

Improving the Quality of Data From EFNEP Participants With Low Literacy Skills: A Participant-driven Model

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ABSTRACT

Low literacy skills and poor evaluation tool readability combined with the stresses of the classroom environment create a high cognitive load for Expanded Food and Nutrition Education Program (EFNEP) participants, resulting in lower quality data. The authors advocate for 9 strategies for improving the participant cognitive load for the evaluation process using the EFNEP *Family Record* as an example.

Key Words: evaluation, EFNEP, low literacy, low-income, cognitive load, enrollment form (*J Nutr Educ Behav.* 2014;46:309-314.)

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INTRODUCTION

Federally funded programs such as the Expanded Food and Nutrition Education Program (EFNEP) and Supplemental Nutrition Assistance Program–Education (SNAP–Ed) are required to collect participant data for program evaluation.^{1,2} In its report to Congress, the US Department of Agriculture stresses the need to improve the quality of nutrition education program data.³ However, collecting such data in the group setting is a challenge for the EFNEP educator,⁴ and many participants experience embarrassment and stress when they are unable to comprehend elements on the evaluation forms.⁵ Additionally, in California, educators report that the respondent burden is substantial, as data collection takes the entire first class, thus raising dropout rates.^{6,7}

Literacy and Group Delivery

More than 23% of California residents lack basic reading and writing skills.⁸

It is from these Californians that EFNEP recruits. Of California's EFNEP participants, 44% have not completed high school, and 73% are Hispanic. The delivery method shifted from individual in the home to a group setting during the 1980s and 1990s.^{9,10} Today, 90% of California participants are enrolled in groups, which is comparable to 85% on a national level.¹ An unintended consequence of shifting the delivery method from the educator completing the forms in the participant's home is that participants are now expected to read and write to complete the self-administered evaluation forms, including the 24-hour diet recall.^{6,7} Yet the national EFNEP evaluation tools have remained essentially the same and do not reflect the changes in delivery in the group setting, with its corresponding high cognitive load for the participant.^{1,7,11}

Purpose

The viewpoint presented in this paper is that data quality is compromised

because of the high cognitive load for the target EFNEP population, particularly those with limited literacy skills. Using the EFNEP demographic form as an example, an approach to lowering cognitive load, and thereby improving data quality, is presented.

COGNITIVE LOAD THEORY

The principles of Cognitive Load Theory (CLT)¹² are applicable and useful to guide the development of the EFNEP evaluation process. Cognitive load refers to the total amount of cognitive activity, or “thinking power,” required by the participant to respond to all items in the evaluation process.

The authors, who have a combined 90 years of experience with EFNEP, identified elements contributing to cognitive load for the EFNEP evaluation process. This cognitive load is the total, including the interactions, of all of the following elements.¹² These elements are total text on data collection tools, total number of questions or items, complexity of items, unfamiliar words, stresses from the group process, extraneous noise from other participants, language spoken by the educator, language of evaluation forms and their readability, participant sensitivity to items, noise from outside the classroom, participant inability to read and write, number of steps to be recalled from working memory to

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respond accurately, and the participant's first language. Of these 13 elements, the first 10 are partially or completely under the control of the EFNEP administrator, nutrition specialist, and/or educator.

GUIDING PRINCIPLES

To accomplish the purpose, the authors advocate for a new framework with a shift in priorities for the evaluation process (Table 1). The new guiding principles give top priority to meeting the needs of the participant providing the evaluation data.¹³ The second priority is to meet the needs of the educator collecting the data. The third priority is given to the data entry person. Last priority would go to the administrator, nutrition specialist, and evaluator who design the evaluation and interpret the data, but are not directly engaged

in the data collection process (Table 1).¹³⁻¹⁵

The authors' perception is that the traditional EFNEP evaluation tools (Figure A) send unintended messages to participants and educators that the evaluation is not important and that it is difficult, contributing to lower data quality, that is, incomplete and inaccurate data.^{6,7} The tools give top priority in the evaluation process to data entry staff and administrators (Table 1). The existing *Family Record* scored "difficult reading" on the Flesch Reading Ease and ninth grade (8.8) using Flesch-Kincaid Readability Index (Figure A).^{16,17}

Evaluator's Division of Responsibility

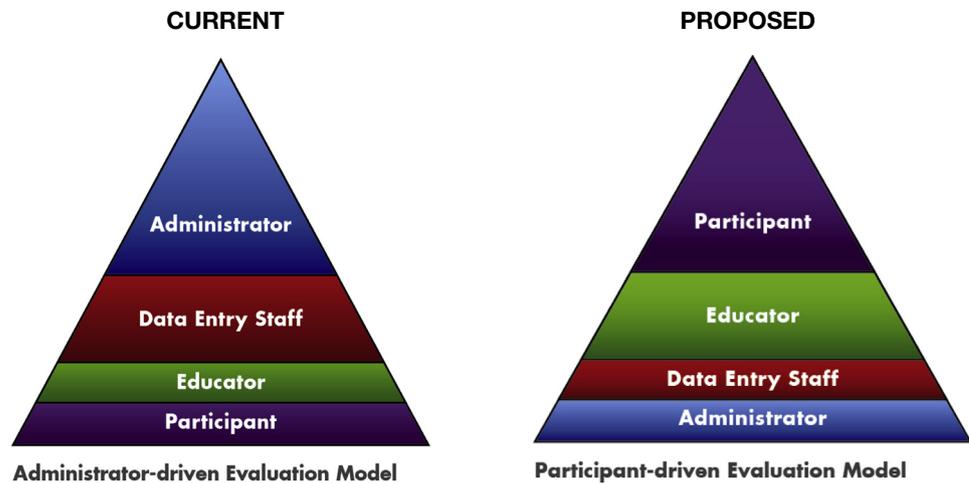
The guiding principles provide the foundation for the Evaluator's Division of Responsibility model.¹⁵ Nutri-

tion education professionals decide the general focus of the evaluation tool, as well as the specific content of each item (Table 1). This assessment of adequacy is referred to as content validity.^{4,18,19} The participant decides how to ask each item, the sequence, item grammatical structure, and the format for the overall tool.^{13,19} This assessment of suitability for the target audience is referred to as face validity.^{4,14,19}

Participant-driven Evaluation Tool

The product of implementation of the guiding principles and the Evaluator's Division of Responsibility is a participant-driven evaluation tool (Table 1). Top priority in the evaluation process is no longer given to the data entry person and administrator. Item sequencing and formatting

Table 1. A Comparison of 2 Nutrition Education Evaluation Models (Current and Proposed): Guiding Principles, Content, Text, Message, and Perceptions



| | | |
|--|--|---|
| Guiding principles | First priority goes to the administrator and then data entry staff. The sequence of items on tool is designed to minimize data entry time. | First priority is to meet the needs of the EFNEP participant. Second priority is to meet the needs of the EFNEP educator. |
| Evaluation tool content | Determined by administrator | Determined by administrator |
| Evaluation tool text, sequence, format | Determined by administrator and data entry preferences | Heavily influenced by participant preferences |
| Message to educators and participants | "Evaluation is difficult, a requirement; get it over fast." | "Evaluation is important!" |
| Meeting federal guidelines | Yes | Yes |
| Perception of the low-literate client | Threatening | Nonthreatening |
| Perception of educator | Does not motivate or energize | Energizes educators |

EFNEP indicates Expanded Food and Nutrition Education Program.

EFNEP FAMILY RECORD

Expanded Food & Nutrition Education Program

Cooperative Extension
EFNEP

Complete on each family at ENTRY into EFNEP and again at EXIT. Technician should fill in shaded items.

| | | | |
|--|--|---|-----------------------------------|
| 1. Technician's Name & ID#: | | 2. Check: ENTRY EXIT | |
| 3. Unit ID: _____ | 5. Enrolled in EFNEP before? (circle Yes OR No) Yes No | 7. Age: _____ | 9. Pregnant (circle) Yes No |
| 4. Homemaker's ID: _____ | 6. If Yes, did you receive a Certificate of Completion? Yes No | 8. Sex: Female _____ Male _____ | 10. Breastfeeding: Yes No |
| Homemaker (First) (MI) (Last) a) Name _____ b) Street _____ c) City _____ Zip _____ d) Phone _____ | | Additional concerns/problems affecting family: Grade of school completed by homemaker: _____ | |
| 11. Race: Check the category you identify with 1-00 ___ White (non-Hispanic) 2-00 ___ Black (non-Hispanic) 3-00 ___ Am Indian/Alaskan Native 4-00 ___ Hispanic 5-00 ___ Asian or Pacific Islander | | 12. Place of Residence: circle number 1 Farm 2 Towns under 10,000 & rural non-farm 3 Towns & Cities 10,000 to 50,000 4 Suburbs of Cities over 50,000 5 Central Cities over 50,000 Date put on Computer: _____ | |
| 14. Household Members: Children by Age List First Name of Children (through Age 19) | | 15. Number of Other Adults in Household (don't count Homemaker) | |
| 1. _____ | Age (Years) | 13. Total Household Income Last Month: \$ _____ | |
| 2. _____ | | 16. Lesson type (Check one): 1 ___ Group 2 ___ Individual 3 ___ Both 4 ___ Other | |
| 3. _____ | | 17. Number of Lessons since last record: _____ | |
| 4. _____ | | | |
| 5. _____ | | | |
| 6. _____ | | | |
| 7. _____ | | | |

| | | | |
|--|------------------------------|----------------------------------|----------------------|
| 18. Entry Date: | | 20. Exit Date: | |
| 19. Programs/agencies from which Family received assistance at ENTRY: (Circle YES or NO) | | 21. Exit Reason: (circle) | |
| WIC/CSFP Yes No | Food Stamps Yes No | 1 Educational Objective Met | 2 Returned to School |
| FDPPIR (Food Distribution Prog. on Indian Res.) Yes No | Commodities Yes No | 3 Took Job | 4 Family Concerns |
| Head Start Yes No | Child Nutrition Yes No | 5 Staff Vacancy | 6 Moved |
| AFDC Yes No | Other _____ Yes No | 7 Lost Interest | 8 Other |
| (Give name of program or agency) | | (Give name of program or agency) | |

About Me

Lesson 1

Date _____ Phone () - _____

Name _____ Message phone () - _____

Address _____ Female Male Age _____

City _____ Zip _____ WAIT

Ages of others who live with you.

Check one or more.

Asian
 Native American
 Black or African American
 White

Hispanic? Y N

Pregnant? Y N
Nursing? Y N

Monthly food costs \$ _____ WAIT

Programs you and your family use.

School meals
 Food bank (Pantries)
 CalFresh (Food stamps)
 Head Start
 CalWORKs (TANF)
 WIC
 Other _____ STOP

DO NOT COPY

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Figure. An example of the Expanded Food and Nutrition Education Program (EFNEP) *Family Record* used in most states (A) and the new version, *About Me* (B), for entry.

are no longer the means of minimizing data entry time. Instead, survey format, question text, item sequence, and protocol are guided by input from participants and educators.²⁰ More importance is placed on the face validity of the tool and subsequent reliability and validity of participant responses.^{4,13,19,20} The participant-driven tool advocated in this viewpoint demonstrates to participants and educators that EFNEP professionals have taken the time and effort to provide evaluation tools that are appropriate for their skill levels and motivating while transmitting the message that “Evaluation is important!”²¹

Cycle of Motivation

It is the responsibility of professionals to motivate EFNEP educators about evaluation. It is their job responsibility, in turn, to inspire participants to provide quality data. It is the partici-

part's responsibility to provide valid data. Use of administrator-driven tools with low-literate EFNEP participants leads to a breakdown in this motivational cycle.

One aspect of giving top priority to participants is consideration of motivational appeal of the evaluation tools. Getting and sustaining the attention of participants is an element of motivation²¹ and essential for the educator collecting the data.¹³ Keeping participants' attention increases fidelity to the evaluation process²⁰ and subsequently reduces random error associated with the tool.¹³

DISCUSSION

In the authors' view, participants' low literacy skills and poor evaluation tool readability combined with the stresses of the classroom environment create a high cognitive load for EFNEP participants. Some evidence is the generic EFNEP enrollment form, the

Family Record (Figure A) or similar, that was used in 48 states and 6 territories during fiscal year 2012–2013.¹ In contrast, a form reflecting educator and participant preferences and employing 9 strategies for improved readability (Table 2) and the principles of CLT is shown (Figure B).²²

Nine Strategies

The authors advocate that professionals use 9 strategies for developing participant-driven evaluation tools for reducing participant cognitive load (Table 2). The first strategy was developed for California EFNEP in 2011 and implemented in 2012 and 2013 to facilitate educator-guided group data collection.^{6,7} The other 8 strategies have been reported in the health and general literacy literature.^{13,20,23–25,27,29,30} The 9 strategies are as follows:

(1) *Use color-dependent instructions.* A simple strategy, color-dependent instructions, uses color cues in place of

Table 2. Applying 9 Strategies (First and Second, New, and Third Through Ninth, Existing) to Improve Functionality of Evaluation Tools for USDA's Low-Literate Nutrition Program Participants: Comparing EFNEP *Family Record* and Its New Version, *About Me*

| Strategy | EFNEP <i>Family Record</i> (federal form), Figure A | EFNEP <i>About Me</i> (California form), Figure B |
|---|--|---|
| 1. Use color-dependent instructions. | No color, text only. | Color can replace written instructions. Each section of <i>About Me</i> is color coded, helping educators keep clients on task. The educator can refer to a color instead of asking participants to locate specific text or read instructions. "We will begin with the green box near the top of the page." |
| 2. Use icon-dependent instructions. | No icons, text only. | The hand at the end of each color-coded box reminds participants to wait or stop for educator direction.  |
| 3. Reduce total word and syllable counts. | 267 words with 25 multi-syllable words. | 98 words with 8 multisyllable words. |
| 4. Remove academic terminology. | "Check the ethnicity you identify with: Hispanic/Latino; non-Hispanic/non-Latino." 10 words, 3 unfamiliar. | Participants report that "non-Hispanic/non-Latino" and "Check the ethnicity you identify with" contain words that are not part of their vocabularies. They prefer, "Are you Hispanic? Yes/no." 5 words, all familiar. |
| 5. Use client-friendly vocabulary. | This EFNEP tool was titled the <i>Family Record</i> . Educators shared that they are hesitant to use this title, as the term "record" conjures up a prison record or jail time by participants' family members. | The term <i>Family Record</i> was replaced by <i>About Me</i> , a client-friendly title. These substitutions inevitably contain fewer syllables. |
| 6. Remove complex punctuation. | "Household members. List ages of people who live with you. Do not include yourself." 14 words, 20 syllables, complex punctuation (colon). | Text was simplified and shortened to: "Ages of others living with you." 6 words, 8 syllables, simple punctuation. |
| 7. Remove math symbols. | Symbols such as \leq for "less than or equal to" and \geq for "more than or equal to" are confusing for most Americans and more so for those with minimal literacy skills. | Removal of math symbols improves readability for this audience. |
| 8. Move selected items to the educator section. | This question is wordy and difficult for participants with low literacy skills. "Identify your place of residence: <input type="checkbox"/> Farm/rural; <input type="checkbox"/> Towns or rural non-farm \leq 10,000; <input type="checkbox"/> Towns and cities \geq 10,000 and \leq 49,999; <input type="checkbox"/> Suburbs of cities \geq 50,000; <input type="checkbox"/> Central cities \geq 50,000." | This question was moved to the Staff/Educator box located on reverse side, so 9,000 participants would not have to struggle with it. The educator will provide this information based on class location. The instruction guide provides the details for the educator. "Residence <input type="checkbox"/> Farm <input type="checkbox"/> Small town <input type="checkbox"/> Town <input type="checkbox"/> Suburb <input type="checkbox"/> City" |
| 9. Relocate sensitive items. | Asking for participants' income is intrusive, especially at the first meeting. Collecting accurate data is a struggle. The question was originally asked at the first lesson and was worded as "Total household income received last month." | Asking about income at exit increases participant's willingness to respond and with greater accuracy. The question was simply worded "Monthly family income." To meet EFNEP's income requirements, collaborating agencies prescreen participants. |

USDA indicates United States Department of Agriculture; EFNEP, Expanded Food and Nutrition Education Program.

text to guide the participants through the tool. The educator says, "Next, find the purple box" while pointing to the purple box on the *About Me* foam-core poster board (Figure B, Table 2).^{22,31} Color-dependent instructions help educators keep the group together so participants can hear the educator's explanation of each item. Color-dependent instruction becomes particularly important when guiding the group through the 5 steps of the 24-hour multiple-pass diet recall.²⁶

(2) *Use icon-dependent instructions.* Another simple strategy for reducing text instructions and facilitating group data collection is using icon-dependent instructions.²⁵ A universally understood icon that is culturally appropriate replaces or simplifies text instructions (Figure B, Table 2).²²

(3) *Reduce total word and syllable count.* Start by eliminating redundant or unnecessary words. Although a syllable count is not a perfect indicator of complexity or word difficulty, it is a useful measure.^{20,24,27,29,30}

(4) *Remove academic terminology.* Participants with low literacy skills speak using common 1- and 2-syllable words. Their speech does not include polysyllabic and Latinate constructions that come easily to the tongue of the college-educated professional.²⁷

(5) *Replace text with client-friendly terminology* (Table 2).

(6) *Remove complex punctuation.*

(7) *Remove math symbols.*

(8) *Move appropriate items to educator section on reverse side.*

(9) *Relocate sensitive items* (Table 2).

In multiple field tests, participants preferred the less complex versions: fewer words, removal of academic language, client-friendly words, simple punctuation, no math symbols, and educator items removed from view.^{7,13,20,31}

Complexity

In designing evaluation tools, many professionals operate on the premise that the more complex the question, the more accurate the responses from participants.²⁷ To paraphrase Sheatsley, evaluation tools are usually written by professionals who consult with other educated persons; thus, it

is common for these tools to be overwritten, overcomplicated, and too demanding of the participant.²⁸ At issue is that complexity for EFNEP participants leads to confusion, resulting in misunderstanding of text, skipping of items, and guessing.^{7,13,31} Because they take words literally and skip unfamiliar text, these participants have problems identifying key concepts and the main idea of the question.²⁹⁻³¹

Sources of Error

No evaluation tool is a perfect measure of what it intends to measure; consequently, all tools have sources of error, random and systematic.^{4,13,24} The responsibility of professionals is to design tools that minimize these sources of error. For each question or item, the authors compared the traditional and new versions, recognizing that no version is perfect and the final version is a compromise. The authors asked educators and participants: Which version, the complex or simple new one, is more understandable for other participants in this group? Which version is more likely to provide accurate answers?

To provide consistency of presentation by educators and minimize participant error, educators were trained using a 20-page instruction guide (available from the first author).³¹ As words are simplified or removed using the 9 strategies, clear, specific instructions in the educator's script and protocol became increasingly important to the validity of the data.^{7,13,19,31}

Educator Comments

After using the new evaluation tools for 6 months, EFNEP educators preferred *About Me* with its color-dependent instructions, commenting on improved readability, enhanced participant comprehension, and the tool's appeal (personal communication with educators, May 5, 2012).

Time Savings

Compared to the traditional *Family Record* administered to 9000 California participants annually at Lesson 1 (entry) and 8 (exit), *About Me* is saving about 180,000 minutes of total par-

ticipant time in California that is now available for nutrition education lessons or California's new color-coded 24-hour diet recall protocol.²⁶

Readability

The new version, now called *About Me*, has a second-grade (2.8) Flesch-Kincaid Readability score (Figure B).^{16,17} Readability for the revised form improved by 7 grade levels.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Addressing a high cognitive load and literacy issues is critical, yet challenging, for ensuring validity of evaluation data collected in a group setting. For practitioners, the principles of CLT are relevant to the evaluation process and specifically to the quality of EFNEP data. The proposed participant-driven evaluation model and the 9 strategies suggested in this viewpoint were used to redesign the traditional *Family Record*, but the same model and strategies could be applied elsewhere in any program employing self-administered evaluation tools in a group setting. The color-dependent instructions could be applied to any tools or measures for clients with limited literacy. For researchers, data collection is usually by individual interview; however, the research discussed here has implications for recruitment and retention of low-income subjects who have minimal abilities to read and write.

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