Statewide Vegetable Intervention Evaluation Instruments for 4th Graders in Pennsylvania Show Face Validity and Reliability

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Abstract

Local agencies across Pennsylvania (PA) partner with school districts to deliver classroom-based Supplemental Nutrition Assistance Program Education (SNAP-Ed). To encourage a consistent nutrition education message, a 4-lesson curriculum was derived from extant materials on vegetables. The intervention targeted 4th graders, utilized active learning components (e.g. games, worksheets, and food tastings), and aligned with state academic standards. Evaluation tools, modified from previously validated instruments, were designed in tandem with curricular development and included survey items to assess students' attitudes, self-efficacy, preference and knowledge regarding vegetables. To strengthen evaluation compliance, local agency nutrition educators received a detailed evaluation protocol and participated in a "Webinar" training conducted by the PA SNAP-Ed Management Entity. This project describes assessment of survey face validity and reliability. Survey administration was pilot-tested with two 4th grade classrooms to determine duration and identify preliminary item format and instruction revisions. Cognitive interviews (N=30) assessed comprehension and interpretability of items and instructions. Responses informed item wording and protocol revision to accommodate a variety of student reading abilities. Findings indicated that item purpose was understood. To examine reliability, 147 students completed the revised survey at two time points, 10-14 days apart, with no intervening SNAP-Ed. Test-retest Pearson correlation coefficients for attitude, self-efficacy, vegetable preference, and knowledge scales were 0.71, 0.60, 0.85, and 0.30, respectively. These activities readied the curriculum for outcomes and impact assessment. This study was funded by SNAP-Ed, USDA, and approved by the university Office of Research Protections.

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Background

Intervention

The 4th Grade Vegetable Core intervention is comprised of four lessons that:

- are targeted to 4th grade students.
- are approximately 45 minutes in length.
- address PA SNAP-Ed vegetable goals and objectives.
- align with PA Department of Education State Academic Standards.
- contain worksheets, handouts, and activities.
- include food tastings.
- are evaluated by a curriculum-specific survey administered during Lesson 1 and Lesson 4.

Survey

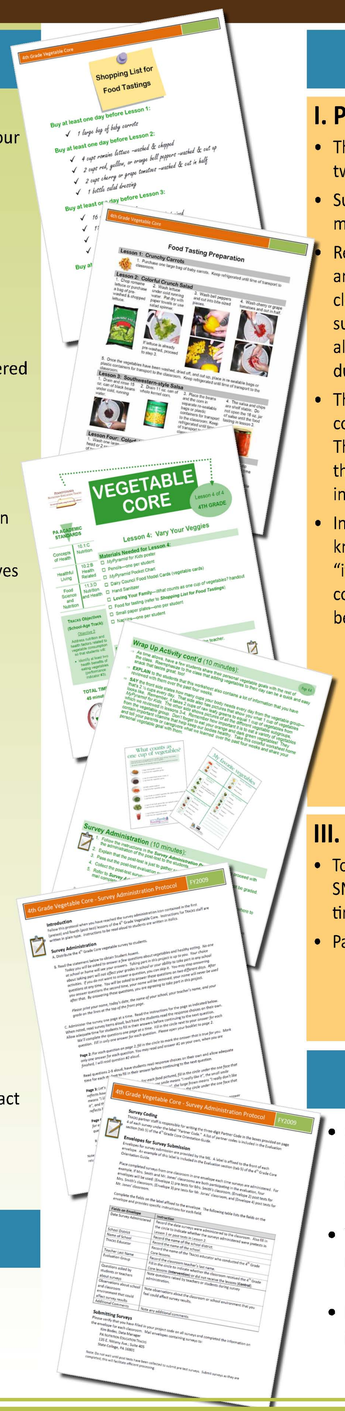
- Food preference, attitude, and self efficacy survey items were used with permission from New Mexico SNAP-Ed (Cooking with Kids). Items and scales were modified to align with lesson content.
- Knowledge items were developed to assess vegetable objectives and key messages from the four lessons.

1. Attitude Scale
   - 2 items - taste of vegetables, making snacks with vegetables
   - 5 response options
2. Self-efficacy Scale
   - 2 items - making snacks with vegetables, eating a variety of vegetables
   - 5 response options
3. Preference Scale
   - 10 items - romaine lettuce, celery, carrots, black beans, tomato, peppers, corn, broccoli, peas, spinach
   - 5 response options
4. Knowledge Scale
   - 4 true/false items
   - 1 multiple choice with 4 response options

- In addition, survey items included age, gender, and two questions intended to identify possible confounders to impact assessment.
  - Do you make food with your family?
  - How often do you choose your own snacks?

Objectives

- To test face validity of 4th Grade Vegetable Survey
- To test reliability of 4th Grade Vegetable Survey



Methods & Results

I. Pilot Testing

- The survey was piloted with two 4th grade classrooms.
- Survey duration was 13 and 15 minutes for pilot classrooms.
- Reading level variability among students and between classrooms indicated that survey items should be read aloud to maintain appropriate duration and improve clarity.
- The word "snack" caused confusion for respondents. The first use of the word in the survey was revised to include a definition.
- Instruction was added for knowledge items to indicate "if you are not sure of the correct answer, make your best guess."

II. Cognitive Interviews

- Cognitive interviews were conducted with 4th grade students (N=30) recruited from SNAP-Ed eligible sites.
- To improve comprehension, further revision of survey items and instructions was based on cognitive interview findings (Table).

Participants

- 66.7% female
- Mean age = 9.1 years
- 53.4% Black, 43.3% White, 3.3% Asian

Original Survey	Interview Findings	Revised Survey
Attitude: How do you feel about tasting vegetables?	Two interpretations of the word "tasting" emerged- tasting new vegetables and taste of vegetables in general.	How do you feel about the taste of vegetables?
Self-efficacy: I can eat vegetables from all the subgroups each week. A subgroup is a group within a group, for example, My Pyramid has five subgroups: Orange, Dark Green, Starchy, Dry Beans and Peas, and Other.	Students had difficulty with the length of this question. They also didn't understand words like "subgroup" and "starchy". Interviewer suggested asking a general question about ability to eat a variety.	I can eat many kinds of vegetables each week.
Knowledge: Eating vegetables can help keep my skin healthy.	The concept of "healthy" was well understood. There was a high correct response rate for this item indicating a ceiling effect.	Broccoli has vitamin C, which helps keep my gums and teeth healthy.
Knowledge: Carrots and corn are in the same vegetable subgroup.	Students could not define "vegetable subgroup". However, they knew where to find this information (MyPyramid, Internet, Library, etc.)	Since vegetable subgroups were to be defined and discussed during the intervention, the original item was retained.
Knowledge: Eating vegetables can help protect my body against infection.	Students had difficulty with the term "infection".	Vegetables help keep me from getting sick.
Knowledge: Beans are high in fiber.	While some students had heard of fiber before, most could not define or describe it.	Since fiber was to be defined and discussed during the intervention, the original item was retained.
Knowledge: What is the recommended amount of vegetables for you to eat each day?	Students had difficulty with the word "recommended".	What amount of vegetables is best for me to eat each day?

III. Reliability

- To assess temporal reliability, 4th grade students (N=147) in eight SNAP-Ed eligible classrooms completed the revised survey at two time points, 10-14 days apart, with no intervening SNAP-Ed.
- Participants
  - 52.1% female
  - Mean age = 9.3 years
- Test-retest Pearson correlation coefficients for attitude, self-efficacy, and vegetable preference scales were 0.71, 0.60, 0.85, respectively.
- Time 1 survey responses were used to examine internal consistency of scales. Cronbach alpha coefficients for attitude, self-efficacy, and vegetable preference were 0.74, 0.65, and 0.71, respectively.
- The knowledge scale does not exhibit external or internal reliability. Test-retest results may have been influenced by guessing and/or learning effects. The knowledge scale is comprised of five items measuring various concepts, e.g. health benefits of vegetables, vegetable subgroups, and recommended vegetable intake.

Conclusions

- Cognitive interview findings emphasize the utility of testing surveys with the target audience to insure accurate item interpretation.
- Test-retest scores on attitude and preference scales indicate reliability; self-efficacy appears moderately reliable.
- Reliable and face valid scales are available to test a vegetable intervention targeting 4th graders participating in SNAP-Ed.