too.

**EQ3: How were these theory-based strategies incorporated across the selected Youth EFNEP curricula?**

Table 4.2 displays how the selected Youth EFNEP curricula addressed each theory-based strategy. Specifically, this table reports on the nutrition, physical activity and food safety themes that were derived from each theory-based strategy, which were addressed across all selected curricula. Additionally, this table presents the extent to which these common themes were implemented by each curriculum. Results show that several themes were commonly addressed across curricula, and that most of the curricula tended to address these themes with information and at least one “hands on” opportunity or activity to practice the learned knowledge and skills. The following section includes qualitative information to complement the results from table 4.2.
**Overall application of motivational educational strategies.** All the selected curricula addressed personal motivational strategies through focusing on the benefits and/or positive outcomes of each food group of MyPyramid; eating a variety of foods; eating breakfast; daily physical activity; hand washing; keeping everything clean; washing fruits and vegetables; and storing & separating foods properly. Other positive outcomes were mentioned such as the benefits of nutrients and of limiting the amount of fat and added sugar; however, they were not present across all curricula. Oral explanations, visuals, reinforcing questions, handouts and some hands on activities such as match games (i.e. food groups & benefits), jeopardy game and team discussions were the most common educational activities used to learn and apply these motivational strategies. Another finding was that in most lessons of all the selected curricula, tasting activities were incorporated.

**Overall application of cognitive educational strategies.** Many of the educational experiences, especially for the nutrition core area, were designed to increase cognitive/factual knowledge necessary to support behavior change. The knowledge-related themes commonly included in all curricula were: concepts from MyPyramid such as knowing a variety of foods from each food group, serving sizes and number of servings recommended per day of all food groups; examples of healthy snacks choices and of nutritious foods for breakfast; daily recommendation of physical activity (60 minutes each day or most of the days); MyActivity Pyramid levels; ways to be active every day (i.e. rope jumping, playing a sport or active games); when hands should be washed; methods to keep food safe (i.e. “Fight BAC rules”); foods that would be safe to eat at
room temperature, and foods that need to be kept cold. These themes were addressed through oral explanation and discussions (i.e. cases scenarios to identify improper food safety practices). Handouts, games, food models and questions were also used as instructional strategies to reinforce the concepts learned.

**Overall application of behavioral-skill building educational strategies.** All the analyzed curricula provide both passive and hands on experiences (i.e. clear instructions, demonstrations, guided practice, games, worksheets, visuals) for the students to learn and practice how to apply essential behavioral skills. For example, all the curricula included several activities to teach food labels and to compare food products. Also, a common behavioral approach across curricula was to instruct students on how to plan and prepare a healthy snack, based on MyPyramid food groups. For physical activity, all curricula included both individual and group-cooperative opportunities for students to practice and participate in several types of physical activities or games such as jumping, stretching, running in place, dancing, and muscle movements. Relative to food safety, all curricula provide opportunities of food preparation to show how to wash hands, to clean fruits and vegetables, and applying safe food storage practices.

**Overall application of self-regulation/monitoring educational strategies.** Self-regulation approaches were addressed across curricula for the core areas of nutrition and physical activity. Essentially, to encourage students to improve behaviors during the program and in the future, all curricula include activities for setting healthy goals and monitoring progress toward goal. For instance, in one of the curriculums, within the core area of nutrition, students use a journal to a write goal for trying something different each week.
and instructors have to monitor students’ progress or changes on a weekly basis. Similarly, for physical activity, in almost every lesson of the curricula sampled, there was a portion devoted to reminding the students to record their daily exercise/physical activity.

*Overall application of socio-environmental educational strategies.* The curricula analyzed do not include much information or opportunities regarding personal, family, and/or peer norms that influence behavioral change related to nutrition, physical activity and food safety. However, to promote a supportive environment, all curricula included newsletters, which are sent to parents after each lesson. These newsletters included nutrition-related tips and healthy recipes to improve children’s food choices and encourage parents and children to cook together. For example, if the lesson was about whole grains, then the newsletter includes tips for parents about learning how to incorporate more whole grains in family meals.

**DISCUSSION**

Findings from this study suggest that content analysis could be used to identify and select appropriate theory-driven curricula content for the program logic model outcomes. Also, the content analysis results of this study can be used as a foundation to develop, identify and/or select evaluation tools for Youth EFNEP that “matched” the program scope and content. Essentially, knowing the common content elements and how behavior change is commonly addressed across the selected curricula (theory into
practice) may help EFNEP administrators and researchers to prioritize which core measures and questions could be potentially included in an outcome evaluation tool for Youth EFNEP. Furthermore, it may protect against type III error whereby there is a mismatch between what was delivered in the program and the intended change measured through the evaluation (Kalafat, Illback, Sanders, 2007).

**Summary of Curricula Content Analysis Outcomes**

This content analysis of three youth nutrition education curricula demonstrates that the primary focus of the reviewed curricula was nutrition followed by physical activity and food safety. These findings are consistent with recent review articles of school based nutrition interventions, where most of the interventions analyzed targeted both nutrition and physical activity behaviors (Roseman, Riddell, Haynes, 2011; Sharma, 2011; Zenzen & Kridli, 2009). Focusing on these two behaviors is particularly important for Youth EFNEP participants, who are at greater risk of childhood obesity and food insecurity (Nord, Coleman-Jensen, Andrews, Carlson, 2011; Troiano & Flagel, 1998; Lutfiyya, Garcia, Dankwa, Young, Lipsky, 2008). However, since the reviewed curricula devote more time to nutrition, it would be important to complement these curricula with other materials that place a stronger emphasis on physical activity and food safety.

In this study, the coding system used for the curricula content analysis provided a systematic framework to identify which themes were commonly addressed across curricula. Examples of themes commonly addressed within the nutrition core content
area were aspects related to label reading, choosing/preparing healthy snacks, eating breakfast and the basics of MyPyramid such as: variety, food groups, recommended daily servings and serving sizes. For physical activity the curricula commonly addressed a variety of ways to increase physical activity; and for food safety the emphasis was on aspects related to hand washing and essential food safety practices like cleaning, cooking, storing and avoiding cross contamination.

Based on the following statement “interventions do not directly change behaviors; instead, interventions are designed to change mediating variables, and changes in mediating variables change behavior” (Baranowski, 2006; Brug, Oenema, Ferreira, 2005), it was imperative for this study to identify the common theoretical basis of the reviewed curricula. Social Cognitive Theory served as a useful theoretical framework to facilitate the process of identifying/coding implicit-explicit mediating variables (theory-based strategies) used across curricula for influencing behavior change. Social Cognitive Theory suggests that effective nutrition education programs designed for children include the following essential components: motivational-informational (why change and how to change); opportunities to develop social and self-management; opportunities to build self-efficacy to support behavior change and overcome difficulties; and opportunities to promote environmental support for change (Bandura, 2004; Contento, 2008).

Although the purpose of this study was not to assess the quality or effectiveness of the reviewed curricula in terms of how to change mediating variables and/or behavioral change, the present study demonstrates that by assessing the type (presence or not presence), frequency (mean prevalence) and intensity (type of educational
experiences used to both learn and apply) of theory-based strategies used, researchers were able to have insight not only about the curricula content and specific themes but also about which implicit/explicit mediating variables related to child nutrition, physical activity and food safety behavioral change were commonly targeted across curricula. In fact, the major findings of the content analysis of theory-based strategies used revealed that the included curricula really focus on increasing knowledge, motivation and skills. It is interesting that the curricula did not include much opportunity for family involvement and/or for self-control and or for addressing how participants would handle environmental barriers/challenges. Many studies suggest that strong inclusions of parental support as well as an analysis of barriers, planning and evaluation of goals are extremely important to change behavior by increasing participants’ self-efficacy (Anderson, Richard, Winnet, Wojcik, 2001; Beckman, Hawley, Bishop, 2006; Wright, Wilson, Griffin, Evans, 2010).

Finally, to link core content areas, themes and theory-based strategies, all curricula included educational activities mainly guided by the experiential learning model—“learn by doing approach” (Kolb, 1984). For example, a combination of oral explanations, guided practice, games, demonstrations, skill building, food preparation and tasting activities were commonly included across curricula to actively involve students rather than only using didactic instructional strategies.
LIMITATIONS

There are several limitations on this study. First, results could not be generalized for the following reasons: there was not a random selection of curricula; new curriculums could have been added since the research began; and the curricula sample was small (n=3). However, specific selection criteria were established to identify curricula that are used by more than one state and that included all the EFNEP core content areas. Second, although efforts were made to establish the content validity of the content analysis coding guide, due to the wide variety of contents and approaches included in the reviewed curricula, and the difficulties of conceptualizing and operationalizing the categories and codes used, this coding guide may not be accurate enough to capture the entire scope addressed in the curricula. Third, although trainings were conducted for the nutrition undergraduate students (data collectors) and the final coding decisions were discussed and agreed by at least two reviewers, the limited experience of undergraduate students on this type of research technique may add a certain level of subjectivity. Finally, this study focuses on evaluating common elements of the reviewed curricula necessary to establish a foundation for questionnaire development; it did not evaluate other characteristics of the curricula such as: age-appropriateness, cultural appropriateness, adherence to dietary recommendations and other factors that may affect the quality and effectiveness. Fortunately, future research could complement this type of curricula content analysis, with other curriculum evaluation tools and with a comprehensive outcome and process evaluation of the implementation of the program.
IMPLICATIONS FOR QUESTIONNAIRE DEVELOPMENT

In spite of the limitations, this study has practical implications especially for questionnaire development. Results suggest that this type of content analysis could be used as a systematic approach to review, select and/or improve nutrition education materials. This study expands the current knowledge related to theory adherence of nutrition education curricula used with EFNEP youth participants. This is imperative, as preventing childhood obesity has become a public health priority. Results from this content analysis could be used to develop, identify and/or select evaluation tools/questions with content appropriateness. Moreover, curricula results showing the emphasis on individual level (intra-personal) mediating variables with an incomplete level of attention to interpersonal (family, friends) and environmental constructs, suggest that, in the same way, evaluation measures should focus on knowledge, motivation (i.e. outcome expectations), self-efficacy, intention, and potentially initiating behavior change, not on sustained behavior change which requires attention to be placed on interpersonal and environmental factors as well.

ACKNOWLEDGEMENTS

This study was supported by the Clemson University Creative Inquiry Initiative, and by the MICIT/CONICIT Government of Costa Rica. The authors want to thank all the EFNEP State Coordinators and/or staff who responded to the web-based survey that informed the research team about curricula used at their states with 3rd, 4th and 5th
graders. In addition, special thanks to the nutrition undergraduate students from the Creative Inquiry FDSC 450 Section 03 from the Food, Nutrition and Packaging Science Department at Clemson University, who were part of the data collection team: Ginger Thomas, Trisha Hall, Victoria Hayden, Amelia Gannon, Melissa Ikerd, Hannah Clarck, Kathryn Lybran, Carli Onksen and Laura Johnson.
### Table 4.1

**General Characteristics of Curriculums Included in the Content Analysis**

<table>
<thead>
<tr>
<th>Name of curriculum</th>
<th>Developer</th>
<th>Theoretical Framework</th>
<th>Age Range</th>
<th>Format/# lessons</th>
<th>Evaluation Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump into Food and Fitness</td>
<td>Michigan State University Extension</td>
<td>Experiential Learning Model</td>
<td>Grade 3 to 5</td>
<td>One general curriculum for all grades/8 lessons</td>
<td>Questionnaire to assess knowledge, attitudes and behaviors</td>
</tr>
<tr>
<td>Show me Nutrition</td>
<td>University of Missouri Extension</td>
<td>Experiential Learning Model</td>
<td>Pre-kinder to 8 grade</td>
<td>Specific curriculum for each grade/# of lessons varies</td>
<td>Knowledge-based questionnaire</td>
</tr>
<tr>
<td>Exploring My Pyramid with Professor Popcorn</td>
<td>Purdue University Extension</td>
<td>Experiential Learning Model</td>
<td>Grade 1 to 6</td>
<td>Specific curriculum for each grade /5 lessons each</td>
<td>Questionnaire to assess knowledge and behaviors</td>
</tr>
</tbody>
</table>

Note: The content analysis included curricula only for 3rd, 4th and 5th grades.
Figure 4.1. Mean distribution of core content areas employed in all curricula
Note: To facilitate the quantitative content analysis, the EFNEP core areas related to diet quality, food choices/shopping and preparation were grouped into the nutrition core content area.
Figure 4.2. Mean Prevalence of Theory Based Strategies Across All Curricula Sorted by Core Content Areas
Table 4.2
Analysis of the Application of Theory-Based Strategies Across All Curricula

<table>
<thead>
<tr>
<th>Theory-Based Strategy/ Common Themes</th>
<th>Learning/Application Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JIFF</td>
</tr>
<tr>
<td><strong>Motivational Strategies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Nutrition themes</strong></td>
<td></td>
</tr>
<tr>
<td>Importance/benefits of eating whole grains</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of eating vegetables</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of eating fruits</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of eating fruits</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of eating dairy products</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of eating meat and beans</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of eating a variety of foods</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of eating breakfast</td>
<td>2</td>
</tr>
<tr>
<td>Tasting a variety of foods</td>
<td>3</td>
</tr>
<tr>
<td><strong>Physical Activity themes</strong></td>
<td></td>
</tr>
<tr>
<td>Importance/benefits of being physically active everyday</td>
<td>1</td>
</tr>
<tr>
<td><strong>Food Safety themes</strong></td>
<td></td>
</tr>
<tr>
<td>Importance/benefits of hand washing</td>
<td>2</td>
</tr>
<tr>
<td>Importance/benefits of keeping everything clean</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of storing food properly</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of cooking food properly</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of separating food properly</td>
<td>1</td>
</tr>
<tr>
<td>Importance/benefits of washing fruits and vegetables</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cognitive-Factual Knowledge Strategies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Nutrition themes</strong></td>
<td></td>
</tr>
<tr>
<td>Variety of foods from each food group</td>
<td>3</td>
</tr>
<tr>
<td>Recommended daily servings from each food group</td>
<td>2</td>
</tr>
<tr>
<td>Size of servings from each food group</td>
<td>1</td>
</tr>
<tr>
<td>Examples of healthy snack choices</td>
<td>2</td>
</tr>
<tr>
<td>Examples of nutritious breakfast foods</td>
<td>2</td>
</tr>
<tr>
<td>Concept of whole grain</td>
<td>1</td>
</tr>
<tr>
<td><strong>Physical Activity themes</strong></td>
<td></td>
</tr>
<tr>
<td>Recommended amount of physical activity</td>
<td>3</td>
</tr>
<tr>
<td>Levels of physical activity according to My Pyramid</td>
<td>1</td>
</tr>
<tr>
<td>Ways to increase daily physical activity</td>
<td>2</td>
</tr>
<tr>
<td>Identify physically active and physically inactive behaviors</td>
<td>1</td>
</tr>
<tr>
<td><strong>Food Safety themes</strong></td>
<td></td>
</tr>
<tr>
<td>When hands should be washed</td>
<td>2</td>
</tr>
<tr>
<td>Methods to keep food safe (e.g. “fight BAC rules”)</td>
<td>1</td>
</tr>
<tr>
<td>Foods that would be safe to eat a room temperature</td>
<td>1</td>
</tr>
<tr>
<td>Foods that need to be kept cold</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4.2 (Continued)

<table>
<thead>
<tr>
<th>Theory-Based Strategy/ Common Themes</th>
<th>Learning/Application Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JIFF</td>
</tr>
<tr>
<td><strong>Behavioral-skill building strategies</strong></td>
<td></td>
</tr>
<tr>
<td><em>Nutrition themes</em></td>
<td></td>
</tr>
<tr>
<td>Reading food labels to make healthy eating choices (low fat, low sugar, low sodium)</td>
<td>3</td>
</tr>
<tr>
<td>Plan and prepare healthy meals and snacks</td>
<td>3</td>
</tr>
<tr>
<td><em>Physical Activity themes</em></td>
<td></td>
</tr>
<tr>
<td>Practice a variety of physical activities and/or physically active games</td>
<td>3</td>
</tr>
<tr>
<td><em>Food Safety themes</em></td>
<td></td>
</tr>
<tr>
<td>Practice how to wash hands</td>
<td>2</td>
</tr>
<tr>
<td>Practice how to clean fruits and vegetables</td>
<td>2</td>
</tr>
<tr>
<td>Practice safe food storage practices</td>
<td>2</td>
</tr>
<tr>
<td><strong>Self-Regulation/Monitoring Strategies</strong></td>
<td></td>
</tr>
<tr>
<td><em>Nutrition themes</em></td>
<td></td>
</tr>
<tr>
<td>Set a goal to increase daily physical activity</td>
<td>3</td>
</tr>
<tr>
<td>Monitor progress in attaining a physical activity goal</td>
<td>2</td>
</tr>
<tr>
<td><em>Physical Activity themes</em></td>
<td></td>
</tr>
<tr>
<td>Set a goal to increase daily physical activity</td>
<td>3</td>
</tr>
<tr>
<td>Monitor progress in attaining a physical activity goal</td>
<td>2</td>
</tr>
<tr>
<td><strong>Social-Environmental Strategies</strong></td>
<td></td>
</tr>
<tr>
<td>Parents involvement to encourage healthy food choices</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: 1=only information; 2= information and one opportunity or activity to apply and practice learned knowledge and/or skills; 3= information and more than one opportunity or activity to apply and practice learned knowledge and/or skills. JIFF=Jump into the Food and Fitness; SMN=Show me Nutrition; PP=Professor Pop Corn
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CHAPTER V

DEVELOPMENT AND CONTENT VALIDATION PROCESS OF EFNEP
YOUTH QUEST: A NUTRITION EDUCATION IMPACT ASSESSMENT TOOL
DESIGNED FOR LOW-INCOME CHILDREN

In Preparation to Evaluation and Program Planning

Abstract

Objective: To describe the development and content validation of a self-report
questionnaire designed for the youth component of the Expanded Food and Nutrition
Education Program (EFNEP), and to highlight the lessons learned during the process.

Theoretical framework: The Community Nutrition Education (CNE) logic model and
constructs from Social Cognitive Theory (SCT) and the Theory of Planned Behavior
(TPB).

Target Audience: Low income ethnically diverse children in third, fourth and fifth
grades.

Description: EFNEP Youth Quest is a self-report questionnaire that includes knowledge
and psychosocial mediating variables targeted by Youth EFNEP interventions. The
constructs and content areas were selected based on topics a content analysis of multiple
curricula used by Youth EFNEP. Items were selected from existing questionnaires used
by Youth EFNEP and published school-based interventions; new items were created as
necessary.
**Evaluation:** This study describes the two stage-process for the content validation of EFNEP Youth Quest. The first a developmental stage involved: determining the content domains, measures and item topics; generating an item pool; and determining the format of the measurement. Second a judgmental stage involved expert reviews of the draft instrument and revisions, pilot testing of the revised instrument and final revision.

**Conclusion:** Findings from this study suggest that EFNEP Youth Quest is a content valid and age-appropriate tool for evaluating Youth EFNEP programs. However, further research is needed to determine the factor structure, reliability and predictive validity of the instrument (currently in progress). The procedures and lessons learned during the development and content validation of EFNEP Youth Quest could serve as a framework for similar assessment evaluation tools for different age groups.

**Keywords:** youth, EFNEP, content validity, questionnaire development, psychosocial mediators
1. Background

In the United States, the problems of childhood obesity and food insecurity are greater among children from lower-socioeconomic families and from minority groups (mainly African-Americans and Hispanics) (Nord, & Parker, 2010; Troiano, & Flagel, 1998; Lutfiyya et al., 2008). Compared to food secure children, food insecure children have more eating related risk factors associated with obesity including higher consumptions of fast food and calories from fat and less food availability of both healthy and unhealthy foods (Widome, Neumark-Sztainer, Hannan, & Story, 2009). Furthermore, studies have shown that children living in low-income food-insufficient households spend more time watching television, live in neighborhood environments that lack opportunities to promote physical activity or that are perceived by parents as not sufficiently safe to allow children to play outside (Casey, Szeto, Lensing, Bogle, & Weber, 2001; Lutfiyya et al., 2008).

Research on childhood obesity prevention strategies is critical to develop more effective interventions among this population. However, much work is needed to overcome the methodological challenges related to the evaluation and measurement of the effectiveness of this type of interventions.

The Expanded Food and Nutrition Education Program (EFNEP) is one example of a federally funded program that aims “to assist limited-resource audiences in acquiring the knowledge, skills, attitudes and changed behavior necessary for nutritionally sound diets” (USDA-NIFA, 2010). EFNEP operates in all 50 states and U.S. territories, and it
targets two main audiences: low income children (Youth EFNEP) and low-income families with children (Adult EFNEP).

Annually, Youth EFNEP reaches more than 400,000 youth through traditional classroom programs, after-school programs, day camps and youth group activities during the summer. The implementation of the program includes a series of nutrition education lessons, taught by paraprofessionals, in which children are encouraged to learn and practice essential elements related to diet quality, physical activity, food safety, food preparation and food shopping practices.

Currently, one of the research priorities of Youth EFNEP is to have valid and reliable, age-appropriate evaluation instruments to report and disseminate the effectiveness of the program. Evaluation measures of nutrition education programs such as Youth EFNEP should be also practical to administer and for participants to respond (Townsend, 2006). Moreover, evaluation measures need to be based on the national goals but also they need to be developed upon curriculum’s objectives, content, duration and intensity, because different curricula are being used by different states (Contento, 2011; Townsend, & Kaiser, 2007).

To contribute to the enhancement of the current evaluation methods used by Youth EFNEP, the EFNEP Youth Quest questionnaire was designed as a comprehensive impact assessment tool that is robust for evaluating essential elements commonly found in various curricula used across the U.S. Youth EFNEP program. This evaluation tool was designed specifically for youth EFNEP participants in 3rd, 4th and 5th grades and includes knowledge and psychosocial mediating variables targeted by Youth EFNEP.
interventions. The development and validation of this evaluation tool included theory-based and rigorous psychometric procedures (i.e. content and face validity, factor analysis, test-retest reliability, internal consistency and convergent validity) to assess validity, reliability and utility.

The purpose of this article is to provide a comprehensive description of the development and content validation of the EFNEP Youth Quest questionnaire, and to highlight the lessons learned during the process.

2. Methods

Content validity is a term used to describe the degree to which items on an instrument adequately reflect a desired domain of content (DeVellis, 1991; Grant, & Davis, 1997). Based on our literature review, content validity of EFNEP Youth Quest was addressed through a two-stage process (Chatterji, Sentovich, Ferron, & Randina-Gobioff, 2002; DeVellis, 1991; Lynn, 1986; Townsend, 2006).

First, a developmental stage involved: determining the content domains, measures and item topics (conceptualization); generating an item pool; and determining the format of the measurement. Second, a judgmental stage involved expert reviews of the draft instrument and revisions, pilot testing (cognitive interviews) of the revised instrument and final revision.
2.1. Settings, participants and protocol

This study took place primarily at Clemson University, South Carolina. Two nutrition students (one at the doctoral level and one at the undergraduate level) coordinated the development and content validation of EFNEP Youth Quest questionnaire. First an advisory committee of three faculty members provided feedback during instrument development process. These faculty members had combined research experiences with EFNEP, Cooperative Extension, nutrition education, physical activity, public health, health disparities, behavioral theories, evaluation and measurement. Next, for the initial validation of EFNEP Youth Quest, a panel of five experts from Clemson University as well as from other universities (i.e. Colorado State University and Virginia Polytechnic Institute and State University) was invited to review the first draft of the questionnaire. Finally, for pilot testing the questionnaire, a convenience sample of low-income-minority children (n=14, mean age = 9.2), who attended summer camps completed the cognitive interviews.

The Institutional Review Board (IRB) of Clemson University granted approval for this study. Specifically, for cognitive interviews, consent forms were directly handed out to parents, one week before the cognitive interviews; and the assent forms were given to the children the day of the interview. Participants received an incentive valued at five dollars (gift bag with one snack bar and nutrition related magnets, book marks and pens).
2.2. Theoretical and conceptual framework

The theoretical framework of this study was the Community Nutrition Education Logic Model (CNE, Medeiros, Butkus, Chipman, Cox, Jones, & Little, 2005), and constructs from two behavioral theories widely used in school-based obesity prevention programs: Social Cognitive Theory (SCT, Bandura, 1986) and Theory of Planned Behavior (TPB, Ajzen, 1991) (Zenzen, & Kridli, 2009). The framework was essential to identify the program’s theory at the individual level and to prioritize the constructs for inclusion in the questionnaire development (See Figure 5.1).

Secondly, the conceptual framework was obtained through curricula content analysis techniques. Multiple Youth EFNEP nutrition education curricula (n=3), designed for 3rd, 4th and 5th graders, were reviewed and content analyzed. The aim of this preliminary study was to identify core content areas, topics and theory-based strategies commonly taught across curricula that could potentially serve for the generation of items and construction of the questionnaire. The main procedures and results of this content analysis study are reported elsewhere (Hernandez-Garbanzo, Griffin, et al., in preparation).

Furthermore, to build on previous efforts done by the “EFNEP Youth Evaluation Workgroup” and to be aligned with what Youth EFNEP should teach, this research was also based on: 1) the National Youth EFNEP core areas and behavioral outcomes (Table 5.1); and 2) the National guidelines from MyPlate and Fight BAC campaign (PFSE, 2010; USDA, 2011).
2.3. Overview of the developmental stage of EFNEP Youth Quest

In this study, the purpose of questionnaire development was to design an impact assessment tool for Youth EFNEP participants in 3rd, 4th and 5th grades that include outcomes that could be modified by Youth EFNEP interventions. Overall, the questionnaire development process occurred in three phases as described below.

2.3.1. Phase 1: Identification of content domains, measures and item topics

The aim of this phase was to identify and provide a clear description of the “content domains” to be measured (DeVellis, 1991). This step also involved the selection of measures and item topics.

Identifying content domains, measures and item topics to include in the questionnaire was particularly a challenging task for the research team. Because Youth EFNEP programs target a variety of behaviors (i.e. diet quality, physical activity, food choices/shopping practices, food safety and food preparation) - through a wide variety of educational materials - there were many variables to organize and define for this stage. For this reason, and to make the process more systematic, comprehensive and efficient, we integrated empirical findings from the literature review and guidelines of scale development with the respective theoretical and conceptual framework of this study.

As a result, the research team identified three relevant content domains for inclusion in the development of the instrument: 1) nutrition (dietary quality, food preparation and food choices were combined in this category), 2) physical activity and 3) food safety. Item topics for potential inclusion were: whole grains, fruits, vegetables, dairy, meats, fat,
sugar, dairy, label reading, breakfast, physical activity, and the “Fight BAC rules” (i.e. clean, separate, cook and chill). In addition to that, an emphasis was placed on measuring knowledge and psychosocial mediating variables (i.e. outcome expectations, intentions, and self-efficacy) rather than behaviors (Brug, Oenema, & Ferreira, 2005; Dzewaltowski, Noble, & Shaw; 1990; Townsend & Kaiser, 2007). There are several reasons supporting this methodological decision: 1) data from the content analysis study revealed that knowledge and psychosocial mediators of behavior change were the main target of the program educational objectives and instructional activities (Hernandez-Garbanzo, Griffin et al., in preparation); and 2) the theoretical framework of this study and additional literature hypothesize that in the short-term, knowledge and psychosocial mediating variables are the most appropriate measures to impact; and that changes on these mediators may explain future behavior change (Contento, Randell, & Basch, 2002). Furthermore, multiple investigators have found that measuring behavioral change among children is quite complex; compared to adults, children are less likely to have direct responsibility for their actions and/or behaviors (Bere, van Lenthe, Kleoo, & Brug, 2008; Van Der Horst et al., 2007).

2.3.2. Phase 2: Item generation

The aim of the item generation was to generate a large pool of items for constructing the first draft of the questionnaire. First, this phase included the development of inclusion criteria for items in developing a preliminary questionnaire. Potential items had to be theory based and clearly represent relevant cognitive and psychosocial constructs
this study attempted to measure. Items had to reflect objectives/content of commonly used Youth EFNEP curricula. Finally, items had to be age-appropriate (for children in 3rd, 4th and 5th grades) and had to be tested for content and/or face validity.

Next, an extensive literature review was conducted to identify Youth EFNEP instruments as well as other instruments used for measuring knowledge and psychosocial measures related to nutrition, physical activity and food safety among school-aged children. After a preliminary review of more than 200 potential items (76 food safety items, 41 physical activity items and 83 nutrition items), the first version of the questionnaire consisted of 68 items (Baranowski et al., 2000; Burgess-Champoux, Rosen, Marquart, & Reicks, 2008; Glanz, & Steffen, 2008; Kelder et al., 2005; Potter, Judkins, Piesse, Nolin, & Huhman, 2008; Saunders et al., 1997; Stevens et al., 1999; Trost et al., 1997; Wilson, Margarey, & Matterson, 2008). Items that did not meet the list of specifications or were considered to be repetitive or ambiguous were excluded. New items had to be created for specific topics (i.e. food safety self-efficacy).

2.3.3. Phase 3: Determination of the format of the measurement

The aim of this phase was to establish the format and layout of the questionnaire (i.e. sections, response format, directions format, appearance). We designed a self-report questionnaire that can be administered using a paper-pencil format before and after Youth EFNEP interventions. The selected items were organized according to the following ten sections: nutrition knowledge, nutrition outcome expectations, nutrition intentions, nutrition self-efficacy, physical activity outcome expectations, physical activity social
influences, physical activity self-efficacy, food safety knowledge, food safety outcome expectations and food safety self-efficacy. The rule of thumb was a decision made about having at least three items per measure, mainly to ensure that the scale’s length was long enough for reliability purposes but short enough to reduce response burden (DeVellis, 1991). Then, the questionnaire’s wording style, instructions, response options and layout were designed according to the experiences, development and cognitive level of children in 3rd, 4th and 5th grades. For instance, lengthy and negative worded items were avoided; and response options were reduced to three-point or binary scales (Saunders et al., 1997). Finally, to make the questionnaire visually attractive and enjoyable for kids, a graphic designer was consulted regarding child-appropriate images, fonts and layout.

2.4. Overview of the judgment stage of EFNEP Youth Quest

2.4.1. Obtaining expert reviews

Five experts with backgrounds in EFNEP, nutrition, physical activity, education, psychology, evaluation, public health, and health promotion & education, were invited to rate and review items of the draft questionnaire. Experts rated with a 4-point Likert scale, each of the items in terms of relevancy, clarity, ambiguity, and adequacy of response options. They also provided qualitative suggestions to revise, and/or delete and/or add new items.

Experts’ ratings were analyzed by the calculation of item-level content validity index (I-CVI) and scale average content validity index CVI (S-CVI/Ave). While I-CVI
(proportion of experts who scored an item as relevant with either a 3 or 4) measures validity for each item, S-CVI/Ave (average of I-CVIs divided by the total number of items) measures the validity for the questionnaire as a whole. In this study, values of I-CVI less than 1 indicated the need for item revision or deletion. A S-CVI/Ave of 0.80 was the minimum acceptable value for the content validity of the questionnaire (Grant, & Davis, 1997; Lynn, 1986; Polit, & Beck, 2006). Both the values of content validity index as well as the comments given by experts served as the basis to modify, delete and/or add new items to the questionnaire before it was pilot-tested.

2.4.2. Pilot-test study

Cognitive interviews techniques were used to assess if children understood the questionnaire’s instructions, items and response options as intended by the researchers, the appropriateness of the layout and illustrations of the questionnaire (Bowen, 2008).

The cognitive interview guide was developed based on existing cognitive interviews protocols found in the literature (Shafer, & Lohse, 2010; Willis, 1999). An undergraduate and a doctoral student from the Food, Nutrition and Packaging Sciences Department at Clemson University, were trained and used the interview guide to implement the cognitive interviews.

Cognitive interviews took place in a private classroom and lasted approximately one hour. All interviews were tape-recorded and were facilitated by an interviewer while a second staff member recorded notes and observations. The interviewer provided and practiced simple examples of think-aloud techniques before starting the testing process.
(de Leeuw, Borges, & Smits, 2004). The interviewer first read the question aloud; the child followed along and was asked to select a response. Next, the child was asked to say what they were thinking when they answered the question. Probes to elicit additional information were: “Could you tell me in your own words, what you think this question is asking?” “What does the term “whole milk” mean to you?” “Was this question easy or hard for you” “Is this how you would ask your friend this question?”

The analysis included several steps to identify primarily problems associated with the questionnaire design. Researchers reviewed the recorded notes, observations and tape-recorded transcripts of each interview. To summarize and analyze the data, the researchers coded each problem into categories that were both mutually exclusive and exhaustive. To insure the reliability of the results the two researchers discussed the qualitative data to come to an agreement in regards to the classification of the problems (Conrad, & Blair, 2004).

3. Results

3.1. Results of expert reviews

Results from the calculation of content validity index indicated that all the experts rated the majority of the items either relevant or very relevant. As displayed in table 5.2, 14 out of the 67 items (21%) had a mean item level of CVI of 0.75 (ratings 1 or 2), and 53 items (79%) had an item level of CVI of 1.00 (rating 3 or 4). The S-CVI/Ave score, which indicates the average item quality of the overall instrument, was 0.95.
Table 5.3 summarizes the types of modifications that occurred to the “EFNEP Youth Quest questionnaire” as a result of the experts’ ratings and suggestions. Reasons for modifying or deleting a question were: items with CVI less than 1, not good representation of the construct of interest, misinterpretation of the construct of interest, repetitive items, language problems, specificity and lack of familiarity with specific terms. Furthermore, some items and/or response options were seen as too easy or too difficult.

Variations existed in the ratings across scales. For the most part, items within the scales of nutrition outcome expectations and physical activity social influences were the ones that received the lowest ratings of I-CVI. According to the experts, reasons behind this problem were: limited representation of the construct of interest or limited relevancy for the curriculum content, respectively.

Moreover, the experts qualitative comments revealed that items related to nutrition intentions and nutrition self-efficacy were the most likely to have a different interpretation. In particular, experts indicated that most of these items could be problematic and be considered “food preferences”. Proposed solutions for this issue were: to improve the instructions format (stronger link between the instructions, headers and questions), and to replace specific examples of “unhealthy vs. healthy food options” with more general examples of “unhealthy vs. healthy food options” (See Table 5.3). In addition, the experts recommended that pilot testing be done to identify the understanding and interpretation of these items from the participants’ point of view.
The overall results after expert reviews were: 16 items remained the same; 23 items were deleted primarily because they had low relevancy (n=14) or because comments made against them showed a strong rationale for deleting the item (n=9); 28 items were slightly reworded to improve issues revealed by the experts; and 11 items (5=nutrition outcome expectations; 3=nutrition self-efficacy; and 3=physical activity self-efficacy) were added to improve the content and construct representation. Finally, the total number of items was 57.

3.2. Results of the pilot study

A total of 14 children (6 males, 8 females), aged 8 and 11 completed the cognitive interviews. Participants were from minority groups (5 African-Americans, 9 Hispanics) recruited from EFNEP eligible summer camps.

As depicted in table 5.4, a variety of problems emerged from the cognitive testing indicating need for further revision of the questionnaire. As expected by experts, one of the main problems during the cognitive testing was related with the interpretation of the self-efficacy questions. Specifically, when children were asked self-efficacy questions, most of them had difficulties to distinguish between “what I can do” with “what I actually do”. Also, they misunderstood for whom the question was asked. For example, instead of answering, “Yes, I am sure I can ask my parents to buy whole grain bread” some of the answers received were “Yes, we buy whole grain bread” or “Yes, my parents buy whole grain bread”. Strategies used to addressed these issues were: 1) provide brief instructions and make them more visually appealing; 2) provide one simple example of
how to answer these types of questions; 3) add the words “I Can” to each of the response options; 4) highlight (bold) the word “CAN” in the instructions, questions and response options; and 5) capitalize the word “You” and clearly explain to the respondents that these questions do not have to be respond for anyone else but “you” (Table 5.4).

Another problem pointed out by the children was the length of the questionnaire. When the interviewer was asking questions from the last two sections of the questionnaire, most of the children were already tired evidenced by their gestures, body posture, lack of attention and comments. Therefore, to avoid response burden and make the questionnaire implementation more interactive, researchers printed the questionnaire in a double-sided booklet format, and added stop signs after each section and with it a 1-minute routine of physical activity between sections.

Another important limitation was that some questions were not appropriate in relation to the children’s context (i.e. school environment, socio-economic status). For example, one child said, “I am not sure I can eat fruits every day because my parents sometimes do not have the money to buy fruits every week”. In this particular case, it was suggested to replace the word “everyday” to “most days” in attempt to reduce the confounding factor of limited availability of fruits at home.

Other issues requiring revision from cognitive testing were: to improve the adequacy of the instructions (i.e. shorter and more visually appealing); to simplify the length and wording of questions; to clarify vague terms, consistency and style of response options; to enhance data quality (i.e. put an “I don’t know option” for knowledge questions); and to improve the appropriateness of the pictures and general layout of the questionnaire (i.e.
put knowledge questions at the end). Overall, revisions after cognitive interviews yielded a new version of the questionnaire with a total of 57 questions.

4. Discussion and lessons learned

In this study, the content validity of EFNEP Youth Quest questionnaire was investigated and addressed by a justification of how the instrument was developed; by quantitative and qualitative expert reviews; and by pilot testing the instrument with cognitive interviews techniques.

By describing the content validation process of “EFNEP Youth Quest”, this study attempted to provide new and important insights that could benefit the evaluation and measurement practices of Youth EFNEP program. This study highlighted a number of factors that researchers have to take into consideration when developing a questionnaire particularly for nutrition and physical activity programs such as Youth EFNEP.

4.1. Lesson # 1: Have a theoretical and conceptual framework to guide the questionnaire development process

With respect to the identification of content domains, topics and measures, the research team highlighted the importance of using theory in conjunction with scale development guidelines, literature review and curricula content analysis. This approach was essential to organize all the variables that characterize Youth EFNEP, to focus what was most important to measure and therefore to ensure the content validity of the
questionnaire during the developmental stage. One of the most important results of this combined approach was to support the decision, and explain the usefulness of measuring changes in cognitive and psychosocial constructs related to nutrition, physical activity and food safety behaviors. According to the literature, cognitive and psychosocial mediating variables are sensitive to testing, as well as helpful to understanding the mechanisms by which an intervention might achieve its effects (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003; Kraemer,Wilson, Fairburn, & Agras, 2002; Medeiros et al., 2004; Townsend, & Kaiser, 2007).

4.2. Lesson # 2: Both expert reviews and pilot-testing cannot be overlooked

Regarding assessing the quality of the items, findings from this study confirmed that it was crucial to obtain the point of views of both the experts and the respondents. Findings from the expert reviews were very useful to assess the quality of the items, confirm the content validity of the questionnaire (i.e. S-ICVI/Ave=0.95), and also to address important limitations of the draft instrument (i.e. redundancy, lack of relevancy, language problems, specificity). Another lesson learned from expert reviews was that the selection of at least five experts on diverse areas and with expertise on Youth EFNEP, and/or with the theoretical and conceptual model of this study, helped to improve the measurement, interpretation and documentation of the content validity results (Yaghmale, 2003). By pilot-testing the questionnaire with cognitive interviews, the researchers had increased opportunities to maximize the age-appropriateness and socio-cultural competence of the questionnaire. Additionally, this testing process was pivotal to have
an in depth understanding of children’s item interpretation, response and developmental skills toward answering the overall questionnaire.

4.3. Lesson # 3: Consider limitations as opportunities to improve

Limitations of this study should be noted as opportunities to improve. The first limitation is that this study focuses only on the development and content validation processes of EFNEP Youth Quest, rigorous psychometrics analysis are not reported. Thus, the next phase is to evaluate the factor structure, convergent validity, internal consistency and test-retest reliability of the instrument with a larger sample of participants. Secondly, although it was valuable that the instrument was pilot-tested with a sample of low-income Hispanic and African-American youth, the results cannot be generalized. Further research should consider including also low-income White children, having a larger sample size and/or pilot-test the instrument in other states. Lastly, another limitation related to the judgment stage was that both expert reviews and cognitive interviews were employed only one time each during the questionnaire development process. Researchers recommend using an iterative process (multiple rounds of expert ratings and pilot-testing) to have a better assessment and revision of items (Bowen, 2008; Chatterji, Sentovich, Ferron, & Rendina-Gobioff, 2002).

4.4. Lesson # 4: Focus on one age group at the time
Given the wide variety of age-dependent nutrition education curricula and range of cognitive and developmental skills of EFNEP youth participants (Serrano et al., 2011), investigators considered it important to focus the questionnaire design for one age group; specifically 3rd, 4th and 5th graders. The 3rd-5th grade age range was chosen because at this age children have the developmental skills (language and reading skills) needed to be surveyed (Borges, de Leeuw, & Hox, 2000). Additionally, this grade group is aligned with one of the grade spans of the National Health Education Standards (NHES) (Joint Commission on National Health Education Standards, 2007). Overall, by specifying the age range of the intended audience, the research team was able to develop the questionnaire based on recommended practices for interviewing children between the ages 8 to 10 (de Leeuw, Borgers, & Smits, 2004; Saunders et al., 1997; Stevens et al., 1999).

4.5. Lesson # 5: Length of the questionnaire matters

One lesson learned from the phases of item generation and construction of the measurement, was that the length of the questionnaire really matters. According to scale development guidelines “having a lot of items is one form of insurance against poor internal consistency” (DeVellis, 1991). Nevertheless, when designing an evaluation tool for children and for federal programs serving low-income communities, the perspective is quite different (Banna, Becerra, Kaiser, & Townsend, 2010; Townsend, 2006). Usually, among low-income children, especially among minority groups, long questionnaires could represent a potential risk for fatigue, lack of concentration, higher rates of non-
response or non-completion (Banna, Becerra, Kaiser, & Townsend, 2010; Borgers, De Leeuw, & Hox, 2000). Therefore, to overcome this challenge, this study demonstrated that it was important to design the questionnaire long enough (at least 3 items per scale) to ensure reliability but also short enough to avoid response burden. Another action taken to minimize the response burden was to reduce the response format of the questionnaire to three-point or binary scales; even though this represents a shortcoming for the overall variability of the questionnaire (DeVellis, 1991; Saunders et al., 1997).

5. Conclusion

Findings from this study suggest that EFNEP Youth Quest is a content valid and age-appropriate tool that could potentially be used for the evaluation of Youth EFNEP program. However, further research is needed to determine the factor structure, reliability and convergent validity of the instrument (in progress). The procedures and lessons learned during the development and content validation of EFNEP Youth Quest could serve as a framework to EFNEP leaders and researchers to work with different age groups.

Acknowledgments

This study was supported by Clemson University and by the MICIT/CONICIT Government of Costa Rica. The authors want to thank the experts who evaluate and provided feedback to the first draft of EFNEP Youth Quest. In addition, special thanks to
children who participated in the cognitive interviews and to the community leaders who helped the research team to recruit participants.
Figure 5.1. Theoretical framework for the development of an impact assessment tool for the Youth Expanded Food and Nutrition Education Program (Youth EFNEP).
Table 5.1.
National Youth EFNEP core areas and outcomes

<table>
<thead>
<tr>
<th>Core Areas</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nutrition</td>
<td>Youth choose food according to MyPlate Recommendations</td>
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<tr>
<td>2. Physical Activity</td>
<td>Youth improve their physical activity practices</td>
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<tr>
<td>3. Food Safety</td>
<td>Youth use food safe handling practices</td>
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<tr>
<td>4. Food Shopping</td>
<td>Youth make good choices when spending food for money</td>
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<tr>
<td>5. Food Preparation</td>
<td>Youth acquire the skills to prepare nutritious, affordable foods</td>
</tr>
</tbody>
</table>

Source: EFNEP/FSNE Youth Evaluation Workgroup (USDA, 2009).
Table 5.2. Ratings on EFNEP Youth Quest items by five experts: items rated 3 or 4 on a 4-point relevance scale

<table>
<thead>
<tr>
<th>Item</th>
<th>Expert 1</th>
<th>Expert 2</th>
<th>Expert 3</th>
<th>Expert 4</th>
<th>Expert 5</th>
<th># In Agreement</th>
<th>Item CVI</th>
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<td>Proportion Relevant</td>
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<td>Mean I-CVI=0.95</td>
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<td>0.89</td>
<td>0.94</td>
<td>Mean expert proportion (S-CVI/Ave)=4.74/5=0.95</td>
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Ratings of 1= not relevant; 2=item needs revision; 3=relevant but needs minor revisions; 4=very relevant.  
Dashes indicate ratings of 1 or 2. "X" indicates ratings of 3 or 4. CVI: Content Validity Index; I-CVI: Item-level Content Validity Index; S-CVI/Ave: Scale-level Content Validity Index averaging method=average of the I-CVIs for all items on the instrument (Polit & Beck, 2006; Polit, Beck & Owen, 2007).
### Table 5.3.
Issues identified by experts to improve the content validity of EFNEP Youth Quest

<table>
<thead>
<tr>
<th>Example of original item (s) or response (s) or instruction</th>
<th>Problem identify by experts</th>
<th>Solution proposed by experts and/or researchers</th>
<th>Example of revised item (s) or response (s) or instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Items with I-CVI &lt; 1.00 (relevance rates of 1 or 2)</strong></td>
<td></td>
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<tr>
<td>Item #12-Breakfast is important to me</td>
<td>I-CVI=0.8</td>
<td>Delete items with I-CVI &lt; 1.00, unless qualitative comments from experts provide a strong justification to keep the item.</td>
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<tr>
<td>Experts indicated that this question seems more like a general attitude than a good representation for the construct “nutritional outcome expectations”.</td>
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<tr>
<td><strong>Repetition of items</strong></td>
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<tr>
<td>Item #55-If I think a food may be spoiled, I …</td>
<td>Experts indicated that other food safety knowledge questions had already addressed food spoilage, and they were more consistent with the overall format of the knowledge questions.</td>
<td>Delete items in order to avoid repeating identical concepts.</td>
<td>Deleted</td>
</tr>
<tr>
<td>a) Cook it</td>
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<td>b) Taste it to see if tastes ok</td>
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<td>c) Throw it in the trash</td>
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<tr>
<td><strong>Language</strong></td>
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<tr>
<td>Item #24-For lunch, I can drink water instead of regular “pop”-Kool aid</td>
<td>Three experts said that they are regional differences of how the term “pop” is used.</td>
<td>Modify ambiguous words or terms to make them more culturally and age-appropriate. Two experts said that soda is probably better in the southeast.</td>
<td>Item #24-For lunch, I can drink water instead of regular soda</td>
</tr>
<tr>
<td><strong>Misinterpretation of the content or construct of interest</strong></td>
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<td>Section C included a set of 9 items to assess food choice intentions. One item example is: Item#15-Which bread would you choose for a sandwich? A. White bread B. Whole wheat bread</td>
<td>Two experts indicated that these types of items could be assessing personal preferences or nutrition knowledge (which is the healthiest option). There was not any information to let the children know that they are supposed to be choosing their intent to do a behavior.</td>
<td>Clarified instructions to avoid misinterpretation of the construct of interest.</td>
<td>Directions: Tell us which food or drink would you pick? If you had a choice… #15-Which bread would you choose for a sandwich? A. White bread B. Whole wheat bread</td>
</tr>
<tr>
<td>Example of original item (s) or response (s) or instruction</td>
<td>Problem identify by experts</td>
<td>Solution proposed by experts and/or researchers</td>
<td>Example of revised item (s) or response (s) or instruction</td>
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<tr>
<td><strong>Lack of familiarity with specific terms</strong>&lt;br&gt;Item #60-I think unsafe food can make people really sick&lt;br&gt;a) Disagree&lt;br&gt;b) Not sure&lt;br&gt;c) Disagree</td>
<td>Three experts indicated that some youth might not know what the words unsafe food or threatening mean.</td>
<td>To clarify the term unsafe food, one expert suggested putting examples of unsafe foods. However, in general the suggestion was to develop a new scale for assessing food safety outcome expectations since two examples were not age-appropriate.</td>
<td>Deleted these two items. Also, provided recommendations for future research since developing a new scale for food safety outcome expectations was beyond the purpose of this research study.</td>
</tr>
<tr>
<td><strong>Specificity</strong>&lt;br&gt;Item #20-Which food would you ask the adults in your house to buy?&lt;br&gt;A. Bag of oranges&lt;br&gt;B. Bag of tortilla chips</td>
<td>Two experts indicated that by listing specific foods like bag of oranges (#20) or pepperoni pizza (#26), there is an increased risk of measuring taste preferences than food intentions and self-efficacy, respectively.</td>
<td>Modify words or terms that confuse the interpretation of the construct of interest. Experts suggested using examples of foods in general than specific food choices or meals.</td>
<td>Item #20-Which food would you ask the adults in your house to buy?&lt;br&gt;A. Bag of fruits (e.g. oranges, apples, bananas)&lt;br&gt;B. Bag of tortilla or potato chips</td>
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<tr>
<td>Item #26- At home, I can ask for cheese pizza instead of pepperoni pizza</td>
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<td>Item #26- At home, I can ask for a fruit instead of a chocolate bar</td>
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<td>Example of original item (s) or response (s) or instruction</td>
<td>Problem identified by experts</td>
<td>Solution proposed by experts and/or researchers</td>
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<tr>
<td><strong>Level of difficulty - Items too easy</strong></td>
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<td>Item # 2-Maria, Jon and Quinton were outside playing soccer when their moms called them for lunch…Which meal contains foods from all the five groups?</td>
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<tr>
<td>Item # 2-Which food contains foods from all the five groups?</td>
<td>Two experts indicated that this item was too easy for the intended audience. “…With this format, it is very easy for the participants to recognize the foods in the food groups”.</td>
<td>Additional descriptions were added in the question and response options to enhance the question’s difficulty level. One expert said, “The idea is that students “count” ingredients and come up with an answer”.</td>
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<tr>
<td>a) Ham, green pepper and pineapple pizza</td>
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<td>a) Maria’s-Grilled ham sandwich with lettuce, low-fat cheese, whole wheat bread, served with orange</td>
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<tr>
<td>b) A grilled cheese sandwich</td>
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<td>b) Jon’s- Grilled cheese sandwich made with low-fat cheese, whole wheat bread, served with milk</td>
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<tr>
<td>c) A fruit smoothie</td>
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<td>c) Quinton’s- Peanut butter sandwich served with fruit smoothie made with low-fat yogurt and strawberries</td>
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Table 5.4.
Problems identified from the analysis of the cognitive testing study of the EFNEP Youth Quest questionnaire

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<tr>
<th>Example of original item (s) or response (s) or instruction</th>
<th>Problem identified by respondents</th>
<th>Solution proposed by participants and/or researchers</th>
<th>Example of revised item (s) or response (s) or instruction</th>
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</table>
| **Misinterpretation of the content or construct of interest** | Twenty two questions were related to self-efficacy and included the following format: **Directions:** Tell us how sure you are about being able to do the following things. Please CIRCLE one answer for each question. How sure are you that you CAN: **Examples of two items:** **Question**-I can get my parents to do physical activity or sports with me  
A. Not sure  
B. A little bit sure  
C. Sure  
**Question**-At the store, I can read a food label to help choose a healthy snack or drink.  
A. Not sure  
B. A little bit sure  
C. Sure | Most of the respondents did not read or misread the instructions. Additionally, they selected the answers based on what they do instead of what they can do, and/or in some cases they selected the answers in terms of what their parents or others do (i.e. “Yes my parents read the food labels”) | Clarified instructions. Make all of them brief and more appealing for the kids (bigger letters and have a kid with a speech bubble telling the instructions).  
After reading the instructions provide a simple example of how to answer and not to answer the self-efficacy questions.  
Highlight keywords (YOU and CAN) in the instructions and questions.  
Add additional description to the response options (I CAN). | **Choose one:** How sure are YOU that you CAN successfully do the following…  
**Question**-I CAN get my parents to do physical activity or sports with me  
A. Not sure I CAN  
B. A little bit sure I CAN  
C. Sure I CAN  
**Question**-At the store, I CAN read a food label to help choose a healthy snack or drink.  
A. Not sure I CAN  
B. A little bit sure I CAN  
C. Sure I CAN |
<p>| <strong>Questions too long</strong> | One of the knowledge questions had a story format with the intention of making the kids more involved with the question: “Maria, Jon and Quinton were outside playing soccer, when their moms called them in for lunch… which meal contains foods from all the five groups?” | Took the respondents a long time to read and answer the question; and when paraphrasing the question they said a shortened version. | Eliminated the story format of the question to make it easier and faster to read and/or answer. | <strong>Question</strong>-Which meal contains foods from all the food groups? |</p>
<table>
<thead>
<tr>
<th>Example of original item (s) or response (s) or instruction</th>
<th>Problem identified by respondents</th>
<th>Solution proposed by participants and/or researchers</th>
<th>Example of revised item (s) or response (s) or instruction</th>
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<tr>
<td><strong>Lack of familiarity with specific terms</strong>&lt;br&gt;&lt;br&gt;<em>Question</em>- Which would you pick to drink: Regular milk OR Low fat/skim milk</td>
<td>Respondents had difficulties to identify the differences between the different types of milk. Most of the respondents knew the different types of milks based on the color of the cap.</td>
<td>First, replaced the word “regular” milk with “whole” milk, because that is how it is presented in the package. Second, add pictures of whole milk and low-fat milk. Third, include in the protocol the use of food models to show the different types of bread and milk while the interviewer asks these questions.</td>
<td><img src="image" alt="Whole milk" /> <img src="image" alt="Low fat/skim milk" /></td>
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<tr>
<td><strong>Question</strong>- What is the best way to get rid of bacteria?</td>
<td>This question was constantly requested for repetition. Many respondents stated that this question was hard to understand because they did not know the meaning of “get rid of bacteria”</td>
<td>The wording of the question was totally replaced to facilitate children’s understanding and with the intent to measure how to avoid cross-contamination.</td>
<td><img src="image" alt="Question" /> <strong>Question</strong>- What will you do to avoid germs?</td>
</tr>
<tr>
<td><strong>Question</strong>- I can do physical activity 60 minutes each day</td>
<td>Most of the respondents did not know the definition of “physical activity”. In addition, most of the respondents used the word hours when describing a time frame.</td>
<td>Included an oral explanation and pictures to illustrate the definition of physical activity, and added “1 hour” beside 60 minutes.</td>
<td><img src="image" alt="Question" /> <strong>Question</strong>- I can do physical activity 60 minutes (1 hour) each day</td>
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<tr>
<td><strong>Inadequacy of response options</strong>&lt;br&gt;&lt;br&gt;Five nutrition knowledge questions asked about the amount in cups or ounces of each food group that children should eat each day. Example: <em>Question</em>: How many ounces should you eat from the grain group each day? <em>Response options</em>: A) 4 ounces, B) 5 ounces, C) 6 ounces</td>
<td>Most respondents reported to guess the answers of these questions, mainly because they did not know how much an ounce or a cup was.</td>
<td>Added a “D” option for “I don’t know”, and added pictures of approximates quantities besides the responses options.</td>
<td><img src="image" alt="How much food for the milk, yogurt and cheese group should you eat each day?" /> <strong>Question</strong> - How much food for the milk, yogurt and cheese group should you eat each day? A) 1 cup, B) 3 cups, C) 5 cups, D) I don’t know</td>
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<tr>
<td>Example of original item (s) or response (s) or instruction</td>
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<td>Solution proposed by participants and/or researchers</td>
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<td><strong>Limited question’s appropriateness</strong></td>
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<td><em>Question</em>- I can eat fruit everyday</td>
<td>Some children indicated that they are not sure to eat fruit every day because their parents run out of money.</td>
<td>To make the questions more appropriate to the economic situation of the targeted participants the word “everyday” was replaced with “most days”</td>
<td><em>Question</em>- I can eat fruit most of the days</td>
</tr>
<tr>
<td><em>Question</em>- When you were at the school and you were thirsty, which would you pick?</td>
<td>Most of the respondents reported that their schools do not have soda available for them.</td>
<td>Removed the word “school” to make the question relevant to their daily lives.</td>
<td><em>Question</em>- Which one would you pick if you are thirsty?</td>
</tr>
<tr>
<td><strong>Question</strong>- I can do physical activity 60 minutes each day</td>
<td>Most of the respondents did not know the definition of “physical activity”. In addition, most of the respondents used the word hours when describing a time frame.</td>
<td>Included an oral explanation and pictures to illustrate the definition of physical activity, and added “1 hour” beside 60 minutes.</td>
<td><em>Question</em>- I can do physical activity 60 minutes (1 hour) each day</td>
</tr>
<tr>
<td><strong>Lack of appropriateness of the pictures</strong></td>
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<tr>
<td>Cartoon carrots in the physical activity section</td>
<td>Respondents recommended replacing the pictures of the physical activity section, since the cartoon carrots do not look like they were playing a sport.</td>
<td>Included pictures of cartoon kids, who are doing different types of physical activity.</td>
<td></td>
</tr>
<tr>
<td>Example of original item (s) or response (s) or instruction</td>
<td>Problem identified by respondents</td>
<td>Solution proposed by participants and/or researchers</td>
<td>Example of revised item (s) or response (s) or instruction</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>----------------------------------</td>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------</td>
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<tr>
<td><strong>High response burden</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The original questionnaire included 9 pages—single-sided, stapled</td>
<td>Most of the respondents stated and reflected frustration because the questionnaire had many pages</td>
<td>Respondents agreed to change the questionnaire to a booklet style (only 5 pages—2 sided)</td>
<td>Print and staple the questionnaire in a vertical booklet style.</td>
</tr>
<tr>
<td>The original questionnaire included 57 questions divided into three core areas sections: nutrition, physical activity and food safety.</td>
<td>Most of the respondents reported that the questionnaire was long also because of the number of questions and instructions.</td>
<td>Grouped the questions by psychosocial measures with similar instructions instead of grouping them by core content areas. Also, include stop signs after each section and with it a 1-minute routine of physical activity.</td>
<td>Attempt to reduced burden and incorporate interactive activities within the questionnaire implementation.</td>
</tr>
<tr>
<td>Knowledge questions at the beginning of the questionnaire</td>
<td>Knowledge questions at the beginning create discomfort among many respondents. Respondents perceived the questionnaire as a test</td>
<td>Knowledge questions were placed at the end of the questionnaire. Also, instructions were included at the beginning of the questionnaire to indicate that this questionnaire is not a test.</td>
<td>Clarified instructions and appropriate sequence of the questionnaire.</td>
</tr>
</tbody>
</table>
References


CHAPTER VI

ITEM REDUCTION AND PSYCHOMETRIC TESTING OF EFNEP YOUTH QUEST: A SELF-REPORT QUESTIONNAIRE DESIGNED FOR THE YOUTH EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM (EFNEP)

In Preparation to Public Health Nutrition

Abstract

**Objective:** To determine the factor-structure and assess psychometric properties of EFNEP Youth Quest, a self-report questionnaire designed for the youth component of the Expanded Food and Nutrition Education Program (EFNEP).

**Design:** This study involved exploratory factor analysis (EFA), internal consistency, test-retest reliability and item analysis of EFNEP Youth Quest. Additionally, the predictive validity of the nutrition and physical activity psychosocial scales were assessed against direct measures of food intake and physical activity.

**Setting:** Elementary schools serving low-income audience in South Carolina and North Carolina, U.S.A

**Subjects:** Multiethnic male and female 3rd, 4th and 5th graders, from low-income SNAP-eligible schools. Data from 454 elementary students were used for EFA, item analysis and internal consistency, from 75 for test-retest reliability assessment, and from 62 (nutrition) and 47 (physical activity) for scale predictive validity analyses.
Results: EFA yielded interpretable factors for the set of psychosocial items within the nutrition (n=3), physical activity (n=2) and food safety (n=1) domains, with large factor loadings (>0.40) and adequate goodness of fit. The internal consistency across final scales was acceptable (Cronbach’s α> 50). Kappa statistics for test-retest was significant across all items from the reduced scales, but the level of agreement varied substantially, ranging from 0.06-0.70. In predictive validity analysis, three out of the 12 hypothesized correlations were significant. The difficulty index for the nutrition and food safety knowledge items ranged between 6-40% and 49-92%, respectively. The final outcome after EFA and item analysis was a reduction of the number of items of EFNEP Youth Quest from 57 to 35.

Conclusion: This study provides an empirically tested measure, which can be used to evaluate Youth EFNEP programs. Although further work is needed, results of this study suggest the questionnaire is acceptable for Youth EFNEP evaluation.

Keywords: low-income youth, factor analysis, validity, reliability, Youth EFNEP
Background

The increasing problem of childhood obesity and food insecurity among low-income children highlight the importance of developing effective interventions among this population (Koplan, Liverman & Kraak, 2005; Nord, & Parker, 2010; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010).

The Expanded Food and Nutrition Education Program (EFNEP), is one example of a federally funded program that aims “to assist limited-resource audiences in acquiring the knowledge, skills, attitudes and changed behavior necessary for nutritionally sound diets” (USDA-NIFA, 2011). EFNEP operates in all 50 states and U.S. territories, under the guidance of the United States Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA) and Land-grant Universities. EFNEP targets two main audiences: low-income children (Youth EFNEP) and low-income adults with children (Adult EFNEP).

Annually, Youth EFNEP reaches more than 400,000 youth, age 3 years through high-school students, from traditional classroom settings, after-school programs, day camps and youth group activities during the summer. The implementation of the program includes a series of nutrition education lessons, taught by paraprofessionals, who are recruited from the community, and trained by EFNEP coordinators.

State EFNEP Coordinators can develop new or use existing education curricula to meet the national outcomes and also to meet the specific needs and/or characteristics of the diverse audiences in their state (i.e. age range, ethnicity, location) (Guthrie, Stommes
& Voichick, 2006). If a state EFNEP coordinator chooses to use an existing curriculum, it is typically one developed by other land grant universities.

National guidelines established that Youth EFNEP programs should address the following core areas and outcomes: 1) youth choose foods according to MyPyramid recommendations; 2) youth improve their physical activity practices; 3) youth use safe food handling practices; 4) youth make good choices when spending money for food; and 5) youth acquire the skills to prepare nutritious, affordable foods.

In order to evaluate the effectiveness of Youth EFNEP, it is necessary to have evaluation measures that are valid and reliable, but also practical to administer and to answer by respondents (Townsend, 2006). Moreover, they need to be age-and-developmentally appropriate, cultural sensitive and developed upon the program’s goals, objectives, content, duration and intensity (Contento, 2011; Townsend, & Kaiser, 2007). Currently, there is not a standard evaluation measure for Youth EFNEP with all the characteristics mentioned above.

To contribute to this evaluation need, EFNEP Youth Quest questionnaire was designed as a comprehensive impact assessment tool for evaluating essential elements commonly found in various curricula used across the U.S. Youth EFNEP program (Hernández-Garbanzo, Griffin et al., in preparation). This evaluation tool was designed specifically for youth EFNEP participants in 3rd, 4th and 5th grade. The questionnaire development process was based on National Youth EFNEP core areas and outcomes, theory, curricula content analysis and empirical findings from the literature (Hernández-Garbanzo, Cason et al., in preparation; Hernández-Garbanzo, Griffin et al., in
preparation). The questionnaire was designed to measure outcome expectations, self-efficacy, intentions and knowledge related to nutrition, physical activity and food safety. Items were selected mainly through existing questionnaires used by Youth EFNEP and published school-based interventions; but also new items had to be created for specific topics. The drafted questionnaire was reviewed by experts and pilot-tested with cognitive interviews (Hernández-Garbanzo, Cason et al., in preparation). Revisions yielded a final total of 57 items. Details of the questionnaire development, content and face validity are reported elsewhere (Hernández-Garbanzo, Cason et al., in preparation).

This study administered EFNEP Youth Quest questionnaire to 454 subjects from South Carolina and North Carolina, for the factor analysis and internal consistency of the psychosocial scales of the questionnaire, and item analysis of the knowledge items. Test-retest reliability and predictive validity of the reduced scales were also determined. The objective of this study was to determine the factor structure and assess the psychometric properties (reliability, validity, item difficulty) of the EFNEP Youth Quest questionnaire.

Methods

Study design, sample and recruitment

The Institutional Review Board (IRB) of Clemson University granted approval for the study design, procedures and instruments. This study included three different phases for the psychometric testing of EFNEP Youth Quest questionnaire (57 items). Phase 1 involved exploratory factor analysis (EFA), internal consistency assessment and item
analysis. Based on the number of items included in the questionnaire, a sample size of minimum 285 participants was needed in order to reduce the error variance (DeVellis, 1991; Hatcher, 1994). In phase 2, for test-retest analysis, EFNEP Youth Quest was administered on two different occasions three weeks apart (without nutrition education intervention) to seventy-five participants randomly chosen from sample 1. Phase 3 assessed the predictive validity of EFNEP Youth Quest’s nutrition and physical activity psychosocial scales, using direct measures of food intake (Block Kids Food Screeners) and physical activity (accelerometers), respectively. The sample from phase 3 was also randomly chosen from the total participants of sample 1, and it was different from the subsample of phase 2.

Researchers worked in collaboration with South Carolina EFNEP Coordinators, EFNEP Nutrition Education Assistants (NEAs), Zest Quest® Coordinators and Zest Quest® Wellness Coaches (school health promotion staff) to recruit 3rd, 4th and 5th graders (both females and males) from low-income SNAP-eligible schools. To ensure an ethnically diverse sample the schools participating were from five different counties in South Carolina and in one county of North Carolina. Consent form and assent forms were obtained respectively from parents and students. Participants from sample 1 and 2 received an incentive worth two dollars (gift bag with nutrition related magnets, book marks and erasers), and participants from sample 3 received an additional incentive worth around five dollars (metal water bottle).
Data collection team

Under the direction of the Principal Investigators, the data collection team consisted of one EFNEP specialist and thirteen trained students (three masters’ students and ten undergraduates) from the Food, Nutrition and Packaging Science Department at Clemson University.

Data collection measures and procedures

EFNEP Youth Quest cognitive and psychosocial measures

EFNEP Youth Quest is a self-report questionnaire that was developed for youth EFNEP participants in 3rd, 4th and 5th grades with the purpose of measuring cognitive and psychosocial mediating variables that could be modified by Youth EFNEP interventions. Procedures of how the questionnaire was developed, and tested for content and face validity are described elsewhere (Hernández-Garbanzo et al., in preparation). The version of the questionnaire used in the presented study consisted on fifty-seven items organized within eight different scales: food choice intentions, nutrition outcome expectations, physical activity outcome expectations, nutrition self-efficacy, physical activity self-efficacy, food safety self-efficacy, nutrition knowledge and food safety knowledge (see Table 6.1 for an overview of the scales, response formats and scoring of the measures included in EFNEP Youth Quest). EFNEP Youth Quest was administered in a classroom setting using a standardized protocol (available upon request from the first author). Participants spent approximately 20 minutes completing the questionnaire.
**Demographics measures**

EFNEP Youth Quest included a demographic section, in which each participant responded to three questions about age, gender and grade level. Race-ethnicity was obtained from the schools.

**Block Kids Food Screener**

The Block Kids’ Food Screener (BKFS) was used to measure the food intake of participants (n=62). BKFS is a short food questionnaire designed for children ages 12-17 and was developed by the Block Dietary Data Systems (NutritionQuest, Inc., Berkeley, CA). The screener includes 39 items to assess food intake, food choices, and quantity of foods from “yesterday”. This screener was chosen not only for its reported validity and reliability, but also because it included the assessment of food groups relevant to EFNEP Youth EFNEP Quest’s items (Cullen, Watson, & Zakeri, 2008). The screener was administered in a classroom setting during weekdays (mostly Fridays). Data collectors read the instructions and questions out loud, and used food models to help students estimate food quantity. Completion time was less than 15 minutes. Block Dietary Data Systems (NutritionQuest, Inc., Berkeley, CA) analyzed the data obtained from the Block Kids Foods Screeners. The variables of interest included: mean daily intake of fruits, vegetables, saturated fat, and added sugars.

**Accelerometers**

Children’s physical activity counts were assessed for seven consecutive days by
using an Actical accelerometer (Mini Mitter Company Inc., 2003). Validity and reliability of Actical accelerometers with school-aged children has been reported in other studies (Puyau, Adolph, Vohra, & Butte, 2002). Trained staff met with the participants (n=56) in their respective schools and fitted the accelerometers on their anterior right hip. The accelerometers were calibrated and set to measure activity counts in an epoch time of 60 seconds (Robertson, Brown, Wilcock, Oldfield, & Thorogood, 2011). The participants were asked to always wear the accelerometer, only taking it off during bathing and swimming.

After data collection, raw accelerometer data was downloaded and saved. Then raw accelerometer was prepared for analysis using “the Monitor Data Analysis Assistant Software” developed by Danlhos Computer Consulting, LLC, which runs on a Windows platform (Microsoft.NET 1.1). This program reduced the raw accelerometer activity counts to time spent in sedentary, light, moderate and vigorous physical activity based on Actical-cutpoints used in calibration studies with children. The specific counts cut-points were: 0-11= sedentary, 12-507=light, 508-718=moderate and 719 or more= vigorous (Evenson, Catellier, Gill, Ondrak, & McMurray, 2008).

The first and seventh day of data collection were omitted from accelerometer analysis because the participants did not have the opportunity to wear the accelerometers all day. Participants who had at least 4 complete days of data (3 week days and 1 weekend day) were included in the study. A complete day was defined as ≥ 7 hours of data (Robertson, Stewart-Brown, Wilcock, Oldfield, & Thorogood, 2011). Participants who had 20 or more consecutives counts of zeros, and/or had high counts per minutes
(>15 000) were excluded (Cliffs, Reilly, & Okely 2009). Based on this criteria, accelerometer data from 47 participants were included in the analysis. The variables of interest included: mean daily minutes spent in moderate, vigorous and moderate to vigorous physical activity.

**Statistical analysis**

**Demographic characteristics**

Demographic characteristics of the factor analysis sample (from Study 1) were analyzed with IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010), using descriptive statistics (frequencies and percentages).

**Treatment of Missing Data**

The occurrences of missing data for each item was computed and found to range 0.2-1.5 percent. Because data was categorical with no covariates (only factors indicators), and the level of missingness was minimal (less than 5%), missing data was deleted pairwise with Mplus Software (version 6.1, Muthen & Muthen) (Muthén & Muthén, 2010).

**Exploratory factor analysis**

Exploratory factor analysis (EFA) was conducted on the psychosocial mediating variables with Mplus Software (version 6.1, Muthen & Muthen). This software was
selected because it includes tetra-choric correlations for the factor analysis of non-normal and categorical data (Woods, 2002). In this study, the primary aim of EFA was to determine the number of factors underlying the nutrition, physical activity and food safety items; and the secondary aim was to use factor analysis as an item reduction strategy to keep only those items that best measure each factor (DeVellis, 1991).

The analysis was performed for each content domain: nutrition, physical activity and food safety. All variables were determined as categorical (8 were binary, 35 were 3-point ordinal). The weighted least squares with mean and variance (WLSMV) was the estimator used for the analysis (Muthén, du Toit, & Spisic, 1997).

With regard to the rotation criterion, because it was expected for factors to be correlated, both Geomin and CF-Equamax oblique rotations were considered; but CF-Equamax was consistently more interpretable, especially to detect items that cross-loaded or that had higher cross-loadings. Therefore, the following analyses were done only with CF-Equamax rotation, which “minimizes variable and factor complexity and spread variances more equally across factors” (Sass, & Schmitt, 2010).

A four-factor solution was indicated for the EFA of nutrition items (three theorized factors: food choice intentions, nutrition outcome expectations and nutrition self-efficacy); a three-factor solution for physical activity items (two theorized factors: physical activity outcome expectations and physical activity self-efficacy); and a two-factor solution for food safety items (one theorized factor: food safety self-efficacy).

The factor identification was based on scree plots, eigenvalue-one criterion, and content interpretability. In addition, the “goodness-of-fit” (estimation of models or
number of factors that best fit the data) for each content domain was assessed with the following statistics: Root Mean Square Residual (RMSEA= recommended value ≤ 0.06), Comparative Fit Index (CFI= recommended value ≥ 0.95), Tucker-Lewis Index (TLI= recommended value ≥ 0.95) and Standardized Root Mean Square Residual (SRMR= recommended value ≤ 0.08) (Hu, & Bentler, 1999). Description of the characteristics of these model fit indexes is reported elsewhere (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Hu, & Bentler, 1999; Yuan, 2005). Items were deleted if: 1) factor loadings were <0.40; 2) loaded on the incorrect theorized factor; or 3) loaded in more than one factor (cross-loading). In general, after item deletion, factor analysis was run again until the “best” factor structure for each content domain was reached. Finally, the reduced psychosocial measures or factors for each content domain were scored (final items within each factor were summed) to obtain a new variable. Scoring consisted of summing items within each factor. Mean scores and standard deviations for the new variables were calculated with IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010).

Internal consistency

The internal consistency of each psychosocial scale was measured with Cronbach’s alpha using IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010). Those scales with Cronbach’s alpha between 0.5 and 0.70 were considered acceptable (Bowling, 2002; Cortina, 1993; Nunnally, & Bernstein, 1994).
**Item analysis**

The item difficulty for each knowledge item was assessed in this study. Each item was assessed as correct or incorrect; then the percentage of correct answers for a given item (item difficulty index) was calculated. Items with difficulty index 80% (too easy) >X< 20% (too hard) were considered for revision and possible deletion (Kline, 1993). SPSS software (version 19, IBM Corporation, Somers, NY, 2010) was employed for these calculations.

**Test-retest reliability**

Test-retest reliability was calculated on the individual items, with the exception of knowledge items, by using kappa (κ) statistics (weighted κ for ordinal items and un-weighted κ for binary items) (Sim, & Wright, 2005). Kappa statistics were significant at ρ values less than .05. The relative agreement between scores of individual items from time 1 to time 2 was interpreted using the following classification scales for the kappa coefficient: 0=poor, .01–.20 =slight, .21–.40=fair, .41–.60=moderate, .61–.80=substantial, and .81–1=almost perfect (Landis, & Koch, 1977). IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010) was employed for the data analysis.

**Predictive validity**

Two different analyses were employed for predictive validity. The first analysis correlated the nutrition-related psychosocial scales with the mean intake of cups of fruits and vegetables, grams of saturated fat and teaspoons of added sugar. It was hypothesized
that the nutrition related psychosocial scales would be positively correlated with cups of fruits and vegetables, and negatively correlated with grams of saturated fat and teaspoons of added sugar. The second analysis correlated the physical activity related psychosocial scales with mean of MPA, MVPA and VPA. A positive correlation was expected between these variables. All these associations were calculated with IBM SPSS software (version 19, IBM Corporation, Somers, NY, 2010) using Spearman correlation coefficients and ρ values less than .05.

Results

Sample characteristics

Demographic characteristics of the factor analysis sample are shown in Table 6.2. In total 454 participants completed the EFNEP Youth Quest questionnaire: 229 males and 225 females. Grade distribution was relatively even, 35.7% were in third grade, 33.7% in fourth grade and 30.6% in fifth grade. The majority of the respondents were 9 years old (34.4%), and identified as Caucasian non-Hispanic (46.9%), followed by African American (37.7%) and Hispanic (10.8%).

Factor analysis and reliability results

An exploratory factor analysis was conducted separately for each content domain. Initially, based on the eigenvalues and scree-plot analysis, three dominant factors emerged for the set of nutrition items (27 items); two dominant factors for the set of physical activity items (9 items); and one dominant factor for the set of food safety items.
(7 items). All the emerged factors were compared with the scales hypothesized/theorized by this study and were labeled as follows: nutrition factors (#): 1=healthy eating intentions, 2=outcome expectations of healthy eating, 3=self-efficacy for healthy eating; physical activity factors (#): 1=outcome expectations of physical activity, 2=self-efficacy to overcome barriers; and food safety factor (#): 1=self-efficacy for food safety.

Of the 27 nutrition items, fifteen items were eliminated because their factor loadings were below 0.40. Of the 9 physical activity items, four were removed because they loaded below 0.40 (n=1), cross-loaded (n=1), and/or loaded in the wrong theorized factor (n=2). The number of food safety items was kept the same.

After item deletion, exploratory factor analysis was run again for the nutrition and physical activity items until the “best” factor structure was achieved. Table 6.3 depicts the results of the analysis of the goodness of fit for all the EFA performed by each content domain. Overall, the final factor model and set of items for each content domain were acceptable according to the fit indexes criteria, excepting the TLI of the nutrition model.

Table 6.4- 6.6 present the final factor analysis and reliability results for the nutrition, physical activity, and food safety items, respectively. A summary of the results of these tables is described as follows.

**Nutrition domain.** The final factor analysis revealed three factors with a total of 12 items. As represented in Table 6.4, the first factor (four items) measured intentions to select healthier food options particularly those with less fat and sugar. Factor loadings for this scale ranged from .56-0.83, accounting for 30.66% of the variance
(Eigenvalue=3.68). The second factor (third items) measured positive outcome expectations related to fruits & vegetables, and breakfast. Factor loadings for this scale ranged from .43-0.87, accounting for 15.33% of the variance (Eigenvalue=1.84). The third factor measured (five items) self-efficacy for healthy eating, specifically to ask or choose healthier snacks and/or food options. Factor loadings for this scale ranged from .42-0.70, accounting for 11.33% of the variance (Eigenvalue=1.36). The internal consistency of the three factors was acceptable (α=0.63, 0.55, 0.55, respectively). Test-retest reliability κ values ranged from 0.51-0.70 (moderate-substantial) for factor 1 items; from 0.11-0.50 (fair–moderate) for factor 2 items, and from 0.20-0.46 (fair to moderate) for factor 3 items.

Physical activity domain. The final factor analysis revealed two factors with a total of five items. As represented in Table 6.5, the first factor (three items) measured positive outcome expectations related to being physically active (i.e. helps get or keep me in shape). Factor loadings for this scale ranged from 0.51-0.80, accounting for 45% of the variance (Eigenvalue=2.25). The second factor (two items) measured self-efficacy to overcome physical activity barriers. Factor loadings for this scale ranged from 0.63-0.83, accounting for 22.80% of the variance (Eigenvalue=1.14). The internal consistency of factor two was acceptable (α=0.60), while for factor one was poor (α=0.43). Test-retest reliability κ ranged from 0.07-0.32 (slight-fair) for factor 1 items; and from 0.23-0.26 (fair) for factor 2 items.

Food safety activity domain. The food safety factor included seven items, accounting for 36.85% of the variance (Eigenvalue=2.58). All item loadings were at least
The internal consistency of the food safety self-efficacy factor was acceptable (α=0.58). Test-retest κ values ranged from 0.06 to 0.35 (slight-fair).

**Item analysis results**

Table 6.7 displays the item difficulty index for each of the nutrition and food safety knowledge items. The difficulty index for the nutrition knowledge questions ranged from 6% to 40%, and for the food safety knowledge questions from 49% to 92%. The question “how many ounces should you eat from the grain group each day?” was answered correctly by only 6% of the participants, indicating that this question might be too difficult. This item, however, was not eliminated because it was assumed that after a nutrition education intervention more participants would be able to respond to this question correctly. In contrast, the following two questions: “where is a good place to store meat?” and “what should you do when you wash your hands?, were removed because they were answered correctly by more than 80% of the participants, indicating that these questions were too easy.

Overall, the final outcome of the factor analysis and item analysis was a questionnaire with 35 items; having removed 22 items removed from the original version.

**Predictive validity results**

The correlations between the nutrition psychosocial mediating scales with food screener data are depicted in table 6.8. Higher scores of outcome expectations of healthy eating were positively correlated with cups of vegetables ($r^2=0.22; p<0.05$). Higher
scores of healthy eating intentions were positively correlated with cups of fruits \( r^2 = 0.21; p<0.05 \), and negatively associated with teaspoons of added sugar \( r^2 = -0.26; p<0.05 \). Self-efficacy for healthy eating was not significantly correlated with any of the food intake variables. As represented in Table 6.9 no significant associations were found between the physical activity psychosocial scales with MPA, MVPA and VPA.

**Discussion**

This study has examined the psychometric analysis of EFNEP Youth Quest questionnaire, including exploratory factor analysis, internal consistency, test-retest reliability, predictive validity and item analysis. The results of this study add to previous efforts that have been done to improve the quality of evaluation measures of Youth EFNEP programs, and provide preliminary data of a psychometrically tested evaluation tool that could be used for the outcome evaluation of Youth EFNEP.

In the present study, exploratory factor analysis yielded interpretable factors for the nutrition (three factors), physical activity (two factors) and food safety (one factor) domains of EFNEP Youth Quest questionnaire. The results of the final EFA demonstrated the factorial validity of the reduced nutrition, physical activity and food safety psychosocial mediating scales, as evidence by the adequate factor loadings (at least 0.40) and goodness of fit of the final models and set of items. This study also demonstrated that the internal consistency was acceptable \( (\alpha > 0.50) \) across all final psychosocial scales, except for the scale of outcome expectations for physical activity. Other studies have reported similar low internal consistency of physical activity outcome
expectations scales (Saunders et al., 1997; Sharma, Hoelscher, Kelder, Diamond, Day, & Hergenroeder, 2009). Moreover, kappa statistics for testing the temporal stability of the reduced psychosocial scales was significant across all items. However, the level of agreement from time 1 to time 2 varied substantially (ranging from 0.06 to 0.70), and only six out of the 24 items demonstrated a moderate-substantial temporal stability. Contrary to what was expected, it was found that results of the predictive validity of the final psychosocial scales did not support all the hypothesized correlations of this study; significant correlations were found only between the scale of intentions for healthy eating with fruits and added sugar intake; and between the scale of outcome expectations for healthy eating with vegetables intake. Results from the items analysis showed that the difficulty index for the nutrition and food safety knowledge items ranged between 6-40% and 49-92%, respectively. Furthermore, through the exploratory factor analysis of the psychosocial set of items, and the item analysis (item difficulty index) of the knowledge items we were able to reduce the number of items of EFNEP Youth Quest from 57 to 35.

More specifically, given the factor validity and acceptable internal consistency of the reduced psychosocial scales, the results of temporal stability of certain items with unacceptable levels of agreement could be attributable to several factors other than unreliability like memory, fatigue, learning effect, and time period between administration of the questionnaires (DeVellis, 1991; Penkilo, George, & Hoelscher, 2008). According to Turconi et al. (2003), in test-retest reliability, the shorter the time interval between the administrations of a questionnaire the higher the correlation (Turconi et al., 2003). This suggests that in our study the time period of three weeks
between the two administrations might be an important limitation, especially when other studies conducted with children have demonstrated better temporal stability with less time period between administrations (less than two weeks) (Burgess-Champoux, Rosen, Marquart, & Reicks, 2008; Penkilo, George, & Hoelscher, 2008).

Unfortunately this study could not demonstrate sufficient evidence for the predictive validity of the final nutrition psychosocial scales. Specifically, the scale of intentions for healthy eating was only significantly correlated with fruits and sugar intake, nor with vegetable and saturated fat intake. The scores of outcome expectations for healthy eating were only significantly correlated with vegetables intake, while the scores of self-efficacy for healthy eating did not show any relationship with the dietary intake variables. Similar results have been shown in other studies (Backman, Haddad, Lee, Johnston, & Hodgkin, 2002; Cullen et al., 2004; Domel et al., 1995). A possible explanation for the limited correlation between these variables is the criterion selected to measure dietary intake. First, in this study it seems that the implementation of the BKFS did not represent a real measure of “usual food intake”, since it only captured one day of food consumption. Additionally, since the BKFS did not include some food items or ethnic foods that children often eat; food intake probably was underestimated (Langevin et al., 2007). Furthermore, the participants have difficulty remembering what they ate the previous day and/or estimating the portion sizes (Baxter et al., 2009). In general, there is not a gold standard to measure dietary intake. Thus, what researchers recommend in order to have a better estimation of dietary intake is to conduct direct observation of dietary intake, use more than one indicator of dietary quality, use more reference days of
data, and/or use 24 hour food recalls rather than previous day food recalls (Baxter et al., 2004; Mertz, 1992; Simons-Morton, & Baranowski, 1991; Townsend, & Kaiser, 2005). However, time and resources constraints precluded the following of these recommendations. More research is needed to assess with accuracy the predictive validity of the nutrition psychosocial scales.

In regard to the predictive validity of the physical activity psychosocial scales, this study found that despite using accelerometers to objectively measure daily physical activity, the correlations between the two physical activity psychosocial scales with MPA, MVPA, or VPA did no result as expected. Particularly, results from the outcome expectations scale seem to support previous findings from Strauss et al. (2001), where they also found that children’s beliefs of the health benefits of physical activity was not correlated with moderate and high level physical activity (Strauss, Rodzilsky, Burack, & Colin, 2001). For the self-efficacy scale, the results were comparable to those obtained by Jago et al. (2009), where the correlations obtained between self-efficacy and MVPA were not significant and slightly low ($r=0.09-0.11$) (Jago et al., 2009); but they were different from other studies where strong and significant correlations between self-efficacy and physical activity have been demonstrated (Huang, Wong, Salmon, & Hui, 2011; Rosenkranz, Welk, Hastmann, & Dzewaltowski, 2011; Strauss, Rodzilsky, Burack, & Colin, 2001). In this study, the reported lack of relationship may be due to the small sample size for the accelerometer analysis (n=47) and the reduced length of the physical activity scales (≤ three items), which could limit respectively the statistical power of the correlations and the full measurement of the construct. Another explanation of this issue
is related to the epoch length of one minute used in this study, which may not be the best epoch length to estimate a detailed picture of MVPA and VPA in children (Edwardson, & Gorely, 2010; McClain, Abraham, Brusseau, Tudor-Locke, 2008). Further work is needed that considered these methodological limitations.

**Strengths/limitations**

This study has several strengths that are important to highlight. It should be noted that the investigators followed a comprehensive, theory-based methodology to develop, test and conduct the psychometric analysis of EFNEP Youth Quest questionnaire. The testing process included: large sample sizes recommended for EFA; multiple phases to explore the validity (factor validity, predictive validity) and reliability (internal consistency, temporal stability) of the questionnaire; low-percentage of missing values indicating adequate adherence to the research protocols. An ethnically diverse sample of low-income children, suggest that the questionnaire may work well for youth EFNEP audiences in 3\textsuperscript{rd}, 4\textsuperscript{th}, and 5\textsuperscript{th} grades. For the analysis, as when working with categorical data (binary and ordinal items), the process was comprehensive and rigorous in terms of the type of statistical software used for EFA and the type of statistical tests needed for each psychometric analysis. Extreme care was used when selecting the type of rotations for EFA, and the necessary criteria to determine the best factor structure (i.e. eigen-values, scree-plots, fit indices, factor loadings and interpretability).

This study has several limitations, besides the ones mentioned in the discussion. Although this study was conducted with an ethnically diverse sample, the proportion of
each ethnic group was not large enough to assess the factorial invariance of the questionnaire. Also, because a convenience sample was used, results of this study could not be generalized to the entire low-income youth population. Future studies could consider further validation with a larger sample and/or test the questionnaire in other states. Another limitation related to the brief format of the questionnaire was that the length of the scales and their corresponding responses format were not large enough to ensure a strong variability and/or reliability. To address this issue, future studies may include more items and/or Likert-type scales; yet it is recommended to test the acceptance of these types of changes with both experts and children. This study focuses on the psychometric properties of the psychosocial scales, thus more rigorous testing is needed for the knowledge items. Finally, because many items were deleted after the item difficulty and factor analysis, further work is needed to re-evaluate the content validity of the new version of the questionnaire.

**Conclusion**

This study provides preliminary data of the item reduction and psychometric properties of EFNEP Youth Quest questionnaire and demonstrates a step forward to improve the evaluation measures of Youth EFNEP. Although further work is needed, results of this study suggest that this questionnaire is acceptable for Youth EFNEP, for evaluating changes in cognitive and psychosocial measures related to nutrition, physical activity and food safety among ethnically diverse-low-income youth audiences.
Acknowledgments

This study was supported by Clemson University and by the MICIT/CONICIT Government of Costa Rica. The authors want to thank the schools and children who participated in the study, and to those who helped the research team to recruit participants. In addition, special thanks to the staff and students from the Food, Nutrition and Packaging Science Department at Clemson University, who were part of the data collection and data registration: Mercedes Rossi, María Catalina Aragón, Maciel Ugalde, Ginger Thomas, Jermain Shaw, Trisha Hall, Mariam Nasrollahi, Katherine Ancona, Amelia Gannon, Melissa Ikerd, Kathryn Lybran, Laura Johnson, Victoria Hayden, and Hannah Clark.
### Table 6.1 General characteristics of EFNEP Youth Quest measures

<table>
<thead>
<tr>
<th>Sections/Scales</th>
<th>Measures</th>
<th>Items (#)</th>
<th>Item example</th>
<th>Response format</th>
<th>Score per item</th>
<th>Source of scale/items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section A. Food choice intentions</strong></td>
<td>Intentions to select healthy foods and beverages in different situations</td>
<td>8</td>
<td>Which food would you choose for snack?</td>
<td>Binary scale format with two food options</td>
<td>A</td>
<td>Stevens et al. 1999 - Burgess-Champoux et al. 2008 - Kelder et al. 2005</td>
</tr>
<tr>
<td><strong>Section B. Nutrition outcome expectations</strong></td>
<td>Positive outcome expectations related to dietary change</td>
<td>8</td>
<td>If I eat fruits and vegetables everyday I will be healthier</td>
<td>3-point Likert scale</td>
<td>B</td>
<td>Baranowski et al. 2000 - Glanz et al. 2008</td>
</tr>
<tr>
<td><strong>Section C. Physical activity outcome expectations</strong></td>
<td>Positive outcome expectations related to being physically active</td>
<td>3</td>
<td>Being physically active every day is good for my health</td>
<td>3-point Likert scale</td>
<td>B</td>
<td>Saunders et al. 1997 - Wilson et al. 2008</td>
</tr>
<tr>
<td><strong>Section D. Nutrition self-efficacy</strong></td>
<td>Self-confidence and skills necessaries to select or ask for healthier food options</td>
<td>11</td>
<td>For a snack, I CAN ask my for frozen low-fat yogurt instead of ice cream</td>
<td>3-point Likert scale</td>
<td>C</td>
<td>Stevens et al. 1999 - Burgess-Champoux et al. 2008 - Kelder et al. 2005 - Baranowski et al. 2000</td>
</tr>
<tr>
<td><strong>Section E. Physical activity self-efficacy</strong></td>
<td>Self-confidence and skills necessaries to be physically active</td>
<td>6</td>
<td>I CAN be physically active no matters how tired I may feel</td>
<td>3-point Likert scale</td>
<td>C</td>
<td>Saunders et al. 1997</td>
</tr>
<tr>
<td><strong>Section F. Food safety self-efficacy</strong></td>
<td>Self-confidence and skills necessaries to improve food safety practices</td>
<td>7</td>
<td>I CAN refrigerate food leftovers within two hours or less</td>
<td>3-point Likert scale</td>
<td>C</td>
<td>New but wording based on CPFCFSE</td>
</tr>
<tr>
<td><strong>Section G. Nutrition knowledge</strong></td>
<td>Knowledge related to the five food groups and the recommended amount of each food group.</td>
<td>6</td>
<td>How many cups of vegetables should you eat each day?</td>
<td>4-point Multiple choice (including I don’t know option)</td>
<td>D</td>
<td>EFNEP-UNLE - EFNEP-UME - EFNEP-UWE</td>
</tr>
<tr>
<td><strong>Section H. Food safety knowledge</strong></td>
<td>Knowledge related to the Fight BAC rules (clean, separate, cook and chill)</td>
<td>8</td>
<td>Where is a good place to store meat?</td>
<td>4-point Multiple choice (including I don’t know option)</td>
<td>D</td>
<td>EFNEP-UME - EFNEP-UWE - EFNEP: UCDE - FNP: KST</td>
</tr>
</tbody>
</table>

A: 0=unhealthy food choice, 1=healthy food choice; B: 1=disagree, 2=not sure, 3=agree; C: 1=Not sure I CAN, 2= I’m a little bit sure I CAN, 3=Sure I CAN; D: 0=incorrect, 1=correct
CPFCFSE=Canadian Partnership for Consumer Food Safety Education. EFNEP: Expanded Food and Nutrition Education Program. UNLE: University of Nebraska-Lincoln Extension (Youth Evaluation Questionnaire). UME: University of Missouri Extension (Missouri Show me Nutrition Curriculum Evaluation Tool); UWE: University of Wisconsin Extension (Youth Curriculum Sourcebook Evaluation Tool); FNP: Family Nutrition Program. KST: Kansas State University (Kansas FNP Youth Evaluation). UCDE: UC Davis Extension (Kids Karoos).
Table 6.2 Demographic characteristics of children who completed the Youth EFNEP Quest questionnaire (n=452)

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Participants (n=452)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency (n)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>229</td>
</tr>
<tr>
<td>Female</td>
<td>225</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>112</td>
</tr>
<tr>
<td>9</td>
<td>156</td>
</tr>
<tr>
<td>10</td>
<td>132</td>
</tr>
<tr>
<td>11</td>
<td>48</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Caucasian non-Hispanic</td>
<td>213</td>
</tr>
<tr>
<td>Hispanic</td>
<td>49</td>
</tr>
<tr>
<td>African American</td>
<td>171</td>
</tr>
<tr>
<td>Asian American</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>162</td>
</tr>
<tr>
<td>4th</td>
<td>153</td>
</tr>
<tr>
<td>5th</td>
<td>139</td>
</tr>
<tr>
<td>Model</td>
<td>RMSEA</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Nutrition Model 1 (27 items, 3 factors)</td>
<td>0.038</td>
</tr>
<tr>
<td>Model 2 (14 items, 3 factors)</td>
<td>0.033</td>
</tr>
<tr>
<td>Final Model 3 (12 items, 3 factors)</td>
<td>0.046</td>
</tr>
<tr>
<td>Physical Activity Model 1 (9 items, 2 factors)</td>
<td>0.000</td>
</tr>
<tr>
<td>Model 2 (5 items, 2 factors)</td>
<td>0.000</td>
</tr>
<tr>
<td>Food Safety 1 Model (7 items, 1 factor)</td>
<td>0.017</td>
</tr>
</tbody>
</table>

Note: RMSEA = Root Mean Square Error of Approximation (recommended value ≤ 0.06); CFI=Comparative Fit Index (recommended value ≥ 0.95); TLI=Tucker Lewis index (recommended value ≥ 0.95); SRMR=Standardized Root Mean Squared Residual (recommended value ≤ 0.08)
<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Loadings</th>
<th>Test Retest (κ statistics)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1: Healthy eating intentions</strong></td>
<td>Factor 1</td>
<td>Factor 2</td>
</tr>
<tr>
<td>Which food would you ask the adults in your house to buy? (bag of fruits or bag of tortilla/potato chips)</td>
<td>.83</td>
<td>.05</td>
</tr>
<tr>
<td>Which one would you pick if you are thirsty? (can of soda or bottle of water)</td>
<td>.68</td>
<td>.11</td>
</tr>
<tr>
<td>Which would you choose to eat for breakfast? (donut or bowl of cereal)</td>
<td>.58</td>
<td>.06</td>
</tr>
<tr>
<td>Which food would you choose for a snack? (frozen yogurt or ice cream)</td>
<td>.56</td>
<td>.15</td>
</tr>
<tr>
<td><strong>Factor 2: Outcome expectations of healthy eating</strong></td>
<td>.01</td>
<td>.87</td>
</tr>
<tr>
<td>If I eat fruits and vegetables everyday I will think better in class</td>
<td>.09</td>
<td>.69</td>
</tr>
<tr>
<td>If I eat breakfast everyday it will help me learn better at school</td>
<td>-.04</td>
<td>.43</td>
</tr>
<tr>
<td>If I eat fruits and vegetables everyday I will have more energy</td>
<td>-.04</td>
<td>.43</td>
</tr>
<tr>
<td><strong>Factor 3: Self-efficacy for healthy eating</strong></td>
<td>.23</td>
<td>-.04</td>
</tr>
<tr>
<td>For a snack, I can ask my parents for frozen low fat yogurt instead of ice cream</td>
<td>-.05</td>
<td>.20</td>
</tr>
<tr>
<td>At the store, I can ask my parents to read the food labels to choose a healthy snack or drink</td>
<td>-.10</td>
<td>.21</td>
</tr>
<tr>
<td>At the store, I can ask read the food labels to help choose a healthy snack or drink</td>
<td>-.02</td>
<td>.06</td>
</tr>
<tr>
<td>During breakfast I can drink low-fat or fat free milk instead of regular whole milk</td>
<td>-.01</td>
<td>-.00</td>
</tr>
</tbody>
</table>

| Eigenvalues | 3.68 | 1.84 | 1.36 |
| % of variance | 30.66 | 15.33 | 11.33 |
| Cronbach’s α | .63 | .55 | .55 |
| Mean score (SD) | 2.88 (1.2) | 8.1 (1.3) | 13.29 (1.9) |

SD=Standard Deviation
κ=kappa. Test-retest reliability analysis with un-weighted kappa statistics for binary scales, and weighted kappa statistics for ordinal scales.

*P<0.05
Table 6.5 Results of the final exploratory factor analysis (n=454) and test-retest correlation (n=75) of EFNEP Youth Quest on physical activity items

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Loadings</th>
<th>Test Retest (κ statistics)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
</tr>
<tr>
<td><strong>Factor 1: Outcome expectations of physical activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being physically active everyday helps get or keep me in shape</td>
<td>.80</td>
<td>-.02</td>
</tr>
<tr>
<td>Being physically active everyday is good for my health</td>
<td>.54</td>
<td>.10</td>
</tr>
<tr>
<td>Being physically active everyday is fun</td>
<td>.51</td>
<td>.15</td>
</tr>
<tr>
<td><strong>Factor 2: Barriers self-efficacy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can be physically active no matter how tired I may feel</td>
<td>-.08</td>
<td>.83</td>
</tr>
<tr>
<td>I can be physically active even it is hot or cold outside</td>
<td>.19</td>
<td>.63</td>
</tr>
<tr>
<td><strong>Eigenvalues</strong></td>
<td>2.25</td>
<td>1.14</td>
</tr>
<tr>
<td><strong>% of variance</strong></td>
<td>45.00</td>
<td>22.80</td>
</tr>
<tr>
<td><strong>Cronbach’s α</strong></td>
<td>.43</td>
<td>.60</td>
</tr>
<tr>
<td><strong>Mean score (SD)</strong></td>
<td>8.6 (0.8)</td>
<td>4.7 (1.3)</td>
</tr>
</tbody>
</table>

SD=Standard Deviation
κ=kappa. Test-retest reliability analysis with un-weighted kappa statistics for binary scales, and weighted kappa statistics for ordinal scales.
*P<0.05
Table 6.6 Results of the final exploratory factor analysis (n=454) and test-retest correlation (n=75) of EFNEP Youth Quest on food safety items

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Test Retest (κ statistics)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1: Self-efficacy for food safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can keep raw meat, poultry, and seafood apart from other cooked foods</td>
<td>.76</td>
<td>.27*</td>
</tr>
<tr>
<td>I can use a different cutting board for raw meat products (beef, poultry, pork &amp; seafood)</td>
<td>.55</td>
<td>.35*</td>
</tr>
<tr>
<td>I can refrigerate food leftovers within two hours or less</td>
<td>.53</td>
<td>.21*</td>
</tr>
<tr>
<td>I can use a food thermometer to be sure that cooked food is safe to eat</td>
<td>.46</td>
<td>.25*</td>
</tr>
<tr>
<td>I can clean counter tops before preparing food</td>
<td>.45</td>
<td>.07*</td>
</tr>
<tr>
<td>I can always wash fruits and vegetables with cold running water</td>
<td>.41</td>
<td>.14*</td>
</tr>
<tr>
<td>I can wash my hands with warm water and soap for 20 seconds before preparing or eating food</td>
<td>.40</td>
<td>.06*</td>
</tr>
<tr>
<td>Eigenvalues</td>
<td>2.58</td>
<td></td>
</tr>
<tr>
<td>% of variance</td>
<td>36.85</td>
<td></td>
</tr>
<tr>
<td>Cronbach’s α</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>Mean score (SD)</td>
<td>18.6 (2.3)</td>
<td></td>
</tr>
</tbody>
</table>

SD=Standard Deviation  
κ=kappa. Test-retest reliability analysis with un-weighted kappa statistics for binary scales, and weighted kappa statistics for ordinal scales.  
*P<0.0
Table 6.7 Item difficulty of the nutrition and food safety knowledge questions of EFNEP Youth Quest (n=454)

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Incorrect (n)</th>
<th>Correct (n)</th>
<th>Total (n)</th>
<th>Difficulty Index (% Answering correctly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>273</td>
<td>174</td>
<td>447</td>
<td>39</td>
</tr>
<tr>
<td>45</td>
<td>425</td>
<td>28</td>
<td>453</td>
<td>6</td>
</tr>
<tr>
<td>46</td>
<td>266</td>
<td>188</td>
<td>454</td>
<td>41</td>
</tr>
<tr>
<td>47</td>
<td>297</td>
<td>156</td>
<td>453</td>
<td>34</td>
</tr>
<tr>
<td>48</td>
<td>294</td>
<td>159</td>
<td>453</td>
<td>35</td>
</tr>
<tr>
<td>49</td>
<td>271</td>
<td>183</td>
<td>454</td>
<td>40</td>
</tr>
<tr>
<td>Food Safety Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>147</td>
<td>307</td>
<td>454</td>
<td>68</td>
</tr>
<tr>
<td>51</td>
<td>198</td>
<td>255</td>
<td>453</td>
<td>56</td>
</tr>
<tr>
<td>52</td>
<td>35</td>
<td>419</td>
<td>454</td>
<td>92</td>
</tr>
<tr>
<td>53</td>
<td>114</td>
<td>337</td>
<td>451</td>
<td>75</td>
</tr>
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<td>54</td>
<td>230</td>
<td>222</td>
<td>452</td>
<td>49</td>
</tr>
<tr>
<td>55</td>
<td>109</td>
<td>344</td>
<td>453</td>
<td>76</td>
</tr>
<tr>
<td>56</td>
<td>50</td>
<td>404</td>
<td>454</td>
<td>89</td>
</tr>
<tr>
<td>57</td>
<td>88</td>
<td>366</td>
<td>454</td>
<td>80</td>
</tr>
</tbody>
</table>

n = Frequency
Table 6.8 Spearman’s correlations between the nutrition psychosocial scales of EFNEP Youth Quest and the food screener data (n=62)

<table>
<thead>
<tr>
<th>Food Screener data</th>
<th>Fruit (cups)</th>
<th>Vegetable (cups)</th>
<th>Saturated fat (grams)</th>
<th>Added sugar (teaspoons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome expectations of healthy eating</td>
<td>.06</td>
<td>.22*</td>
<td>.10</td>
<td>.02</td>
</tr>
<tr>
<td>Healthy eating intentions</td>
<td>.21*</td>
<td>.16</td>
<td>.01</td>
<td>-.267*</td>
</tr>
<tr>
<td>Self-efficacy for healthy eating</td>
<td>.13</td>
<td>.12</td>
<td>.08</td>
<td>-.21</td>
</tr>
</tbody>
</table>

$r_s$ = Spearman correlation  
*P<0.05

Table 6.9 Spearman’s correlations between the physical activity psychosocial scales of EFNEP Youth Quest and the accelerometer data (n=47)

<table>
<thead>
<tr>
<th>Accelerometer data</th>
<th>MPA (min/day)</th>
<th>MVPA (min/day)</th>
<th>VPA (min/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome expectations of physical activity</td>
<td>-0.06</td>
<td>-0.08</td>
<td>-0.06</td>
</tr>
<tr>
<td>Self-efficacy to overcome barriers</td>
<td>0.12</td>
<td>0.17</td>
<td>0.14</td>
</tr>
</tbody>
</table>

$r_s$ = Spearman correlation  
MPA = Moderate Physical Activity; MVPA = Moderate to Vigorous Physical Activity; VPA = Vigorous Physical Activity  
*P<0.05
References


CHAPTER VII
DISSERTATION SUMMARY

This chapter presents a summary of the main findings obtained from the development and psychometric testing of EFNEP Youth Quest questionnaire. This chapter also presents the conclusions as well as the recommendations for future research.

Summary of the results

This study developed and tested the EFNEP Youth Quest questionnaire, a comprehensive evaluation tool for low-income youth in third, fourth and fifth grade that include knowledge and psychosocial mediating variables targeted by Youth EFNEP interventions. The goal of this study was to create an impact evaluation tool for Youth EFNEP program with the following characteristics: theory-driven, content-appropriate, age-appropriate, appropriate for low-income audiences, with acceptable-high levels of reliability and validity; and practical to respond and administer (no more than 20 minutes).

The questionnaire was developed based on the following theoretical and conceptual foundations: 1) the Community Nutrition Education logic model with constructs of Social Cognitive Theory and Theory of Planned Behavior; 2) National Youth EFNEP core areas and behavioral outcomes; 3) National guidelines from MyPyramid and Fight BAC campaign; 4) empirical findings from the literature review; 5) findings from a content analysis of multiple Youth EFNEP curricula; and 6) guidelines of scale development.
A systematic approach was used to reach the research goal and specific aims of this study and included the following phases: 1) preliminary phase/curricula content analysis; 2) conceptualization phase; 3) construction phase; 4) content validity/expert reviews phase; 5) pilot-testing/cognitive interviews phase; 6) revision phase, and 7) psychometric testing and analysis phase (i.e. factor analysis, internal consistency, item difficulty, test-retest reliability, predictive validity).

The following sections will summarize the main findings from this dissertation associated with the specific aims and research questions of this study.

**Finding 1. Contents and mediators of behavior commonly taught in Youth EFNEP curricula**

One of the major findings of the curricula content analysis was that, the most evident approach identified across the selected curricula was increasing motivation, knowledge and skills. Opportunities to address family involvement, self-control or environmental theory-based strategies were limited in the reviewed curricula. These results, in particular, were important to focus the questionnaire development on measuring knowledge, motivation, self-efficacy, and/or other individual mediating variables associated with initiating behavior change not on sustained behavior change; which also requires attention to be placed on interpersonal and environmental factors. Moreover, results from the content analysis served as conceptual basis to develop content appropriate and standard questionnaire items, by identifying the common nutrition, physical activity and food safety contents taught in all the reviewed curricula.
Finding 2. Evidence of the content appropriateness of EFNEP Youth Quest questionnaire

Another finding from this study was that, the content validity of EFNEP Youth Quest items was demonstrated by means of a combination of approaches. These approaches included: 1) preliminary curricula content analysis; 2) comprehensive process for the questionnaire conceptualization and construction; and 3) expert reviews. Specifically, results from the curricula content analysis provided the conceptual framework to develop the questionnaire with essential elements commonly found in various curricula used across the U.S Youth EFNEP program. Results from the questionnaire conceptualization demonstrated that the selection of measures, contents and item topics were both curricula and theory driven. Moreover, the content appropriateness of the questionnaire was supported because the item selection was through literature review and/or existing instruments. In terms of expert reviews, results from the content validity index revealed that all experts (n=5) rated the majority of the items (53 out of 67 items) as relevant or very relevant. Overall, results from the expert reviews were critical to assess the quality of items, address limitations of the questionnaire (i.e. repetitive items, specificity, misinterpretation, not good representation of the construct of interest) and confirm the content validity of the first draft of EFNEP Youth Quest questionnaire.
Finding 3. Evidence of the age appropriateness and understandability of EFNEP Youth Quest questionnaire

As a result of the cognitive interviews with children (n=14, 5 African-American, 9 Hispanics), several problems were identified that for the most part were different from the problems identified from the expert reviews. Examples of these problems were: misinterpretation of content and constructs of interest, lengthy questions, lack of familiarity with specific terms, inadequacy of response options, lack of appropriateness of the questions and/or pictures, and high response burden. The research team very carefully addressed these problems to maximize the age-appropriateness, socio-cultural competence and understandability of the questionnaire.

Finding 4. Evidence of factor validity of the psychosocial scales

The factor structure of the psychosocial scales of EFNEP Youth Quest was validated with a sample of 452 participants (229 males, 225 females; 46.9% Caucasian non-Hispanic, 37.7% African-Americans, 10.8% Hispanics, 1.1% Asian America, 3.3% Other). Final results of exploratory factor analysis revealed theory-based and interpretable factors for nutrition (three factors), physical activity (two factors) and food safety (one factor), as evidenced by the adequate factor loadings (at least 0.40) and goodness of fit of the final models and set of items. The factors were labeled as follows: nutrition factors (#): 1=healthy eating intentions (four items), 2=outcome expectations of healthy eating (three items), 3=self-efficacy for healthy eating (five items); physical activity factors (#): 1=outcome expectations of physical activity (three items), 2=self-
efficacy to overcome barriers (two items); and food safety (#): 1=self-efficacy for food safety (7 items).

**Finding 5. Evidence of internal consistency of the psychosocial scales**

Internal consistency reliability of the final psychosocial scales was determined using Cronbach’s alpha. All final psychosocial scales except the physical activity outcome expectation scale (Cronbach’s alpha=0.43) had acceptable internal consistency (Cronbach’s alpha >0.50).

**Finding 6. Degree of difficulty of knowledge items**

The majority of the nutrition and food safety knowledge items appeared to have an acceptable degree of difficulty. Specifically, the difficulty index for the knowledge items ranged from 6% to 40%, and for the food safety items ranged from 49% to 92%. Based on this type of item analysis, two food safety items were removed because they had a very low degree of difficulty, which means that questions were too easy to answer for the majority of participants.

**Finding 7. Limited temporal stability/test-retest reliability of the psychosocial items**

Reliability of the psychosocial items was also assessed using test-retest (n=76, three weeks apart without nutrition education intervention). Test-retest analysis was determined using Kappa statistics. Results for the nutrition psychosocial items provided evidence of fair to substantial temporal stability ($\kappa=0.11$-$0.70$, $p<0.05$). Results of the
physical activity ($\kappa=0.07-0.32$, $p<0.05$) and food safety ($\kappa=0.06-0.35$, $p<0.05$)
psychosocial items did not provide sufficient support for temporal stability with Kappa coefficients values ranging between slight and fair.

**Finding 8. Not sufficient evidence for the predictive validity of the nutrition psychosocial scales**

To determine the predictive validity of the nutrition psychosocial scales, Spearman correlations were calculated between scores of the final nutrition psychosocial scales and measures of food intake (n=62 children completed a Block Kids’ Food Screener). It was hypothesized that evidence of the validity of the nutrition psychosocial scales would be characterized by positive correlations with cups of fruits and vegetables, and for negative correlations with grams of saturated fat and teaspoons of sugar. Significant positive correlations were found between the scores of outcome expectations of healthy eating with cups of vegetables ($r^2=0.22$, $p<0.05$), and between the scores of healthy eating intentions with cups of fruits ($r^2=0.21$, $p<0.05$). Significant negative correlations were found between the scores of healthy eating intentions and teaspoons of added sugar ($r^2=0.26$, $p<0.05$). Non-significant correlations were found for scores of self-efficacy for healthy eating with the food intake variables.
Finding 9. Not sufficient evidence for the predictive validity of the physical activity psychosocial scales

To establish the predictive validity of the physical activity psychosocial scales, Spearman correlations were calculated between scores of the final physical activity psychosocial scales and scores of physical activity obtained through accelerometers (n=56 children wore an accelerometer; only 47 were included in the analysis). It was hypothesized that evidence of the validity of the physical activity psychosocial scales would be characterized for positive correlations with MPA, MVPA and VPA. This study did not provide sufficient evidence of the predictive validity, as only poor no significant correlations were found between the physical activity psychosocial scales and MPA, MVPA, and VPA.

Conclusions

This dissertation contributes to the enhancement of the evaluation methods of Youth EFNEP programs. Overall, results indicate that although further work is needed, the EFNEP Youth Quest questionnaire is acceptable to be used with ethnically diverse-low-income youth audiences, from 3rd through 5th grades, with the aim of evaluating the impact of Youth EFNEP on cognitive and psychosocial mediators related to nutrition, physical activity and food safety.

This study highlights the importance of using behavioral theories and curricula content analysis techniques as foundation to develop, identify and/or select evaluation
tools for Youth EFNEP that “matched” the program goals, objectives, intensity and content.

Additionally, the results of this study demonstrated the importance of combining expert reviews and cognitive interviews as opportunities to inform decisions related to retain, modify or delete items. Experts’ and children’s points of view were both pivotal to confirm the content and face validity of the questionnaire, and to maximize the age-appropriateness and social-competence of the questionnaire.

This study also highlights the importance of selecting a large and ethnically diverse sample from the targeted audience (at least 5 participants per item) to conduct rigorous psychometric procedures as exploratory factor analysis. Moreover, this study underscores that importance of using appropriate methods for assessing the factor structure of the nutrition, physical activity and food safety psychosocial scales, which were composed by categorical data (binary and ordinal items). These methods included: 1) Using appropriate statistical software to compute factor analysis for categorical data (i.e. Mplus); 2) report the rotation used and why it was used; and 3), and using the necessary criteria to determine the best factor structure (i.e. eigen values, scree-plots, fit indices, factor loadings and interpretability).

Furthermore, this study highlights how complex it is to develop a brief, valid and reliable questionnaire for low-income children. For reliability purposes it is recommended to have more items or more response options. However, when designing questionnaires for children, lengthy questionnaires can placed response burden and consequently affect the accuracy of the responses and/or the overall response rates. The
action taken in this study to address this complex issue included: 1) design the questionnaire with at least 3 items per scale, so that it was long enough to ensure reliability whole being short enough to avoid response burden; 2) simplify the response format of the questionnaire to three-point or binary scales; 3) calculate item difficulty index to discard knowledge questions that were too easy or too difficult; and 3) use factor analysis as an item reduction strategy.

**Recommendations for future research**

- Further research is needed to refine and verify the content validity of the reduced-final version of EFNEP Youth Quest questionnaire.
- Further research is needed to assess if EFNEP Youth Quest questionnaire is useful in other states and appropriate to be used with other age groups.
- Further research is needed to determine the factor invariance of the psychosocial scales between groups (i.e. grades, gender, ethnic/race).
- Future research is needed to investigate the best procedures to determine the predictive validity of the nutrition and physical activity psychosocial scales.
- Further research is needed to determine the reliability and validity (i.e. factor structure and predictive validity) of the knowledge items.
- Further research is needed to determine the sensitive to change of EFNEP Youth Quest questionnaire.
APPENDICES
APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL LETTERS
February 24, 2010

Dr. Katherine Cason  
Clemson University  
Department of Food Science and Human Nutrition  
255 Poole Agriculture Center  
Clemson, SC 29634


Dear Dr. Cason:

The Institutional Review Board (IRB) of Clemson University reviewed the above-mentioned study using Expedited review procedures and has recommended approval. Approval for this study has been granted as of February 19, 2010 for all research sites with a support letter on file with IRB. Please find enclosed with this letter your original, stamped student assent document to be used with this protocol. The other original, stamped consent documents for this protocol were picked up by your student, Yenory Hernandez.

Your approval period is February 19, 2010 to February 18, 2011. Your continuing review is scheduled for January 2011. Please refer to the IRB number and title in communication regarding this study. Attached are handouts regarding the Principal and Co-Investigators’ responsibilities in the conduct of human research. The Co-Investigator responsibilities handout should be distributed to all members of the research team. The Principal Investigator is also responsible for maintaining all signed consent forms (if applicable) for at least three (3) years after completion of the study.

No change in this approved research protocol can be initiated without the IRB’s approval. This includes any proposed revisions or amendments to the protocol or consent form. Any unanticipated problems involving risk to subjects, any complications, and/or any adverse events must be reported to the Office of Research Compliance immediately. Please contact the office if your study has terminated or been completed before the identified review date.

The Clemson University IRB is committed to facilitating ethical research and protecting the rights of human subjects. Please contact the Office of Research Compliance at 656-6460 if you have any questions.

Sincerely,

Laura A. Moll, M.A., CIP  
IRB Administrator

Enclosures
September 8, 2010

Dr. Katherine Cason
Clemson University
Department of Food Science and Human Nutrition
255 Poole Agricultural Center
Clemson, SC 29634


Dear Dr. Cason:

Your amendment submitted to the Institutional Review Board (IRB) August 23, 2010, has been approved by expedited review procedures on September 8, 2010. Your approval remains through February 18, 2011, the expiration of your approval period. Please find enclosed with this letter your original, stamped consent document to be used with this protocol.

No change in this approved research protocol can be initiated without the IRB’s approval. This includes any proposed revisions or amendments to the protocol or consent forms. Any unanticipated problems involving risk to subjects, any complications, and/or any adverse events must be reported to the Office of Research Compliance immediately. Please contact the office if your study has terminated or been completed before the identified review date.

The Clemson University IRB is committed to facilitating ethical research and protecting the rights of human subjects. Please contact the Office of Research Compliance at 656-6460 if you have any questions.

Sincerely,

Laura A. Moll, M.A., CIP
IRB Administrator

Enclosure
October 13, 2010

Dr. Katherine Cason
Clemson University
Department of Food Science and Human Nutrition
255 Poole Agricultural Center
Clemson, SC 29634


Dear Dr. Cason:

Your amendment submitted to the Institutional Review Board (IRB) September 17, 2010, has been approved by expedited review procedures on October 7, 2010. Your approval remains through February 28, 2011, the expiration of your approval period. Please find enclosed with this letter your original, stamped consent document to be used with this protocol.

No change in this approved research protocol can be initiated without the IRB’s approval. This includes any proposed revisions or amendments to the protocol or consent forms. Any unanticipated problems involving risk to subjects, any complications, and/or any adverse events must be reported to the Office of Research Compliance immediately. Please contact the office if your study has terminated or been completed before the identified review date.

The Clemson University IRB is committed to facilitating ethical research and protecting the rights of human subjects. Please contact the Office of Research Compliance at 656-6460 if you have any questions.

Sincerely,

[Signature]
Laura A. Moll, M.A., CIP
IRB Administrator

Enclosure
February 7, 2011

Dr. Katherine Cason
Clemson University
Department of Food Science & Human Nutrition
255 Poole Agricultural Center
Clemson, SC 29634

SUBJECT: IRB Protocol # IRB2010-024 entitled "Measuring the Impact of Youth EFNEP Program: Tool Development and Validation"

Dear Dr. Cason:

The Institutional Review Board (IRB) of Clemson University reviewed the above-mentioned study using expedited review procedures. On the continuing review form, you indicated the status of this project is enrollment closed – remaining research activities are limited to data analysis only. Continuing approval for this study has been granted as of February 3, 2011.

Your approval period is February 19, 2011 to February 18, 2012. Your next continuing review is scheduled for January 2012. Please refer to the IRB number and title in communication regarding this study.

No change in this approved research protocol can be initiated without the IRB’s approval. This includes any proposed revisions or amendments to the protocol. Any unanticipated problems involving risk to subjects, any complications, and/or any adverse events must be reported to the Office of Research Compliance immediately. Please contact the office if your study has terminated or been completed before the identified review date.

The Clemson University IRB is committed to facilitating ethical research and protecting the rights of human subjects. Please contact the Office of Research Compliance at 656-6460 if you have any questions.

Sincerely,

Laura A. Moll, M.A., CIP
IRB Administrator
Title of Study
Measuring the Impact of Youth EFNEP Program:
Tool Development and Validation

Description of the research and your child’s participation

Your child is invited to participate in a research study conducted by researchers from Clemson University. The purpose of this research is to develop and test an evaluation tool, which in the future will be used by the Youth Expanded Food and Nutrition Education Program (EFNEP). It is very important to identify if the evaluation tool is a true measure of what your child learns in nutrition education classes.

Your child’s participation will involve meeting with our staff up to 4 times at the beginning of the school year, then again at the end of the school year. These meetings will be arranged with the school principal, your child’s teacher or nutrition educator assistant during times that will limit interference with your child’s school day. We will meet with your child no more than 30 minutes at a time. During these meetings, we may collect the following information:

1. Questions about the paper-pencil evaluation tool, including opinions about each question’s wording and responses. The interviewer will be taking notes and audiotape the interview to appropriately capture all the comments.
2. Basic demographics (e.g., age, gender, grade)
3. Height and weight
4. Knowledge related to healthy eating, physical activity and food safety.
5. Beliefs, attitudes, feelings and behaviors about: food/nutrition, food safety (e.g., washing hands, proper cooking methods), physical activity/exercise, and sedentary behaviors (e.g., watching television, playing video games).

We will also randomly select some children and invite them to wear, for one week, a small device (called an accelerometer—it is about the size of a matchbox), on a belt (that we provide to your child) around their waist. This device will measure his/her physical activity (e.g., how often they move, the strength of each movement). If your child is randomly selected and takes part in wearing the device at the beginning of the school year, we will ask him/her to wear the device again at the end of the school year.

Risks and discomforts

There are no known risks associated with this research. However, if any question makes your child feel uncomfortable, he or she is free to skip it. If your child wears the accelerometer belt directly against their skin, there is a slight risk for skin irritation, yet we instruct each child to wear those belts on top of their clothes and not directly against the skin.
Potential benefits
There are no known benefits to your child that would result from your child's participation in this research. However, this research may help us to make improvements to the questionnaire; and also to evaluate and improve the Youth EFNEP program.

Protection of confidentiality
We will do everything we can to protect your child's privacy. Your child's identity will not be revealed in any publication that might result from this study. Your child's forms will be protected by a coding that does not identify his/her name, except only to study staff. All forms will be kept in a locked location up to 5 years, following federal regulations and Clemson University policies. In rare cases, a research study will be evaluated by an oversight agency, such as the Clemson University Institutional Review Board or the Federal Office for Human Research Protections, that would require that we share the information we collect from your child. If this happens, the information would only be used to determine if we conducted this study properly and adequately protected your child's rights as a participant.

Voluntary participation
Participation in this research study is voluntary. You may refuse to allow your child to participate or withdraw your child from the study at any time. Your child will not be penalized in any way should you decide not to allow your child to participate or withdraw your child from this study. Your child will receive a small incentive worth $2-$10 if he/she participates.

Contact information
If you have any questions or concerns about this study or if any problems arise, please contact Dr. Katherine Cason at Clemson University at (864) 723-4520 or Yenory Hernandez at (864) 986-9486. If you have any questions or concerns about your child's rights as a research participant, please contact the Clemson University Institutional Review Board at 864.656.6460.

Consent
I have read this parental permission form and have been given the opportunity to ask questions. I give my permission for my child to participate in this study.

Parent's signature: ___________________________ Date: ____________
Child’s Name: ________________________________

A copy of this parental permission form should be given to you.
Information Concerning Participation in a Research Study
Clemson University

Measuring the impact of Youth EFNEP Program:
Tool Development and Validation

Description of the Research and Your Participation
Your child is invited to participate in a research study conducted by the researchers
Katherine Cason (principal investigator) and Yenory Hernandez (PhD. Candidate), from
Clemson University. The purpose of this research is to develop and validate an
evaluation tool, which in the future will be used by the Youth Expanded Food and
Nutrition Education Program.

Your child’s participation will involve meeting with our staff up to 2 times. These
meetings will be arranged with the school principal, your child’s teacher or nutrition
educator assistant during times that will not interfere with your child’s school day. We
will meet with your child no more than 30 minutes at the time.
During these meetings, your child will complete a self-report survey about:
1. Knowledge related to nutrition, physical activity and food safety.
2. Belief, attitudes, feelings and behaviors about: food/nutrition, food safety, (e.g.,
washing hands, proper cooking methods), physical activity/exercise.

Risks and Discomforts
There are no known risks associated with this research. However, if any question makes
your child feel uncomfortable, he or she is free to skip it.

Potential Benefits
There are no known benefits to your child that would result from your child’s
participation in this research. However, this research may help us to make
improvements to the questionnaire.

Incentives
Your child will receive a small incentive worth $2-$10 if he/she participates (a bottle of
water and/or a decorative lunch bag with two or more of the following things:
bookmarks, notepads, eraser, magnets, puzzles, door hangers, pens or pencils).

Protection of Confidentiality
We will do everything we can to protect your child’s privacy. Your child’s identity will
not be revealed in any publication that might result from this study. Your child’s forms
will be protected by a coding that does not identify his/her name, except only to study
staff. All forms will be kept in a locked location up to 5 years, following federal
regulations and Clemson University policies. In rare cases, a research study will be
evaluated by an oversight agency, such as the Clemson University Institutional Review
Board or the federal Office for Human Research Protections that would require that we

This form is valid only if the
Clemson University IRB
stamp of approval is shown here:
share the information we collect from your child. If this happens, the information would only be used to determine if we conducted this study properly and adequately protected your child's rights as a participant.

Voluntary Participation

Participation in this research study is voluntary. You may refuse to allow your child to participate or withdraw your child from the study at any time. Your child will not be penalized in any way should you decide not to allow your child to participate or withdraw your child from this study.

Contact Information

If you have any questions or concerns about this study or if any problems arise, please contact Dr. Katherine Cason at Clemson University at (864) 723-4520 or Yenory Hernandez at (864) 643-9251. If you have any questions or concerns about your child's rights as a research participant, please contact the Clemson University Institutional Review Board at 864.656.6460.

A copy of this informational letter will be given to you.
APPENDIX C

STUDENT ASSENT FORMS
STUDENT ASSENT TO PARTICIPATE IN A RESEARCH STUDY

Title of the Study:
Measuring the Impact of Youth EFNEP program: tool development and validation

You are being invited to participate in a research study. Below you will find answers to some of the questions that you may have.

What is it for?
- To find out if the survey used in nutrition classes is a true measure of what you learned.

Why me?
- You are being asked to be in this research study because you are between the ages of 9 and 12 years old. Also, because we want to know your opinions about the survey, and what children at your age know and do related to food, nutrition and physical activity. This is not a test. The answer that you will give will be kept in private. No one will ever know what you say. Your name will never be used.

What Will I Have to Do?
- You will need to meet with our staff no more than 30 minutes.
- Your height and weight will be measured.
- Your physical activity and food habits will be measured.
- You will answer a pencil-paper survey about your knowledge, attitudes and feelings about food/nutrition and physical activity.
- You will give your opinions about the survey’s questions and responses.

Did My Parents Say It Was Okay?
- Your parents have already signed a consent form for your participation, but it is up to you to continue or stop participating at any time without penalty. This research study will not affect or benefit your grades.

Who Will Be Helped By This Research?
- At the end of this research study you will help us to design a better survey for the Youth Expanded Nutrition Education Program. Also for your participation you will receive at the end a small incentive worth $2-$10.

By signing below, I am saying that I have read this form and have asked any questions that I may have. All of my questions have been answered so that I understand what I am being asked to do. By signing, I am saying that I am willing and would like to participate in this study. I also have received a copy of this form to keep.

Signature of Child/Student

Date

Date: (Indicate date prepared)
STUDENT ASSENT TO PARTICIPATE IN A RESEARCH STUDY

**Title of the Study:** Measuring the Impact of Youth EFNEP program: tool development and validation

You are being invited to participate in a research study. Below you will find answers to some of the questions that you may have.

**What is it for?**
- To find out if the survey used in nutrition classes is a true measure of what you learned.

**Why me?**
- You are being asked to be in this research study because you are in 3rd, 4th or 5th grade. Also, because we want to know what children at your age know and do related to food, nutrition and physical activity. This is not a test. The answer that you will give will be kept in private. No one will ever know what you say. Your name will never be used.

**What Will I Have to Do?**
- You will need to meet with our staff up to 2 times, no more than 30 minutes.
- You will answer a pencil-paper survey about your knowledge, attitudes, feelings and behaviors about food/nutrition and physical activity.

**What Are The Good Things And Bad Things That May Happen To You If You Are In The Study?**
- There are known good or bad things that may happen to you if you are in the study. However, at the end of this research study you will help us to design a better survey for the Youth Expanded Nutrition Education Program.
- Also, you will receive at the end a small incentive worth $2-$10 (a bottle of water and/or a decorative lunch bag with two or more of the following things: bookmarks, notepads, eraser, magnets, puzzles, door hangers, pens or pencils).

This form is valid only if the Clemson University IRB stamp of approval is shown here:

[Clemson University IRB Consent Form]

APPROVED 10/17/2000
EXPIRES 2/28/2011

Page 1 of 2
What If You Want To Stop? Will You Get In Trouble?
- Your participation is voluntary and you have the right to stop at any time. Your decision will not affect your relation with us or with the school.
- This research study will not affect or benefit your grades.

Do You Have Any Questions?
- You can ask questions at any time. You can ask them now. You can ask later. You can talk to me or you can talk to someone else at any time during the study. Here is the telephone number to reach us 864-6439251, Yenory Hernandez, Food Science and Human Nutrition Department, Clemson University.

By participating in this study, I am saying that I have read this form and have asked any questions that I may have. All of my questions have been answered so that I understand what I am being asked to do. I am saying that I am willing and would like to participate in this study. I also have received a copy of this form to keep.
APPENDIX D

THEORETICAL MODEL OF THIS STUDY
**Youth EFNEP**

**A LOGIC MODEL TO LOW-INCOME YOUTH AND CHILDREN IN 3rd, 4th and 5th GRADES, EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM (EFNEP)**

**Program Mission**
Attain limited-resource audiences in teaching the knowledge, skills, attitudes and changed behavior necessary for nutritionally sound diets, and to contribute to their personal development and the improvement of the total family diet and nutritional well-being.

**Population Served**
Any low-income children or youth from the age of 6 through 15 years and who live in low-income rural or urban areas from South Carolina as well as from other states where EFNEP program is implemented.

**Population Needs to be Addressed by Services**
Children from lower socio-economic families and from minority groups have the highest rates of overweight and obesity, therefore they are more likely to experience obesity related effects such as: psychological problems, lower academic achievement and cardiovascular adult diseases. In addition, children from low-income families lack opportunities that promote physical activity and they are also more likely to grow up in a food-insecure household, where food availability of both healthy and unhealthy foods is limited.

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**Short Term —— Medium term —— Long Term**

---

**Inputs**

- Financial Resources
- Planning
- Process
- Mobile educational supplies and curricula
- People: EFNFP staff, part-time trainees, volunteers, state- and local partners
- Time

**Activities**

- Teach age-appropriate nutrition education lessons, including hands-on activities and topics such as: hygiene practices, healthy choices, food storing and handling, planning nutritious meals and recipes, cooking tricks to include more fruits and vegetables, identify and practice diverse physical activities, food safety, right EAC rules-handling
- Use newsletter, recipes and other activities to involve parents

**Theory Constructs and Strategies**

- **Motivational Mediators**
  - Outcome expectations
  - Self-efficacy

- **Action Mediators**
  - Knowledge & behavioral skills
  - Decision-making & decision-making skills

- **Environmental Supports**
  - Reinforcement
  - Social support (parents activities)
  - Modeling (teachers’ demonstrations)

---

**Outputs**

- Increased awareness, knowledge and skills in:
  - Nutritional knowledge
  - Dietary behaviors

**Outcomes—And-Impact**

- **Goal**: Increase healthy eating practices

  - **Medium-term Goals**
    - Increase healthy eating practices
    - Increase food safety practices
    - Increase knowledge about nutrition and food safety

  - **Long-term Goals**
    - Increase food literacy
    - Increase knowledge about nutrition and health

---

**Process**

- **Behavioral Intention**
- **Nutrition Behavior**

**EVALUATION**

- **Nutrition Behavior**
- **Food, Health & Nutritional Impacts**

---

**Outcome (pre-post tests)**

- Increased knowledge about food safety
- Increased knowledge about nutrition and food safety

---

**Nutritional Impact**

- **Mortality**: Decrease risk factors for:
  - Obesity and overweight
  - Food insecurity

---

**Youth EFNFP participants will be able to:**

- Improve food handling practices
- Use safe food handling practices

---

**Notes**

- Additional lessons about the benefits of healthy eating
- Increased awareness of fruits and vegetables
- Increased awareness of healthy eating
- Improved decision-making skills
- Increased decision-making skills
- Increased food handling practices
- Increased food safety practices
- Increased knowledge about food safety

---

**EFNEP**

- Expanded Food and Nutrition Education Program

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**References**

- USDA, Food and Nutrition Service, 2018
- USDA, Food and Nutrition Service, 2019
- USDA, Food and Nutrition Service, 2020
- USDA, Food and Nutrition Service, 2021
APPENDIX E

WEB BASED SURVEY SENT TO EFNEP STATE COORDINATORS
**YOUTH EFNEP/SNAP-ed ASSESSMENT**

Created: July 20 2009, 11:41 AM  
Last Modified: July 20 2009, 11:41 AM  
Design Theme: Basic Green  
Language: English  
Button Options: Labels  
Disable Browser “Back” Button: False

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**Page 1**

**Question 1** - Open Ended - One or More Lines with Prompt  
[Optional]

Please enter your personal information

- Name
- Email
- Position
- State

---

**Page 2**

**Question 2** - Open Ended - One or More Lines with Prompt  
[Optional]

Which curriculum (s) do you use for delivering Youth EFNEP/SNAP-Ed among elementary school age children?

- Name
- # of Lessons in the curriculum
- Languages available

---

**Page 2**

**Question 3** - Choice - Multiple Answers (Bullets)  
[Optional]

What topic does the curriculum address? (Check all that apply)

- Food Preparation Skills
- Food Resource Management
- Food Safety
- Healthy eating
- Physical Activity
- Other, please specify

---

**Page 2**

**Question 4** - Choice - Multiple Answers (Bullets)  
[Optional]

What grade levels does the curriculum address? (Check all that apply)
Page 2 - Question 5 - Open Ended - Comments Box

Additional comments you wish to share

Page 3 - Heading
CURRICULUM FUNDAMENTALS

Page 3 - Question 6 - Yes or No
The curriculum matches Youth EFNEP/SNAP-Ed national goals, core areas and outcomes.

✓ Yes
✗ No

Page 3 - Question 7 - Yes or No
The curriculum matches with national or state health education standards.

✓ Yes
✗ No

Page 3 - Question 8 - Yes or No
The curriculum is based on behavioral theory (e.g. social cognitive theory, theory of planned behavior, etc)

✓ Yes
✗ No
If yes, please indicate which theory or theories

Page 3 - Question 9 - Yes or No
The curriculum provides opportunities activities that affirm health-promoting beliefs and behaviors (e.g. hands on activities, peer discussions, problem solving)

✓ Yes
✗ No

Page 3 - Question 10 - Yes or No
A progressive sequence has been established so that each lesson plan reinforces the one before it and sets the stage for the next one.
Yes
No

Page 3 - Question 11 - Yes or No
Guidance, strategies, or activities are provided to expand learning opportunities outside of the classroom (e.g. family activities, investigate/ internet review assignments).

Yes
No

Page 3 - Question 12 - Yes or No
The curriculum is "user-friendly" and easily implemented by EFNEP/SNAP-Ed paraprofessional educators.

Yes
No

Page 3 - Question 13 - Open Ended - One Line
In some countries #13 is associated with bad luck but in others #13 is considered a special number. For this question, please take a breath of 13 seconds and think in something that make you feel really happy. Ready?! Now, please go ahead with question # 14.

Page 3 - Question 14 - Open Ended - Comments Box
Overall, what do you think of the curriculum that you are currently using for your school-age audience?

Page 3 - Image
You are almost done!

Page 4 - Heading
YOUTH EFNEP/SNAP-ed EVALUATION TOOL

Page 4 - Question 15 - Open Ended - One Line
Name of the tool or instrument used in your state for evaluating Youth EFNEP/SNAP-Ed among school-age children?

Page 4 - Question 16 - Open Ended - One Line
Developers/authors of the tool or instrument

Page 4 - Question 17 - Yes or No
Did you make any modification to the original version of the tool or instrument?
Yes
No
If yes, please explain.

Has this tool or instrument been pilot tested with low-income school-aged children(e.g. for validity and reliability).
Yes
No
If so, please describe.

What is the purpose of this tool or instrument?

Grades for which the tool or instrument was designed (check all that apply)
Grade 1
Grade 2
Grade 3
Grade 4
Grade 5
Grade 6
Other, please specify

What language is the tool available in?

How do you use the results obtained from the evaluation tool(s)? (Check all that apply)
Accountability (Annual report)
Create increase awareness of nutrition educational activities
Determine program effectiveness
Evaluate program personnel
Facilitate supervision
Improve your program
Other, please specify

Do you make use of the Wisconsin Youth Website to obtain and/or share evaluation tools; and/or to have information about tools available for outcome evaluation of YOUTH EFNEP/SNAP-Ed.
Yes
No
If so, please describe.

<table>
<thead>
<tr>
<th>Page 4 - Question 24 - Open Ended - Comments Box</th>
<th>Mandatory</th>
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</thead>
<tbody>
<tr>
<td>What changes would you recommend to enhance Youth EFNEP/SNAP-ed evaluation tools or instruments?</td>
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</table>

<table>
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<tr>
<th>Page 4 - Question 25 - Open Ended - Comments Box</th>
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<tbody>
<tr>
<td>Are there any additional comments you would like to make about YOUTH EFNEP evaluation tools?</td>
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</tbody>
</table>

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<th>Page 4 - Image</th>
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<td>THANK YOU!</td>
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</table>

(Adapted from the HECAT Curriculum Information Form)
APPENDIX F

CONTENT ANALYSIS CODING MANUAL
null
APPENDIX H

CONTENT VALIDITY: INVITATIONAL LETTER FOR PANEL OF EXPERTS
Recruitment Letter for Panel of Experts

Dear ________,

I am conducting a research project for the youth component of the Expanded Food and Nutrition Education Program (EFNEP). The main purpose of this project is to develop and validate “EFNEP Youth Quest” self-report questionnaire. EFNEP Youth Quest questionnaire was designed to be used with Youth EFNEP participants in 3rd, 4th and 5th graders, and as a comprehensive impact assessment tool for evaluating essential elements commonly found in various curricula used across the U.S. Youth EFNEP program. The development of this questionnaire is critical to contribute to the enhancement of the evaluation methods used by Youth EFNEP, and also to have a better understanding of the mechanisms needed for the prevention of childhood obesity.

I am writing to request your participation in this process because of your knowledge and your involvement in activities related with health education and promotion. Your participation will include serving on a panel of review experts to conduct a content validation of the questionnaire that we are developing. We would greatly value your opinion and would appreciate any feedback you could provide. The review should take approximately 15-20 minutes of your time.

At this point, we have an inventory of potential questions for inclusion in the questionnaire, selected from a review of literature and existing Youth EFNEP evaluation instruments. These questions are classified into three core sections: nutrition, physical activity and food safety; and include measures of knowledge and psychosocial constructs associated with nutrition, physical activity and food safety behavioral change in children.

Enclosed you will find a copy of the inventory of questions to be reviewed, specific directions to follow while you are reviewing as well as other supporting materials. Please feel free to write your comments on the materials provided or use additional paper as needed. Lastly, please return all your revisions/comments no later than month/date/year.

Thank you in advance for your cooperation and guidance in this endeavor!

Sincerely,

Yenory Hernandez-Garbanzo
Email: hernanh@clemson.edu
Mail address: E255 Poole Agricultural Center, Clemson, SC29634

Encl: instructions and content validity rating forms
APPENDIX I

CONTENT VALIDITY RATING FORMS
Overview
As part of the content validity process of the questionnaire, “Youth EFNEP Quest”, you are asked to assess the general appropriateness of the instrument, and the extent to which you think each item is measuring what it is supposed to measure. Specifically, you are asked to rate each item based on relevance, clarity, ambiguity and adequacy of response options.

Questions in the enclosed inventory are potential candidates to be included in our final questionnaire. Our goal is to include in the final questionnaire those questions that best measure the effectiveness of Youth EFNEP program. Revision, selection, elimination or substitution of questions will be based on your expert opinions, so please do not hesitate to be as detailed as possible.

Specific instructions
- Rate the appropriateness of the questionnaire prospective name on a scale of 1-4 (1=not appropriate, 2=somewhat appropriate, 3=quite appropriate, 4=highly appropriate).
- If you have suggestions for the questionnaire name, please write suggested title in the space provided.

- As you read through each question or item, please rate as follows:
  1. Rate the level of relevance on a scale of 1-4 (1=not relevant, 2=item needs revision, 3=relevant but needs minor revision, 4=very relevant). Space is provided for you to comment on individual questions or item as needed.
  2. Rate the level of clarity on a scale of 1-4 (1=not clear, 2=item needs revision, 3=clear but needs minor revision, 4=very clear). Space is provided for you to comment on individual questions or item as needed.
  3. Rate the level of ambiguity on a scale of 1-4 (1=meaning is vague, 2=item needs revision, 3=not vague but needs minor revision, 4=not at all vague). Space is provided for you to comment on individual questions or item as needed.
  4. Rate the level of adequacy of response options on a scale of 1-4 (1=not adequate, 2=needs revision, 3=adequate but needs minor revision, 4=very adequate). Space is provided for you to comment on individual questions or item as needed.

- Please let us know you comments in regard these final questions:
  1. Which are some opportunities for revision of items-questions?
  2. Which are some opportunities to recommend deleting item-questions?
  3. Which are some opportunities to add additional items-questions?
Directions:
Please circle one rating for each of the reviewing criteria. Also, please write recommendations to revise, substitute, add, or eliminate any item/questions using the “Comments” column.

Section A. Review of the Questionnaire Prospective Name
- Level of appropriateness: 1=not appropriate, 2=somewhat appropriate, 3=quite appropriate, 4=highly appropriate

<table>
<thead>
<tr>
<th>Questionnaire Title</th>
<th>Appropriateness</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youth EFNEP Quest</td>
<td>1 2 3 4</td>
<td></td>
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</table>
# Content Review of Nutrition, Physical Activity and Food Safety Items

<table>
<thead>
<tr>
<th>Construct: Knowledge</th>
<th>Response Options</th>
<th>Relevancy</th>
<th>Clarity</th>
<th>Ambiguity</th>
<th>Adequacy of response options</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Level in which students know essential nutrition information (i.e. My Pyramid food groups and how much should be eaten from each food group/daily)</td>
<td></td>
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<tr>
<td>Questions</td>
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</tbody>
</table>
| 1. Which item contains foods from all the five groups? | a. Ham, green pepper and pineapple pizza  
 b. A grilled cheese sandwich  
 c. A fruit smoothie | | | | | |
| 2. How many ounces should we eat from the grain group each day? | a. 4 ounces  
 b. 5 ounces  
 c. 6 ounces | | | | | |
| 3. How many cups of vegetables do you think we should eat each day? | a. ½ to 1 cup  
 b. 2 to 3 cups  
 c. 4 to 5 cups | | | | | |
| 4. How much fruit do you think we should eat each day? | a. ½ to 1 cup  
 b. 1 ½ to 2 cups  
 c. 3 cups | | | | | |
| 5. How many ounces should we eat from the meat and beans groups each day? | a. 2 ounces  
 b. 5 ounces  
 c. 7 ounces | | | | | |
| 6. How much food from the milk, yogurt and cheese group should we eat each day? | a. 1 cup  
 b. 3 cups  
 c. 5 cups | | | | | |
## Construct: Outcome Expectations
Level in which students enhance their understanding about the benefits of eating healthier (e.g., eating a variety of vegetables, calcium-rich foods, eating breakfast daily and trying new foods)

### Questions

<table>
<thead>
<tr>
<th>Construct</th>
<th>Response Options</th>
<th>Relevancy</th>
<th>Clarity</th>
<th>Ambiguity</th>
<th>Adequacy of response options</th>
<th>Comments</th>
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<tr>
<td></td>
<td></td>
<td>1 = not relevant 2 = item needs revision 3 = relevant but needs minor revision 4 = very relevant 1 = not clear 2 = item needs revision 3 = clear but needs minor revision 4 = very clear 1 = meaning is vague 2 = item needs revision 3 = not vague but needs minor revision 4 = not at all vague 1 = not adequate 2 = needs revision 3 = adequate but needs minor revision 4 = very adequate</td>
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<td>8. I like tasting new vegetables that I haven’t tried before</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<td>9. I drink milk so I can have strong bones now</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>10. I drink milk because it is good for me</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>11. Eating breakfast everyday helps me learn better</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<td>12. Breakfast is important to me</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>13. I like to try different foods</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>Construct: Food choices intentions</td>
<td>Level in which students enhance their intentions to select healthy foods/beverages.</td>
<td>Response Options</td>
<td>Relevancy</td>
<td>Clarity</td>
<td>Ambiguity</td>
<td>Adequacy of response options</td>
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<td>Questions</td>
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<td>1=not relevant</td>
<td>1=not clear</td>
<td>1=meaning is vague</td>
<td>1=not adequate</td>
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<tr>
<td>14. If you were at school, which one would you pick?</td>
<td>1. Can of soda 2. Glass of orange juice</td>
<td>Pictures included</td>
<td>2=item needs revision</td>
<td>2=item needs revision</td>
<td>2=item needs revision</td>
<td>2=needs revision</td>
</tr>
<tr>
<td>15. Which bread would you choose for a sandwich?</td>
<td>1. White bread 2. Whole wheat bread</td>
<td>Pictures included</td>
<td>2=item needs revision</td>
<td>2=item needs revision</td>
<td>2=item needs revision</td>
<td>2=needs revision</td>
</tr>
<tr>
<td>16. Which one would you choose for breakfast?</td>
<td>1. Whole grain cereal (like Cheerios, Wheaties, Total) 2. Other cold cereal (like Rice Krispies, Captain Crunch, Corn Flakes)</td>
<td>Pictures included</td>
<td>3=relevant but needs minor revision</td>
<td>3=clear but needs minor revision</td>
<td>3=not vague but needs minor revision</td>
<td>3=adequate but needs minor revision</td>
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<tr>
<td>17. Which would you choose to eat in the morning?</td>
<td>1. Donut 2. Toast with no butter</td>
<td>Pictures included</td>
<td>3=relevant but needs minor revision</td>
<td>3=clear but needs minor revision</td>
<td>3=not vague but needs minor revision</td>
<td>3=adequate but needs minor revision</td>
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<tr>
<td>18. Which would you do if you were going to eat a piece of chicken?</td>
<td>1. Leave on the skin 2. Take off the skin and not eat the skin</td>
<td>Pictures included</td>
<td>4=very relevant</td>
<td>4=very clear</td>
<td>4=not at all vague</td>
<td>4=very adequate</td>
</tr>
<tr>
<td>19. Which food would you ask for?</td>
<td>1. Frozen yogurt 2. Ice cream</td>
<td>Pictures included</td>
<td>4=very relevant</td>
<td>4=very clear</td>
<td>4=not at all vague</td>
<td>4=very adequate</td>
</tr>
<tr>
<td>20. Which food would you ask the adults in your house to buy?</td>
<td>1. Bag of oranges 2. Bag of tortilla chips</td>
<td>Pictures included</td>
<td>4=very relevant</td>
<td>4=very clear</td>
<td>4=not at all vague</td>
<td>4=very adequate</td>
</tr>
<tr>
<td>21. Which would you pick to drink?</td>
<td>1. Regular milk 2. Low fat or skim milk</td>
<td>Pictures included</td>
<td>4=very relevant</td>
<td>4=very clear</td>
<td>4=not at all vague</td>
<td>4=very adequate</td>
</tr>
<tr>
<td>22. Which one would you order at a fast food restaurant?</td>
<td>1. A regular hamburger 2. Grilled chicken sandwich</td>
<td>Pictures included</td>
<td>4=very relevant</td>
<td>4=very clear</td>
<td>4=not at all vague</td>
<td>4=very adequate</td>
</tr>
<tr>
<td>Construct: Self-efficacy</td>
<td>Response Options</td>
<td>Relevancy</td>
<td>Clarity</td>
<td>Ambiguity</td>
<td>Adequacy of response options</td>
<td>Comments</td>
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<tr>
<td>Level in which students enhance their self-confidence to select or ask for healthier food options.</td>
<td></td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
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<tr>
<td><strong>Questions</strong></td>
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<tr>
<td>24. For lunch, I can drink water instead of regular pop or Kool aid.</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
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<tr>
<td>27. During breakfast, I can drink low fat or skim milk instead of regular milk</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
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<tr>
<td>30. At the store, I can read a food label to help choose a healthy snack or drink</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
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<tr>
<td>Construct: Outcome expectations</td>
<td>Questions</td>
<td>Response Options</td>
<td>Relevancy 1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>Clarity 1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>Ambiguity 1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>Adequacy of response options 1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
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<tr>
<td>Level at which students enhance their understanding about the benefits of being physically active</td>
<td>31. Being physically active is fun</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<td></td>
<td>32. Being physically active is good for my health</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<td></td>
<td>33. I can still do sport or other physical activity even if I am not good at it</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>Construct: Social influences</td>
<td>Response Options</td>
<td>Relevancy</td>
<td>Clarity</td>
<td>Ambiguity</td>
<td>Adequacy of response options</td>
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<td>Level of influences that students have for being physically active</td>
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<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
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<td>Questions</td>
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<td>34. My friends think that doing physical activity is fun</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>35. My friends think that doing physical activities is important</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>36. My family thinks I should do physical activities</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>37. My parents show or tell me they really like it when I do physical activities</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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<tr>
<td>38. If I asked my parents to do physical activities with me, they probably would.</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
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</table>
### Construct: Self-efficacy
Level at which students enhance their self-confidence to be physically active.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Response Options</th>
<th>Relevancy</th>
<th>Clarity</th>
<th>Ambiguity</th>
<th>Adequacy of response options</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>39. I think I can ask my parents to sign me up for a sport</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
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<tr>
<td>40. I think I can be physically active no matter how busy my day is</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
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<td>41. I think I can be physically active no matter how tired I may feel</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
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<tr>
<td>42. I think I can be physically active even if it is hot or cold outside</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
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<tr>
<td>43. I think I have what it takes to be physically active.</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
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<tr>
<td>Questions</td>
<td>Response Options</td>
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<td>44. The Fight Bac rules are:</td>
<td>1. Clean, separate, cook, and chill</td>
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<td></td>
<td>2. Wash hands, wash utensils, cook, and freeze</td>
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<td></td>
<td>3. Wash hands, cook, chill, and freeze</td>
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<tr>
<td>45. What should you use to check the temperature of cooked meat?</td>
<td>1. Your hand</td>
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<td>2. A food thermometer</td>
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<td>3. The amount of steam from the meat</td>
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<td>46. You should check food temperatures:</td>
<td>1. When you’re cooking and storing food</td>
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<td>2. When you throw food away</td>
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<td>47. What will happen if hot or cold food is not stored at the proper temperature?</td>
<td>1. Someone else will eat it</td>
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<td>2. Nothing will happen</td>
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<td>3. There will be quick bacterial growth</td>
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<tr>
<td>Questions</td>
<td>Response Options</td>
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<td>Clarity</td>
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<td>Adequacy of response options</td>
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</tr>
<tr>
<td>Construct: Knowledge Level at which students know essential Food Safety information (e.g. Washing hands, keep from cross contaminating, and cooking foods properly)</td>
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</tr>
<tr>
<td>48. Where is a good place to store meat?</td>
<td>1. The utility room 2. The kitchen counter 3. The refrigerator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49. ___ Can make food spoil and make you sick.</td>
<td>1. Bacteria 2. Fruit juice 3. Refrigeration</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>50. ___ Foods to the proper ___ to make them safe to eat.</td>
<td>1. Stir; consistency 2. Cook; temperature 3. Freeze; time</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>51. ___ After using the bathroom, handling pets, coughing or sneezing.</td>
<td>1. Wash hands 2. Wipe hands 3. Rinse hands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52. When you wash your hands what do you do? That’s easy, I …</td>
<td>1. Run some water over them quickly and dry. 2. Wash my hands with soap for a few seconds. 3. Wash my hands with soap for 20 seconds.</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Construct: Knowledge Level at which students know essential Food Safety information (e.g. Washing hands, keep from cross contaminating, and cooking foods properly)</td>
<td>Questions</td>
<td>Response Options</td>
<td>Relevancy</td>
<td>Clarity</td>
<td>Ambiguity</td>
<td>Adequacy of response options</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>53. What is an example of cross contamination?</td>
<td></td>
<td>1. Touching raw meat when making a salad 2. Biting a carrot when getting some more dip with it 3. Both are examples of cross-contamination</td>
<td>1=not relevant 2=item needs some revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs some revision 3=clear but needs minor revision 4=very clear</td>
<td>1=doubtful 2=item needs some revision 3=not doubt but needs minor revision 4=very clear</td>
<td>1=not adequate 2=need some revision 3=adequate but need minor revision 4=very adequate</td>
</tr>
<tr>
<td>54. If I think a food may be spoiled, I …</td>
<td></td>
<td>1. Cook it 2. Taste it to see if it tastes ok 3. Throw it in the trash</td>
<td>1=not relevant 2=item needs some revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs some revision 3=clear but needs minor revision 4=very clear</td>
<td>1=doubtful 2=item needs some revision 3=not doubt but needs minor revision 4=very clear</td>
<td>1=not adequate 2=need some revision 3=adequate but need minor revision 4=very adequate</td>
</tr>
<tr>
<td>55. These chicken and rice leftovers have been in the refrigerator for over a week. I think we should…</td>
<td></td>
<td>1. Eat it 2. Taste it and then decide 3. Put it back in the refrigerator 4. Throw it away</td>
<td>1=not relevant 2=item needs some revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs some revision 3=clear but needs minor revision 4=very clear</td>
<td>1=doubtful 2=item needs some revision 3=not doubt but needs minor revision 4=very clear</td>
<td>1=not adequate 2=need some revision 3=adequate but need minor revision 4=very adequate</td>
</tr>
<tr>
<td>56. I ate a lot of food at the picnic and now I have a stomachache and feel awful. The food was left out of the cooler all day. I’ll bet you have…</td>
<td></td>
<td>1. The flu 2. Food poisoning 3. Nerves because of the math test tomorrow</td>
<td>1=not relevant 2=item needs some revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs some revision 3=clear but needs minor revision 4=very clear</td>
<td>1=doubtful 2=item needs some revision 3=not doubt but needs minor revision 4=very clear</td>
<td>1=not adequate 2=need some revision 3=adequate but need minor revision 4=very adequate</td>
</tr>
</tbody>
</table>
### Construct: Knowledge

**Level at which students know essential Food Safety information (i.e. Washing hands, keep from cross contaminating, and cooking foods properly)**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Response Options</th>
<th>Relevancy</th>
<th>Clarity</th>
<th>Ambiguity</th>
<th>Adequacy of response options</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>57. We should wash fruits and vegetables before we eat them:</td>
<td>1. To keep them fresh 2. Only if they are dirty 3. To wash off the germs and dirt 4. To make them juicy</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
</tbody>
</table>

### Construct: Outcome Expectations

**Level at which students enhance their understanding about the benefits or risks related to food safety (i.e. keeping germs out of our food)**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Response Options</th>
<th>Relevancy</th>
<th>Clarity</th>
<th>Ambiguity</th>
<th>Adequacy of response options</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>58. I think unsafe food can make people really sick.</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>59. I think unsafe food can be life threatening.</td>
<td>1. Disagree 2. Not sure 3. Agree</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>Construct: Self-efficacy</td>
<td>Response Options</td>
<td>Relevancy</td>
<td>Clarity</td>
<td>Ambiguity</td>
<td>Adequacy of response options</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------------</td>
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<td>-------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Level at which students enhance their self-confidence and skills necessary to food safety skills</td>
<td>HOW SURE ARE YOU THAT YOU CAN?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60. Wash hands with warm water and soap for 20 seconds before preparing food?</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>61. Wash hands with warm water and soap for 20 seconds before eating?</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>64. Clean countertops before preparing food?</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>65. Always wash fruits and vegetables with cold running water?</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>66. Clean and disinfect the cutting boards used for raw meat, fish and poultry before using for any other foods?</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>67. Keep raw meat, fish and poultry wrapped properly and kept separately in the refrigerator so juices do not drip on other foods?</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
<td>1=meaning is vague 2=item needs revision 3=not vague but needs minor revision 4=not at all vague</td>
<td>1=not adequate 2=needs revision 3=adequate but needs minor revision 4=very adequate</td>
<td></td>
</tr>
<tr>
<td>68. Put cooked meat fish and poultry on a different platter than the one with the raw juices</td>
<td>1. Not sure 2. A little bit sure 3. Very sure</td>
<td>1=not relevant 2=item needs revision 3=relevant but needs minor revision 4=very relevant</td>
<td>1=not clear 2=item needs revision 3=clear but needs minor revision 4=very clear</td>
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</tbody>
</table>
APPENDIX J

COGNITIVE INTERVIEW PROTOCOL
Cognitive Interview Protocol

Conducting the Cognitive Interview: Instructions

- **1 Week Prior to Conducting the Cognitive Interview**
  1. Send reminders to the summer camp director 1 week before the interviews

- **1-2 Days Prior to Conducting the Cognitive Interview**

  Assemble the following materials:
  ___ Cognitive Interview materials (List of nutrition, physical activity, food safety questions and question and notes sheet)
  ___ Pens
  ___ Consent Forms
  ___ Assent Forms
  ___ Record Forms
  ___ Tape recorder
  ___ Cassette tapes
  ___ Pack of incentives (Bring only enough bags for the number of interviews you will be conducting)
  ___ Clip boards (3)

  1. Make sure the tape recorder is working properly. Practice recording in advance to verify that the tape recorder can adequately pick up sound.
  2. Obtain characteristic of students:
      - Race and ethnicity
      - Gender percentage of each grade
      - Income level

Day of the Cognitive Interview

1. Arrive at least 30 minutes early to set up materials and familiarize yourself with the interview location.
2. Test the functioning of the recorder to make sure it is working properly. If there is a problem, be very attentive to note taking.
3. Set up the table and chairs so the two chairs are perpendicular to one another. This perpendicular arrangement facilitates conversation.
4. Verify that you have the materials to be reviewed during the cognitive interview. (Nutrition, physical activity, food safety questions and notes sheet).
5. Set up equipment and materials so they are easily accessible to you.
6. Keep the incentives in a secure location.
7. Complete the appropriate information on the cognitive interview recording form.
8. Review the interview tips explained in this protocol.
Interview tips

- Allow enough time so that the cognitive interview is not rushed. More complete and in depth responses to fewer questions will be more useful than minimal or less in depth responses to more questions.
- Provide non-verbal reinforcement to let the interviewee know that you are listening, such as nodding your head, saying ‘hmm mmm,’ and saying ‘okay,’ or ‘I see.’
- Encourage the interviewee to provide specifics about what she/he is thinking.
- Use the following prompts if the interviewee appears to be having difficulty thinking aloud:
  - “Tell me what you’re thinking.”
  - “What are you thinking about right now?”
- Listen to what the interviewee ‘thinks’ about or mentions so you can probe further on these items later on, if needed. For example, if an interviewee says she/he ‘liked’ a graphic or thought something was ‘interesting,’ but does not explain why, probe with additional questions.
- If you have a trained note taker available, have him/her record items the interviewee talks about during the cognitive interview, such as graphics, questions she/he ask, overall design or appearance (i.e., length, color, layout), etc., and put quotes around words/phrases used by the interviewee.
- Instruct the note taker, if applicable, to record non verbal actions the interviewee displays while looking over the materials, such as fidgeting, twirling hair, appearing distracted, etc.
- Debrief with the note taker if applicable, to verify that all the information is complete.

Interviewee Arrival
Guidelines for the interviewee’s arrival

1. Introduce yourself, thank the interviewee for coming, and show him/her where to sit.
2. Establish rapport with the interviewee to ease anxiety that she/he may have about participating in the cognitive interview.
3. Remind the interviewee about the purpose of the project and tell him/her you are interested in hearing what she/he has to say about the materials.
4. Record the start on the cognitive interview recording form.
5. Hand the interviewee a assent form and read the form aloud to the interviewee.
6. Answer any questions.
7. Begin the cognitive interview page 9
Pre-Planning and Talking Points
1. Practice script.
2. Consider questions that may be asked and how you are going to answer them.
3. Be prepared to handle a situation when the student may get off topic.
4. Practice active listening techniques:
   - Nodding
   - Pausing after the interviewee makes a comment so to not rush them
   - Short verbal responses:
     - Yes, okay, uh huh
   - Additional questions:
     - “Could you give me an example of what you mean?”
     - “Tell us more.”
     - “I’m not sure I understand could you please explain further.”
     - “Are there any other view points?”
5. Plan for different personalities.
   - Dominators
     - “Thank you (NAME). Would any one else like to comment?”
     - “Does anyone feel differently
   - Shy
     - “(NAME) I don’t want to leave you out what do you think?”
     - Make eye contact and use their name.
   - Ramblers
     - Don’t keep eye contact long and look at other participants
6. Provide ground rules.
   - Be respectful when others are talking
   - Don’t put down someone else’s opinions or suggestions (We can disagree without being mean)
   - One person talks at a time
   - It is important to give everyone a chance to speak

Conducting the Cognitive Interview:
Cognitive Interview Introduction and Questions

Introduction
- “I have some nametags that I would like for you to write the name that you would prefer to be called and your age. This will help us remember names and to help you remember everyone else’s names.”
- Pass out nametags.
- “I will be tape recording this activity. Do I have your permission to record the activity?”
- If yes, start the tape recorder and read the assent form to the interviewee.
- If no, read the assent form to the interviewee.
- “When I say ‘Go’ I want you to say what today is”
- Be sure to press RECORD before you tell the student to begin
Once the student has said what the day is, press PLAY to listen to the recording.

If you cannot hear you or the student make adjustments and repeat the test.

If you can hear you and the student clearly, continue with the interview by pressing the RECORD button to begin recording.

Before starting the interview first clearly say into the recorder the Student ID number, today’s date, and your initials.

“Good job! Do you have any questions before I begin?”

Pause and give the student time to ask any questions they may have.

“Hello! My name is (YOUR NAME). I am from Clemson University. Are you enjoying the camp so far? First, I want to thank you for participating in this activity. We are asking for your help because this is a questionnaire for kids made by kids and you are going to help us. As we go through each question we want you to tell us if you understand the questions, was the question clear, what you think would make the questionnaire better, was it boring, etc. Your feedback will help us a lot.”

“What I am going to do is ask you questions about each of the questions on this questionnaire.” Hand out the questionnaires. “These are questions that we have gathered. All you have to do is give me your opinion and/or suggestions. Please remember that there are no right or wrong answers. But before we start asking you questions my friend and I are going to give you an example on how we want this activity to go.”

Example:

Friend asks: If your parents asked you where you wanted to go on vacation this year would you choose the beach or the mountains? Before you answer the question do you understand what the question is asking?

Interviewer: Yes, you are asking me if I would rather go to the beach or the mountains on vacation.

Friend: Good job. Now you may answer the question.

Interviewer: I would choose the beach.

Friend: Why did you choose the beach?

Interviewer: Because, I like the beach more than the mountains.

Friend: So, you choose one over the other because of preference and not because of any other factors?

Interviewer: Yes, I love the beach

Friend: Do you like the wording of the question or would you understand it better if it had pictures?

Interviewer: I would like to see pictures.

Friend: Do you have any other suggestions for this question?

Interviewer: No

“That was an example of how we would like the activity to go. Remember that we want your opinions and suggestions so please feel free to think aloud. Do you know what it means to think aloud?

• If no explain that it means whatever he/she is thinking feel free to tell us.

• If yes continue.
Do you have any questions before we begin?”
Wait for any questions and then begin.
Each question will be used for each question in nutrition, physical activity and food safety.
When asking the questions take notes in the Question and Notes Sheet (Appendix 2)
Before asking the list of questions below read the question aloud and then ask the student to read it to themselves.

Question 1
  • “Tell me what you think the question is asking.”

Question 2
  • “Do you like the wording of the question?” “Is this how you would ask your friend this question?”

Question 3
  • “What is your answer to the question?”

Question 4
  • “Why did you choose that answer?”

Question 5
  • “Did any other factors influence your decision?”

Question 6
  • “Do you think the question was be easier to understand if it had pictures?”

Question 7
  • “Was this an easy or hard question for you?”

Question 8
  • “What did and didn’t you like about the question?”

Question 10
  • “Would you rather take this questionnaire in Spanish or in English?”

Question 11
  • “What are your other thoughts about the question?”

Closing
“Thank you for helping us with this activity, you were a lot of help! Please feel free to share any other comments that you haven’t shared to this point.”
  • Pause to allow the interviewee time to share additional comments.
  “Your input will be very helpful in developing our questionnaire. Do you have any questions?”

  • Answer any questions and thank the interviewee for his/her participation
  • Hand the interviewee the pack of incentives.
  • After completing the cognitive interview
  • Record the stop time of the interview on the interview recording form.
  • Record in the notes section of the recording forms any notes, comments, or reactions you hand about the cognitive interview, such as what went well, what didn’t go well, distractions, etc.
• Complete all information on the cognitive interview recording forms.
• Review all notes and fill in any gaps in the interviewee’s responses.
• Debrief with the note taker to make sure no information was missed, to discuss what went well, what could be improved, etc.
• Rewind the tape and write the interviewee ID#, the date of the interview, and your initials on the tape label.
• Keep information for each interviewee in a separate and secure file. This information includes:
  o Cognitive interview recording forms, including notes, comments, etc.
  o Cognitive interview tape

2 Days after interviews
• Send thank you letters to the summer camp director and participants for participating in the interviews.
Cognitive Interview Recording Form

<table>
<thead>
<tr>
<th>Interviewer:</th>
<th>Date: __________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewee ID#</td>
<td>Start Time: ________________ AM</td>
</tr>
<tr>
<td></td>
<td>PM</td>
</tr>
<tr>
<td>Age: ______________________________</td>
<td>Stop Time: ________________ AM</td>
</tr>
<tr>
<td>Gender: M F</td>
<td>PM</td>
</tr>
<tr>
<td>Interview recorded: Yes No</td>
<td>Location: ____________________</td>
</tr>
</tbody>
</table>

Notes:
- Record any factors that influenced the interview, such as interruptions, background noise, recorder problems, etc.
- Note any non-verbal communication about the interviewee (such as: appears distracted, fidgets)

Questions and Notes Sheet

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

References:

Acknowledge: Thanks to Ginger Thomas (nutrition undergraduate summer intern at Clemson University) to contribute in the development/adaptation of this protocol.
APPENDIX K

REVISED EFNEP YOUTH QUEST QUESTIONNAIRE

(After expert reviews and cognitive interviews)
APPENDIX L

EFNEP YOUTH QUEST PROTOCOL
EFNEP YOUTH QUEST PROTOCOL
(adapted from the Zest Quest® Evaluation Project)

Research Design:

1. **Criteria for eligibility**: School children on 3rd, 4th and 5th grade; from low-income/SNAP-eligible schools; and whose parents/guardian approved participation (signed consent form).

2. **Instrumentation**:
   - EFNEP Youth Quest= knowledge and psychosocial scales

3. **Phases**:
   - *Phase 1*: Summer 2010-October 2010 (recruitment and sending consent forms)
   - *Phase 2*: September 2010-November 2010 (data collection)
   - *Phase 3*: September 2010-November 2010 (data registration and analysis)

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**PROCEDURES MANUAL FOR IMPLEMENTING EFNEP YOUTH QUEST**

1. **INTRODUCTION**
   - This questionnaire will be implemented using a paper and pencil format (**pencil or highlighter**).
   - There are administered in a classroom setting
   - The questionnaire includes sections with nutrition, physical activity and food safety cognitive and psychosocial items.
   - Trained administrators/monitors will provide initial instructions, be available for questions, oversee the overall procedures of administration, and ensure the each participant complete ALL the questions.

2. **DATA COLLECTORS**
   - All data collection procedures for the EFNEP Youth Quest questionnaire need to be performed by staffs, which have successfully completed the appropriate training and IRB certification procedures.
The ratio of staff to student for administration should be at least one trained staff per 15 students.

Generally, we will have for this particular study, groups of 25-30 students/per administration, therefore we encourage to have at least 2 trained staff/per administration.

3. TRAINING AND CERTIFICATION REQUIREMENTS
- All staff involved with the administration of the questionnaire EFNEP Youth Quest must have completed the training outlined in this manual and the IRB certification.
- Staff should become familiar with the measurement protocol, the questionnaire and other materials used in this study.
- Each trainee should complete the questionnaire herself/himself prior to the training session.

4. ***CONFIDENTIALITY CONSIDERATIONS
- Each student being measured has the right to her/his responses being confidential
- Students’ names should not appear anywhere in the questionnaire except for the front cover sheet on the labels provided.
- This page will contain the student’s name and ID label but will be removed from the questionnaire after the instrument has been administered and reviewed for complete responses.
- The staff should be pleasant and respectful to each student who participates in the study.

5. EQUIPMENT
  The following supplies are needed for the administration of EFNEP YOUTH QUEST
  __Lists of students with approved parental consent form (lists include ID number and specification of type of testing)
  __Labels for each questionnaire
  __Appropriate number of data collection booklets
  __Copies of students assent forms
  __Copies of protocol
  __Copies of instruction script and FAQs for each monitor in plastic sleeves
Highlighters or #2 sharpened pencils with erasers for each student, plus extras back up.
Handouts for visual aid of physical activity definitions, as required
Bag of incentives for each student

6. STUDENT LISTS AND ID LABELS
- Students Lists and ID labels are generated by the Measurement Coordinator(s) (Yenory Hernandez and Catalina Aragon)
- Each student with consent for measurement will have ID labels printed (consent forms, assent forms and questionnaire should have the ID labels of each student)
- All questionnaire booklets should be pre-labeled prior to arriving at the classroom.
- After each student completes the questionnaire and turns it in, the cover sheet with the students name is to be removed and discarded.

7. STUDENT QUESTIONNAIRE DESCRIPTION
- EFNEP Youth Quest is a questionnaire about nutrition, physical activity and food safety.
- The purpose of the questionnaire is to provide an impact assessment tool for EFNEP Youth, which could demonstrate the student’s mastery on psychosocial constructs related to nutrition, physical activity and food safety behavioral change.
- The questionnaire is designed for 3rd, 4th and 5th graders.
- The questionnaire is a self-report questionnaire originally designed for pre-post testing.
- It is recommended that staff read the directions and each question aloud.
- Specifically, directions should be read carefully, and most importantly it should be emphasized that: (1) the questionnaire is not a test; (2) there is no right or wrong questions, and (3) it is very important to always answer with the truth.
- Data collectors should also emphasized during the initial instructions that they are not examining individual questions but are checking for completeness
- After the questionnaires have been collected and checked for completeness, a measurement staff is responsible for documenting, on the last page, that the questionnaire has been visually checked. If the student should make any corrections, they should be made at this time.
• Once back at the site office (E255 Poole Agricultural), staff will give the survey to the Measurement Coordinator (s) for a final data quality assurance/quality control check.

8. PREPARATION FOR ADMINISTRATION (Checklist)
• ___Obtain eligible student listings and labels from Measurement Coordinator (s)
• ___Pre-label instruments
• ___Put in a corner of the questionnaire your staff/researcher #ID
• ___Bring all the required equipment listed previously

9. ADMINISTRATION OF THE QUESTIONNAIRE
• Testing can occur any day of the week, and should be scheduled in consultation with the appropriate school staff (i.e. principal, classroom teacher, wellness coach, nutrition educator assistants)
• It is preferred that the questionnaire be given in a classroom setting where the student has a table and a chair
• There is a script located at the end of the document.
• Questionnaires are distributed to each student using the labels on the cover sheet with the students’ name on it.
• Responses to frequently asked questions can also be found at the end of the document.
• Before going ahead with the implementation of the questionnaire, staff should give and explain briefly the assent forms to the students. The questionnaire will be only implemented to those kids who have both-approved parent consent forms and approved assent forms.
• Staff will read aloud directions and each of the questions. It is very important to maintain a good tone of voice and be also enthusiastic. Avoid at all the fact of being boring for the kids.
• Staff should give time to the students to understand the directions and to answer each question
• Each section has a stop sign to give a brief pause between sections. Each student must stop at the end of each section that have the sign “STOP” and must not work ahead. Before going ahead to the next section do a physical activity break of 2 minutes with the kids (stretching, flexibility, dancing, etc.)
• While the students are completing the questionnaire, the administrator(s) should circulate the room and unobtrusively observe to be sure that students are completing each question.

10. COLLECTING THE QUESTIONNAIRE
• Each survey should be reviewed to ensure that every question is answered
• Data collectors should take time to verify that all questions were answered when the children hand in the survey
• If time permits, and a participant missed a question(s), ask him/her to complete them
• If any question has multiple answers, point this out and ask the student to erase the response they do not want
• Data collectors should emphasize that they are not examining individual questions but are checking for completeness
• Thank the students for their participation, give them the incentive and remove the cover sheet (these cover sheets should be destroyed since they have the names of the participants)

11. REVIEW, EDIT AND CLEAN UP
• Each team member is responsible for reviewing all questionnaires after data collection
• Make sure that is complete
• Corrections should be only made where it is absolutely obvious what the intended response was.
• These corrections should be part of the scanning process that will take place at the site office

12. DATA MANAGEMENT
• All reviewed questionnaires should be given to the Measurement Coordinator the day after data was collected.
• Questionnaire should be store only in the site office
• Separate folders should be labeled with the school name/date of data collection to store completed questionnaires.
• All questionnaires need to be data entered within 1 week of data collection (Data base in excel sheets)
GENERAL QUESTIONNAIRE ADMINISTRATION SCRIPT

Class script (all students)
1. Greet the class. Instruct the students to clear their desk.
2. Distribute the questionnaire, pencil or highlighters and the assent forms to each student.
3. Read the following:
   “Hello. I’m __________ from __________. We are here today as part of the EFNEP Youth Quest Questionnaire Development Project. We will be handling out a questionnaire that we would like you to complete.

   This is a questionnaire about nutrition, physical activity and food safety. We think it will take you about 30 minutes to finish the questionnaire. Working quietly and carefully is most helpful for all of us.

   After completing the questionnaire we will give you an incentive as appreciation of your help!

   It is important to clarify to you all, that this is not a test. There are no right or wrong answers. This questionnaire is more about answering the best you can and most importantly we want you to tell us the truth.

   “Please take a look to the assent form. This document is basically explaining that participation in this questionnaire is optional. You may choose not to participate. You can also stop at anytime. If you decide not to participate, this will not affect your relationship with your school of the University in any way”

   “Your answers to these will be kept private. Your parents and teachers are not permitted to see your responses”. We hope that you will answer all the questions but you may skip any question if choose to. If you decide to continue please put your signature at the end of this document” (Show to the students where they have to sign).
“Now, let’s start completing the questionnaire!

“In the first page, do not write your name, just complete the information that they ask you: What’s your age? What’s your grade? What’s your gender?

“In page #2, we have some general instructions for completing the questionnaire; I am going to read them for you”

4. **Read the instructions aloud for the students:**
   “Dear student,

   Thank you for answering the following questionnaire.

   This questionnaire is divided into different parts. In every section, please do not forget to read and understand the directions. Also, **CIRCLE just ONE** answer for each question unless otherwise is directed.

   After your leader read each question, select your answer. Please do not work ahead. Do not answer a question until your group leader has read it aloud to the group. We will go from one question to the next only when everyone in the group has picked an answer”. Also, in every section you will see a stop sign that means that we will stop at the end of each section, before starting a new one”.

   Remember; answer your question as best as you can and as honestly as you can. There are no right or wrong answers.

   If you have any questions, please raise your hand and your group leader will walk around and help you.

   Once you have finished, we will check the survey for completeness. We will only be checking to make sure you answered all the questions. We will not look at your individual answers.

   Thank you so much for your help. Are there any questions before we begin?
Script for Group Leaders-extra details:

- For section C: Physical Activity Outcome Expectations read the following to the students before starting this section”
  “Now, I’d like to call your attention to the definition of **being physically active**. Being physically active means you play games or sports, exercise, run or walk fast so that you breathe faster”.

- For sections D, E and F: Self-efficacy sections please after reading the instructions emphasized the following to the students:
  “Before going ahead, remember in this section we are not asking about WHAT DO YOU DO? OR WHAT DO YOU PREFER to do? We are asking questions first of all about YOU and if YOU think that you **CAN** successfully do the following things…ok?!”
GENERAL QUESTIONS (which apply to all questions):

Q. What does <word>mean?
(In cases where the word is not defined in this document)
A: “Whatever it means to you”

Q. How do I answer if______________
(Scenario/question not addressed in this document)
A: “Answer as best you can or answer whichever one best applies to you”

Q. What does [phrase or word] mean?
A: Re-read the question to the student, putting the appropriate emphasis on the phrase or phrases that may explain the question.

Q. What is the point of answering [blank]?
A: It helps us with our research project

Q. I don’t understand the question
A: Read the instructions aloud and go through the question together, putting emphasis where it will help explain the question.
APPENDIX M

ACCELEROMETERS PROTOCOL
PROTOCOL FOR THE ACCELEROMETER

The Actical activity-monitoring device utilizes an accelerometer to monitor the occurrence and intensity of motion. This type of sensor integrates the amplitude and frequency of motion and produces an electrical current that varies in magnitude. An increased intensity of motion produces an increase in voltage. Actical stores this information in the form of activity counts. The monitor stores 32 bits of data every second. It does this 60 times until it hits the 60 second mark and then it takes the average of all data points for the 60 epoch. For the EFNEP Youth Quest project, we will convert the activity counts to minutes spent in moderate and vigorous physical activity using a special data reduction program. Actical data provides us with an objective measurement of these two study outcomes.

1. Equipment
   - 1 Laptop with Actical software
   - 1 ActiReader
   - Actical monitors
   - Belts for monitors
   - Color-coded student ID labels for monitors
   - Transparent tape
   - Pens/Pencils
   - Student information / instruction sheets
   - Parent or Guardian information / instruction sheets
   - Sports Team Leader or Coach memos

2. Data Collectors
   Measurement staff that have successfully completed the appropriate training and certification procedures outlined in this manual perform all data collection procedures. Prior to certification, trainees will successfully demonstrate initialization, downloading and visual data inspection using data from 3 subjects.

3. Schools and scheduling
   Actical monitors will be placed on students after the Team Leader and/or Measurement Coordinator make arrangements with the School Liaison to set up a time and place at the school.
Acticals will be retrieved on the following (DAY), in order to collect 7 full days of data. One measurement staff person will download data this day, at the school. If a student is present on the day the activity monitors are returned, but forgets to wear the monitor or is absent on the day monitors are returned, a return visit to the school to retrieve the monitor and/or administer the 3DPAR is required.

4. **Labels**
Prior to the measurement team going out to a school the Measurement Coordinator and/or Team Leader will apply color-coded student ID labels to the back of the Actical monitor. This label assists in ensuring that the correct monitor is issued to the appropriate student. The ID label on a monitor must be matched to the ID number on the student’s name badge.

5. **Measurement Procedures**
Actical monitors must be initialized before collecting data. Initialization may be done on the evening or afternoon before meeting with the students. The start date and time should be programmed so that the monitor will begin collecting data after the student begins to wear it. Most students will put their monitor on in the early afternoon, so as a default initialize the monitor to begin collecting data at 15:00 (which is 3:00PM) on the day the monitor will be given to them. If an entire school schedule changes, the Measurement Coordinator will decide whether all monitors will need to be re-initialized. If belts go on as scheduled for a school but one or more students are not present, their monitors may need to be re-initialized, depending on how many days later their monitor goes on. This decision will be made on a case-by-case basis by the Measurement Coordinator upon advisement from the Principal investigator and the statistician. The steps for initializing monitors, distributing and picking up monitors, downloading monitors, storing and backing up data, as well as visually inspecting data are outlined in the following appendices.
Data Collection Procedure

Monitor Belt: Once monitor has been initialized, insert the unit onto a belt and add a buckle to the belt. The correct orientation of the monitor is such that the blue arrow points upward.

Distributing Activity Monitors: Activity monitor data collection occurs on the first day that baseline assessment begins for a given school. Students will return their monitors one week later (e.g., if a monitor goes on a student on a Monday, he/she would return it the following Tuesday).

Note: The Measurement Coordinator or you Team Leader will make arrangements with the School Liaison prior to the date for your team to access students at the appropriate school. Driving arrangements for your team should be coordinated through the Team Leader. On data collection days, be sure to get to your school at minimum 30 minutes prior to the scheduled data collection time.

Each student should be given a nametag label during this contact that includes his or her name and ID number (see Anthropometric Protocol). Explain the procedures regarding wearing the activity monitors to each student. (This can occur in groups.) Below is a prepared script containing the information that the data collection staff should tell the students. Data collectors should practice this script before meeting with the students.

A label is provided that will include each student’s ID number, and staff contact number in the event that the monitor is lost. This label should be placed on the monitor matching the ID to the student who is to wear that monitor. Check the label just before you put it on the monitor to be sure that it matches the ID number on the student’s nametag label. Cover the label with transparent tape.
SCRIPT:

"I am going to give you an activity monitor today. It needs to be worn everyday through next (fill in the correct day of the week). The monitor is attached to a belt that will be worn around your waist. Please wear the monitor all day, including when you are asleep. The only time you should remove the monitor is when you shower or bathe. Sweating will not hurt the monitor, so you should wear it when you play sports or games. If you need to take the monitor off, put it somewhere that it will not be bumped, dropped, or broken. It is very important that you put the belt and the monitor back on your waist as soon as you can. We need you to wear the monitor for as much as you can everyday."

"It is important that you always wear the monitor in the same location on your waist (front right hip), and that the monitor is worn with the blue arrow pointing up.” Illustrate this to the student as the monitor is placed on the waist.

"Here are three things to remember about wearing the monitor:

1. Keep the belt tight
2. Take it off only when you shower or bathe
3. Any time you take it off, put it back on as soon as you can"

"I am going to give you a sheet that contains my phone number. Please feel free to call me if you have any questions about the monitor."

Also add:

"We will also be calling you and your parents/guardians next week to see if you have any questions and to check on how things are going."

"We will be back next ____________ to pick up the monitor. You should wear the monitors to school on that day and through the day until we meet to take the belt off."

Each student should be given a copy of both the student and the parent information and instruction sheet to take home, and for those that need it, a copy of a letter for any sports team coaches or leaders if they are participating in a sport where they might have to take the monitor off. See Appendices C, D and E for instruction sheets.
Telephone Call: Using the Participant/telephone list, each student will be called prior to the end of the week to remind them to keep wearing the activity monitor and to make sure they wear it to school on the day you plan to pick up the monitor. Leave a message if the student is not there either with an adult or on an answering machine.

Actical Monitor Removal

The student should come to school wearing the monitor the next week, 8 days later (e.g., if students get monitors on a Tuesday, they will be removed on the following Wednesday – so that we will have 7 complete days of data). At the time the belt is removed from the student match the id on the activity monitor label to the student. The label on the monitor remains until the data are downloaded to the laptop. The ID number on the label will be sued to name the data file when following the download produces outlined below. Downloading the activity monitors should occur within 24 hours after removal.
**ACTIVITY MONITOR INSTRUCTIONS**

Wear the monitor **ALL DAY – EVERY DAY**

From when you wake up until you go to bed

Take the monitor off **ONLY** for:

- SHOWERING
- BATHING

The monitor should always be worn against your **right hip bone**; blue arrow facing up; ID sticker facing your body.

DO NOT take the monitor apart – that will ruin the data and we wont be able to use it.

We may call you during the week to see how you’re doing.

We will be back on _________ at _________ to pick up the monitor.

***Make sure you wear it to school on that day, too***

If you have any questions, please call

__________________________ or email us

__________________________

**THANK YOU FOR HELPING US WITH THIS IMPORTANT RESEARCH!**
PARENTAL INSTRUCTION MEMO

TO: Parents/Guardians
FROM: 
DATE: 

As you know, your child was invited to participate in the EFNEP Youth Quest program evaluation, led by Clemson University. The purpose of this memo is to inform you of the details of this study, and the importance of wearing the physical activity monitor assigned to your child.

The monitor (attached to a belt) must be worn over the right hip; directly over the hip bone. The monitor will stay in the correct position most easily if it is worn against the skin, underneath clothes. The colored dot should be facing upward on the belt. The monitor is very small, is hardly noticeable, and will not interfere with your child’s normal, everyday activities.

The monitor must be worn all day long for 7 consecutive days. It should be removed for purposes of showering or bathing, but should be put back on immediately afterwards.

The monitor should be worn for one week, seven consecutive days – from ______________ through ______________. I will return to (SCHOOL NAME) on ______________ to pick up the monitor assigned to your child.

PLEASE remind your child to wear the monitor everyday. It is crucial to the integrity of the study that the monitor is worn as instructed, for the next 7 days.

We have given your child two signs to remind him/her to wear the monitor on each morning. (It will be helpful if these are placed in obvious places, such as the refrigerator and on the bathroom mirror). If you or your child has any questions, comments, or concerns regarding the study, please do not hesitate to call me at 864-643-9251. If I do not answer please leave a message and I will promptly return your call. You can also contact me by email at hernanh@clemson.edu.

Thank you for allowing your child the opportunity to participate in this important program evaluation.

Sincerely,

Yenory Hernandez
COACHES OR SPORTS TEAM LEADERS MEMO

To Whom It May Concern:

Greetings! The student carrying this letter is a participant in the EFNEP Youth Quest program evaluation.

Each child participating in the evaluation project will wear an activity monitor for 7 days so that we can monitor his/her physical activity. The activity monitor is a motion-sensing device, like a pedometer, that is about the size of a small pager and is worn on a belt around the waist, over or under clothing. We are asking each participant to wear the activity monitors for a full week, including when he/she is playing sports and engaging in other physical activity, so that we receive accurate information about his/her activity level. Each student who wears a monitor does have parental consent to do so, and has provided his/her assent as well. There is minimal risk of injury in wearing the activity monitors during sports, and those who are concerned about this possibility were offered a padded pouch in which the monitor can be placed while participating in organized activities.

We ask that you allow this student to wear the activity monitor during your organized activity so that we may better measure his/her activity level. If you have any questions about the study or the activity monitor, please feel free to contact Yenory Hernandez at Clemson University by phone at 864-643-9251 or by email at: hernanhn@clemson.edu.

Thank you for your understanding and cooperation with our evaluation!

Sincerely,

Yenory Hernandez
APPENDIX N

BLOCK KIDS FOOD SCREENER: INSTRUMENT AND PROTOCOL
Think about everything you ate or drank yesterday. Remember what you had for breakfast, lunch, dinner, after school, while watching TV, and at bedtime.

Please write your name in this box.

DID YOU EAT OR DRINK IT YESTERDAY?

Cereal, like corn flakes, Frosted Flakes ○ Yes ○ No
Cooked cereal, like oatmeal ○ Yes ○ No
Eggs, breakfast sandwiches or breakfast burritos ○ Yes ○ No
Breakfast bars, granola bars, Protein bars ○ Yes ○ No
Glasses of milk ○ Yes ○ No
Real fruit juice, like orange juice, apple juice, or Mexican fruit drinks like licuados (DO NOT include soda) ○ Yes ○ No
Drinks like Coke or 7-Up, Sunny Delight, Hawaiian Punch, or aguas frescas (DO NOT include diet soda) ○ Yes ○ No
Apples, bananas, or oranges ○ Yes ○ No
Applesauce, fruit cocktail ○ Yes ○ No
Any other fruit, like strawberries, grapes ○ Yes ○ No
French fries, hash browns, tater tots ○ Yes ○ No
Other potatoes, like mashed or boiled ○ Yes ○ No
Ketchup or salsa ○ Yes ○ No
Lettuce salad ○ Yes ○ No
Tomatoes, including on salad ○ Yes ○ No
Green beans or peas ○ Yes ○ No
Other vegetables, like corn, carrots, greens, broccoli ○ Yes ○ No
Vegetable soup, tomato soup, any soup or stew with vegetables in it ○ Yes ○ No
Chili beans, pinto beans, black beans, including in burritos ○ Yes ○ No

HOW MUCH DID YOU EAT?

1 bowl 2 bowls 3 bowls
A little Some A lot
A little 2 eggs 3 eggs
1/2 1 2
1 glass 2 glasses 3 glasses
1 glass 2 glasses 3 glasses
1 bottle 2 bottles 3 bottles
1/2 1 2
A little Some A lot
A little Some A lot
A little Some A lot
A little Some A lot
A little Some A lot
1/4 tomato 1/2 tomato 1 tomato
A little Some A lot
A little Some A lot
A little Some A lot
A little Some A lot
### DID YOU EAT OR DRINK IT YESTERDAY?

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refried beans</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hamburgers, cheeseburgers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hot dogs, corn dogs, or sausage</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Lunch meat like boloney, ham, Lunchables</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Pizza or pizza pockets</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Spaghetti or ravioli with tomato sauce</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Macaroni and cheese</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Chicken, including nuggets, wings, tenders, also in sandwiches or stew</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Fish, fish sticks or sandwiches, tuna, shrimp</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Burritos or tacos</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Beef like roast, steak or in sandwiches</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Meat balls, meat loaf, beef stew, Hamburger Helper</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Pork, like chops, roast, ribs</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Popcorn</td>
<td>Yes</td>
<td>No</td>
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<td>Snack chips like potato chips, Doritos, Fritos, tortilla chips</td>
<td>Yes</td>
<td>No</td>
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<td>Ice cream</td>
<td>Yes</td>
<td>No</td>
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<td>Candy, candy bars</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Cookies, donuts, cakes like Ho-Hos</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Cheese. Remember cheese in sandwiches or nachos with cheese or quesadillas</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Whole wheat bread or rolls (NOT white bread)</td>
<td>Yes</td>
<td>No</td>
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### HOW MUCH DID YOU EAT?

<table>
<thead>
<tr>
<th>Food Item</th>
<th>A little</th>
<th>Some</th>
<th>A lot</th>
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<tbody>
<tr>
<td></td>
<td>1 small</td>
<td>1 large</td>
<td>2 large</td>
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<tr>
<td></td>
<td>1 slice</td>
<td>2 slices</td>
<td>3+ slices</td>
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<td></td>
<td>A little</td>
<td>Some</td>
<td>A lot</td>
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<td>Some</td>
<td>A lot</td>
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### Please tell us about yourself

#### What kind of cereal did you eat?
- Plain Cheerios, Grape Nuts, Shredded Wheat, Wheaties, Wheat Chex, Kix
- Honey Nut Cheerios, Cap'n Crunch, Lucky Charms, Life, Golden Grahams, Frosted Mini Wheats, Raisin Bran
- Other sweet cereals, like Frosted Flakes, Froot Loops
- Any other cereal, like Corn Flakes, Rice Krispies

#### What kind of milk did you drink?
- Whole milk
- Low fat 1% milk
- Chocolate milk
- Lactaid milk
- Reduced fat 2%
- Nonfat milk
- Soy milk
- Don't know

#### Are you

- Male
- Female

#### How old are you

- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
BLOCK Kids Food Screener

Interviewer Instructions
For use in electronic format

Copyright 2007
NutritionQuest / Block Dietary Data Systems
15 Shattuck Square, Suite 288
Berkeley, CA 94704-1151
Phone: 510-704-8514
Fax: 510-704-8996
**General Instructions**

**Introducing the Food Screener**

Read from text in electronic version as appropriate – ignoring portions of text designed for self-administration (e.g. “clicking”).

Be sure to not use phrases that include the word "diet", as some respondents may think we mean "dieting", rather than simply the respondent’s usual food habits. Do not spend too much time at this initial introduction.

**Read questions as written**

The words are not optional. Do not paraphrase. Do not omit any words.

If subject answers question before it has been read completely, the interviewer should continue reading. This allows the subject to think about inclusion of foods that they might not otherwise have considered in giving their response.

**Respondent questions**

If respondent asks a question for clarification, and you know the answer because it is in this manual, you may give the answer. It is not necessary to reread the entire question.

**Note regarding foods not on the food list**

The food list represents the most important nutrient sources in most children’s diets. It does not and is not intended to include all possible foods that children ever eat. Thus, it is likely that some foods that a child eats will not be on the list. Do not attempt to force unmentioned foods into categories by guessing at their similarity.

**Instructions About the Frequency Part of Food Questions**

**Frequency categories**

Be sure the respondent has been provided with a copy of the Flashcards showing frequency categories. Be careful to select the correct category (click on the button), since recording the frequency incorrectly can make a big difference in the nutrient estimate.

Although you will ask the question in an open-ended way (“How many days last week did you eat...”), encourage the respondent to give her answers in terms of one of the predefined categories. Respondents easily get the idea and will quickly learn to give answers in the categories shown. Ask them to refer to the flashcard for categories.
**Should I read all the response categories?**

In this Food Questionnaire, the answers are all in categories referring to how many days in the last week a food was eaten or beverage drunk, such as "None", “1 day”, “2 days” …

In most cases it is not necessary to read the response categories every time, although you may do so if the respondent is hesitating or unclear.

Instead, you will first show the respondent an example of the type of categories you will be using to record her answers. Then, you will simply ask the question in an open-ended way, wait for a response (such as "5 days last week"), and record it in the appropriate category.

**Wording of the frequency questions**

It is not necessary to say “How often did you eat ….” for every food. You can repeat the introductory phrase from time to time, but most often you should just read the next food, without the “How often…” This will make the interview go a little faster, be less boring, and perhaps encourage the respondent to pick up the pace.

Similarly, avoid repetitively saying “(name of food). How often do you eat that?” It is okay to say that occasionally to vary the wording and pace, but not for every food.

Do not, however, just say “Did you eat ….” This unnecessarily lengthens the interview, because then if the respondent says “yes” you still have to ask the “How often” question.

**Items with more than one food**

For example, “Apples or pears”. Do not try to get separate estimates of frequency for the two foods. Just ask the respondent to answer frequency for that group of foods. And, don’t worry about the two foods having different sizes.

**Frequency answers that overlap the response categories**

If the respondent answers with a range that does not fit exactly into one of the available categories (e.g., “3-4 days last week”), ask the respondent to choose which of the available categories is closest to how often they ate that item. For example, a response of “3-4 days last week” could be probed with “was that closer to 3 days last week, or 4 days”.  

**“None” frequency**

Use the “None” response for any foods not eaten in the last week. These will be counted as zero.
**Avoid confusion between “how often” and “how many”**

There is potential for confusion between “how often” and “how many”. Make sure to keep them separate for the respondent.

So if respondent is answering orange juice as “4 cups a week”, explain that you will ask “How many each time” in a subsequent question, but right now, you want her to tell you “how often” per week, meaning “how many days”: **not how many glasses per week**.

## Instructions About the Portion Size Part of Food Questions

### Portion size is in this interview is very general

Ask the portion size before moving on to frequency of the next food.

Ask the respondent “how much” did you eat/drink (the food or beverage) and read the portion size options. For some foods these are expressed in specific units (e.g. glasses, pieces).

For a number of foods the portion sizes are expressed in very general terms: “a little / some / a lot.” If the respondent asks you to interpret these, you are to ask them what these terms mean to them, saying, “What would you say is a little, some, a lot?” Or, if they press for an answer, ask them to describe the quantity in the way a person like them (in sex and age) would reply.

### How important is portion size?

Although portion size will definitely improve the accuracy of the answers, you should not permit the respondent to spend undue time on the portion size answers. These questions should move along quickly, with a breezy “What would you describe as ‘a little’, ‘some’, or ‘a lot’?”

### Note on beverage “portion sizes”

The portion size part of the beverages section is designed to capture the number of glasses or bottles that the child usually drank on the days she drank the beverage.

For beverage items describing portion size in “glasses”, one glass is assumed to be an 8 oz. serving. This applies to milk, Hawaiian Punch and similar beverages, Hi-C and similar beverages, and fruit juices. This portion size information is provided for you the interviewer, so that you will be able to answer questions, if the respondent asks. The interviewer **does not need to offer the respondent this information, but if she asks, you may respond**.

For sodas, there is an additional question about the size of can/bottle/cup (in number of ounces) that the child usually drank on the days he/she drank this type of beverage.
**Wording of the portion size questions**

Each food has a correct wording for asking the portion size questions ("how many", “how much”, etc.).

It is not necessary to make a full sentence out of the portion size section each time. You do not need to say for every food, “When you have …, about how many/much do you have on the day you ate it?”

**Additional instructions**

**Questions about type of cereal and milks**

Refer respondent to the flashcard when asking, “If you ate cereal last week, what kind of cereal…” Only read the cereal names if they don’t have flashcard. Ask respondent to indicate the one they are the most of. Indicate to respondent that there can be only one response for this question.

Likewise with type of milk. Refer respondent to the flashcard and ask them to tell you ”If you drank milk last week, what kind of milk did you drink?” You can read descriptions as needed. Ask respondent to indicate the one they drank the most of. Indicate to respondent that there can be only one response for this question.

**Questions about gender and age**

At the end of the survey, is text “Please tell us about you.”

Interviewer will probably already have this information about the respondent. If so, just enter information and click through to the next page. If not, ask these questions.

Be sure to click through to completion of screener.