REPORT

Improving Readability of an Evaluation Tool for Low-income Clients Using Visual Information Processing Theories

Marilyn S. Townsend, PhD, RD[1]; Kathryn Sylva, MA[2]; Anna Martin, MA[3]; Diane Metz, MA[4]; Patti Wooten-Swanson, PhD[5]

ABSTRACT

Literacy is an issue for many low-income audiences. Using visual information processing theories, the goal was improving readability of a food behavior checklist and ultimately improving its ability to accurately capture existing changes in dietary behaviors. Using group interviews, low-income clients (n = 18) evaluated 4 visual styles. The text plus color photographs style was preferred over the other 3 visual styles: text only, text plus black and white line drawings, and text plus gray-scale photographs. Employing cognitive interviewing in an iterative process, clients (n = 25) recommended simplifying text for 10 items, modifying content for 15 of 16 visuals, and replacing text with visual content for 7 of 16 items. Professional staff (n = 7) and educators (n = 10) verified that visuals and revised text accurately reflected the content of each item. Clients reported that the revised checklist captured their attention, added pleasure to the evaluation process, improved their understanding of the behaviors in question, and facilitated comprehension of text. Readability scores improved by more than 2 grades. This process can be duplicated by others interested in enhancing the quality of existing evaluation tools.

Key Words: program evaluation, readability, low-literacy, low-income, EFNEP, FSNE, visual information processing

(J Nutr Educ Behav. 2008;40:181-186)

INTRODUCTION

Literacy is an issue for many low-income clients[1,2] participating in the United States Department of Agriculture's (USDA's) community-based health education programs such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); Head Start; the Expanded Food and Nutrition Education Program (EFNEP); and Food Stamp Nutrition Education (FSNE). Many low-income clients find traditional text-alone evaluation materials difficult to understand.[3] A Food and Nutrition Service report to Congress recommended improved methods for evaluation of program outcomes.[3]

[1]Department of Nutrition, University of California at Davis, Davis, California
[2]Design Program, University of California at Davis, Davis, California
[3]University of California Cooperative Extension, San Joaquin County, Stockton, California
[4]University of California Cooperative Extension, Solano County, Fairfield, California
[5]University of California Cooperative Extension, San Diego County, San Diego, California

Address for correspondence: Marilyn S. Townsend, PhD, RD, Department of Nutrition, University of California at Davis, One Shields Ave., Davis, CA 95616-8669. Phone: (530) 754-9222; fax: (530) 752-7588; E-mail: mstownsend@ucdavis.edu
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doi: 10.1016/j.jneb.2007.06.011

Theories of Visual Information Processing

Four visual information processing theories are particularly relevant for the educational environment for low-literate or English as a Second Language (ESL) clients participating in these programs. The Cognitive Theory of Multimedia Learning suggests learners understand written text with representative visuals better than they do text alone.[4] Appropriate visuals facilitate making connections between words and mental images. With words alone, learners try to form their own mental images, but this process is more difficult for low-literate learners. What are appropriate visuals? Realism theory states that the more realistic the visuals in the learning situation, the more likely learning will be facilitated.[5,6] Understanding is facilitated by realism cues. Realism cues refer to lifelike color and form. Dwyer proposed a Visual Realism Continuum with representative color photographs providing a more realistic impression than gray-scale (ie, white, various shades of gray, black) photographs, and with gray-scale photographs providing a more realistic impression than black and white line drawing representations (Figure 1).[7] Realistic or representative (ie, less abstract) photographs are the preferred choice for low-literate audiences.

The Cue Summation theory states that increasing the total number of cues in the learning environment increases understanding.[8] Color information serves as a visual cue. Rep-

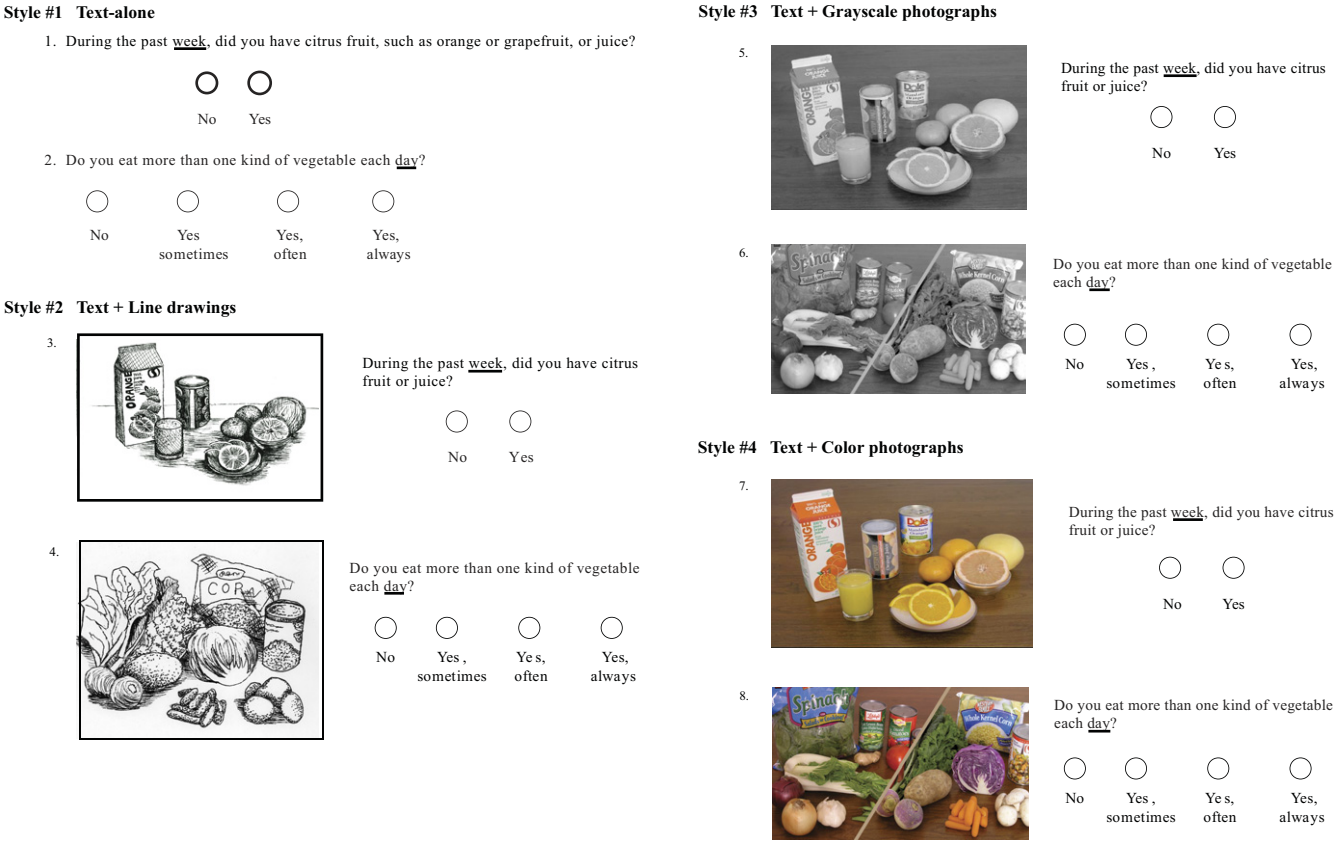

Figure. Four versions of two evaluation items demonstrate the Visual Realism Continuum: traditional black/white text-alone with no visual cues (Style #1), text plus black/white line drawings with minimal realism (Style #2), text plus grayscale photograph with realism cue (Style #3), and text plus color photograph with realism and color cues (Style #4).

resentative color visuals are superior to gray-scale versions for pictorial recognition, comprehension, and memory. Color provides more realism to aid the learner's understanding by functioning in a dual role: coding and realism. For the coding function, additional information is provided by the color. For the realism function, color can be used to present a realistic version of the visual's content. Color provides the learner with more realistic attributes or "handles" with which to understand and retrieve information.

With application to questionnaire design, item sequence, visuals, and overall appearance of the evaluation tool, Keller and Sudman recommended that the tasks of the client in providing the evaluation data and of the educator/instructor in collecting it from the client should be made as easy and as enjoyable as possible.[9,10] The needs of the program manager and the data entry person should be secondary.

A review of 46 learning studies using text information with and without visuals revealed an overwhelming advantage for the inclusion of visuals as a mechanism for enhanced understanding and learning.[11] There was a statistically significant advantage for the illustrated-text version for 85% of the studies. In no case was the text-alone version better for the client.[11] In a major 2002 nutrition education literature review, no illustrated-text tools for program evaluation were reported.[2] And in a current search of the literature, the authors found no reports of such evaluation tools for participants in these USDA programs or other community-based nutrition education programs.

The authors' goal was to develop a process for improving the ability of evaluation tools to more accurately capture existing dietary behavior change. This study builds on a previously published report for development and validation of evaluation tools for FSNE.[12] As noted, these evaluation tools for low-income clients should be easy to administer, have a low respondent burden, and be easily understood by clients.[1,2,12] Employing visual information processing theories, the authors hypothesized that a representative color illustrated-text style of the evaluation tool would be the preferred choice of participants, would facilitate understanding and would result in increased readability compared to the traditional black and white, text-alone style.

PROTOCOL FOR SYSTEMATIC 5-STEP PROCESS

The 5-step method used in the development of this illustrated-text style for the evaluation tool is described below and was guided by the works of Mayer[4] and Keller.[9]

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