Chapter 4

DEVELOPMENT OF THE SURVEY INSTRUMENTS

Anne Campbell, Diné College (formerly of Educational Testing Service)

One of the goals of the 1992 National Adult Literacy Survey was to relate the literacy skills of the nation's adults to a variety of demographic characteristics and explanatory variables. To accomplish this goal, the survey included the administration of a background questionnaire as well as literacy simulation tasks. The next three sections describe the conceptual framework for the survey and the development of the background questionnaire and the literacy tasks.

4.1 CONCEPTUAL FRAMEWORK

One of the major goals of the National Adult Literacy Survey (NALS) was to compare its results with those from other large-scale assessments of literacy that have been conducted during the past few years. These include two major surveys: 1) the 1985 Young Adult Literacy Assessment, conducted as a part of the National Assessment of Educational Progress (NAEP) and carried out by Educational Testing Service (ETS) and the Response Analysis Corporation under a grant from the National Center for Education Statistics (NCES; Kirsch and Jungeblut, 1986), and 2) the 1990 Workplace Literacy Survey, conducted by ETS under a contract from the Employment and Training Administration (Kirsch, Jungeblut, and Campbell, 1992). Thus, the conceptual framework for the National Adult Literacy Survey is based on the framework developed for the Young Adult Literacy Assessment and used again in the Workplace Literacy Survey.

The foundation for the 1985 Young Adult Literacy Assessment, the 1990 Workplace Literacy Survey, and the 1992 National Adult Literacy Survey was the following definition of literacy:

> *Using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential.*

This definition characterizes literacy by focusing on what adults do with printed and written information. It rejects an arbitrary standard, such as signing one's name, completing five years of schooling, or scoring at the eighth grade level on a test of reading achievement. In addition, this definition goes beyond simply decoding and comprehending text and implies that the information-processing skills that adults use to think about content are part of the concept of literacy.

The National Center for Education Statistics specified in its contract requirements for conducting the National Adult Literacy Survey that ETS appoint a Literacy Definition Committee to provide substantive expertise to guide the development and conduct of the survey. The Literacy Definition Committee recommended adopting the above definition of literacy, along with the three literacy scales

developed to report the results of the Young Adult Literacy Assessment as the framework for the National Adult Literacy Survey.

Three literacy scales—prose literacy, document literacy, and quantitative literacy—were also used in the two preceding national surveys of literacy and represent distinct and important aspects of the ability to use printed and written information.

Prose literacy consists of the knowledge and skills needed to understand and use information contained in prose texts, both expository and narrative. Expository prose consists of printed information in the form of connected sentences and longer passages that define, describe, or inform, such as newspaper stories or written instructions. Narrative prose tells a story, but is less frequently used by adults in everyday life than by school children, and did not occur as often in the texts presented in the prose literacy tasks. Prose varies in its length, density, and structure (e.g., use of section headings or topic sentences for paragraphs). Using information contained in prose texts, or prose literacy, means that people can locate information contained in prose in the presence of related, but unnecessary information, find all the information, integrate information from various parts of a passage of text, and write new information related to the text.

Document literacy consists of the knowledge and skills required to locate and use information found in documents. Documents differ from prose text in that they are more highly structured. Documents consist of structured prose and quantitative information, in complex arrays arranged in rows and columns, such as tables, data forms, and lists (simple, nested, intersected, or combined), in hierarchical structures such as tables of contents or indexes, or in two-dimensional visual displays of quantitative information, such as graphs, charts, and maps. Using information contained in documents, or document literacy, means that people can locate information in documents, repeat the search as many times as needed to find all the information, integrate information from various parts of a document, and write new information as requested in appropriate places in a document, while screening out related, but inappropriate information.

Quantitative literacy consists of the knowledge and skills needed to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials. Quantities can be located in either prose texts or in documents. Quantitative information may be displayed in analog form in graphs, maps, or charts, or it may be displayed in digital form using whole numbers, fractions, decimals, percentages, or time units (hours and minutes). Using quantitative information contained in prose or documents, or quantitative literacy, means that people can locate quantities while screening out related, but unneeded information, repeat the search as many times as needed to find all the numbers, integrate information from various parts of a text or document, infer the necessary arithmetic operation(s), and perform the arithmetic operation(s) correctly.

The three literacy scales were measured with literacy tasks that simulate the demands that adults encounter when they interact with printed materials on a daily basis (simulation tasks). The tasks used to measure literacy along the three scales incorporate many features designed to demonstrate that adults can use information, including quantitative information, contained in texts and documents.

The adoption of the definition of literacy and the three scales from the Young Adult Literacy Assessment facilitated implementing the goal of comparing the demonstrated literacy proficiencies of the national survey population with those of the populations from the two prior surveys. To ensure that valid comparisons could be made by linking the scales, a set of 85 tasks that were administered in the Young Adult Literacy Assessment and in the Workplace Literacy Survey were also planned to be included in the 1992 National Adult Literacy Survey. Still, new tasks needed to be developed because some of the old tasks had become dated and because a better balance of tasks among the three scales was needed (about two-thirds of the original tasks contributed to the document scale, leaving one-sixth of the tasks for the prose scale and one-sixth for the quantitative scale).

Taking into consideration the definition of literacy and the three literacy scales, the Literacy Definition Committee established the following guidelines for developing new literacy tasks:

- Continued use of open-ended simulation tasks rather than multiple-choice questions;
- Continued emphasis on measuring a broad range of information-processing skills covering a variety of contexts;
- Increased emphasis on simulation tasks that require brief written and/or oral responses;
- Increased emphasis on tasks that focus on asking the respondent to describe how he or she would set up and solve the problem; and
- The use of a simple, four-function calculator to solve quantitative problems.

Using these guidelines, an additional 81 tasks were developed specifically for the 1992 National Adult Literacy Survey in order to complement and enhance the original set of 85 literacy tasks.

In addition to the definition of literacy and the three literacy scales, the administration of a background questionnaire to collect demographic and background information was also carried over from the 1985 and 1990 assessments. This information, along with the information gathered from the simulation tasks, is important for interpreting and reporting the literacy results.

4.2 THE SCOPE OF THE BACKGROUND QUESTIONNAIRE

The questionnaire was intended to provide data about the U.S. adult population, enhance understanding of the factors related to the observed distribution of literacy skills, and facilitate comparisons with previous studies. A modified version of the questionnaire was developed for the prison population, as some of the questions for the population at large were not relevant for this subgroup (see Appendix H). Both background questionnaires, but not the literacy tasks, were also translated into Spanish.

Two goals guided the development of the questionnaire:

- To ensure the usefulness of the data by addressing issues of concern throughout the nation; and
- To ensure comparability with the Young Adult Literacy Assessment and the Department of Labor Workplace Literacy Survey by including some identical questions.

In keeping with these goals, the background questionnaire addressed the following broad issues:

- General and language background;
- Educational background and experiences;
- Political and social participation;
- Labor force participation;
- Literacy activities and collaboration; and
- Demographic information.

4.2.1 General and Language Background

By design, the survey is a study of English literacy proficiency. Projected demographic changes, however, point to a large and growing population of adults with limited English proficiency. It was likely, therefore, that little or no information from the simulation tasks in English would be available for these individuals and, thus, they could be characterized only from the information collected in the background questionnaire. In addition, many of the questions included in the category of general and language background were important in characterizing the sample of young adults in the 1985 Young Adult Literacy Assessment; and, in fact, the age at which English was learned was found to be a powerful variable in previous analyses of the data on young adults. In order to gather as much pertinent information as possible, the questions relating to respondents' general and language background addressed the following:

- Country of birth;
- Education before coming to the United States;
- Language(s) spoken by others in the home;
- Language(s) spoken while growing up;
- Language(s) spoken now;
- Participation in courses for English as a second language; and
- Self-evaluation of proficiency in English and other languages.

4.2.2 Educational Background and Experiences

Although "self-educated" individuals can still be found, formal education remains among the most important factors in the acquisition of literacy skills. Level of education is known to be an important predictor of demonstrated performance on the prose, document, and quantitative literacy scales across racial/ethnic groups. The questions addressing educational background and experiences were designed to provide data for descriptive and relational analyses as well as to address some specific issues. The questions collected information on the following:

- Highest grade or level of education completed;
- Reasons for not completing high school;
- High school equivalency;
- Current educational aspirations;
- Types and duration of training received in addition to traditional school;
- Context, that is, school, home, or work, in which literacy activities were learned; and
- Physical, mental, or health conditions that may affect literacy skills.

4.2.3 Political and Social Participation

People need to read, write, and calculate in order to accomplish important tasks not only at work and in school, but also at home and in their communities. The questions included under political and social participation make it possible to explore the kinds of free-time activities that adults engage in relative to demonstrated proficiencies. Information on the use of library services is important because libraries promote reading and often provide literacy programs. In addition, because an informed citizenry is essential to political participation, and because printed material is an important medium for conveying information on public issues, information was collected on how adults keep abreast of current events and public affairs. The questions in this section addressed the following:

- Sources for obtaining information about current affairs;
- Television viewing;
- Use of library services; and
- Voting behavior.

4.2.4 Labor Force Participation

There is widespread concern that the literacy skills of both our present and future work forces are not adequate for competing in the current global economy or for coping with our rapidly evolving technological society. The questions relating to labor force participation are based on standard labor force concepts widely used in economic surveys; they allow a variety of labor market activity and experience variables to be constructed. Combined with the data on the demonstrated literacy proficiencies of adults, the labor market variables make it possible to examine associations between literacy proficiencies and the labor market experiences of key subgroups. In addition, the questions included make it possible to link results to the Department of Labor literacy survey. The questions in this section addressed the following:

- Employment status;
- Weekly wages or salary;
- Weeks of employment for the last year;
- Annual wages or salary; and
- Industry and occupation.

4.2.5 Literacy Activities and Collaboration

Questions relating to literacy activities and collaboration addressed several important issues. Some of the questions provided information about the types of materials—newspapers, magazines, books, and brief documents—that adults read, making it possible to investigate the relationship between the types of materials read and demonstrated literacy proficiencies. Another subset of questions asked about the frequency of particular reading, writing, and mathematics activities engaged in for personal use as well as for use on the job. By asking adults about the types of literacy practices they engage in specifically for work, analyses can relate on-the-job literacy practices to various occupational categories, education levels, and income levels. The issue of collaboration was addressed by questions that asked if a person received assistance when engaging in particular literacy activities. The questions in this section collected information on the following:

- Newspaper, magazine, and book reading practices;
- Reading, writing, and mathematics activities engaged in for personal use;
- Reading, writing, and mathematics activities engaged in for work; and
- Assistance received from others with particular literacy activities.

4.2.6 Demographic Information

The inclusion of demographic variables makes it possible to describe the adult population as well as to investigate the demonstrated literacy proficiencies of major subgroups of interest, such as racial/ethnic groups, males and females, and age groups, including those over the age of 64. In addition, the data allow for the investigation of such issues as the educational experiences of White, black, and Hispanic populations as well as their access to literacy related services; the educational experiences of different generations of adults; and the relationships of socioeconomic status and family background to literacy.

The demographic information collected included the following:

- Educational attainment of parents;
- Marital status;
- Number of people in family employed full time and part time;
- Sources of income other than employment;
- Family and personal income from all sources;
- Race/ethnicity;
- Age; and
- Sex.

4.2.7 Prison Survey Background Questionnaire

Because many of the questions for the household population were not appropriate for a prison population, a more relevant version of the background questionnaire was developed incorporating questions from the 1991 Survey of Inmates of State Correctional Facilities, sponsored by the Bureau of Justice Statistics of the U.S. Department of Justice (see Appendix H).

Most of the questions in the household survey questionnaire that dealt with general and language background and with literacy activities and collaboration remained in the incarcerated questionnaire. Many of the questions dealing with education, however, were either revised or replaced with questions from the 1991 inmate survey. These questions better reflected the educational experiences of inmates both prior to their incarceration and while in prison. The questions pertaining to political and social participation in the household questionnaire were replaced with questions from the 1991 inmate survey dealing with current offenses and criminal history. Some of the questions in the household questionnaire dealing with labor force participation were replaced with questions about inmates' prison work assignments. Several questions dealing with family income and employment status of family members were dropped from the demographic section of the questionnaire. As a result of these changes, the questionnaire for the prison population addressed the following major topics:

- General and language background;
- Educational background and experiences;
- Current offenses and criminal history;
- Prison work assignments and labor force participation prior to incarceration;
- Literacy activities and collaboration; and
- Demographic information.

4.2.8 Spanish Versions of the Questionnaires

Because Spanish is the second most prevalent language in this country, both the household and prison background questionnaires were translated into Spanish and administered by bilingual interviewers. The non-English, non-Spanish language groups are not prevalent enough across the country as a whole to make other translations practical for conducting the survey. Because native Spanish speakers may not be able to complete the assessment's simulation tasks in English, it was considered important to collect background information in order to understand the language background and literacy experiences of that group. Since the survey was intended to assess only the English literacy skills of the population, the simulation tasks were not offered in Spanish.

4.3 DEVELOPMENT OF THE SIMULATION TASKS

This section describes the development of the new National Adult Literacy Survey tasks as well as the scope of the combined pool of existing tasks—that is, the original tasks plus the tasks newly developed for

the National Adult Literacy Survey. It also describes the process of grouping the tasks into blocks or sections and then assembling these blocks into booklets for administration.

4.3.1 Organizing Framework for Task Development

The framework used to develop the National Adult Literacy Survey tasks reflects research conducted on the tasks from the 1985 Young Adult Literacy Assessment, particularly with respect to the processes and strategies involved in completing the tasks. Thus, the National Adult Literacy Survey tasks served to refine and extend the three existing literacy scales—prose, document, and quantitative literacy.

In developing the tasks for the National Adult Literacy Survey, one goal was to complement the tasks that had been developed for the Young Adult Assessment. This meant including a diversity of stimulus materials and designing tasks that represented the broad range of skills and processes inherent in the three domains of literacy. Furthermore, the tasks were designed to assess a wide variety of skills reflecting the demands adults encounter in occupational, community, and home settings—skills that involve reading, writing, and computing. Because the tasks were meant to simulate the kinds of activities that people engage in when they use printed materials, they were open-ended. The underlying principle for the development of the National Adult Literacy Survey tasks was that demonstrated performance on any given task reflects interactions among the following:

- The structure of the stimulus material, e.g., exposition, narrative, table, graph, map, or advertisement;
- The content represented and/or the context from which the stimulus is drawn, e.g., work, home, community; and
- The nature of what the individual is asked to do with the material, i.e., the purpose for using the material, which guides the strategies needed to complete the task successfully.

4.3.2 Materials/Structures

The stimulus materials selected for the tasks included a variety of structures or linguistic formats that adults encounter in their daily activities. The materials were reproduced in their original format. Most of the prose materials used in the survey were expository—that is, they describe, define, or inform—since much of the prose that people read is expository in nature; however, narratives and poetry were included as well. The expository materials included a diversity of linguistic structures, from texts that were highly organized both topically and visually to those that were loosely organized. They also included texts of varying lengths, from full-page magazine articles to short newspaper articles of several paragraphs.

The document tasks were based on a wide variety of document structures, which were categorized as tables, charts and graphs, forms, maps, and miscellaneous documents. Tables included matrix documents in which information is arrayed in rows and/or columns, such as transportation schedules and lists or tables of information. Documents categorized as charts and graphs included pie charts, bar graphs,

and line graphs. Forms included any documents that required information to be filled in, and miscellaneous structures included such materials as advertisements and coupons.

Because quantitative tasks involve performing arithmetic operations on numbers embedded in print, they were based on some kind of stimulus material. The materials for quantitative tasks included both prose and document structures as there are no structures that are unique to quantitative tasks. The majority of these tasks were based on document structures.

Across the entire pool of tasks, the most prevalent structure used for tasks was tables—33 percent of the materials were tables (Table 4-1). While it may seem that there was a disproportionate number of tables, this particular structure comprises a wide range of materials that present information in matrix formats using words, numbers, pictures, and symbols. Thus, materials such as transportation schedules, menus, tables of contents, as well as tables of information, were categorized as tables.

Table 4-1. Percentages of stimulus materials by categories of structures

Structure	Percent of Tasks		Total
	Original in 1985	New in 1992	
Exposition	6	15	21
Narrative and Poetry	1	5	6
Tables	23	10	33
Charts and Graphs	4	6	10
Forms	13	6	19
Maps	1	2	3
Miscellaneous	4	4	8

4.3.3 Adult Contexts/Content

Since adults do not read printed materials in a vacuum, but rather within a particular context or for a particular purpose, materials were used that represent a variety of contexts or content. Six adult context/content areas were identified as follows:

- **Home and family**: interpersonal relationships, personal finance, housing, and insurance;
- **Health and safety**: drugs and alcohol, disease prevention and treatment, safety and accident prevention, first aid, emergencies, and staying healthy;
- **Community and citizenship**: community resources and being informed;
- **Consumer economics**: credit and banking, savings, advertising, making purchases, and maintaining personal possessions;
- **Work**: occupations, finding employment, finance, and being on the job; and
- **Leisure and recreation**: travel, recreational activities, and restaurants.

An attempt was made to include as broad a range of contexts and contents as possible and to select materials that would not be so specialized as to be familiar only to certain groups. This was to ensure that any disadvantages for people with limited background knowledge would be minimized.

Across the entire pool of tasks, 32 percent of the materials fell into the community/citizenship category (Table 4-2). While it may seem that this category is over-represented, it is a very broad category and includes such materials as news articles from newspapers and magazines, information from governmental agencies, transportation schedules, information from schools and colleges, and so on.

Table 4-2. Percentages of tasks by categories of context/content

Context/Content	Percent of Tasks		Total
	Original in 1985	New for 1992	
Home/Family	7	7	14
Health/Safety	3	1	4
Community/Citizenship	12	20	32
Consumer Economics	11	5	16
Work	13	2	15
Leisure/Recreation	6	13	19

The materials and contexts described above define the axes of the matrix in Table 4-3. This table illustrates that the tasks included in the assessment were based on a variety of materials from a variety of contexts. Each dot indicates that at least one task was included that was based on a particular kind of material from a particular context. For example, the row for the content area labeled health/safety contains two dots, one under exposition and one under tables. This means the assessment included tasks that were based on two types of materials, exposition and tables, related to the context of health/safety.

Table 4-3. Task coverage by context or content and type of material

	Materials						
Context/Content	Exposition	Narrative/ Poetry	Tables	Charts/ Graphs	Forms	Maps	Miscellaneous
Home/Family	✓		✓		✓		✓
Health/Safety	✓		✓				
Community/ Citizenship	✓		✓	✓	✓	✓	
Consumer Economics	✓		✓	✓	✓		✓
Work	✓		✓	✓	✓		✓
Leisure/Recreation	✓	✓	✓	✓		✓	✓

4.3.4 Processes/Strategies

After the stimulus materials were selected, tasks were developed that simulated the way people would use the materials and required different strategies for successful task completion. Prose tasks were developed that involve three strategies for processing information: *locating*, *integrating*, and *generating* information. For *locating* tasks, readers must match information given in the question with either literal or synonymous information in the text (see Exhibit 4-1, “swimmer” tasks).

Exhibit 4-1. Example of prose locating task

Swimmer completes Manhattan marathon

The Associated Press

NEW YORK-University of Maryland senior Stacy Chanin on Wednesday became the first person to swim three 28-mile laps around Manhattan.

Chanin, 23, of Virginia, climbed out of the East River at 96th Street at 9:30 p.m. She began the swim at noon on Tuesday.

A spokesman for the swimmer, Roy Brunett, said Chanin had kept up her strength with "banana and honey" sandwiches, hot chocolate, lots of water and granola bars."

Chanin has twice circled Manhattan before and trained for the new feat by swimming about 28.4 miles a week. The Yonkers native has competed as a swimmer since she was 15 and hoped to persuade Olympic authorities to add a long-distance swimming event.

The Leukemia Society of America solicited pledges for each mile she swam.

In July 1983, Julie Ridge became the first person to swim around Manhattan twice. With her three laps, Chanin came up just short of Diana Nyad's distance record, set on a Florida-to-Cuba swim.

Find the article "Swimmer completes Manhattan marathon" on page 2 of the newspaper provided and answer the following questions.

11. Underline the sentence that tells what Ms. Chanin ate during the swim.

12. At what age did Chanin begin swimming competitively?____

Of the original prose tasks, about one-third were *locating* tasks, and of the new prose tasks developed for the survey, about two-thirds were *locating* tasks. Of the total item pool—the original and new combined—slightly over half the tasks require readers to use *locating* strategies.

Integrating tasks require readers to pull together two or more pieces of information located at different points in the text. None of the original prose tasks were *integrating* tasks, and of the new prose tasks developed for the survey, about one-fourth were *integrating* tasks.

Generating tasks require readers not only to process information located at different points in the text, but also to go beyond that information by making broad, text-based inferences in order to produce new information (see Exhibit 4-2, "Dickinson" task) or by drawing on their knowledge about a subject (see Exhibit 4-3, "Wicker" task). Of the original prose tasks, about two-thirds were *generating* tasks. Of the new prose tasks developed for the survey, about one-tenth were *generating* tasks. Of the total item pool—the original and new combined—just under a third were *generating* tasks.

Exhibit 4-2. Example of prose generating task

The pedigree of honey
Does not concern the Bee—
A clover, any time, to him
Is Aristocracy— (Emily Dickinson)

11. What is the poet trying to express in this poem?_____
_____
_____
_____

Exhibit 4-3. Example of prose generating task (reduced from original size)

Did U.S. know Korean jet was astray?

Tom Wicker

THE COMPLICITY with government into which the press has sunk since Vietnam and Watergate has seldom been more visible than on the first anniversary of Soviet destruction of Korean Air Lines Flight 007.

On Sept. 1, headlines, of course, reported the Reagan administration's statements that the event had boosted, during the year, U.S. standing in the world relative to that of the U.S.S.R.

But the press effectively ignored an authoritative article in The Nation (for Aug. 18-25) establishing to a reasonable certainty that numerous U.S. government agencies knew or should have known, almost from the moment Flight 007 left Anchorage, Alaska, that it was off course and headed for intrusion into Soviet air space, above some of the most sensitive Soviet military installations.

Yet no agency, military or civilian, warned Flight 007 or tried to guide it out of danger; neither did the Japanese. As late as Aug. 28, in a briefing, a State Department spokesman claimed "no agency of the U.S. government even knew the plane was off course and was in difficulty until after it was shot down."

If that's true, the author of The Nation's article-David Pearson, an authority on the Defense Department's World Wide Military Command and Control System, who spent a year researching his lengthy article-concludes, "the elaborate and complex system of intelligence, warnings and security that the U.S. has built up over decades suffered an unprecedented and mind-boggling breakdown."

But Pearson shows in excruciating detail why its most unlikely there was any such "simultaneous failure of independent intelligence systems" of the Navy, army, Air Force, National Security Agency, Central Intelligence Agency "or the Japanese self-defense agency"-all of which, he shows, had ability to track Flight 007 at various stages across the Pacific.

What's the alternative to the staggering idea of such a breakdown? That all these agencies deliberately chose not to guide the airliner back on a safe course, because its projected overflight of the Kamchatka Peninsula and Sakhalin Island would activate Soviet radar and air defenses and thus yield a "bonanza" of intelligence information to watching and listening U.S. electronic devices. Despite all administration protests to the contrary, the evidence Pearson presents raises this alternative at least to the high probability level.

But Pearson does not assert as a fact that the United States, South Korea or both deliberately planned an intelligence mission for Flight 007; he concedes the possibility that it simply "blundered" into sensitive Soviet air space, and the electronic onlookers for the United States decided on the spot to take intelligence advantage of the error-never dreaming the Russians would shoot down an unarmed airliner.

But if the disaster happened that way, Pearson notes, two experienced pilots (nearly 20,000 flying hours between them) not only made an error in setting the automatic pilot but "sat in their cockpit for five hours, facing the autopilot selector switch directly in front of them at eye level, yet failed to see that it was set improperly." Nor in all that time could they have used the available radar and other systems to check course and position.

Pearson also presents substantial evidence that Soviet radar detection and communications systems over Kamchatka and Sakhalin were being jammed that night which would help account for their documented difficulty in catching up to Flight 007. He reconstructs electronic evidence too, to show that the airliner changed course slightly after passing near a U.S. RC-135 reconnaissance plane; otherwise it would have crossed Sakhalin far north of the point where a Soviet fighter finally shot it down.

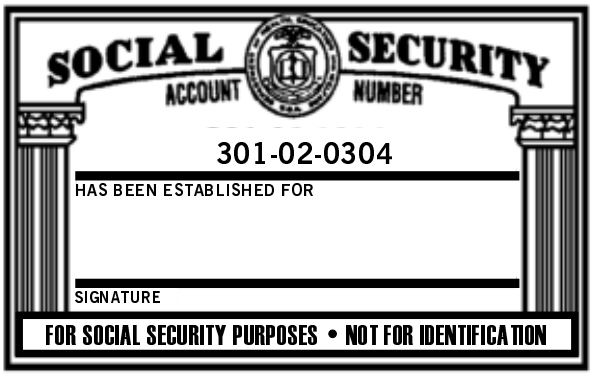
The jamming and course change, as detailed by Pearson, strongly suggest what he obviously fears: "that K.A.L. 007's intrusion into Soviet airspace, far from being accidental, was well orchestrated," with the Reagan administration, at some level, doing the orchestrating. Even if not, the deliberate silence-or shocking failure-of so many U.S. detection systems argue that President Reagan and the security establishment have greater responsibility for Flight 007's fate than they admit-or that a complaisant press has been willing to seek.

Find the article "Did U.S. know Korean jet was astray?" on the front page of the newspaper provided and answer the question below.

8. What argument is Tom Wicker making in his column?_____
_____
_____
_____

The strategies required by document tasks also include locating, integrating, and generating information as well as cycling through information. For *locating* tasks, readers must match one feature or category of information given in the task with either identical or synonymous information in a document. (see Exhibit 4-4, "Social Security card" task). About two-thirds of the original document tasks and about two-thirds of the new document tasks were *locating* tasks. Thus, about two-thirds of the total document pool were *locating* tasks.

Exhibit 4-4. Example of document locating task



1. Here is a Social Security card. Sign your name on the line that reads "signature."

[Note: The critical element in scoring this task was not a proper signature, but successfully locating the place where the signature belongs.]

Cycling tasks require the reader to repeat the matching process by identifying all instances that satisfy a set of conditions stipulated in the question or directive (see Exhibit 4-5, "employment form" task). About one-ninth of the original document tasks, but none of the new document tasks were *cycling* tasks. Of the total document literacy pool, about one-tenth were *cycling* tasks.

Exhibit 4-5. Example document cycling task

You have gone to an employment center for help in finding a job. You know that this center handles many different kinds of jobs. Also, several of your friends who have applied here have found jobs that appeal to you.

The agent has taken your name and address and given you the rest of the form to fill out. Complete the form so the employment center can help you get a job.

Birth date_____ Age____ Sex: Male____ Female____

Height_____ Weight_____ Health_____

Last grade completed in school_____

Kind of work wanted:

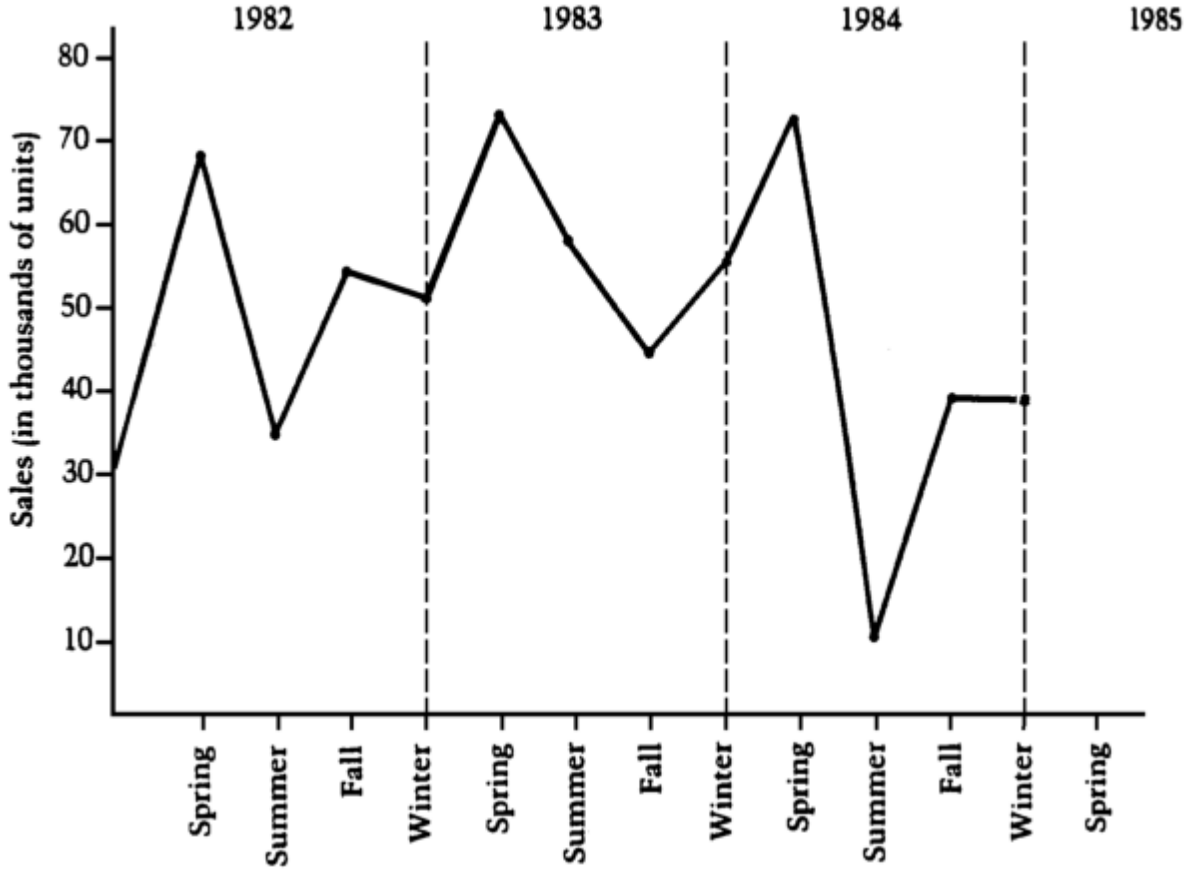
Part-time_____ Summer_____

Full-time_____ Year-round_____

[Note: this document was scored as two tasks: one for entering all personal elements (birth date, age, sex, height, weight, health, and schooling) and another for entering the two features of the kind of work wanted. The later task did not fit the IRT scale and was not included in figuring document literacy scale scores.]

To complete *integrating* tasks, readers must either match on two or more features located in different parts of the document or compare and/or contrast information (see Exhibit 4-6, "graph" task). About one-ninth of the original, and one-fourth of the new document tasks were *integrating* tasks. Of the total document pool, about one-seventh were *integrating* tasks.

Exhibit 4-6. Example document integrating task



13. You are a marketing manager for a small manufacturing firm. This graph shows your company's sales over the last three years. Given the seasonal pattern shown on the graph, predict the sales for Spring 1985 (in thousands) by putting an "X" on the graph.

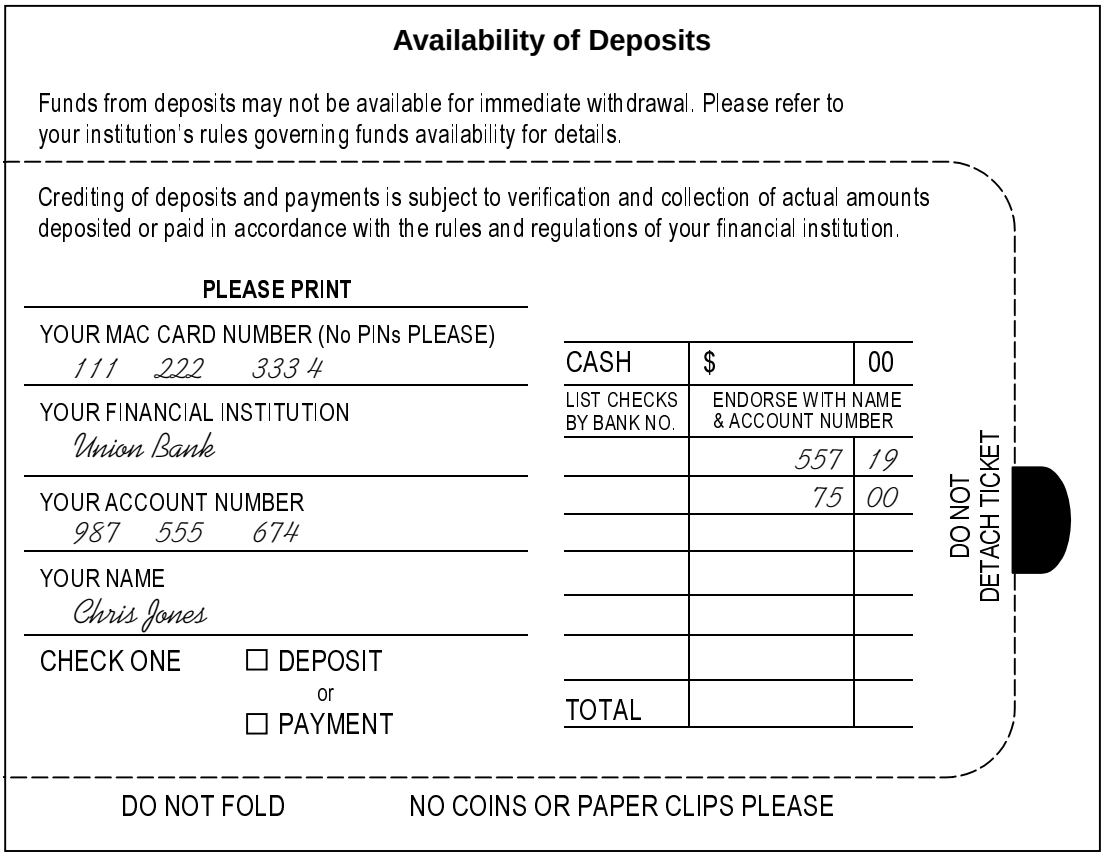
As with *generating* tasks in the prose domain, *generating* tasks involving documents require readers to go beyond information in the document either by drawing on their knowledge of the subject or by making inferences to produce new information. About one-ninth of the original, and one-tenth of the

new document tasks were *generating* tasks. Of the total document pool, about one-tenth were *generating* tasks.

Quantitative tasks require readers to perform arithmetic operations—addition, subtraction, multiplication, or division—either singly or in combination. Some quantitative tasks require readers to explain how they would solve a problem rather than just to produce a numerical answer, and others require the use of a simple, four-function calculator to solve the problem. Tasks can be more or less difficult for readers depending on the type of arithmetic operation involved, the ease of determining what operations were needed, and the ease of locating or identifying the appropriate numbers. Among the National Adult Literacy Survey tasks, the representation of numerical information associated with the quantitative tasks included whole numbers, decimals, percentages, fractions, and time (hours and minutes).

Addition and subtraction tasks are usually considered the easiest operations (see Exhibit 4-7, "deposit slip" task). Of the original quantitative tasks, about one-fourth each involved the operations of addition and subtraction. Of the new quantitative tasks, about one-fifth were addition and somewhat more than one-fifth were subtraction tasks. Across the total quantitative pool, about one-fourth each were addition and subtraction tasks.

Exhibit 4-7. Example quantitative addition task



Availability of Deposits

Funds from deposits may not be available for immediate withdrawal. Please refer to your institution's rules governing funds availability for details.

Crediting of deposits and payments is subject to verification and collection of actual amounts deposited or paid in accordance with the rules and regulations of your financial institution.

PLEASE PRINT

YOUR MAC CARD NUMBER (No PINs PLEASE)
111 222 333 4

YOUR FINANCIAL INSTITUTION
Union Bank

YOUR ACCOUNT NUMBER
987 555 674

YOUR NAME
Chris Jones

CHECK ONE ☐ DEPOSIT or ☐ PAYMENT

CASH	$	00
LIST CHECKS BY BANK NO.	ENDORSE WITH NAME & ACCOUNT NUMBER	
	557	19
	75	00
TOTAL		

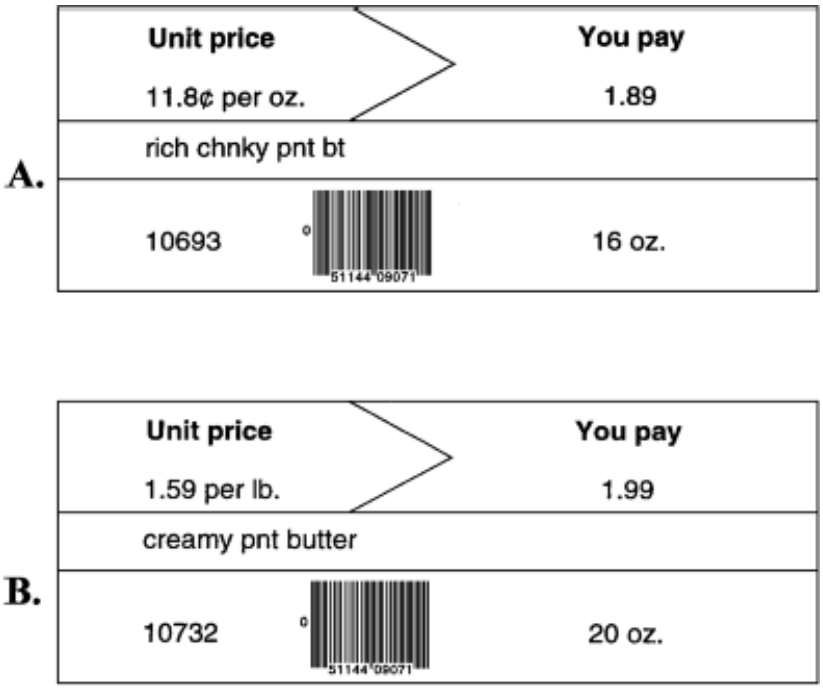
DO NOT DETACH TICKET

DO NOT FOLD NO COINS OR PAPER CLIPS PLEASE

5. You wish to use the automatic teller machine at your bank to make a deposit. Figure the total amount of the two checks being deposited. Enter the amount on the form in the space next to TOTAL.

Multiplication and division tasks are usually considered more difficult than addition or subtraction tasks (see Exhibit 4-8, "cost per ounce" task). About one-sixth of the original quantitative tasks were evenly divided between the operations of multiplication and division. Of the new quantitative tasks, about one-fifth were multiplication and somewhat fewer than one-fifth were division tasks. Across the total quantitative pool, about one-fourth of the tasks involved the operations of multiplication and division.

Exhibit 4-8. Example quantitative division task



You need to buy peanut butter and are deciding between two brands.

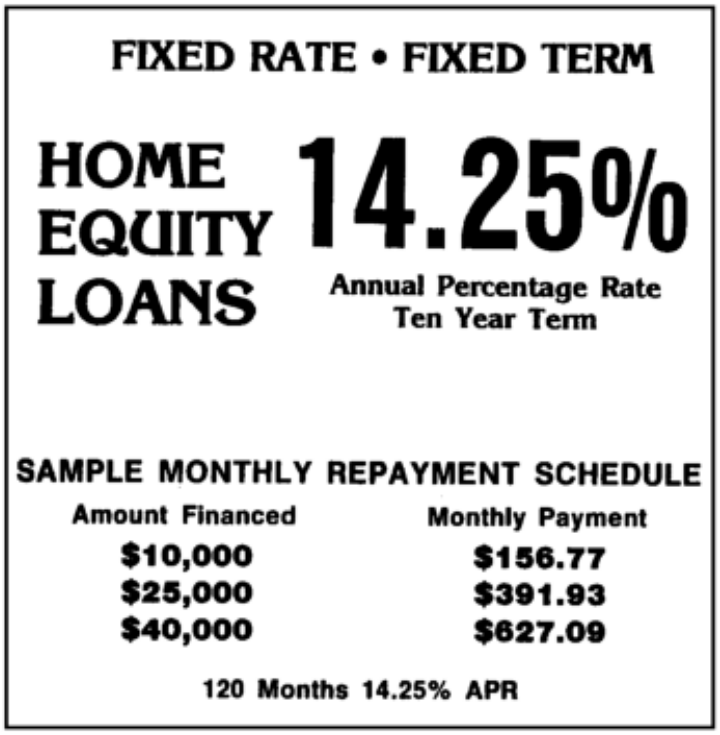
2. Estimate the cost per ounce of the creamy peanut butter. Write your estimate on the line provided.

_____

Tasks that require more than one operation are considered even more difficult (see Exhibit 4-9, "home equity loan" task). About one-third of the original and one fifth of the new quantitative tasks involved a combination of operations. Across the total quantitative pool, about one-fourth were combination tasks.

Other factors are also associated with task difficulty. Deciding what operation is appropriate is sometimes obvious from the wording (see Exhibit 4-7, "deposit slip" task) but sometimes indirect, requiring readers to infer which operation they should perform (see Exhibit 4-9, "home equity loan" task).

Exhibit 4-9. Example quantitative combination task



FIXED RATE • FIXED TERM

HOME EQUITY LOANS

14.25%

Annual Percentage Rate
Ten Year Term

SAMPLE MONTHLY REPAYMENT SCHEDULE

Amount Financed	Monthly Payment
$10,000	$156.77
$25,000	$391.93
$40,000	$627.09

120 Months 14.25% APR

3. You need to borrow $10,000. Find the ad for Home Equity Loans on page 2 in the newspaper provided. Explain to the interviewer how you would compute the total amount of interest charges you would pay under this loan plan. Please tell the interviewer when you are ready to begin.

Similarly, sometimes the numbers that are required to perform the operation are easily identified (see Exhibit 4-7, “deposit slip” task), while for other tasks the required numbers to use in setting up the problem may be embedded in text that has distractors—related but incorrect numbers that might confuse the reader (see Exhibit 4-9, “home equity loan” task).

The materials and processes described above for prose, document, and quantitative literacy tasks define the rows and columns in Table 4-4. The cells with a dot indicate that tasks with that particular combination of material and process were included in the pool of literacy tasks for the National Adult Literacy Survey. For example, some tasks based on expository materials required subtraction, but there were no expository-based tasks requiring addition. The design for the survey did not require that tasks cover all possible combinations of materials and processes.

Table 4-4. Task coverage by process and type of material

Process	Materials						
	Exposition	Narrative/ Poetry	Tables	Charts/ Graphs	Forms	Maps	Miscellaneous
Locate	✓	✓	✓	✓	✓	✓	✓
Integrate	✓	✓	✓	✓		✓	
Generate	✓	✓	✓	✓			
Cycle					✓	✓	✓
Add			✓	✓	✓	✓	✓
Subtract	✓		✓	✓	✓		✓
Multiply	✓			✓	✓		
Divide	✓		✓	✓			✓
Combination			✓		✓		✓

Given the strategies required for processing information, the tasks were open-ended rather than multiple choice. That is, they required readers to engage in activities that are similar to those they might perform if they actually encountered the materials and, thus, were not constrained by an artificial set of response requirements. For example, tasks included reading and responding to editorials, news stories, and classified listings in a newspaper; writing a letter to a credit department; explaining the differences between two types of job benefits; completing a bank deposit slip; writing a check; keeping a running balance in a check ledger; and filling out a form to order merchandise from a catalog.

Because the tasks were open-ended, they required a variety of response modes. For some tasks, the respondents were asked to underline or circle information in the stimulus or copy information from it. For tasks that required completing a form, respondents copied information from the directive or question onto the form. In some cases, the information to be copied involved numbers that were then used to perform an arithmetic operation. Other tasks required respondents to produce an answer, such as making inferences based on information in the stimulus or explaining how to set up and solve a quantitative problem. Incorporating a variety of response modes ensured that the simulation tasks reflected real-life uses of printed materials.

4.3.5 Task Difficulty

Each of the types of tasks described above extends over a range of difficulty on the three scales. Research on the Young Adult Literacy Assessment and Workplace Literacy Survey tasks revealed that the difficulty of a particular task is a result of the interaction of the type of process or strategy required by the task with other variables. For the prose and document tasks these other variables include:

- The number of categories or features of information in the directive that the reader has to process;
- The number of categories or features of information in the text or document that can serve as distractors or plausible answers;

- The degree to which the information given in the question has less obvious identity with the information stated in the text or document; and
- The length and density of the text or the structure of the document.

An analysis of quantitative tasks has shown that the information processing required to complete the tasks affects their difficulty. In general, it appears that many adults can perform simple arithmetic operations when both the numbers and the types of operation are made explicit. The tasks become increasingly difficult, however, when these same operations are performed on numbers that must be located and extracted from different types of texts or documents that contain plausible but irrelevant numbers, or when these operations must be inferred from the directive. As a result, the difficulty of quantitative tasks seems to be a function of:

- The particular operation called for;
- The number of operations needed to perform the task;
- The extent to which the numbers are embedded in printed materials; and
- The extent to which an inference must be made to identify the type of operation to perform.

Because this survey was being administered to a nationally representative sample, it was important to capture the full range of literacy skills that people possess and not just to focus on those adults who may have low-level literacy skills. The tasks included in the survey, therefore, covered a range of difficulty across each of the scales. During the development of the new tasks, the variables described above were taken into account to ensure a range of difficulty, thus extending and refining the literacy scales as represented by the tasks from the young adult literacy assessment.

4.3.6 Development of Scoring Guides

As the new tasks were developed, scoring guides were written specifying correct responses to the tasks. Guides for many of the tasks included the following score points:

1: correct answer
2: incorrect answer
9: response of “don’t know”
0: no response or blank

Guides for some of the tasks, particularly the *generating* tasks, delineated a finer breakdown of score points. The purpose in doing so was to be able to provide data on various correct and incorrect responses to tasks that might be of interest to researchers. Thus, for example, the scoring guide for the Dickinson poem is as follows:

1: no response written or blank
2: literal interpretation
*3: thematic interpretation
9: response of “don’t know”
0: no response or blank
* correct response

As another example, the guide for the home equity loan task is as follows:

1: The respondent states something other than an explanation of computing the interest charges or gives an incorrect explanation
2: The respondent explains one but not both of the steps in computing the total interest charges or is vague about the steps
*3: The respondent explains the two basic steps in computing the total interest charges
9: response of "don't know"
0: No response
* correct response

The scoring guides for the tasks developed for the 1992 assessment underwent several stages of verification and revision. During the test development stage, the tasks underwent a test specialist review, part of which involved checking the accuracy and completeness of the scoring guides. When the scoring was done for the field test of the new tasks, the scoring guides were revised so they would reflect the kinds of responses that people were making to the tasks. As a result of the field test, some of the tasks as well as their scoring guides were revised. In addition, some scoring guides were further revised when the first responses from the main data collection were received. The scoring guides for the tasks from the young adult survey were exactly the same as those used for scoring the tasks for that survey.

4.3.7 Assembling the Tasks for Administration

From a pool of about 110 new tasks developed for the survey, 81 tasks were selected and assembled into seven blocks or sections. Each block was designed to take about 15 minutes of administration time. In selecting the tasks and assembling the new blocks, the following factors were taken into account:

- The inclusion of roughly an equivalent number of tasks from each of the three literacy scales;
- The inclusion of a broad range of content from the identified adult contexts;
- The inclusion of a wide variety of materials and structures;
- A range of difficulty across the tasks as determined from field-test data;
- Representation of content relating to various racial/ethnic groups;
- A variety of response modes; and
- The assignment of all the quantitative tasks requiring the use of a calculator to one block.

Of the new tasks that were selected for the final survey, 27 were selected from the prose scale, 26 from the document, and 28 from the quantitative. These tasks were distributed as evenly as possible across the seven new blocks. Comparatively, the 1985 survey had 14 prose items, 56 document items and 15 quantitative items. Because the new item pool could in and of itself become the basis of a future assessment, it was deemed more important to include a balanced number of new tasks from each scale rather than to achieve balance across the entire pool of both original and new tasks.

A balanced representation of racial/ethnic groups was achieved across the entire set of stimulus materials used in the survey—the ones for the newly developed tasks plus the original materials from the Young Adult Literacy Assessment—not just within one block. About 55 percent of the stimulus materials

were neutral with respect to both gender and race/ethnicity—that is, they did not contain any references to people. In the remaining materials, the references to men and women were about equal, and references to specific racial/ethnic minority groups were found in about 25 percent of the materials. In the remaining 75 percent, the references were either neutral with respect to race/ethnicity or the race/ethnicity of the person referred to was identifiable only if someone might have background knowledge about that particular person.

In addition to seven blocks of new tasks, a core set of six literacy tasks—two from each of the three scales—was assembled. These tasks were relatively easy and served to ease transition from background tasks to easier tasks. The core set was designed to take 5 to 10 minutes to complete. The entire survey was designed to take approximately an hour to complete.

The full set of 166 tasks, assembled into 13 blocks and the core, ensured broad, balanced, and representative coverage of materials and content; however, it would take about three and a half hours for each respondent to complete that number of tasks. Because about 45 minutes seemed to be a reasonable amount of time to expect respondents to spend on the literacy tasks, some form of item sampling procedure was essential. The design most suitable for this purpose is a powerful variant of standard matrix sampling called balanced incomplete block (BIB) spiraling. In BIB spiraling, as in standard matrix sampling, no respondent is administered all of the tasks in the assessment pool. Unlike standard matrix sampling, however, in which items or tasks are assembled into discrete booklets, BIB spiraling allows for the estimation of relationships among all the tasks in the pool through the unique linking of blocks.

With the BIB spiral design, the 13 blocks of tasks—the seven new blocks and the six old blocks—were assembled into 26 assessment booklets, each of which contained a unique combination of three blocks. In addition, each booklet included the section of core tasks. The application of the BIB design resulted in the configuration of booklets shown in Table 4-5. In this design, each block appeared with the same frequency—in six of the 26 booklets—and each block was paired one time with every other block. Position effects were also controlled for at the block level since each block appeared twice in each of the possible positions in the booklets—first, middle, and last. On the three National Adult Literacy Survey data files, the booklet number is identified in the variable BOOK, the category labels of which identify the blocks by letter code (rather than number as shown in the following table).

Table 4-5. Balanced Incomplete Block design for 26 booklets

Booklet number	Core	Block numbers contained in booklet		
1	C	1	2	13
2	C	2	3	9
3	C	3	4	7
4	C	4	13	8
5	C	13	9	6
6	C	9	7	10
7	C	7	8	11
8	C	8	6	12
9	C	6	10	5
10	C	10	11	1
11	C	11	12	2
12	C	12	5	3
13	C	5	1	4
14	C	1	3	8
15	C	2	4	6
16	C	3	13	10
17	C	4	9	11
18	C	13	7	12
19	C	9	8	5
20	C	7	6	1
21	C	8	10	2
22	C	6	11	3
23	C	10	12	4
24	C	11	5	13
25	C	12	1	9
26	C	5	2	7

The spiral component of the design ordered the books for administration so that each booklet was completed by a random sample of respondents. Thus, each booklet and each block was completed by approximately the same number of respondents (Table 4-6). One outcome of the BIB spiral design is that every task is taken by a randomly equivalent subsample of respondents. This ensures that reliable estimates of population performance can be calculated for every task. An additional benefit of this methodology is that every pair of tasks is taken by a representative subsample of the total sample so that correlations between pairs of tasks can be estimated.

Table 4-6. Number of persons responding to each booklet and to each block

Booklet	Number	Block	Number
1	1,000	1	5,748
2	963	2	5,792
3	947	3	5,675
4	973	4	5,683
5	964	5	5,558
6	963	6	5,761
7	947	7	5,598
8	963	8	5,765
9	971	9	5,703
10	1,000	10	5,766
11	966	11	5,782
12	893	12	5,598
13	904	13	5,752
14	965		
15	968		
16	953		
17	969		
18	916		
19	933		
20	941		
21	984		
22	954		
23	922		
24	946		
25	938		
26	911		