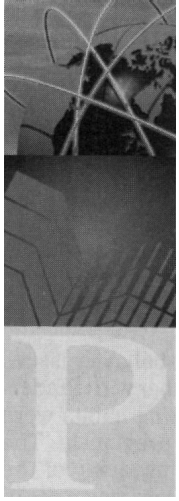

Use of cognitive interview techniques in the development of nutrition surveys and interactive nutrition messages for low-income populations

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ABSTRACT

The effectiveness of dietary surveys and educational messages is dependent in part on how well the target audience's information processing needs and abilities are addressed. Use of pilot testing is helpful; however, problems with wording and language are often not revealed. Cognitive interview techniques offer 1 approach to assist dietitians in understanding how audiences process information. With this method, respondents are led through a survey or message and asked to paraphrase items; discuss thoughts, feelings, and ideas that come to mind; and suggest alternative wording. As part of a US Department of Agriculture-funded nutrition education project, 23 cognitive interviews were conducted among technical community college students in North Carolina. Interview findings informed the development of tailored computer messages and survey questions. Better understanding of respondents' cognitive processes significantly improved the language and approach used in this intervention. Interview data indicated 4 problem areas: vague or ineffective instructions, confusing questions and response options, variable interpretation of terms, and misinterpretation of dietary recommendations. Interviews also provided insight into the meaning of diet-related stages of change. These findings concur with previous research suggesting that cognitive interview techniques are a valuable tool in the formative evaluation and development of nutrition surveys and materials. *J Am Diet Assoc. 2002;102: 690-696.*

Nutrition professionals are often asked to develop surveys and to communicate educational information to the public about health promotion and disease prevention. However, the ability of surveys to obtain accurate information and of educational materials to promote desired behavior changes depends on their understandability and appropriateness for the audience. The traditional method of pilot testing questions and messages often does not reveal problems with wording and language that can impede their effectiveness. A useful approach to detect and address potential problems early in the development phase is to conduct cognitive interviews. Cognitive interview testing involves asking the target population to describe all the thoughts, feelings, and ideas that come to mind when examining specific questions or messages and to provide suggestions to clarify wording as needed. Because of the need to communicate complex scientific information in health messages that are understandable to diverse audiences, cognitive interviews can be particularly useful in the field of nutrition.

Communications are more effective if they are personally relevant (1), fit into an audiences' understanding and view of the world (2), and are tailored to the specific needs and interests of the subjects (3). Recently, studies have demonstrated that such tailored communications are more effective than non-tailored or generic health messages in changing behaviors (4,5). Most tailored communications have targeted behavioral constructs and been focused on health-related

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outcomes such as physical activity (6,7), dietary habits and intentions (7-9), cancer and cholesterol screening (7,10), and changing inaccurate perceptions of cancer and stroke risks (11). Although these studies support the concept of tailoring to improve acceptance of health messages, there is a paucity of data examining the mechanisms through which tailored communications derive their effectiveness. Kreuter (12,13) calls for enhanced tailored communications that measure and address not only behavioral constructs but also underlying factors, like the need for cognition, which comes from information processing theories (1,14). Cognitive interview techniques allow key words and phrases to emerge from the audiences' perspective rather than from a professional or expert source. By probing for words, expressions, and phrases that are most relevant and meaningful, it places the audience in the expert role and enables interviewers to gain valuable insight into subjects' cognitive processes and needs.

This article describes the methods and results of cognitive interviewing used in the FoodSmart study. FoodSmart was a US Department of Agriculture-funded community-based cancer prevention and control demonstration project to test the efficacy of interactive computer-tailored nutrition education for lower-income families in central North Carolina. The primary goals of FoodSmart were to increase knowledge, skills, and self-efficacy related to healthful food selections and to lower dietary fat and increase fruit and vegetable intake to promote health and prevent cancer. Cognitive interview techniques were used to improve computerized nutrition surveys and messages designed for this population. The surveys were used to collect baseline and follow-up data about nutrition knowledge, skills, and self-efficacy among intervention participants who received computer-tailored nutrition messages and educational materials about lowering fat and increasing fruit and vegetable intake. These data were compared to control participants who did not receive the intervention. Specifically, this article discusses how cognitive interview techniques were used to detect potential problems in language, phrasing, and comprehensibility of a computerized nutrition survey and tailored messages and to develop alternative approaches to address problems and enhance effectiveness of the information.

COGNITIVE INTERVIEWS IN MESSAGE DEVELOPMENT AND SURVEY DESIGN

Greenwald (15) first demonstrated the importance of cognitive interviews in determining message effectiveness. Grounded in cognitive psychology and information processing theory, cognitive interview techniques employ the verbalization of thoughts, feelings, interpretations, and ideas that come to mind while examining messages. Respondents are also asked to suggest alternative wording to increase readability, comprehension, and relevance of information. The more relevant and understandable a message, the more likely it will be attended to and accepted (1,14).

Although the technique is becoming more broadly used—for materials development, for example—cognitive interview testing in health has traditionally focused on survey development. In response to the many challenges encountered in the development of survey questions, researchers from the National Center for Health Statistics developed cognitive interviewing techniques to improve the quality of survey information (16). Cognitive interview data have been used in survey development to reduce response error that can occur due to alternative interpretations of questions (16-18). Use of this approach in questionnaire design has been documented not only by the National Center for Health Statistics (19,20), but also by the Census Bureau (21-23) and the Bureau of Labor and Statistics (24). The benefits of cognitive interview techniques to assist in the development, testing, and assessment of survey questions and in the interpretation of preexisting survey data are becoming increasingly recognized as a valuable part of the formative evaluation process (16-18,25-27). For example, cognitive interview strategies have been used to refine several national nutrition surveys, including food frequency questionnaires (28); dietary recalls (29,30); and food insufficiency, hunger, and food security questionnaires (18,31,32). Most recently, cognitive testing was used to evaluate and revise measures of fruit and vegetable consumption frequency in a module from the Behavioral Risk Factor Surveillance System (33).

COGNITIVE INTERVIEWING CONCEPTS AND TECHNIQUES

It is not possible to know with certainty what is going on in the minds of persons examining messages or answering survey questions. This is not the goal. The goal, instead, is to prompt persons to provide valuable clues about the types of cognitive processes being used (17). An advantage of using the cognitive interview approach is that it helps researchers understand how messages are attended to and processed. In addition, by asking subjects to explain problems with particular questions or messages and to suggest resolutions to the problems, insight emerges that may not otherwise have been revealed.

Various techniques have been described for conducting cognitive interviews to elicit information about respondents' ability to interpret messages and questions that are intended and to produce accurate survey responses. See Royston (34) for a description of various methods that may be used alone or in combination for survey or message development.

Other researchers have taken a broader methodological view. Willis (17) identified 2 key cognitive interviewing strategies that have been used extensively for questionnaire design and development: think aloud interviews, and use of probing techniques (concurrent and/or retrospective). With the think aloud approach participants are asked to verbalize all of the thoughts they are thinking in response to a question or when examining an educational message. Respondents may be asked to express their thoughts while viewing the question or message (concurrent approach); respondents may also be asked to answer questions and then go back a second time to verbalize the thoughts they had when the questions were being answered (retrospective approach). Similarly, interviewers using concurrent probing techniques will ask participants questions to further clarify their answers during the interview. Retrospective techniques use clarification questions after the participant has finished examining the survey question or educational message. Paraphrasing is another technique that may be used. With this strategy participants are asked to repeat the questions or messages in their own words. In FoodSmart, a combined approach was used to inform the development of nutrition surveys and tailored computer messages.

METHODS

Sample and Recruitment

A convenience sample of 8 male and 15 female students participated in one-on-one cognitive interviews to test the FoodSmart survey questions and tailored messages. Partici-

Table
Key themes emerging from analyses and implications for survey questions and nutrition messages

Original question	Problems uncovered by cognitive interviews	Action taken	Revised question	Implications
Vague or ineffective instructions				
How many children do you have?	Respondents expressed confusion about how inclusive they should be when answering questions about their children	Clarified definition of "children"	How many children do you have? Please include foster children, grandchildren, or other children you are responsible for	Collected more accurate demographic data
Place a mark in the circle next to the main reason you want to eat less fat	Respondents misread instructions and selected several responses when only 1 was requested	Clarified instructions	People choose to eat less fat for lots of different reasons. From the list below, choose the *one main reason* that you want to eat less fat	Tailored feedback to participants' most salient concern
Confusing questions and response options				
In the past month, how often did you use about 2 pats (2 tsp) of butter or margarine when seasoning vegetables?	Survey question did not distinguish between use of fats when preparing foods and their actual consumption	Added the word "ate"	Now, we'd like to know about some of the foods you ate in the last month. When you ate cooked vegetables, how often were they fixed with butter, margarine, or other fat?	Collected more accurate consumption data; created better-tailored messages using participants' own words
	The word *seasoning* was vague and confusing	Changed *seasoning* to *fixed*		Used language familiar to the audience to clarify meaning of the question
	Portion size (2 tsp) was unrealistic; participants did not know how to respond if they used more or less than the 2 tsp specified	Removed portion size		Eliminated unnecessary confusion related to portion size
	Types of fat were not inclusive; participants did not know how to respond if they used another type of fat (eg, lard)	Added "or other fat"		Collected more accurate consumption data; designed more relevant tailored messages
Variable interpretation of terms				
Would you say that most of the foods you eat are low in fat?	Respondents expressed confusion about the definition of "low fat." For some, low fat foods referred only to those foods specifically marked "low fat" on the package. Others thought that low-fat foods were those that "used to be high in fat, but now they're not"	Clarified definition of "low fat"	*Lots of foods are naturally low in fat, like fruits. Vegetables are low in fat if you fix them without butter or meat fat. Other foods may be low in fat, like skim milk or low-fat cheese. Are most of the foods you eat low in fat?*	Better assessment of participants' dietary fat intake; improved accuracy of data and relevance of tailored feedback
Original material explained why people should eat healthy but did not define "healthy eating" because it was thought to mean the same thing to all respondents	Many respondents narrowly defined "healthy eating" as cutting down only on the salt or sugar in their diet; lowering dietary fat was not always considered	Broadly defined "healthy eating"	What is healthy eating? Enjoying a variety of nutritious foods; eating more grains, fruits and vegetables; and reducing the amount of fat you eat	Obtained more accurate dietary intake data, which were used to develop more understandable tailored messages and educational materials

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Table (cont'd)
Key themes emerging from analyses and implications for survey questions and nutrition messages

Original question	Problems uncovered by cognitive interviews	Action taken	Revised question	Implications
Which one of the following sentences best describes your plans about eating less fat? I'm not thinking of starting to eat foods low in fat, I'm thinking of starting to eat foods low in fat, I'm planning to eat foods low in fat	Respondents were unable to distinguish between *planning* and *thinking*	Clarified terms using participants' own words	Choose the sentence that best describes you: I'm thinking of eating less fat, I'm thinking seriously of eating less fat, I'm already trying to eat less fat	Better assessment of participants' stage of change, resulting in improved accuracy of data and relevance of tailored feedback
Misinterpretation of dietary recommendations				
Assumed that respondents understood how to use the Food Guide Pyramid and interpret its key dietary recommendations	Respondents were not sure if the recommended number of servings shown in the Food Guide Pyramid applied to each meal, each day, or each week	Clarified the use and meaning of the dietary recommendations	Building a healthy daily diet is easy! By the end of the day, just make sure the foods you ate would build a pyramid with: Less fats and sugars; low-fat dairy, lean meats, or beans; 3 to 5 servings of fruits and vegetables; and more grains, breads, cereals, rice, and pasta	Collected more accurate dietary knowledge data, which were used develop better tailored feedback

pants were drawn from a local technical community college in Durham, NC; approximately half of the participants were African-American. This site was selected because the students represented a lower-income population with demographics that were similar to the program's target audience. Participants were recruited through self-selection in response to a posted school notice. Students had to be at least 18 years old, speak and understand English, and be willing to take part in one 30- to 60-minute interview. All participants were told of the nature of the study and informed consent was obtained to tape-record the sessions. In exchange for their time, students were paid $10 per half-hour. Interviews were conducted in an unused classroom and lasted an average of 40 minutes. Two interviewers trained in cognitive interview techniques conducted the interviews.

Interviews

All interviews were tape-recorded and the interviewer also took brief notes during the interview. Cognitive interviews were conducted using an iterative process. A total of 5 to 6 student volunteers were interviewed individually during 3 separate interviewing sessions. After each session, materials were revised in response to students' feedback. To reduce respondent burden, 3 structured interview guides were developed to test selected messages. Interview guides were randomly assigned for each session. Guides differed in the suggested phrasing, terminology, and format used to communicate the various nutrition concepts in the surveys and tailored messages.

Because of the desire to examine both surveys and messages, a combination of approaches—concurrent think aloud interviews, concurrent probing, and paraphrasing—were employed to elicit responses. All cognitive interviews began with the same 2 warm-up questions. The first asked participants to think about the question: "How often do you go food shopping?" The interviewer explained that this question could be answered in a number of ways. For example, "food shopping" could refer to the large shopping done once every week or 2, it could refer to the occasional quick trip to the store to pick up last-minute or forgotten items, or it could include both types of shopping. The purpose of this question was to illustrate that questions and messages can have different meanings for different people. A second warm-up question was asked to familiarize participants with the cognitive interviewing strategy and to help make them more comfortable with the think aloud technique. The second question asked participants to "Visualize the place where you live, and think about how many windows there are there in this place. As you count up the windows, tell me what you are seeing and thinking about." (17, p 7). Because the think aloud technique was not familiar to many people, as respondents were formulating their answer, the interviewer often had to remind them to talk through the process. For instance, if a participant said that he or she was answering the question by starting with the downstairs, the interviewer would ask the respondent to go through each room of the house, then move on to the upstairs, 1 room at a time.

Analysis

Audiotapes from interviews were transcribed verbatim by a professional transcriptionist and double-checked by the interviewers for accuracy and completeness. Interviewers' notes were also examined to add detail to the transcripts. Use of interview guides helped structure and organize participants' responses and facilitated data analysis. Next, interviewers conducted a content analysis and responses were examined for emerging themes and dominant trends across interviews (issues that seemed to appear repeatedly). Content analysis is the process of identifying, coding, and categorizing primary patterns in data (35). Transcripts were reviewed and coded by hand. With each reading of the data, more subtle patterns were discovered and recurring themes emerged. Particularly insightful, interesting, and thought-provoking comments—even if mentioned only by 1 or 2 respondents—were also noted.

RESULTS

Four key themes emerged from the analyses. They were: 1)vague or ineffective instructions, respondents expressed confusion about how to answer survey questions when terms were vague; 2)confusing questions and response options, that is, use of awkward or unfamiliar language in a question or in response options confused respondents; 3)variable interpretation of terms, as illustrated in the Table, even if words were familiar to participants, it could not be assumed that their meaning was consistent for all respondents and terms or phrases that were not explicitly defined were subject to misunderstanding; and 4)misinterpretation of dietary recommendations. For example, one of the goals of FoodSmart was to use the Food Guide Pyramid (36) as part of the intervention. Therefore, cognitive interviews were used to investigate potential problems in understanding and interpretation of the Pyramid's (36) dietary recommendations. Before conducting cognitive interviews, the project team assumed that respondents understood the Food Guide Pyramid's key recommendations. However, it was soon evident that respondents did not interpret the recommendations as intended (see the Table). Each of these themes is listed in the Table with examples to illustrate how suggested changes in wording and phrasing were incorporated into the final survey questions and educational materials as a result of the interviews. Although changes were made in each area, the majority of changes were needed to address the issue of variable interpretation of terms.

DISCUSSION

Cognitive interviews proved useful in developing the FoodSmart nutrition survey and tailoring computer messages by clarifying the meaning and improving the comprehension of questions, words, and concepts. Consequently, potential mistakes and misinterpretations of key messages were avoided among this lower-income population. Specifically, ambiguous instructions were more fully explained, survey response options were expanded, language and phrasing were more clearly defined, and misinterpretations of key dietary recommendations were clarified. Useful insight was also gained about the importance of using familiar language and terms to communicate information.

These findings add to the body of knowledge on the usefulness of cognitive interview testing to improve the development and evaluation of dietary surveys and nutrition education messages. Shepherd and Sims (37) call for future research to examine variations in audience and message topic to further delineate particular circumstances under which cognitive interviews might be used to enhance the effectiveness of nutrition messages. These data respond to that call by illustrating the potential of the cognitive interview approach to bridge the gap between use of standard nutrition messages and effective tailored communications for lower-income audiences.

Strengths

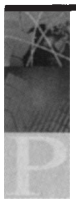
Because cognitive interviews are conducted early in the development of survey questions and nutrition messages, there is time to make necessary changes to improve the comprehension of the information. Other benefits of this approach include the ability to clarify the meaning of words, to determine the best form and response categories to use, and to determine the meaning of specific questions and concepts (18). In FoodSmart, cognitive interviews were used to revise and correct problems in existing questions and messages. However, this approach can also be used earlier in the development process to inform the initial design of new questions and concepts. In this project, cognitive interview strategies were used to modify cancer prevention and control messages and survey questions and to potentially improve their effectiveness among a lower-income population.

Limitations

Cognitive interviewing can be time consuming and costly. Even if interviews average only 40 minutes, the interviewing process requires considerably more time when one takes into account the preparation, the interview itself, and writing up the results of the interview (17). In addition, improvements in the understandability of survey questions and messages can result in increasing the length of the questions or message text. Oftentimes there is an effort by researchers to present short questions and brief text to reduce respondent burden. However, our findings suggest that use of audience-based definitions, words, and phrases—which may be longer in length—actually reduce respondent burden when compared to shorter versions.

Cognitive interviewers and the interviewees also require training, which adds time and cost to projects. However, once interviewers are trained they may not require additional training. Further, once data are analyzed and conclusions made, it should be noted that the findings are descriptive and suggestive, not causal in nature. Finally, results may not be generalizable to other populations or other regions.

Despite these limitations, the interview data suggest that cognitive interview techniques are useful to improve the validity, reliability, and accuracy of survey data and to increase the effectiveness of tailored messages. This technique recognizes and addresses potential researcher biases and assumptions related to language and comprehension of dietary recommendations. The cognitive interview approach also respects a basic tenet of adult education that recognizes that adults enter each learning situation with experience and perceptions based on that experience that influence their learning (38).



APPLICATIONS

Nutrition researchers often examine how study populations attend to, respond to, and make behavioral decisions based upon certain educational messages. For example, message tailoring and expert system interventions (in which responses are driven by experts rather than subjects) require accurate survey assessment to appropriately match educational feedback to audience needs (39). However, when surveys and messages are not well understood, the feedback provided can

be inappropriate or irrelevant.

- Cognitive interview techniques can be used to improve surveys and messages designed for lower-income populations, for whom standard nutrition communications may have limited effectiveness.
- If used in a study's formative development phase, cognitive interview approaches can provide valuable insight into subjects' cognitive processes and information needs and inform development of more effective questions and educational messages.
- Future research should examine use of cognitive interview strategies for designing new questions with a variety of audiences and message topics.

If used in a study's formative development phase, cognitive interview approaches can provide valuable insight into subjects' cognitive processes and information needs and inform development of more effective questions and educational messages

References

1. Petty RE, Cacioppo JT. *Attitudes and Persuasion: Classic and Contemporary Approaches.* Dubuque, Iowa: William C. Brown; 1981.
2. Biocca F. Viewer's mental models of political commercials: Toward a theory of the semantic processing of television. In: Biocca F, ed. *Television and Political Advertising: Vol. 1, Psychological Processes.* Hillsdale, NJ: Erlbaum; 1991.
3. Witte K. Fishing for success: Using the persuasive health message framework to generate effective campaign messages. In: Maibach E, Parrott R, eds. *Designing Health Messages: Approaches from Communication Theory and Public Health Practice.* Thousand Oaks, Calif: Sage; 1995.
4. Brug J, Campbell MK, van Assema P. The application and impact of computer-generated personalized nutrition education. *Patient Educ Couns.* 1999; 36:145-156.
5. Skinner C, Campbell MK, Curry S, Rimer B, Prochaska J. How effective are tailored print communications? *Ann Behav Med.* 1999;21:290-298.
6. Bull FC, Kreuter MW, Scharff DP. Effects of tailored, personalized, and general health messages on physical activity. *Patient Educ Couns.* 1999;36:181-192.
7. Kreuter MW, Strecher VJ. Do tailored behavior change messages enhance the effectiveness of health risk appraisal? Results from a randomized trial. *Health Educ Res.* 1996;11:97-105.
8. Campbell MK, DeVellis BM, Strecher VJ, Ammerman AS, DeVellis RF, Sandler RS. Improving dietary behavior: the effectiveness of tailored messages in primary care settings. *Am J Public Health.* 1994;84:783-787.
9. Brug J, Steenhuis I, van Assema P, de Vries H. The impact of a computer-tailored nutrition intervention. *Prev Med.* 1996;25;236-242.
10. Skinner CS, Strecher VJ, Hospers H. Physicians' recommendations for mammography: do tailored messages make a difference? *Am J Public Health.* 1994;84:43-49.
11. Kreuter MW, Strecher VJ. Changing inaccurate perceptions of health risk: results from a randomized trial. *Health Psychol.* 1995;14:56-63.
12. Kreuter MW, Bull FC, Clark EM, Oswald DL. Understanding how people process health information: a comparison of tailored and nontailored weight-loss materials. *Health Psychol.* 1999:18:487-494.
13. Kreuter MW, Oswald DL, Bull FC, Clark EM. Are tailored health education materials always more effective than non-tailored materials? *Health Educ Res Theory Prac.* 2000;15:305-315.
14. Cacioppo JT, Petty RE, Kao CF. The efficient assessment of need for cognition. *J Pers Assess.* 1984;48:306-307.
15. Greenwald AG. Cognitive learning, cognitive response to persuasion, and attitude change. In: Greenwald AG, Brock TC, and Ostrom TM, eds. *Psychological Foundations of Attitudes.* New York, NY:Academic Press; 1968:147-170.
16. Jobe JB, Mingay DJ. Cognitive research improves questionnaires. *Am J Public Health.* 1989;79:1053-1055.
17. Willis GB. *Cognitive interviewing and questionnaire design: A Training Manual.* Hyattsville, Md: Office of Research and Methodology, National Center for Health Statistics; 1994. Working Paper Series, No. 7.
18. Alaimo K, Olson CM, Frongillo EA. Importance of cognitive testing for survey items: an example from food security questionnaires. *J Nutr Educ.* 1999;31:269-275.
19. Royston P, Bercini D, Sirken M, Mingay D. *Questionnaire Design Research Laboratory. Proceedings of the Section on Survey Methods Research.* Alexandria, Va: American Statistical Association; 1986:703-707.
20. Willis GB, Royston P, Bercini D. The use of verbal report methods in the development and testing of survey questionnaires. *Appl Cogn Psychol.* 1991;5:251-267.
21. Campanelli P, Martin E, Rothgeb JM. The use of respondent and interviewer debriefing studies as a way to study response error in survey data. *Statistician.* 1991;40:253-264.
22. Campanelli P, Rothgeb JM, Martin E. *The Role of Respondent Comprehension and Interviewer Knowledge in CPS Labor Force Classification. Proceedings of the Section on Survey Methods Research.* Paris, France: International Statistical Institute; 1989:425-429.
23. DeMaio TJ, Martin EA, Sigman EP. *Improving the Design of the Decennial Census Questionnaire. Proceedings of the Section on Survey Methods Research.* Alexandria, Va: American Statistical Association; 1987:256-261.
24. Esposito J, Hess J. The use of interviewer debriefings to identify problematic questions on alternative questionnaires. Paper presented at: Annual Meeting of the American Association for Public Opinion Research. May 1992, St Petersberg, Fla.
25. Sudman S, Bradburn NM, Schwartz N. *Thinking About Answers: The Application of Cognitive Processes to Survey Methodology.* San Francisco, Calif:Jossey-Bass; 1996.
26. Shepherd SK, Sims LS, Cronin FJ, Shaw A, Davis CA. Use of focus groups to explore consumers' preferences for content and graphic design of nutrition publications. *J Am Diet Assoc.* 1989;89:1612-1614.
27. Carbone ET. *LEARNSMART: The Application of Adult Learning Theories to Nutrition Education* [dissertation]. Chapel Hill: The University of North Carolina; 1999.
28. Subar AF, Thompson FE, Smith AF, Jobe JB, Ziegler RG, Potischman N, Schatzkin A, Hartman A, Swanson C, Kruse L, Hayes RB, Riedel Lewis D, Harlan LC. Improving food frequency questionnaires: a qualitative approach using cognitive interviewing. *J Am Diet Assoc.* 1995;95:781-788.
29. Smith AF. Cognitive psychological issues of relevance to the validity of dietary reports. *Eur J Clin Nutr.* 1993;47(suppl 2):S6-S18.
30. Smith AF. Cognitive processes in long-term dietary recall. Hyattsville, Md: National Center for Health Statistics; 1991. *Vital and Health Statistics, Series 6: Cognition and Survey Measurement.* DHHS Publication No. PHS 92-1079.
31. Alaimo K. *Food Insecurity, Hunger, and Food Insufficiency in the Unites States: Cognitive Testing of Questionnaire Items and Prevalence Estimates From the Third National Health and Nutrition Examination Survey* [thesis]. Ithaca, NY: Cornell University; 1997.
32. Briefel RR, Woteki CE. Development of food sufficiency questions for the third National Health and Nutrition Examination Survey. *J Nut Educ.* 1992;24(suppl):24S-28S.
33. Wolfe WS, Frongillo EA. Evaluating brief measures of fruit and vegetable consumption frequency and variety: cognition, interpretation, and other measurement issues. *J Am Diet Assoc.* 2001;101:311-318.
34. Royston PN. Using intensive interviews to evaluate questions. In: Fowler FJ, ed. *Health Survey Research Methods.* Washington, DC: US Government Printing Office; 1989:3-7. DHHS Publication No. PHS 89-3447.
35. Patton MQ. *Qualitative Evaluation and Research Methods.* Newbury Park, Calif: Sage; 1990:381.

36. U.S. Department of Agriculture Center for Nutrition and Policy Promotion. *The Food Guide Pyramid.* Home and Garden Bulletin No. 252. Washington, DC: U.S. Department of Agriculture; revised 1996.
37. Shepherd SK, Sims LS. Employing cognitive response analysis to examine message acceptance in nutrition education. *J Nutr Educ.* 1990;22:215-219.
38. Knowles MS. *The Modern Practice of Adult Education: From Pedagogy to Andragogy.* Chicago, Ill: Follett; 1980.
39. Campbell MK, Bernhardt JM, Waldmiller M, Jackson B, Potenziani D, Weathers B, Demissie S. Varying the message source in computer-tailored nutrition education. *Patient Educ Couns.* 1999;36:157-169.

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PRACTICE POINTS

Are *general* nutrition messages understood by the *general* public?

In the preceding study, the authors conclude, "cognitive interview techniques can be used to improve surveys and messages designed for lower-income populations, for whom standard nutrition communications may have limited effectiveness." According to Susan Algert, PhD, RD, these techniques "are particularly effective tools in the development of nutrition education and research materials because they are client or respondent-centered. This method provides us with a tool for addressing potential research biases and assumptions related to how dietary messages are communicated. Dietitians would benefit from knowledge of [these] techniques as a method to target or personalize nutrition messages."

"We receive training," continues Algert, assistant professor in the Department of Family and Consumer Sciences at California State University, Sacramento "in our didactic programs and internships in effective interviewing techniques. [This training] can be expanded upon to include cognitive methods." Algert also points out that this training would not only affect dietitians, but many other groups including public health researchers, health educators, program planners, and clinicians. "Cognitive interview strategies enhance the effectiveness of our [dietitians] nutrition messages, so that disciplines working with diverse groups and individuals can include them as a method for accomplishing behavior change."

Elaine McLaughlin, MS, RD, and a nutritionist for the Food and Nutrition Service, USDA, feels dietitians should approach this subject by thinking about what motivates people take actions to improve their health. "Personal values are what drive most people to [make] decisions about their health," says McLaughlin. To further explain this idea, McLaughlin quotes the International Food Information Council's "New Nutrition Conversation with Consumers": "The concept of consumer-oriented communications is grounded in getting to know your audience- that is, coming to understand what consumers know, believe, value, and do relating to food, diet, and nutrition. The best way to adopt this consumer orientation is to listen, listen, listen, and learn from the consumers themselves. This can be accomplished more formally (ie focus groups, in-home observations, surveys) or informally (ie conversation and discussion among friends, coworkers, family members, etc.) with successful results."

When asked about future studies, Algert suggests dietetics professionals are in need of more information on inter- and intra- group processing of health messages. Yet, also points out that "because of our increasingly diverse society, we [dietitians] need to invest more time and resources in developing research methods, such as these, that enhance the effectiveness of our work as dietetic professionals." McLaughlin is interested in the use of "simple techniques to assess behavior change for different target audiences, and to measure progression through the stages of change for different target audiences, and [an] increased coverage of topics on motivational issues for the public, and constructing positive, easy to implement messages."

This article was written by Melissa Thorpe, Assistant Editor of the Journal *in Chicago, Ill.*