

Literacy Data and Measures

Defining Literacy/Illiteracy

During the 1800s, people were deemed literate if they could write their own names. Today, people need much higher literacy skills to understand their health-care instructions and to function in society.

Until a few years ago, literacy skills were universally measured in terms of **grade level**—the average reading skill level achieved at each year of schooling in the American school system. Readability difficulty of text was also rated by school grade level. This system is in wide use today.

More recently, literacy skills (as well as the literacy demand of materials) are sometimes defined in terms of **competency level** via measures of task difficulty. Descriptions of both the grade level and competency measures follow.

Grade-level measures of literacy

There is no universally accepted definition of literacy or illiteracy. Cook (1977) cites the U.S. Army's definition of literacy in terms of reading skills at a minimum grade level—the 5th grade.¹ This level was commensurate with the reading demands of the simplest of the Army's training manuals. Those who had reading/writing skills at or above 5th grade could read the manuals and were literate; those reading below this level were termed functionally illiterate. This definition is widely shared today, although the word *illiterate* is falling into disuse.

The use of grade levels for reading skills by the Army not only reflects the nation's school systems, but also the scale used by the most widely used reading assessment instrument in the health community: the Wide Range Achievement Test (WRAT).² Grade-level measurements have advantages and disadvantages.

A significant advantage is that grade level is widely understood in the United States as a measuring scale for literacy skills. A further advantage is that, for materials, readability formulas also report reading difficulty in terms of grade level. By measuring reading skills of people and the readability of materials on the same scale, we can easily see if the materials are at a suitable level.

A disadvantage is that most reading skill instruments measure a person's skills at reading text only, but do not measure skills in visual reading, including charts, graphs, and problem solving. Another disadvantage is that adults often develop more advanced skills to read a subject of special interest to them, but such skills would not be detected by the testing instruments.

Competency measures of literacy

Since the mid-1970s, a competency-based scale for both people's reading skills and the difficulty of written materials has been developed and used in the National Adult Literacy Surveys (NALS). A scale of zero (lowest/easiest) to 500 (highest/most difficult) is used for rating both people and the text and numeracy materials. These scores are grouped into five levels:

Level 1	0 to 225	(lowest/simplest)
Level 2	226 to 275	
Level 3	276 to 325	
Level 4	326 to 375	
Level 5	376 to 500	(highest/most complex)

An advantage of the zero to 500 rating scale is that it has broader applications than the grade-level scale. It applies to tasks included in prose, document, and numeracy materials. The reading formulas mentioned earlier apply to text only and without regard to the difficulty of tasks, such as numeracy or graphic tasks, which may be necessary to use the materials.

A major disadvantage of the zero to 500 scale is that its meaning and interpretation are largely unknown to health-care professionals. Health-care materials may contain a number of topics and tasks and it would be difficult to arrive at a single collective rating using the zero to 500 scale. The authors recognize both scales, but in the interest of making this book of immediate use to health-care professionals, the grade-level scale is used predominantly.

Competency scales pose a dilemma for health-care practitioners who want to measure the literacy levels of materials they develop or use on the zero to 500 scale. If they use the extensive NALS survey data about literacy competency, how can they use the same scale to measure the competency demand of their health instructions? There is no convenient formula to use.

The NALS uses three criteria to establish a rating on the scale:

1. The structure of the material (i.e., narrative, chart, graph)
2. The content and/or context
3. The nature of the task that must be done

Since the NALS is a research-based project in literacy, it has not provided a "formula" to apply the three criteria to health-care materials. Furthermore, the NALS competency questions are usually quite brief—at most half a page—and are of the same structure throughout. In contrast, health-care instructions may be several pages long and often consist of several kinds of structure (narrative, tables, graphs, illustrations, etc.)

One way to apply the NALS criteria to health-care materials may be to partition the health instruction and analyze parts of like structure. That is, obtain a NALS score for each part. This seems rather tedious, and we have requested a more suitable approach from the NALS authors.

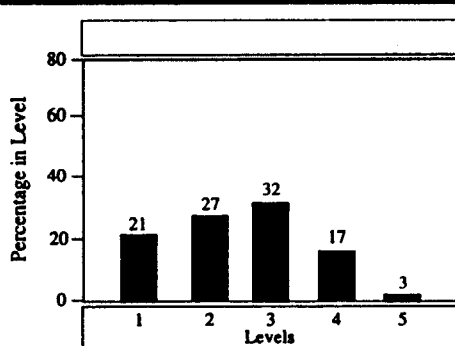
Magnitude of the Literacy Problem

National literacy surveys conducted since the 1970s have consistently shown that between 16 and 20 percent of adult Americans are functionally illiterate.³ Profiles of national literacy in terms of both grade levels and competency levels are shown in Figure 1-1 in Chapter 1. The national data in competency terms for prose, document, and quantitative literacy are shown in Figure A-1.

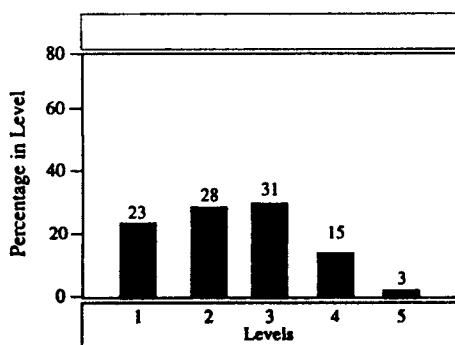
FIGURE A-1

Literacy levels of the total U.S. population. (Source: *National Adult Literacy Survey, U.S. Department of Education, 1993*)

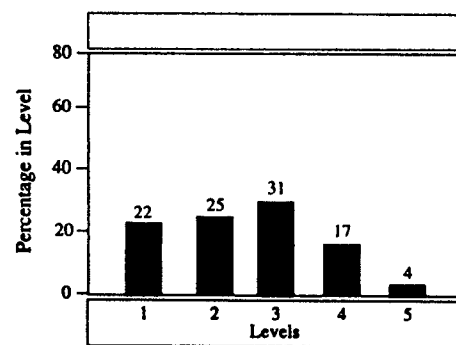
PROSE



DOCUMENT



QUANTITATIVE



The results show 21 to 23 percent in level one. These people, on average, will understand little from most current health instructions.

When we combine the 21 percent at level 1 with the additional 27 percent of marginal readers at level 2, we see that literacy problems are experienced by nearly half of the U.S. population. This population group will either not understand or will have difficulty with most written health care instructions.

Literacy surveys have also been conducted by a number of states including Oregon, Mississippi, Florida, and Hawaii. Some state surveys use the same questions and rating scales as the NALS.⁴

Age and ethnic considerations

Literacy skills vary by age and by ethnic group. Older people, those 65 and over, have much lower literacy skills. Forlizi (1989) points out that functional illiteracy among this group is about 35 percent—about double that of the population as a whole. NALS data show that document literacy skills of the 65 and older group drop to level 1 compared to level 3 for the 25 to 39 age group.

Literacy skills of ethnic groups are lower than that of the U.S. population as a whole. Their lower performance stems from the influence of a number of variables, including years of schooling. Functional illiteracy is more prevalent among ethnic groups, and for one Southeast Asian group, it reaches a level above 50 percent.⁵ The NALS report shows that literacy skills of American ethnic groups average one level lower than the general population.

What does this mean to you as a health-care provider? Clearly, you may have to use instructions at lower literacy levels for older people, for ethnic groups, and indeed, for a great part of the U.S. population. Since these groups have such sizable numbers of people with low reading skills, consider including alternative media such as simple visuals, demonstrations, verbal or audio-taped instructions instead of text.

Literacy skills of patients has an impact on costs for their health care. Weiss (1992) points out that those with the lowest levels of literacy skills are likely to incur health-care costs that are many times higher than people with even marginal literacy skills.⁶

References

1. Cook DW (1977): *Adult Literacy Education in the United States*. International Reading Association, p. 68. Newark, DE.
2. *The Wide Range Achievement Test (WRAT 3)* (1993): Newark, DE: Jastak Inc.
3. Forlizi LA (1989): *Adult literacy in the United States today*. Report from the Institute for the Study of Adult Literacy. University Park, PA: Penn State University.
4. Oregon Progress Board (May 1991): *The Oregon Literacy Survey*. Salem, OR: Economic Development Department.
5. Dehn RW, Schneider DM (November 1989): *Patient Literacy in a Family Practice Clinic*. Presentation at American Academy of Family Physicians, Orlando, FL.
6. Weiss BD, et al. (May–June 1992): *Health status of illiterate adults: relation between literacy and health status among persons with low literacy skills*. *Journal of American Board of Family Practice* 5(3):257–264.

Appendix

B

REALM

**RAPID ESTIMATE OF ADULT LITERACY IN MEDICINE
(REALM)[®]**

Terry Davis, PhD • Michael Crouch, MD • Sandy Long, PhD

Patient Name/
Subject # _____ Date of Birth _____

Reading Level _____
Grade Completed _____

Date _____ Clinic _____ Examiner _____

List 1	List 2	List 3
fat _____	fatigue _____	allergic _____
flu _____	pelvic _____	menstrual _____
pill _____	jaundice _____	testicle _____
dose _____	infection _____	colitis _____
eye _____	exercise _____	emergency _____
stress _____	behavior _____	medication _____
smear _____	prescription _____	occupation _____
nerves _____	notify _____	sexually _____
germs _____	gallbladder _____	alcoholism _____
meals _____	calories _____	irritation _____
disease _____	depression _____	constipation _____
cancer _____	miscarriage _____	gonorrhea _____
caffeine _____	pregnancy _____	inflammatory _____
attack _____	arthritis _____	diabetes _____
kidney _____	nutrition _____	hepatitis _____
hormones _____	menopause _____	antibiotics _____
herpes _____	appendix _____	diagnosis _____
seizure _____	abnormal _____	potassium _____
bowel _____	syphilis _____	anemia _____
asthma _____	hemorrhoids _____	obesity _____
rectal _____	nausea _____	osteoporosis _____
incest _____	directed _____	impetigo _____

SCORE

List 1 _____

List 2 _____

List 3 _____

Raw Score _____

RAPID ESTIMATE OF ADULT LITERACY IN MEDICINE

The Rapid Estimate of Adult Literacy in Medicine (REALM) is a screening instrument to assess an adult patient's ability to read common medical words and lay terms for body parts and illnesses. It is designed to assist medical professionals in estimating a patient's literacy level so that the appropriate level of patient education materials or oral instructions may be used. The test takes 2 to 3 minutes to administer and score. The REALM has been correlated with other standardized tests.

Correlation of REALM with SORT, PIAT-R, and WRAT-R

	PIAT-R Recognition	SORT	WRAT-R
Correlation Coefficient	.97	.96	.88
P Value	p<.0001	p<.0001	p<.0001

Reliability Studies

Test-Retest	Inter-Rater
(n = 100)	(n = 20)
.99	.99

DIRECTIONS:

1. Give the patient a laminated copy of the REALM and score answers on an unlaminated copy that is attached to a clipboard. Hold the clipboard at an angle so that the patient is not distracted by your scoring procedure. Say:
"I want to hear you read as many words as you can from this list. Begin with the first word on List 1 and read aloud. When you come to a word you cannot read, do the best you can or say "blank" and go on to the next word."
2. If the patient takes more than five seconds on a word, say "blank" and point to the next word, if necessary, to move the patient along. If the patient begins to miss every word, have him/her pronounce only known words.
3. Count as an error any word not attempted or mispronounced. Score by marking a plus (+) after each correct word, a check (✓) after each mispronounced word, and a minus (-) after words not attempted. Count as correct any self-corrected word.
4. Count the number of correct words for each list and record the numbers in the "SCORE" box. Total the numbers and match the total score with its grade equivalent in the table below.

Raw Score	GRADE EQUIVALENT
	Grade Range
0-18	3rd Grade and Below Will not be able to read most low literacy materials; will need repeated oral instructions, materials composed primarily of illustrations, or audio or video tapes.
19-44	4th to 6th Grade Will need low literacy materials; may not be able to read prescription labels.
45-60	7th to 8th Grade Will struggle with most patient education materials; will not be offended by low literacy materials.
61-66	High School Will be able to read most patient education materials.

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Tips for Low-Cost Production

You have done the development work on a pamphlet, form, or instruction sheet, you have checked with other professionals, and you are ready to get the views of your target audience. You will need a copy of your materials that looks as good as you can make it. The suggestions that follow will help you through the production stage of the work, even if you have only the most modest copying and word-processing equipment.

Layout

The layout *is* important. The blocks of text and illustrations on a page should be comfortable—neither too widely spaced nor too close together. Lists spread out down the page may be far more attractive (and easier to read) if items are gathered together in the center of the page with a relevant illustration or two to warm things up. One way to check on page organization is to squint your eyes so the print is blurred and only the blocks of print and white spaces are apparent. If it looks awkward or spotty when viewed this way, it probably is awkward and spotty. In general, it's well to leave slightly more space in the margin at the bottom than at the top. Side margins are equal to or slightly less than top margins.

If you have desktop publishing equipment, you can produce the whole page on the computer at one time regardless of page shape. Your computer may not do that, and you may have to arrange blocks of print or illustrations physically to get a page layout to your liking. A procedure to do this is outlined on the following pages.

Cutting out blocks of text and graphics:

- Cut out blocks of the text and the illustrations you will use, being careful to cut them with square corners.
- Place them on a paper of finished size.
- Put a second sheet of *lined* paper underneath to serve as guidelines to keep

your blocks horizontal. (You may have to make the lines darker so they will show through.) An alternative is to use a drafting table, a T-square, and a triangle, which will speed up your work.

- Put masking tape on the corners of these two sheets to hold them on the desk.

Now you are ready to move your blocks of print and illustrations around on the page.

Preliminary layout

When you are satisfied with the placement of each block of copy:

1. Put a small piece of masking tape (not transparent tape) on one corner of each block to hold it in place.
2. Carefully line up the lettering and margins for each block using the see-through lines.
3. Fasten each block firmly with another piece of masking tape on the diagonal corner. The result might look like Figure C-1.
4. Now, put a small mark on the other diagonal corners (or along each edge) with a *light blue* pencil, as light blue will not show on a photocopy (Figure C-2).
5. One at a time, remove each block of copy. Cover the back with rubber cement, being sure to put cement on the edges. For most applications, use adhesive only on the back surface of the block to be attached, not on the page.

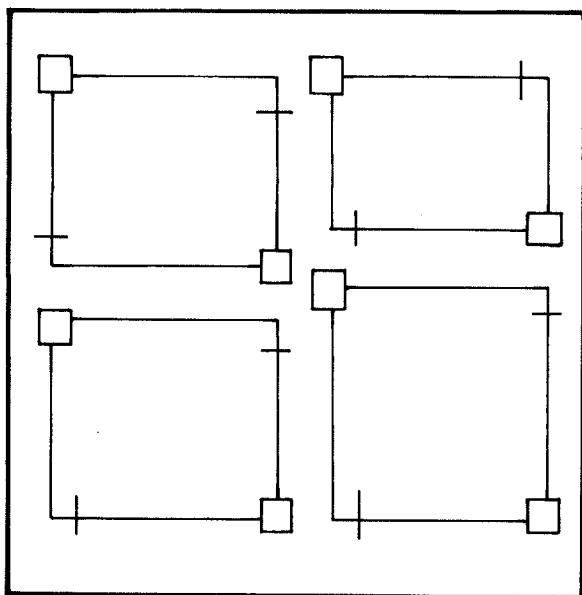


FIGURE C-1

Step 3 in preliminary layout of a page.

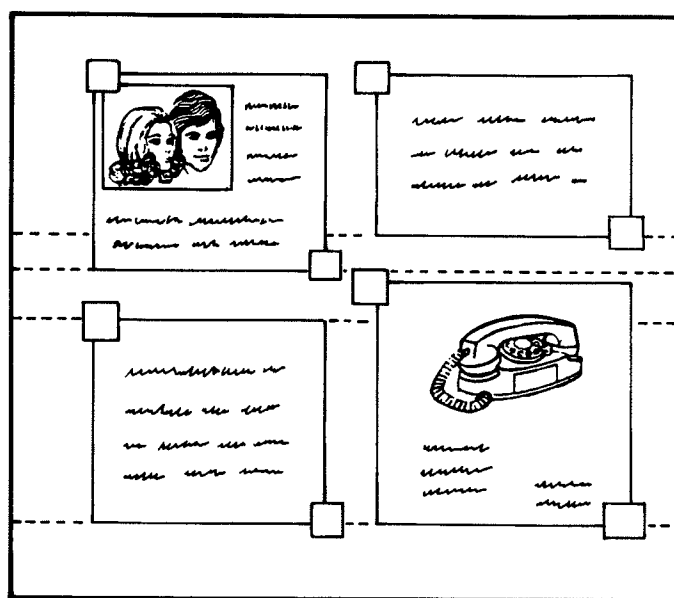


FIGURE C-2

Step 4 in page layout.

6. Replace the copy on the page, using the blue lines to guide you. Some repositioning is possible before firmly pressing the block onto the page.
7. Use the back of a spoon to press the edges and corners of the copy tightly against the page.
8. Then, gently use a soft eraser to remove any rubber cement still on the surface. Having glued only one surface, it's still possible to lift a block and try again if you do this shortly after application.

For most applications, use rubber cement adhesive only on the surface to be attached. Place gently. This can be moved slightly, or peeled off. If you want a *permanent* bond, put adhesive on both the back of the block and on the page (only inside the blue lines). Let both surfaces dry until there is no shine to the adhesive. Carefully put the two surfaces together and press firmly. It will be hard to shift this, once bonding has occurred.

When you buy rubber cement in stationery or hardware stores, get the thinner as well. Store your desk bottle upside-down (to exclude air) and thin as needed.

If there is to be a fold in the completed piece, a very small line or dot where the fold is intended will help you in that operation.

Tips on the Copy Machine

What you have been making is called a *mechanical* in printer parlance. Now you are ready to make a master copy. You will probably be using a standard copy machine. Make an initial copy to check placement of your copy on the machine. You may find a shadow line around the edges of the blocks of copy you glued. Push the "Lighter" button on the copy machine. This should remove the shadow lines. If some still remain, you may have to "Lighten" further or use your bottle of white correcting fluid to cover the troubling edges. (The "Lighter" trick also works if you are printing a copy from material on colored paper. By making the copy lighter, the dark background may disappear.)

When you get a copy with good print contrast and no extraneous marks, print two or three copies on laser paper. This high-quality paper is available wherever copy machine supplies are sold. It is super-white and will provide the best possible contrast for the master copies. Write "Master!" on the back (or with your blue pencil on the front) and *always use the master to make copies*. Giving people material to read with broken or faded letters caused by generations of copies is unprofessional. File the mechanical and two extra masters where they will always be available—and never give them away.

You can reach this stage of production before you test your pamphlet with members of your target audience. You may well do all this again when you have adopted suggestions from audience testing. But it takes longer to explain it than to do it. Once you have worked your way through the steps that produce a good mechanical and master, you'll find it's more fun than drudgery.

Obtaining a STAT or PMT

After all the reviewers have had their say, you will make a final mechanical with the corrections you wish to include. If copies are to be produced in your own agency, that may be as far as you need to go. If you wish to go one step further, you can take your mechanical to a graphic arts facility and get a PMT (photo-mechanical transfer) or a stat (short for photostat), which will provide you with the best possible copy from which to make subsequent masters or copies. Stats cost relatively little (\$5 to \$10) and assure top-quality reproduction. Stats can be damaged by sunlight and should be stored in a filing cabinet.

Graphic Artists and Illustrators

If your budget allows, you can hire a graphic artist and/or an illustrator to do a professional job of illustrating, layout, and design. The graphics designer will work with you on typeface (font), spacing, choice of paper, certain kinds of graphics, such as boxes and picture overlays. The graphics designer works on the overall look you are trying to achieve. The designer may also direct you to an illustrator and may supervise that person if you request it. It usually takes about three months to produce a piece when other professionals are involved. Of course, all this costs money. Be sure you are very clear about *who* does *what*, within what *time schedules*, what happens if you don't agree, and who has final say on process and product. That should all be in writing so there will be no surprises. If you intend to hire professionals, look over their other work (a portfolio) and don't be afraid to ask questions. Two or three bids on a project should give you the information you need to choose wisely.

How or Where Do I Get Illustrations?

There are three major sources for getting illustrations:

1. You may want to employ a professional illustrator. The illustrator will give you several sketches to carry out the ideas you have indicated.
2. If you are on a tight budget, you may have to finish the project yourself. You may be able to find just the illustrations you want in clip art books or a computer graphics program. You can usually buy clip art wherever arts and crafts supplies are sold. If some of the clip art drawings are too shaded (simple line drawings are best) or contain too many distracting details, try correction fluid or cut off the nonessential details.
3. Perhaps you know someone who can produce some drawings for you. It's worth asking at art schools and colleges.

Agreements When Working with Production Professionals

As you work out agreements for the services of people you may hire, specify exactly:

- What is to be done by each one
- Ownership of the materials produced
- Time allowed, with deadlines (if needed)
- Costs of services including revisions

Again, if there's anything you don't understand, don't be afraid to ask questions. If the pamphlet is to be printed, get an estimate of the costs involved.

Printing costs will vary according to:

1. Printing process: offset, copy machine, typeset, etc.
2. Number of copies: cost per copy goes down as quantity goes up.
3. Quality of stock: glossy and heavy equals nice but expensive.
4. Number of colors: each color is a press run.
5. Size of item: standard stock is less expensive.
6. Other operations: folding, stapling, spiralbound, etc.

If the quote you get exceeds your budget, ask your printer's help in trimming the cost by modifying choices in the list above.

Summary

Good presentation is important. You can produce material that looks professional even if it is not "slick." Don't be satisfied with out-of-date, inappropriate, or badly reproduced handouts. Materials with a professional appearance receive greater respect and credibility.



Learner Verification and Revision

Tips on Interviewing

- Q. *What should I do while the person is reading the material?*
- A. Have some notes or other reading material with you so that you can be busy looking at something, not looking directly at the person. Some interviewers have found that giving attention to the children (if present) helps.

During the interview

- Q. *What's the most important thing to keep in mind while interviewing?*
- A. To record exactly what the person says without any interpretation. Broken phrases or slang expressions are important cues for us to learn about language that may communicate more effectively.
- Q. *Suppose the person starts asking me questions about what the piece is actually saying. How should I handle these questions?*
- A. First of all, jot down his or her questions because these may be important cues for us that the point being made is not clear.

Next, acknowledge the question by saying something like, "I'm glad you asked that question. I'll be glad to talk about that as soon as we finish here. Right now, I'd like to go on to . . ."

If you break the train of thought of the interview at this point and digress by giving an explanation, then the whole focus shifts away from the material being tested. It could become a teaching session rather than a learner verification test. You can answer any questions *after* the interview is completed.

- Q. *Do I have to ask the questions as written on the questionnaire?*
- A. Yes. Consistency is necessary among all the different interviews. Please ask the questions the way they're phrased, and in the sequence they are given. Don't skip around.

- Q. *What if I don't understand the answer given to a question I asked?*
- A. The best way to handle this situation is to probe by asking, "Can you tell me what you mean by that?" or, "Please tell me more about that." In any case, write down exactly what the responses are, regardless of your concerns.
- Q. *Should I give encouragement and support during the interview process, such as, "That's right"?*
- A. No. Your purpose is to be as objective as possible in asking the interview questions. Do not influence responses or shift the focus of the interview to one where the respondent is trying to please the interviewer. Likewise, do not interrupt the interview by explaining any answers that are "wrong" or appear off base. It is acceptable to say "Okay" in a neutral fashion after an answer is given.
- In addition, if a respondent asks you if his answer to a question or interpretation to a page is right or wrong, you might respond with: "We're really just interested in your opinion, what makes sense to you."
- Record *all* responses as given. There is no right or wrong when you're trying to identify potential problems.
- Q. *How can I help the respondent feel comfortable?*
- A. The best way is to have a friendly demeanor and be an active listener. This includes eye contact with your respondent, smiling when appropriate, assuming an open physical posture, and responding to comments with nonleading probes. Everyone likes to be asked their opinions about a topic with which they're familiar.

Experience Speaks . . . Advice on Interviewing Techniques from Several Experienced Interviewers for Learner Verification and Revision¹

SELECTING TESTERS

- If possible, use testers from the same ethnic group.
- For foreign testers, make sure they don't change the questions or leave out questions that they don't care to ask.
- It is helpful if the testers have some counseling background.
- Consider two people to do interviews: one to ask questions and one to take notes.

INTRODUCTION OF THE INTERVIEW

- Consider saying: "We're asking lots of people about this booklet and trying to get an idea how *most* of them feel about it. It's in rough draft form here, so it's still easy to change it to make the finished one more clear."
- You may tell people during the introduction preamble that you didn't develop the piece. You're just checking it out, so you won't be offended by whatever they say.

READING OF THE MATERIAL

- When people are busy reading, the tester should be busy with some other activity nearby. It makes people nervous if you hover over them as you read.

DURING THE INTERVIEW

- Sometimes it's hard to get all the things written down that are being said. Some people want to say more and talk about the material. To solve this problem, write key words and phrases.
- Most people aren't prepared to offer ideas for changes/improvements. Stimulating examples or questions are needed to bring out their ideas.

AFTERWARD

- If possible, give the respondents a copy of the preliminary piece being tested and thank them. It makes them feel good about what they have done.

Sample Questionnaire for Interviewers to Evaluate Their Experience

Purpose: to give sponsor feedback on Learner Verification and Revision experience²

Would you help us by sharing your learner verification experience? We would like to know what you encountered and what we might be able to do in the future to make the process even more productive.

1. Total number of learner verification interviews conducted:
2. Total number of people approached who refused to participate:
3. Reasons given for refusal, if available:
4. Approximate minutes per interview:
5. What might we have included in the instructions that would have made the interviews more productive?
6. Is there anything that we could have left out?
7. What kind of problems did you encounter, if any?
8. We would like to have your opinion of the material itself. What do you think of it? Any suggestions for change?

Tabulation of Responses for Large Samples

For large samples (30 or more): A more formal spreadsheet tabulation is preferable for larger samples. Computer programs for spreadsheets offer several flexible frameworks for the layout. Using these tabular frameworks, it is easy to keyboard in the response data. A computer printout of the responses can provide you with an easy-to-scan tabulation so you can quickly identify trouble spots in the material being tested. An example of a computer-generated tabulation sheet is shown in Figure D-1. The figure shows only a part of the actual tabulation.

Function of questions:

comprehension

acceptability

	B1	B1	C	C
Code	10. What is new?	11. First thing Jackie did to start?	12.a. Would you talk to your MD?	12b. If no, why?
03-10-16	It says she's walking and eating better.	Her clothes were too tight and her feet hurt (I asked the question again.) Oh, she talked to her doctor first.	No	Cause most of the time they give you a bunch of stuff to read and tell you not to eat so much and want you to starve yourself.
03-10-17	She walks, she eats more fruits and vegetables.	She talked to her doctor about plan to lose weight.	Probably after I tried a diet.	Probably be cheaper.
03-10-18	She's eating more fruits, vegg, and less fat.	She started eating less.	Yes	
03-10-19	Eating more fruits and vegetables and less fat. out a simple plan.	Talk to her doctor, decided how much weight she wanted to lose and worked	Yes	
03-10-20	Walk more.	She talked to her doctor.	I might if I had one.	
03-10-21	She is walking, eating more fruits and vegetables	Talked to her doctor.	Yes	

FIGURE D-1

Tabulation of six responses to a booklet, "Jackie and Rhonda," for African Americans on losing weight and eating more fruits and vegetables to cut their risk of cancer. (Source: National Cancer Institute, Branch of Special Populations)

References

1. Feedback at National Cancer Institute conference (October 25, 1991): Barbara Pryor, RD, Columbus, OH; Sarah Furnas, RN, Philadelphia, PA; Joan Rupp, RD, San Diego, CA.
2. National Cancer Institute (1992): Branch of Special Populations, Nutrition Guideline for Ethnic Groups.

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