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Basic Reading Skills and the Literacy of America's Least Literate Adults

Results from the 2003 National Assessment of Adult Literacy (NAAL) Supplemental Studies

NCES 2009-481

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Results from the 2003 National Assessment of Adult Literacy (NAAL) Supplemental Studies

February 2009

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Core Literacy Tasks and Main Literacy Assessment

Fluency Addition to NAAL (FAN)

Adult Literacy Supplemental Assessment (ALSA)

The Basic Reading Skills of America's Adults

The Skills of America's Least Literate Adults

Executive Summary

The 2003 National Assessment of Adult Literacy (NAAL) assessed the English literacy of adults in the United States for the first time since the 1992 National Adult Literacy Survey. The assessment was administered to more than 19,000 adults (ages 16 and older) in households and prisons. The tasks included on the assessment were designed to measure functional literacy. Unlike indirect measures of literacy, which rely on self-reports and other subjective evaluations, the assessment measured literacy directly through tasks completed by adults. These tasks represent a range of literacy activities that adults are likely to face in their daily lives.

The main literacy assessment and the core literacy tasks are two of the four components of the NAAL project. This report focuses on the results of the remaining two component: the Fluency Addition to NAAL (FAN) and the Adult Literacy Supplemental Assessment (ALSA). It was beyond the scope of the initial report of the main literacy assessment, *Literacy in Everyday Life: Results from the 2003 National Assessment of Adult Literacy* (Kutner et al. 2006), to also adequately present the results of the FAN and ALSA. The results of the FAN and ALSA appear together in this report because both components address basic reading skills.

Core Literacy Tasks and Main Literacy Assessment

Most respondents were administered the main literacy assessment, which examined the functional

literacy of America's adults. All respondents first attempted seven simple literacy questions, called the core literacy tasks. Adults unable to successfully answer the core literacy tasks were assigned to the supplemental assessment (described below); all other adults were assigned to the main literacy assessment.

Three types of literacy were measured on the main literacy assessment on scales of 0 to 500. *Prose literacy* is the knowledge and skills needed to search, comprehend, and use information from continuous texts such as books, newspaper articles, or magazines. *Document literacy* is the knowledge and skills needed to search, comprehend, and use information from noncontinuous texts, such as maps, schedules, and catalog order forms. *Quantitative literacy* is the knowledge and skills needed to identify and perform computations using numbers that are embedded in printed materials.

Results from the main literacy assessment are reported as averages and as the percentage of adults in each of four literacy levels: *Below Basic, Basic, Intermediate,* and *Proficient*. Statistical significance is reported at $p < .05$. Differences that are not statistically significant either are not discussed or are referred to as "not statistically significant."

Adult Literacy Supplemental Assessment (ALSA)

The Adult Literacy Supplemental Assessment was administered to adults unable to successfully answer the core literacy tasks. Instead of completing the main literacy assessment, these adults completed the ALSA, or supplemental assessment, which gathered information about their letter-reading, word-reading, word-identification, and basic comprehension skills. The supplemental assessment used common products—such as a carbonated beverage can or a box of cold medicine—to evaluate the skills of low literacy adults.

The supplemental assessment (but not FAN) was administered in either English or Spanish, providing insight into how skills differ across adults on the basis of their language background.

Fluency Addition to NAAL (FAN)

Whereas the main literacy assessment measures adults' abilities to comprehend and use printed texts and documents, the Fluency Addition to NAAL measures the basic reading skills of America's adults. Basic reading skills refer to the ability to read the elements of printed text—letters, words, and continuous text—accurately and efficiently. These skills, sometimes referred to as print skills (Strucker, Yamamoto, and Kirsch 2003), are foundational to reading comprehension ability.

Because the FAN was given to all participants, it was possible to examine the relationship between basic reading skills (collected through the FAN) and the ability to complete prose literacy tasks (collected through the main literacy assessment). This examination revealed how limitations in basic reading skills may hinder comprehension. Moreover, because the FAN was given to adults in the ALSA population (those with the lowest literacy) as well as to those in the main assessment, comparisons could be made between the basic reading skills of adults in the ALSA population and those in the main literacy assessment population.

Key Similarities and Differences Between ALSA and FAN

The ALSA and FAN tasks were designed separately. However, there is some overlap in the basic reading skills they assess. Both require reading letters and words aloud. The difference is in the range of abilities covered by the tasks and in the contextual facilitation provided by the materials. In ALSA, adults are asked to read a letter or simple word in the context of a common product package. For many adults, the products are familiar and this context facilitates correct responses (see chapter 4).

By contrast, in FAN tasks, adults are asked to read a wide range of letters and words presented with no additional context. The material that adults are asked to read in FAN ranges from all the letters of the alphabet and simple words to complex words, novel words, and text passages. They are asked to read accurately and efficiently with no contextual clues to facilitate performance.

The Basic Reading Skills of America's Adults

In the FAN, the following research questions are addressed: What is the relationship between proficiency levels (based on the Prose literacy scale of the main literacy assessment) and basic reading skills (i.e., digit, letter, word, and passage reading)? How do basic reading skills vary between the ALSA population and the main literacy assessment population? How do basic reading skills vary among key subgroups?

Results from the FAN are presented as a composite Basic Reading Skills (BRS) score as well as by each of the four oral fluency tasks (digit and letter reading, word reading, decoding, and passage reading) included in the assessment. All scores from the oral fluency assessment are expressed as the number of words correctly read per minute. BRS score is not a composite score of all the four tasks. It includes passage reading, word reading, and decoding, and excludes digit- and letter-reading. The BRS score is a simple average of passage reading, word reading, and decoding scores presented as the number of words read correctly per minute. Word reading and decoding differ in that the former required reading real English words while the latter required reading pseudo-words or made-up English words.

- The average BRS score was higher than the average decoding score, but lower than the average digit- and letter-reading, word-reading, and passage-reading scores.
- The average passage-reading scores for adults with *Intermediate* and *Proficient* prose literacy were higher than the average digit- and letter-reading scores.
- Approximately half (49 percent) of adults with *Below Basic* prose literacy read fewer than 60 words correctly per minute (i.e., at the lowest BRS level).
- The average BRS score for adults in the main literacy assessment population was 98 words correctly read per minute, compared with an average score of 34 words correctly read per minute for adults in the supplemental assessment population.
- BRS scores were highest for White adults and lowest for Hispanic adults.
- Among adults with *Below Basic* prose literacy scores, 39 percent of those who spoke only English before starting school read fewer than 60 words correctly per minute (i.e., at the lowest BRS level), compared with 72 percent of adults with a Spanish language background.

The Skills of America's Least Literate Adults

In the ALSA, the following research questions are addressed: What basic functional literacy tasks can adults at the lowest level of literacy perform? How do key subgroups, especially native versus nonnative English speakers, differ in their ability to perform these most basic functional tasks?

Results from the supplemental assessment are presented as the percentage of adults who correctly answered the questions included on that assessment. In addition, the characteristics of adults in the supplemental assessment population are compared with the characteristics of adults in the *Below Basic* and main literacy assessment populations.

- The majority of adults in the supplemental assessment population were Hispanic and a majority of adults in the supplemental assessment had educational attainment of less than a high school diploma or GED.
- A higher percentage of adults in the English language supplemental assessment population had been diagnosed with multiple disabilities than adults in the Spanish language supplemental assessment population.
- Although adults below the poverty threshold represented 17 percent of adults in the nation, they represented 58 percent of adults in the supplemental assessment population.
- The percentage of correct responses to the letter-reading and word-reading tasks was higher among adults in the English language supplemental assessment population than among adults in the Spanish language supplemental assessment population.
- The percentage of correct responses to the word-identification tasks was higher among adults in the Spanish language supplemental assessment population compared to adults in the English language supplemental assessment population.

Acknowledgments

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The Fluency Addition to NAAL (FAN) reflects the contributions of many individuals. The late Richard Venezky helped guide its design and provided invaluable support and friendship. The FAN Technical Advisory Group—Marilyn Adams, Hollis Scarborough, and Timothy Shanahan—carefully reviewed the results and helped ground them theoretically. Ordinate Corporation designed the recording software for the FAN and also scored the assessment. The Adult Literacy Supplemental Assessment (ALSA) was developed by Larry Condelli,

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CHAPTER ONE

Background Questionnaire

Core Literacy Tasks

Main Literacy Assessment

Adult Literacy Supplemental Assessment (ALSA)

Fluency Addition to NAAL (FAN)

Conducting the Survey

Interpretation of Results

Cautions in Interpretation

Organization of the Report

Introduction

The 2003 National Assessment of Adult Literacy (NAAL) provides a comprehensive picture of the literacy of America's adults. Administered in 2003 and early 2004, the assessment measured the prose, document, and quantitative literacy of adults across the nation in households and in prisons. In addition to assessing literacy, NAAL also collected background information about America's adults. Examining the relationship between literacy and background characteristics offers insight into how the literacy of adults varies by population groups, as well as across workplace, family, and community settings.

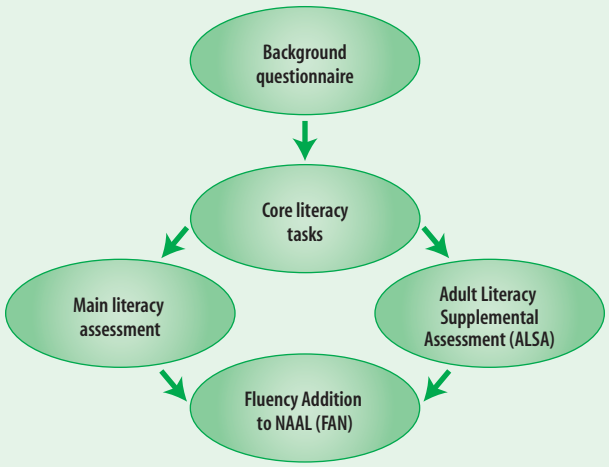
The main literacy assessment and the core literacy tasks are two of the four components of the NAAL project. This report focuses on the results of the remaining two component: the Fluency Addition to NAAL (FAN) and the Adult Literacy Supplemental Assessment (ALSA). It was beyond the scope of the initial report of the main literacy assessment, *Literacy in Everyday Life: Results from the 2003 National Assessment of Adult Literacy* (Kutner et al. 2006), to also adequately present the results of the FAN and ALSA. The results of the FAN and ALSA appear together in this report because both components address basic reading skills.

The Fluency Addition to NAAL was administered to all respondents and provides a measure of the basic reading skills of America's adults. In contrast to the main literacy assessment, in which respondents

answered questions related to a variety of printed materials, the FAN called on respondents to read passages and lists of words, letters, and numbers aloud. The supplemental assessment was administered to adults with the lowest literacy[1] to better understand the skills they call on to make sense of texts and documents.

Figure 1-1 illustrates the administration of the four NAAL components.[2] Demographic information, as well as data about employment, education, literacy practices, community involvement, and health, was first collected through a background questionnaire. After completing the questionnaire, respondents attempted a series of simple literacy tasks called the core literacy tasks. On the basis of their performance on these tasks, respondents were assigned to take either the main literacy assessment or the supplemental assessment (the ALSA). Upon finishing the assessment to which they were assigned, all respondents then completed the oral reading fluency assessment (the FAN).

Figure 1-1. Components of the 2003 National Assessment of Adult Literacy (NAAL)



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

[1] Please refer to appendix B for information about how adults with low literacy were identified.

[2] Although listed separately in figure 1-1, the core literacy tasks are included in the pool of tasks in the main literacy assessment.

Background Questionnaire

The 2003 National Assessment of Adult Literacy household background questionnaire was used to collect data about various demographic and background characteristics of adults. The following topics were included on the questionnaire:

- General and language background
- Educational background and experiences
- Political and social participation
- Labor force participation
- Literacy practices
- Family literacy
- Household income and public assistance participation
- Health

A separate background questionnaire was developed for the prison study. The prison background questionnaire was used to collect demographic data on inmates and provided contextual data on their experiences in prison that were related to literacy, including participation in classes, job training, and prison work assignments.

Core Literacy Tasks

Following the administration of the background questionnaire, all respondents were asked to complete seven core literacy tasks. The core literacy tasks were simple literacy questions that required little or no inference on the part of the respondent, such as those requiring the respondent to identify and underline a sentence in a short written text. The questions were scored by the interviewer in the respondent's household or prison. On the basis of the respondent's performance on the core literacy tasks, the interviewer administered either the main literacy assessment or the supplemental assessment.

Main Literacy Assessment

The tasks on the main literacy assessment were drawn from actual texts and documents, which were either used in their original format or reproduced in the assessment booklets. Each question appeared before the materials needed to answer it, thus encouraging respondents to read with purpose. Respondents could correctly answer many assessment questions by skimming the text or document for the information necessary to perform a given literacy task. All tasks were open-ended, meaning, unlike multiple-choice tasks, these tasks cannot be answered with a simple "yes/no" information.

The assessment used the following definition of functional 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 implies that literacy goes beyond simply being able to sound out or recognize words and understand text. A central feature of the definition is that literacy is related to achieving an objective and that adults often read for a purpose.

Three types of literacy—prose, document, and quantitative—were measured on the main assessment. Only prose literacy will be included in this report:

- *Prose literacy.* The knowledge and skills needed to perform prose tasks (i.e., to search, comprehend, and use information from continuous texts). Prose examples include editorials, news stories, brochures, and instructional materials. Prose texts may be further classified as expository, narrative, procedural, or persuasive.
- For more information on document literacy (e.g., filling out a health insurance form) and quantitative literacy (e.g., calculating a telephone bill) see *Key Concepts and Features of the 2003 National Assessment of Adult Literacy* (White and Dillow 2005).

Item response theory (IRT) models were used to scale the main literacy assessment data (for details, see Baldi 2008). To facilitate the interpretation of the resulting literacy scores, four literacy levels—*Below Basic, Basic, Intermediate,* and *Proficient*—were recommended by the National Research Council's Board on Testing and Assessment (BOTA) Committee on Performance Levels for Adult Literacy (Hauser et al. 2005; White and Dillow 2005).

See appendix B for further details on how literacy levels are determined and created from scale scores.[3]

Adult Literacy Supplemental Assessment (ALSA)

The Adult Literacy Supplemental Assessment (ALSA) was administered to respondents unable to complete the core literacy tasks. As described in chapter 2, the supplemental assessment was designed to capture information about the skills of adults with the lowest literacy. Although these adults have low levels of literacy, they may also draw on certain skills to make sense of English texts and documents. Respondents administered the supplemental assessment were asked to complete a series of basic tasks—letter and word reading, word identification,[4] and comprehension—using products with printed English text commonly found at home, at work, and in the community.

Fluency Addition to NAAL (FAN)

All respondents were administered the Fluency Addition to NAAL following the completion of the main literacy assessment or the supplemental

[3] The reader interested in the full range of adult literacy proficiencies assessed in the main NAAL is referred to Kutner et al. (2007) and associated assessment design reports on the NAAL website (http://nces.ed.gov/naal).

[4] The ability to use context to recognize and read letters and basic words as they appear in the literacy environment (e.g., product packaging) is a foundational skill in understanding how print and literacy function as a communication system in our society; hence, it fits under the definition of literacy used in NAAL.

assessment. As described in chapter 2, the FAN was developed to provide a measure of the basic reading skills of America's adults. Adults who took the oral reading fluency assessment read aloud a series of short text passages and digit, letter, and word lists. Their oral reading of each task on the assessment was recorded and later scored for speed and accuracy.

Whereas the main literacy assessment measures adults' abilities to comprehend printed texts and documents, the FAN focuses on basic reading skills. Examining the relationship between basic reading collected through the oral reading fluency assessment and the ability to complete prose literacy tasks (collected through the main literacy assessment) reveals how limitations in basic reading skills may hinder comprehension. Moreover, examining basic reading among adults in the supplemental assessment population offers a comparison between the basic reading skills of adults in the main literacy assessment population and the adults with the lowest literacy.

Conducting the Survey

The 2003 National Assessment of Adult Literacy included two samples: (1) adults ages 16 and older living in households and (2) inmates ages 16 and older living in federal and state prisons. Each sample was weighted to represent its share of the total population of the United States, and the samples were combined for reporting. Household data collection was conducted from March 2003 through February 2004; prison data collection was conducted from March through July 2004. For the household sample, the screener unit response rate was 82 percent and the background questionnaire unit response rate was 76 percent. The unit household sample response rate for the literacy assessment was 96 percent and the rate for the FAN assessment was 94 percent. The overall unit household sample response rate was 59 percent for literacy assessment and 59 percent for FAN. For the prison sample, 98 percent of prisons who were selected for the study agreed to participate, and the background questionnaire unit response rate for prison inmates was 91 percent. The unit prison sample response rate for the literacy assessment was 98 percent and the rate for the FAN assessment was 95 percent. The overall unit prison sample response rate was 86 percent for literacy assessment and 84 percent for FAN.

Household interviews were conducted in respondents' homes; prison interviews usually took place in a classroom or library in the prison. Whenever possible, interviewers administered the background questionnaire and assessment in a private setting. Assessments were administered one-on-one using a computer-assisted personal interviewing system (CAPI) programmed into laptop computers. Respondents were encouraged to use whatever aids they normally used when reading and when performing quantitative tasks, including eyeglasses, magnifying glasses, rulers, and calculators. Respondents were not allowed to use dictionaries. The procedures followed for administering the oral reading fluency and supplemental literacy assessment are discussed in chapter 2.

Three percent of adults in the sample were unable to participate in the assessment because they could not communicate in either English or Spanish or because they had a mental disability that prevented them from being tested. Literacy scores for these adults could not be estimated, and they are not included in the results presented in this report.

Additional information on the sample, response rates, and data collection procedures is in appendix B.

Interpretation of Results

The statistics presented in this report are estimates of performance based on a sample of respondents, rather than the values that could be calculated if every person in the nation answered every question on the

assessment. Estimates of performance of the population and groups within the population were calculated by using sampling weights to account for the fact that the probabilities of selection were not identical for all respondents. Information about the uncertainty of each statistic that takes into account the complex sample design was estimated by using Taylor series procedures to compute standard errors.

The analyses in this report examine differences related to literacy based on self-reported background characteristics among groups in 2003, using standard *t* tests to determine statistical significance. Statistical significance is reported at $p < .05$. Differences between averages or percentages that are statistically significant are discussed by using comparative terms such as *higher* or *lower*. Differences that are not statistically significant either are not discussed or are referred to as "not statistically significant." Failure to find a statistically significant difference should not be interpreted as meaning that the estimates are the same; rather, failure to find a difference may also be due to measurement error or sampling variance.

Appendix B includes more information about the weights used for the sample and the procedures used to estimate standard errors and statistical significance. Detailed tables with estimates and standard errors for all tables and figures in this report are in appendix C.

Cautions in Interpretation

The purpose of this report is to examine how basic reading skills vary across different population groups as well as the relationship between basic reading skills and prose literacy. This report is purely descriptive in nature. Readers are cautioned not to draw causal inferences based solely on the results presented here. It is important to note that many of the variables examined in this report are related to one another, and complex interactions and relations have not been explored here.

Organization of the Report

Chapter 2 of this report provides background information on the oral fluency assessment and the supplemental assessment, describing the tasks and the theory that guided the development of each instrument. Results from the oral reading fluency assessment are presented in chapter 3, which explores the relationship between background characteristics and the fluency tasks as well as the relationship between a basic reading scale and prose literacy. Results from the supplemental assessment are described in chapter 4. This chapter compares the characteristics of adults in the supplemental assessment population with the characteristics of adults in the *Below Basic* and main literacy assessment populations and also summarizes the kinds of tasks low literacy adults can and cannot accomplish.

Measuring Basic Reading Skills: The Fluency Addition to NAAL (FAN) and the Adult Literacy Supplemental Assessment (ALSA)

The 2003 assessment included two components used to measure the basic reading skills of America's adults: the Fluency Addition to NAAL (FAN) and the Adult Literacy Supplemental Assessment (ALSA). In contrast to the main literacy assessment of the NAAL, the FAN focuses specifically on adults' ability to read words and passages with accuracy and efficiency. The ALSA, or supplemental assessment, was developed to provide information about the skills of adults with the lowest levels of literacy. Together with the main literacy assessment, the fluency assessment and supplemental assessment help reveal the relationship between functional literacy and basic reading skills. The assessments provide insight into the basic reading skills of America's adults, especially those adults who struggle with literacy.

In reading research, the term "fluency" is more typically associated with or reserved for passage reading rather than list reading. Moreover, the term "fluency" has often been defined to signal that expression and intonation are of interest rather than simply accuracy and speed. Although the word "fluency" is used in the title of the assessment, the measures of Basic Reading Skill (BRS) presented in this report include list reading and do not capture pauses or

intonation. The term "oral reading fluency assessment" (or the acronym FAN) is used here to describe the battery of tasks measuring basic reading skills. The word "fluency" originated to distinguish the BRS assessment from the main literacy assessment.

The design of the oral reading fluency and supplemental assessments was informed by research on reading acquisition and proficiency. Skilled reading is associated with fast, accurate, and relatively effortless recognition of words and text (Adams 1990; LaBerge and Samuels 1974; Perfetti 1985; Share and Stanovich 1995). Research suggests that word reading acquisition occurs in stages (LaBerge and Samuels 1974; Samuels 2006). In the early reading stages, readers learn how to identify and distinguish the letters and sounds of the alphabet, learn common sound-letter correspondences, and discover how to use this knowledge to sound out words (that is, how to decode). With some practice, reading may become accurate, but still be slow and require considerable cognitive effort. With more practice, reading becomes fast and accurate and requires considerably less cognitive effort (Sabatini 2002, 2003; Torgesen, Wagner, and Rashotte 1999).

Thus reading, like other skills (e.g., driving a car or playing a piano), becomes more automatic over time (Adams 1990; Breznitz 2006; Carver 1990; LaBerge and Samuels 1974; Rasinski 2006; Samuels 2006). While reading may become more automatic, readers spend extra time, effort, and energy when they encounter novel words. Moreover, reading with speed and accuracy does not necessarily imply comprehension. Some readers may possess the technical skills to read words and texts with little effort, but remain unaware of their substantive meaning.

Fluency Addition to NAAL (FAN)

Unlike the literacy tasks on the main literacy assessment, the tasks on the FAN do not directly indicate how well readers understand text meaning or perform functional literacy tasks. Instead, the tasks on the oral reading fluency assessment measure adults' abilities to read familiar words with speed and accuracy, as well as their skills at decoding unfamiliar words.

Purpose

Skilled, fluent readers possess a wide range of reading capabilities that can be measured in a variety of ways. For the oral reading fluency assessment, the goal of collecting detailed information about the basic reading skills of adults had to be balanced against the burden placed on respondents participating in the assessment. Research suggests that valuable information on basic reading skills can be gathered from tasks that are relatively brief in duration and relatively simple in design (Deno and Marsten 2006; Fuchs, Fuchs, Hosp, and Jenkins 2001; Daane et al. 2005; Tirre 1992; Torgesen, Wagner, and Rashotte 1999). Consistent with this research, four tasks were included on the fluency assessment:

- Digit and letter reading
- Word reading
- Decoding
- Passage reading

The inclusion of the four tasks reflects the range of basic reading skills, from very simple tasks to more authentic and complex reading tasks. At the most basic level, skilled readers have ready knowledge of the numeric and alphabetic code (digit and letter reading) and can easily recognize and read a vast number of common English words (word reading). When readers encounter unfamiliar words in print, they can apply sight-to-sound correspondence skills and knowledge of the English language to decode the words (decoding). That is, readers can produce a plausible pronunciation that can be matched to words in their listening vocabulary or stored in

memory as new vocabulary. Finally, skilled readers can draw on all of their basic print reading skills (both in recognizing words and in using the conventions of print, such as punctuation), as well as their language abilities (such as syntactic parsing and word knowledge), to quickly, efficiently, and fluently read aloud and make sense of continuous text (passage reading).

Most skilled adult readers predominantly read silently, not aloud, though there are occasions, such as reading stories to children or quoting a newspaper article to a friend, in which reading aloud is natural. For non-native speakers of English, command of English print and speaking skills may be limited.[5] Nonetheless, there is considerable evidence that reading aloud is an interpretable data source for inferring silent reading basic skills; in the context of a national survey, oral reading tasks are relatively easy for participants of all ability levels to understand and attempt (Carver 1990, 1997; Samuels 2006).

In the FAN, the following research questions are addressed: What is the relationship between proficiency levels (based on the Prose literacy scale of the main literacy assessment) and basic reading skills (i.e., digit, letter, word, and passage reading)? How do basic reading skills vary between the ALSA population and the main literacy assessment population? How do basic reading skills vary among key subgroups?

Content of the FAN

The tasks included on the oral reading fluency assessment were designed to be sensitive to differences among readers with low proficiency instead of discriminating among highly proficient readers. Consistent with this approach, the word lists comprised frequent, common English words, and the difficulty of the reading passages was written at grade levels 2 through 6, and grade levels 7 and 8. Most proficient readers would not find the tasks particularly challenging, though they might differ in how efficiently they could complete them. In contrast, low proficiency readers might find the English words and passages (as well as the decoding tasks) challenging.

As noted above, four components were included in the oral reading fluency assessment (digit and letter reading, word reading, decoding, and passage reading). The components were measured as follows:

Digit and letter reading

To assess digit and letter reading, respondents read a list of 35 letters and a list of 35 single-digit numbers. Respondents had 15 seconds to read each list.

Word reading

Three word lists of varying difficulty were included on the assessment. Each list comprised 42 words. The first word list contained only single-syllable words, the second included both two- and three-syllable words, and the third had words varying between two and four syllables. Respondents had 20 seconds to complete each of the three word lists.

Decoding

Decoding was measured through three lists of pseudo-words (Torgesen, Wagner, and Rashotte 1999). Pseudo-words are made-up English words that follow the same structural rules as real English words. Like the word reading tasks, three pseudo-word lists of varying difficulty were included on the assessment. Each list comprised 42 words. The first pseudo-word list contained only single-syllable words, the second included both two- and three-syllable words, and the third had words varying between two and four syllables. Respondents had 20 seconds to complete each of the three pseudo-word lists.

[5] For this report, the reader should be cautious in drawing conclusions about the basic reading skills of non-native speaking subgroups because their oral reading scores are confounded with their English oral speaking fluency.

Passage reading

Eight passages were included on the oral reading fluency assessment. Half of the passages were written at grade levels 2 through 6 and the other half were written at grade levels 7 and 8.[6] For the assessment, each respondent read one randomly selected passage at the grade 2 through 6 level and a second randomly selected passage at the grade 7 and 8 level. To ensure that respondents read for comprehension as well as speed, interviewers told respondents that they would be asked a comprehension question once they finished reading the passage. Although interviewers asked the comprehension questions, the answers were not scored. Respondents had 60 seconds to read each passage.

Scoring the FAN

To take the oral reading fluency assessment, respondents wore a microphone and a headset. The microphone was attached to the interviewer's laptop computer, which recorded the respondent's voice as the respondent completed each of the four components of the assessment. Respondents heard a chime in their headset that indicated when they could stop reading a particular task (if they had not completed it already).

The data stored on the laptop computers was later downloaded and scored by an automatic speech recognition (ASR) system. The ASR system was used to assess the speed with which respondents completed each of the tasks on the assessment as well as their accuracy in reading each of the tasks. Accuracy was defined as a spoken rendition of a digit, letter, word, or text that corresponds to a likely rendition of the same digit, letter, word, or text from a highly literate member of the reader's community. That is, reading is accurate if the text spoken by a reader could be reproduced verbatim by a literate listener. This definition implies that different renditions of the same text may be considered accurate though they may differ from one reader to another. As long as the renditions were intelligible to a listener from a reader's community (e.g., readers and listeners with a Spanish language background or readers and listeners with a native English background), it was considered accurate.

The ASR system scored the tasks by comparing a respondent's oral rendering of a digit, letter, word, or text against an accurate rendering of the corresponding digit, letter, word, or text. The system then tallied the number of deviations, or errors, between the respondent's rendering and the rendering from the accurate model. The number of errors was subtracted from the total number of digits or words in the respective task, yielding the number of digits, letters, or words correctly read for the task. The ASR system also calculated the speed with which respondents read the digits, letters, words, or text included on each task. The measures of accuracy and speed were then combined into a measure of the number of words read correctly per minute for each of the four basic reading tasks.[7]

To evaluate the reliability of the ASR system, a sample of the FAN tasks was scored by both the ASR system and human scorers. The correlation between the ASR scoring and the human scoring of the same tasks is 0.99 for passage reading and 0.99 for word lists. This result indicates that the machine scoring is reliable. (For more information, see Baldi et al. 2008.)

Adult Literacy Supplemental Assessment (ALSA)

While the main assessment of the National Assessment of Adult Literacy (NAAL) offers a picture of the range

[6] Grade-level difficulty was measured on the basis of Lexile scores. The Lexile score rates the difficulty of text based on word frequency (or familiarity) and sentence length.

[7] The term "words correctly read per minute" is used throughout this report to refer to all scores from the oral reading fluency assessment, even those scores that measure digit- and letter-reading speed and accuracy.

of literacy among adults in the United States, not all adults could complete even the most basic literacy tasks in the assessment. Through the use of an interactive, orally administered assessment, the supplemental assessment offers insight into the basic skills of low literacy adults. Adults who participated in the alternative assessment were asked to perform rudimentary literacy tasks—reading letters, identifying and reading words, and answering basic comprehension questions—using common materials found at home, at work, and in the community. Placing the literacy tasks within a familiar context aids low literacy adults as they attempt to make sense of printed materials and reveals what adults with the lowest literacy can and cannot do.

Purpose

The supplemental assessment arose as a response to the 1992 National Adult Literacy Survey (NALS) (Kirsch et al. 1993). In 1992, adults unable to complete any of the assessment items were included in the lowest literacy level (Level 1). Level 1 included adults with a range of literacy abilities, from those who could complete no tasks on the assessment to those with literacy slightly below the next highest literacy level, Level 2. Yet little was known about what adults at the lowest end of Level 1 could and could not do. Although these adults struggled with the tasks in the assessment, they may have had some skills that allowed them to navigate and use different types of prose text and documents in their daily lives. The supplemental assessment provides a means of investigating the range of skills that low literacy adults possess and for understanding how these adults make sense of printed materials.

The design of the supplemental assessment was based on research about the strategies that low literacy adults employ when learning to read. Research suggests that low literacy adults are especially likely to rely on background knowledge (i.e., past experience) with printed materials when they encounter novel text, that they are likely to read purposefully when they find materials relevant, and that they rely on context to help them interpret meaning (Cummins 1979; Ruddell et al. 1994). Low literacy adults may also search for frequently used words in a text with which they are familiar in order to make sense of print.

Consistent with this research, the supplemental assessment was structured as an interactive assessment that used authentic, highly contextualized printed materials commonly found at home or in the workplace. Interviewers presented respondents with actual products or materials—a carbonated beverage can or a box of cold medicine—and then asked the respondents to complete a series of basic literacy tasks. Allowing adults to manipulate and examine actual products, as opposed to representations of products, encouraged low literacy adults to apply the same skills they use in daily life to the literacy tasks on the supplemental assessment. By closely mirroring the kinds of literacy materials that adults frequently encounter, the assessment provides information about the compensatory strategies that low literacy adults use to interpret prose text and documents.

In the ALSA, the following research questions are addressed: What basic functional literacy tasks can adults at the lowest level of literacy perform? How do key subgroups, especially native versus nonnative English speakers, differ in their ability to perform these most basic functional tasks?

Selection of Respondents

After the administration of the background questionnaire, all respondents were asked to complete seven literacy tasks (referred to as the core literacy tasks). The purpose of the core tasks was to identify respondents with low literacy who would be administered the supplemental assessment instead of the main literacy assessment. The core literacy tasks were among the easiest in the assessment, ensuring

that only adults with the lowest literacy would be assigned to the supplemental assessment.[8]

Unlike all other literacy tasks in the assessment, the core tasks could be administered in either English or Spanish. The printed items associated with each question were written in English, but respondents had the option of reading the questions and printing their responses in Spanish. Administering the core in Spanish allowed Spanish-speaking respondents with low English abilities to demonstrate their proficiency in reading and interpreting printed materials in English. Although these adults may struggle with the English language, they may be able to navigate and use some texts written in English. The Spanish-language accommodation for the core items was designed to enable as many Hispanics as possible to participate in the main NAAL assessment, where the full range of their English language literacy could be evaluated.

Content of the ALSA

The supplemental assessment was administered using nine common products summarized in table 2-1. Unlike the main literacy assessment, which respondents completed with little interaction with interviewers (interviewers only helped guide respondents through the assessment booklet), the supplemental assessment was administered orally by the interviewer. The interviewer held or handed each item to the respondent and then asked a series of questions associated with the item. Before asking the questions, the interviewer instructed the respondent to take a few seconds to look at the item.

The number of questions associated with each item in the assessment ranged from seven to nine. However, all respondents were asked four similar questions for all items. The interviewer first asked the respondent what the item was (e.g., a box of baking mix) and then asked a follow-up question about where someone would be likely to see, purchase, or use the item.

These questions were followed by the cognitive questions designed to measure the respondent's literacy. The four types of cognitive tasks included on the assessment are summarized in table 2-1:

- Letter reading
- Word identification
- Word reading
- Comprehension

[8] See appendix B for more information about the core literacy tasks and the procedures for determining whether respondents were assigned the main literacy assessment or the supplemental assessment.

Table 2-1. Materials and number of tasks included on the Adult Literacy Supplemental Assessment: 2003

Material	Letter reading	Word identification	Word reading	Comprehension
Total tasks	**5**	**9**	**12**	**19**
Carbonated beverage can	3	1	3	0
No eating or drinking sign	2	2	1	2
Baking mix box	0	1	2	3
Cold medicine box	0	1	1	1
Grocery advertisement	0	0	1	4
Yard sale sign	0	0	1	2
Utility bill	0	1	1	2
Newspaper map	0	3	1	1
Television program schedule	0	0	1	4

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

In the letter-reading tasks, the interviewer pointed to a letter on a particular product and asked the respondent to read the letter aloud. In the word-identification tasks, the interviewer asked the respondent to point to a specific word on an item. The word-reading tasks, like the letter-reading tasks, required respondents to read aloud a word indicated by the interviewer. The comprehension questions covered a range of subjects, from reading instructions and understanding that water should be added to a baking mix, to using a television schedule to find a program airing at a specific time.

Following the cognitive tasks for each of the nine items, respondents were asked two questions about their familiarity with the particular item used for the tasks. The first question associated with each item asked the respondent whether he or she ever used or saw things similar to the item. For example, for the utility bill, the interviewer asked the respondent, "Do you ever see printed bills for your household?"

If the respondent replied yes, a follow-up question was posed, asking whether the respondent had ever read the printed text on the item before this assessment. The follow-up question for the utility bill was "Before today, have you ever read what it says in English on printed household bills?" In the analyses presented in chapter 4, responses to the first familiarity question were used as the measures of respondent familiarity.

Scoring the ALSA

Interviewers recorded respondents' answers to each question directly in the supplemental assessment booklet. For each question, the interviewer circled the number associated with the answer given by a respondent. The information collected from all supplemental assessment booklets was then entered into a database. For the cognitive tasks (i.e., letter reading, word identification, word reading, and comprehension), performance on the assessment is reported as the percent of correct responses. The percent correct is reported both for all tasks within a task group (e.g., the percent of all letter-reading tasks answered correctly) and by each task in the assessment (e.g., the percent of correct responses for the first letter-reading task on the carbonated beverage can).

As with the core tasks discussed earlier, the supplemental assessment was administered in either English or Spanish, though the items associated with each literacy task were printed in English. Consistent with the goal of gathering as much information as possible about low literacy adults, the Spanish language version of the supplemental assessment allowed adults with limited English language abilities to participate in the study. To be counted as correct, answers to the letter- and word-reading tasks had to be spoken in English. Thus, a Spanish pronunciation of a letter-reading task was counted as incorrect. For the comprehension questions, answers in either Spanish or English were acceptable. Answers were counted correct as long as the respondent correctly demonstrated comprehension for a particular task.

Nonliterate in English

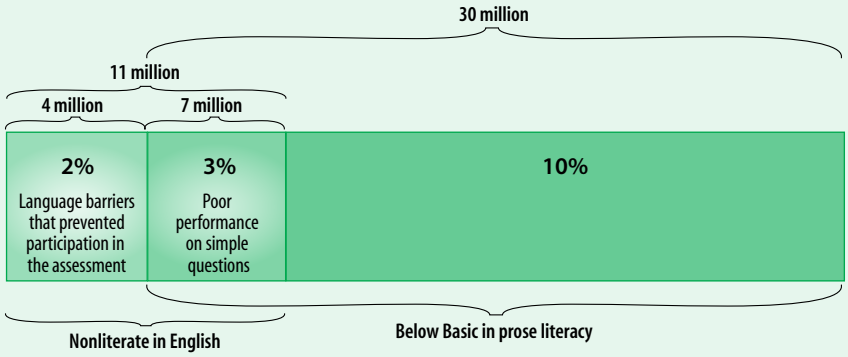
The supplemental assessment population represents approximately 3 percent of America's adults. These adults, who could not complete the core literacy tasks, are considered nonliterate in English. They are also included in the population of American adults with *Below Basic* prose literacy. Thus, the adults in the supplemental assessment population belong to three groups — the *Below Basic* prose population, the nonliterate in English population, and the supplemental assessment population.

Field interviewers determined that 2 percent of adults could not be tested because they spoke a language other than English or Spanish and were unable to communicate in English or Spanish. Because of their inability to communicate in English, the interviewer

could not administer the core literacy tasks or any other portion of the literacy assessment. Summing the 2 percent of adults who could not communicate in English or Spanish plus the 3 percent of adults who are included in the supplemental assessment population yields 5 percent of America's adults who are considered nonliterate in English. In addition to the adults who could not be tested because of a language difficulty (2 percent), 1 percent of adults could not be tested because of a cognitive or mental disability that precluded conducting the interview. This 1 percent of adults are not included in the results of this report.

Figure 2-1 illustrates the three groups of low literacy adults: those who could not communicate in English or Spanish, those in the supplemental assessment population, and those in the *Below Basic* prose literacy population. As indicated in the figure, 30 million adults have *Below Basic* prose literacy, of which 7 million are in the supplemental assessment population. The nonliterate in English population includes an estimated 11 million adults: an estimated 4 million adults limited English proficient which prevented their participation in the assessment and 7 million who performed very poorly on the simple questions included on the main literacy assessment (i.e., those adults in the supplemental assessment population). Adults who are nonliterate in English are also America's least literate adults.

Figure 2-1. Adults with Below Basic prose literacy and nonliterate in English: 2003



NOTE: The group of adults with language barriers that prevented participation in the main literacy assessment or the supplemental study (2 percent or 4 million adults) are not included in the population of 30 million adults with Below Basic prose literacy because their language barriers precluded administration of the core literacy tasks. Because no information about the literacy of these adults could be collected, they are classified only in the nonliterate in English population. Adults who could not be interviewed because of cognitive or mental disabilities (1 percent) are not included in the Below Basic or the nonliterate categories.
Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

3

CHAPTER THREE

Developing the Basic Reading Skills (BRS) Score

Measures of Basic Reading Skills

Basic Reading Skills and Prose Literacy

Summary

The Basic Reading Skills of America's Adults as Measured by Oral Reading Fluency

This chapter describes the development of Basic Reading Skills (BRS) score and presents results from the Fluency Addition to NAAL (FAN), a series of tasks measuring basic reading skills that was administered to respondents after they completed the main literacy assessment or the supplemental assessment (ALSA). Recall from figure 1.1 that FAN was administered to all NAAL respondents, including those who took ALSA (i.e., the least literate adults). Therefore, the BRS results apply to the main assessment participants as well as the ALSA participants. Information collected from the fluency assessment is reported by task (digit and letter reading, word reading, decoding, and passage reading), as well as by the composite BRS score. In addition to presenting the task and BRS scores for adults across key population groups, this chapter examines the relationship between basic reading skills and prose literacy. Average BRS scores by prose literacy levels are reported, as well as the percentage of adults in BRS levels.

Developing the Basic Reading Skills (BRS) Score

The Basic Reading Skills (BRS) score was developed to provide a composite measure of the basic reading processes of America's adults.[9] Combining selected exercises from the assessment yields a picture of some of the core reading skills that are associated with different levels of functional literacy. Because all tasks were performed under time limits, the BRS score measures both accuracy and speed.[10]

For each respondent, the BRS score was calculated as a simple average of the number of words read correctly per minute on each of the tasks measuring three dimensions of basic reading:

1. Word reading (3 tasks)
2. Decoding[11] (3 tasks)
3. Passage reading (2 tasks)

Thus, the BRS score is the average number of words read correctly for eight of the ten tasks on the oral fluency assessment. The digit- and letter-reading exercises were excluded from the BRS score for both theoretical and empirical reasons. Theoretically, the digit- and letter-reading exercises measure an elemental level of reading skill: the ability to recognize and distinguish letters and numbers on sight. Although letter and number recognition is essential for reading, simple naming of the alphabet and digits is still removed from the ability to use letter codes to recognize words, or the ability to read the kind of text found in newspapers, books, or other printed materials. The latter skills are closer to what most would consider basic reading skills.

Empirically, analyses of the data revealed that the digit and letter exercises also functioned differently from the remaining tasks (see appendix B for details). The results indicated that the word-reading, decoding, and passage-reading exercises all measured a single construct, while the digit- and letter-reading tasks captured a different construct. For these reasons, the word-reading, decoding, and passage-reading tasks were used to construct the BRS score.

Analyses of the BRS score, presented in this chapter, examine variations in BRS scores across population groups as well as the relationship between basic reading skills and prose literacy. Although the BRS score is the primary measure of interest, subscores for digit and letter reading, word reading, decoding, and passage reading are also presented to provide a context for interpreting the BRS score. Like the BRS score, the subscores are expressed as the number of words read correctly per minute.

Measures of Basic Reading Skills

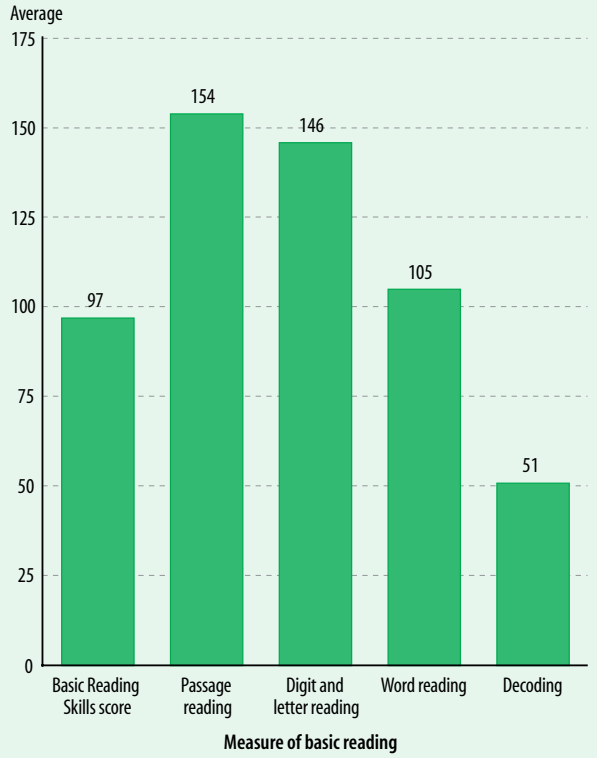
Average BSR scores for each of the oral reading fluency measures are shown in figure 3-1. Adults read passages with the greatest speed and accuracy (154), while the average score was lowest for the decoding tasks (51). The high passage-reading score indicates that adults read continuous text—the kind of text found in newspapers, books, and other printed materials—at a faster and more accurate rate than they can identify digits and letters, identify words, or decode novel words.

[9] Technical details about the construction of the BRS are discussed in appendix B.

[10] Because the tasks were timed, we do not know how accurately respondents would have read had they had unlimited time to complete the tasks.

[11] As noted in chapter 2, decoding was measured through three lists of pseudo-words of increasing difficulty.

Figure 3-1. Average number of words correctly read per minute among adults, by Basic Reading Skills score and measures of oral reading fluency: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

The average BRS score (97) is lower than the passage-, digit- and letter-, and word-reading scores, but higher than the decoding score. The lower score for the BRS, relative to the measures of passage reading, word recognition, and alphanumeric recognition, illustrates the effect of including the decoding components as part of the composite score. The BRS assesses more than an adult's ability to read and recognize words, letters, and numbers. It also measures the capability of adults to apply decoding tools when they encounter novel words, an important skill of good readers.

Correlations between the BRS score and the scores of the four components on the fluency assessment are presented in table 3-1. The table illustrates differences between adults with English language and Spanish language backgrounds. Among adults who spoke only English before starting school, the correlation between the BRS score and passage reading was .84. The correlation for adults who spoke only Spanish, or Spanish and another non-English language before starting school was .95. The relationship between the BRS score and digit and letter reading also differed by language background (.65 for adults who spoke only English before starting school and .82 for adults who spoke only Spanish or Spanish and another non-English language before starting school).

Table 3-1. Correlation between Basic Reading Skills score and measures of oral reading fluency among adults, by language spoken before starting school: 2003

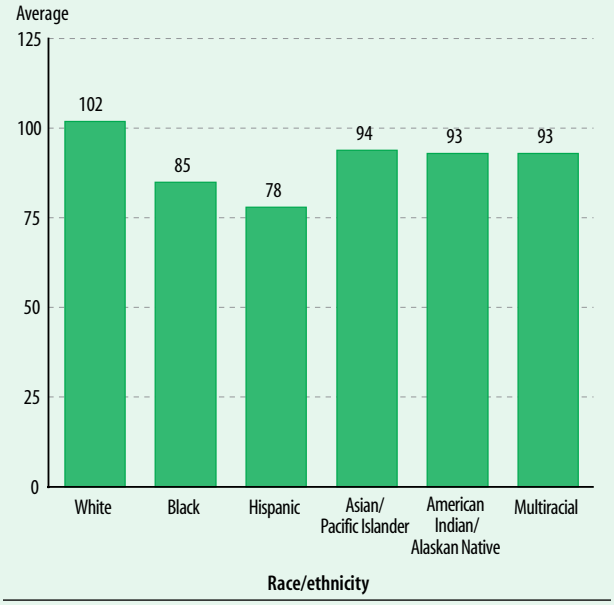
Task	All	English only	Spanish
Passage reading	.87	.84	.95
Digit and letter reading	.69	.65	.82
Word reading	.92	.91	.96
Decoding	.87	.89	.86

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults with Spanish language background include adults who spoke only Spanish, as well as adults who spoke Spanish and another non-English language. Correlation coefficient ranges from -1 to 1. A correlation of 1 (or -1) means there is a perfect positive (or negative) linear relationship between two variables. A correlation of 0 means there is no linear relationship between two variables.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Race/Ethnicity

BRS scores by race and ethnicity are presented in figure 3-2. Among all race and ethnicity groups, Hispanic adults had the lowest BRS score (78) and White adults had the highest BRS score (102). The score for Asian/Pacific Islander adults was higher than the BRS score for Black adults (94 and 85 respectively). American Indian/Alaskan Native (93) and Multiracial adults (93) also had a higher BRS score than Black adults.

Figure 3-2. Average number of words correctly read per minute among adults for Basic Reading Skills score, by race/ethnicity: 2003

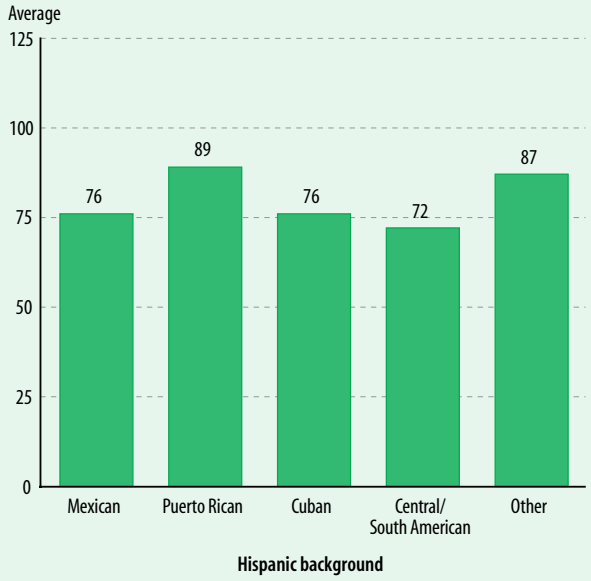


NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. All adults of Hispanic origin are classified as Hispanic, regardless of race. Black includes African American. The Asian/Pacific Islander category includes Native Hawaiians.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Hispanic Background

The BRS scores of adults from Central/South America and Mexico were lower than the BSR scores of adults of Puerto Rican and Other Hispanic origin (figure 3-3). On average, adults from Central/South America read about 17 fewer words correctly per minute than did adults of Puerto Rican heritage. These findings are consistent with the results for prose and document literacy, where the literacy scores for Hispanic adults of Puerto Rican and Other origin were higher than the literacy scores of adults from Central/South America and Mexico (Kutner et al. 2006).

Figure 3-3. Average number of words correctly read per minute among adults for Basic Reading Skills score, by Hispanic background: 2003

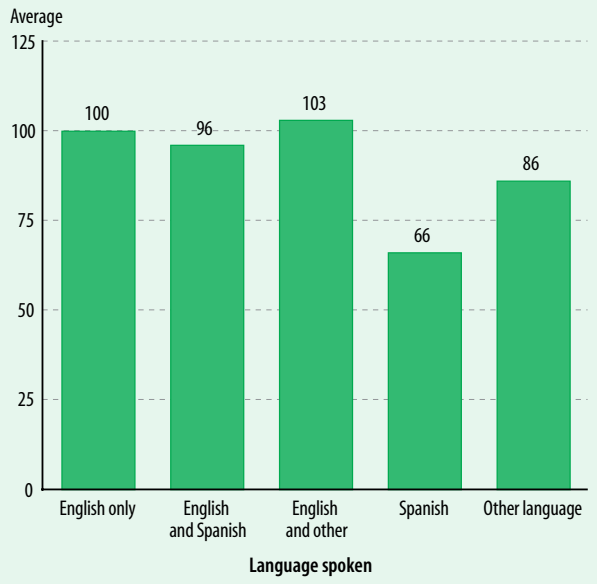


NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Language Spoken Before Starting School

Adults who spoke English and other non-Spanish languages before starting school had the highest average BRS score of all adults, and adults who spoke Spanish only or Spanish and additional non-English languages before starting school had the lowest average BRS score of all adults (figure 3-4). The BSR score for adults with a Spanish-language background was 20 points lower than the next lowest group (Other language) and 34 points lower than adults who spoke only English before starting school.

Figure 3-4. Average number of words correctly read per minute among adults for Basic Reading Skills score, by language spoken before starting school: 2003

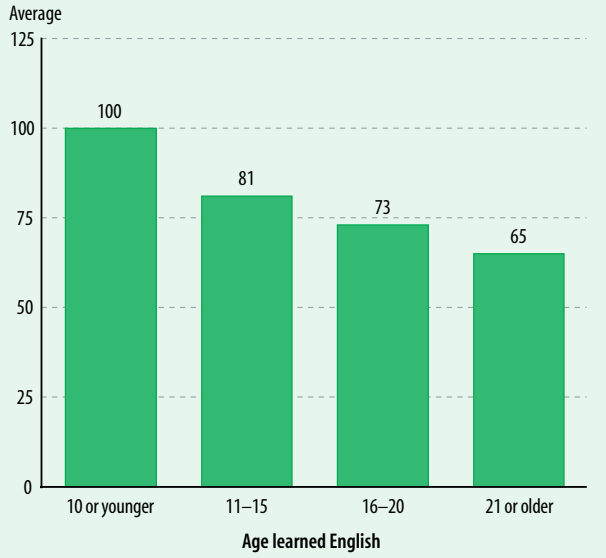


NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. The English and Spanish category includes adults who spoke languages in addition to both English and Spanish. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Age Learned English

Figure 3-5 shows that among adults who spoke a language other than English before starting school, BRS scores were lowest for adults who learned English at a later age. The average score was lowest for adults who learned to speak English after they turned 21 and highest for adults who learned English at age 10 or younger. The BRS score of adults who learned to speak English after age 20 was 35 points lower than the BRS score of adults who learned to speak English at age 10 or younger.

Figure 3-5. Average number of words correctly read per minute among adults who spoke a language other than English before starting school for Basic Reading Skills score, by age learned English: 2003



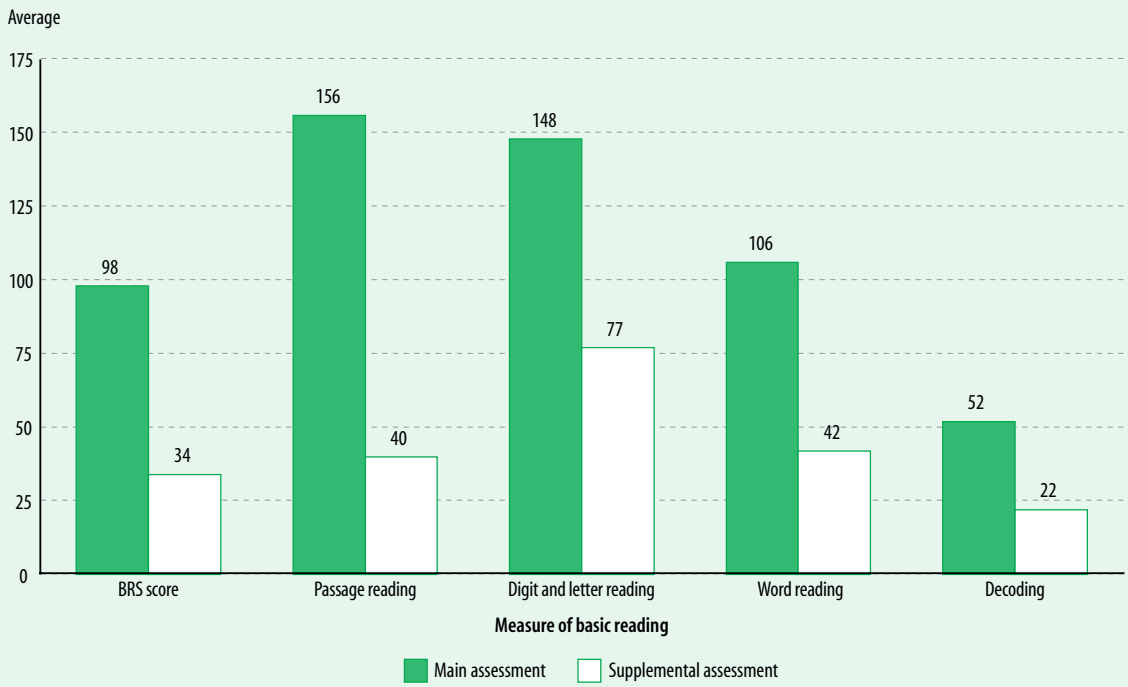
NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Adults who spoke a language other than English before starting school include those who spoke a language other than or in addition to English before starting school.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

The basic reading skills of the least literate adults based on their oral reading fluency

As discussed in chapter 2, the Adult Literacy Supplemental Assessment (ALSA) was designed to measure the literacy of America's least literate adults. The population of adults represented by the supplemental assessment could not complete a series of core literacy tasks and were instead administered a supplemental assessment. The supplemental assessment used common materials found in the home or workplace—such as a carbonated beverage can or a box of cold medicine—to examine the types of skills that low literacy adults use to interpret prose text and documents.

Figure 3-6 shows the average BSR scores for adults in the main assessment and supplemental assessment populations, by the composite BRS score and by each of the four tasks included on the oral reading fluency assessment. As indicated in the figure, adults in the supplemental assessment population struggled with basic reading, relative to adults in the main assessment population. The average number of words read correctly per minute by adults in the supplemental assessment population was lower than the average number of words read correctly per minute by adults in the main assessment population for each of the five measures. The average BRS score for adults in the supplemental assessment population was 64 points lower than the average score for adults

Figure 3-6. Average number of words correctly read per minute among adults for Basic Reading Skills score and measures of oral reading fluency, by main assessment and supplemental assessment populations: 2003



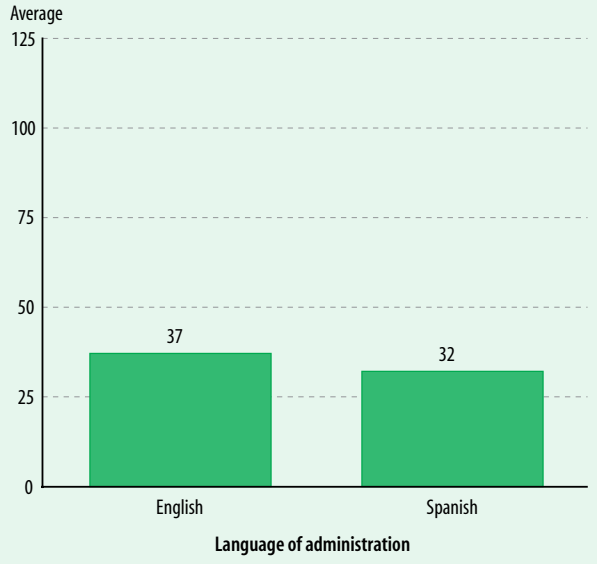
NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

in the main assessment population, and the average passage reading score was 116 points lower.

Within the supplemental assessment population, BRS scores differed between adults with an English language or Spanish language background.[12] The average BRS score for English-speaking adults in the supplemental assessment population was 37, about 5 points higher than the average score for Spanish-speaking adults in the supplemental assessment population (figure 3-7).

[12] Language background for this variable was measured on the basis of the language of administration for the supplemental assessment the respondent selected (English or Spanish).

Figure 3-7. Average number of words correctly read per minute among adults in the supplemental assessment population for Basic Reading Skills score, by language of administration for supplemental assessment: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Basic Reading Skills and Prose Literacy

As indicated in table 3-2, the correlation between prose literacy and the BRS score is .65. The correlation between BRS score and the other two literacy scales, document and quantitative literacy is .60 and .57 respectively. Because basic reading skills are most directly related to prose literacy (Adams 1990), the remaining analyses in this chapter examine BRS scores relative to prose literacy.

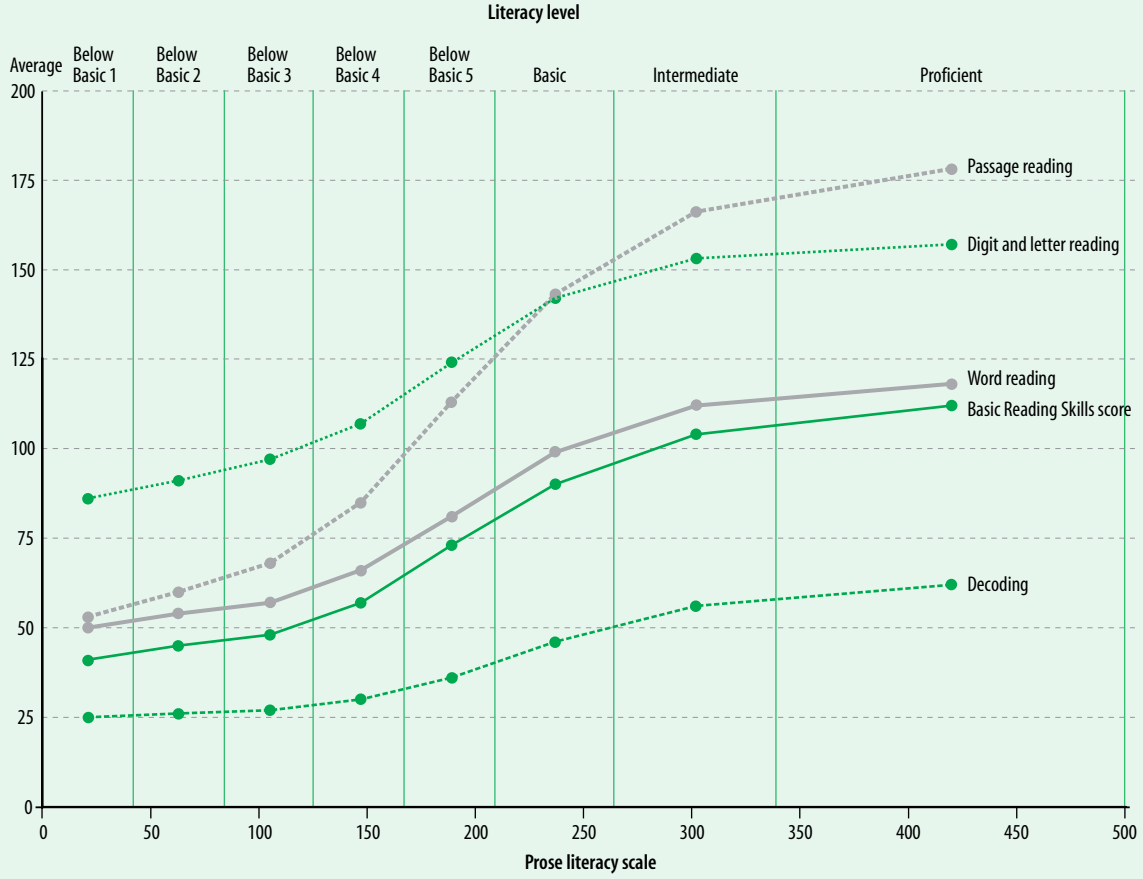
Figure 3-8 shows the relationship between basic reading skills and prose literacy measured in the main assessment. Each of the four tasks on the oral reading fluency assessment (digit and letter reading, word reading, decoding, and passage reading), as well as the composite BRS score, is plotted against the midpoint of eight literacy levels. For example, the vertical line that indicates that the midpoint for *Proficient* prose literacy corresponds to a score of 420 on the prose literacy scale, the *Proficient* prose literacy level ranges from 340 to 500. In addition to the *Basic, Intermediate,*

Table 3-2. Correlation between Basic Reading Skills score and prose, document, and quantitative literacy scores among adults: 2003

Literacy scale	Correlation
Prose	.65
Document	.60
Quantitative	.57

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The correlation between document literacy and the original Basic Reading Skills score could not be calculated because few respondents had both low document literacy and a low Basic Reading Skills score. To estimate the correlations, the Basic Reading Skills score was truncated, with the scores for respondents who read fewer than 25 words correctly per minute recoded as 25 (3 percent of all respondents). The correlations between the untruncated Basic Reading Skills score and prose and quantitative literacy were .58 and .57, respectively. Correlation coefficient ranges from -1 to 1. A correlation of 1 (or -1) means there is a perfect positive (or negative) linear relationship between two variables. A correlation of 0 means there is no linear relationship between two variables.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 3-8. Average number of words correctly read per minute among adults within detailed prose literacy levels, by Basic Reading Skills score and oral reading fluency tasks: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Below Basic 1, 2, 3, 4, and 5 refer to equally spaced intervals along the *Below Basic* portion (0-209) of the prose literacy scale, and the midpoints of the five levels are 21, 63, 105, 146 and 188 respectively. Appendix B provides more details about the construction of the Below Basic prose literacy levels. The score ranges for *Basic, Intermediate*, and *Proficient* levels are 210–264, 265–339, and 340–500. Their corresponding midpoints are 237, 302 and 420.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

and *Proficient* prose literacy levels, the *Below Basic* prose literacy level has been subdivided into fifths in order to more closely examine how basic reading skills vary among adults with low levels of prose literacy. Appendix B provides more details about the construction of the *Below Basic* prose literacy levels.

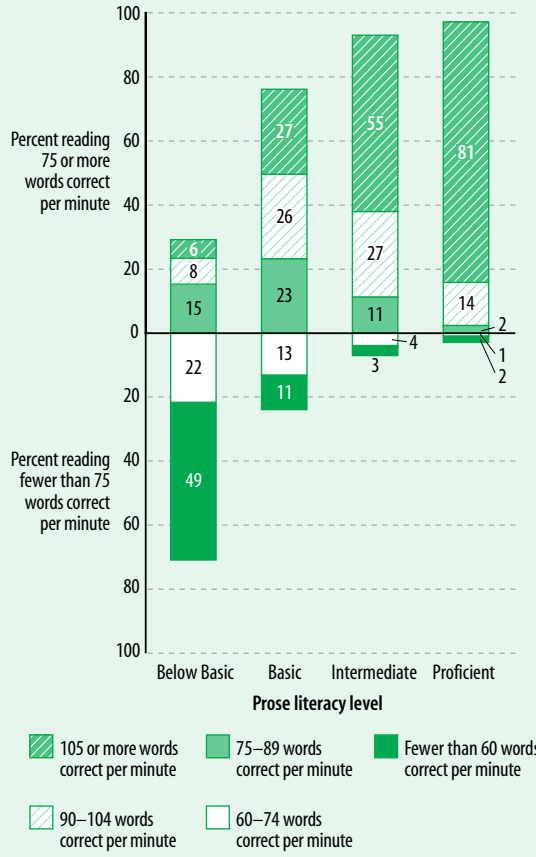
Of the four oral reading fluency tasks plotted in the figure, average BSR scores were consistently lowest for decoding. For adults in the *Below Basic 1* and *Below Basic 2* subgroups (adults with the lowest prose literacy), the average passage-reading score (53 and 60 respectively) was not significantly different from the average word-reading score (50 and 54 respectively). At each successive prose literacy level above *Below Basic 2*, however, the average passage-reading score was higher than the average word-reading score.

From *Below Basic 1* through *Below Basic 5*, the average digit- and letter-reading score is higher than the average passage-reading score. The BSR scores are not different from one another at the *Basic* level, and for adults with *Intermediate* and *Proficient* literacy, passage-reading scores are higher than digit- and

letter-reading scores. These results indicate that adults at the higher prose literacy levels read continuous text with greater speed and accuracy than they read random strings of digits and letters.

Adults were further classified on the basis of their composite BRS score. Figures 3-9 and 3-10 show the percentage of all adults in different basic reading score levels, by each of the four main prose literacy levels:

Figure 3-9. Percentage of adults in each Basic Reading Skills level, by prose literacy level: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

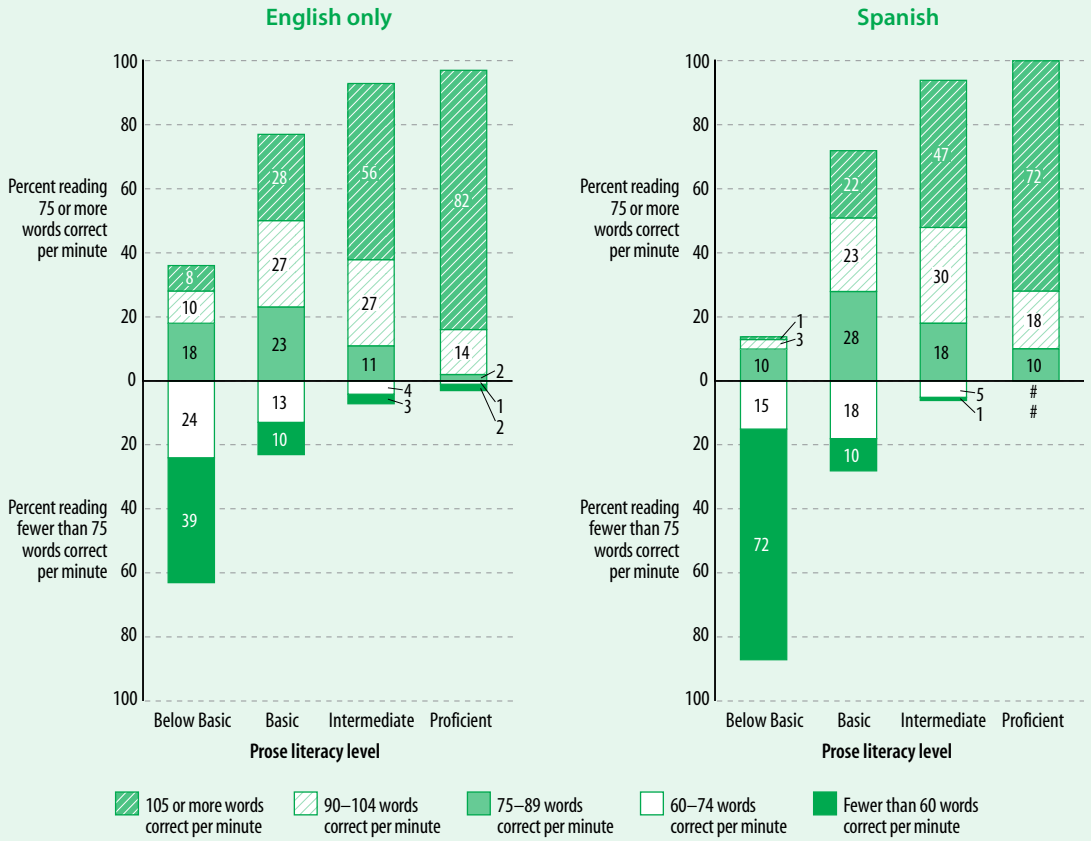
- Fewer than 60 words correct per minute
- 60–74 words correct per minute
- 75–89 words correct per minute
- 90–104 words correct per minute
- 105 or more words correct per minute

There is no definitive empirical basis for deciding on a reading rate increments for forming categories for adults on the BRS. Increments of 15 words correct per minute were selected because this range represents a practical and instructionally relevant difference in observable reading rate behavior.

Figure 3-9 illustrates how adults with low prose literacy struggle with their basic reading skills. Among adults with *Below Basic* prose literacy, 49 percent read fewer than 60 words correctly per minute, and 71 percent read fewer than 75 words correctly per minute. Comparing the adults with *Below Basic* prose literacy with those with *Basic* prose literacy shows that low basic reading skills are particularly concentrated among the former group. Of adults with *Basic* prose literacy, 11 percent read fewer than 60 words correctly per minute and 24 percent read fewer than 75 words correctly per minute. A majority of adults with *Intermediate* prose literacy read 105 or more words correctly per minute (55 percent), as did most adults with *Proficient* prose literacy (81 percent).

Figure 3-10 illustrates differences between adults with an English language or a Spanish language background. Among adults who spoke only English before starting school with *Below Basic* prose literacy, 39 percent had a BRS score of fewer than 60 words correctly read per minute. Among adults who spoke Spanish only before starting school and have below basic prose literacy, 72 percent had BRS scores of fewer than 60 words read correctly

Figure 3-10. Percentage of adults in each Basic Reading Skills level, by language spoken before starting school and prose literacy level: 2003



Rounds to zero.
NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

per minute. Thus, taken as a group, adults with an English language background with *Below Basic* prose literacy read at a faster and more accurate rate than adults at the same level of literacy with a Spanish language background. At the *Basic* prose literacy level, the percentage of adults who spoke English before starting school in the lowest BRS level was not significantly different from the percentage of adults who spoke Spanish before starting school in the lowest BRS level (10 percent each).

Race/Ethnicity

Average BRS scores by race/ethnicity for each of the prose literacy levels are shown in table 3-3. Within the literacy levels, average BRS scores differed on the basis of race and ethnicity. The average BRS score for Hispanic adults with *Below Basic* prose literacy (53) was lower than the average *Below Basic* adult prose literacy scores for all other adult race and ethnicity groups, with the exception of American

Indian/Alaskan Native adults (63), for which there was no difference. The average BRS score for Hispanic adults with *Below Basic* prose literacy was 23 points lower than the score for White adults with the same literacy level, and 17 points lower than the score for Asian/Pacific Islander adults.

For Hispanic adults with *Proficient* prose literacy, average BRS scores were not different from the BSR scores for adults in any other racial/ethnic group, with the exception of Black adults. The average score for Black adults with *Proficient* prose literacy was lower than the average score for White, Asian/Pacific Islander, and Hispanic adults with the same literacy level.

Hispanic Background

The average BRS score for adults of Puerto Rican ethnicity with *Below Basic* prose literacy was higher than the average score for adults of Mexican, Cuban, and Central or South American ancestry with the same literacy level (table 3-4). At the *Proficient* prose literacy level, average BRS scores for adults of Mexican heritage were higher than the BSR scores for adults of Cuban descent. Apparent differences in average BRS scores between adults in the remaining Hispanic background groups with *Proficient* literacy were not significant.

Table 3-3. Average number of words correctly read per minute among adults for Basic Reading Skills score in each prose literacy level, by race/ethnicity: 2003

Race/ethnicity	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
White	76	94	106	113
Black	67	85	97	103
Hispanic	53	86	103	111
Asian/Pacific Islander	70	86	101	112
American Indian/Alaskan Native	63	91	103	110
Multiracial	67	86	100	107

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race. Black includes African American. The Asian/Pacific Islander category includes Native Hawaiians.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table 3-4. Average number of words correctly read per minute among adults for Basic Reading Skills score in each prose literacy level, by Hispanic background: 2003

Hispanic background	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
Mexican	51	86	104	114
Puerto Rican	64	91	102	105
Cuban	52	82	104	102
Central or South American	52	80	97	107
Other	59	88	104	111

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Language Spoken Before Starting School

Adults who spoke Spanish or Spanish and another non-English language before starting school had the lowest BRS score, while adults who spoke English and a non-Spanish language before starting school had the highest BRS score among adults with *Below Basic* prose literacy (table 3-5). The BRS score for adults with a Spanish language background with *Below Basic* prose literacy was 49 words read correctly per minute, 37 points lower than the score for adults who spoke English and another non-Spanish language and 24 points lower than the score for adults who spoke only English before starting school. At the *Proficient* level, the average BRS score for adults who spoke Spanish before starting school was lower than the score for adults with an English only background and English and other non-Spanish background.

Table 3-5. Average number of words correctly read per minute among adults for Basic Reading Skills score in each prose literacy level, by language spoken before starting school: 2003

Language spoken before starting school	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
English only	73	92	105	112
English and Spanish	76	93	105	106
English and other	86	96	107	115
Spanish	49	82	97	105
Other language	65	84	97	106

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The English and Spanish category includes adults who spoke languages in addition to both English and Spanish. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table 3-6. Average number of words correctly read per minute among adults who spoke a language other than English before starting school for Basic Reading Skills score in each prose literacy level, by age learned English: 2003

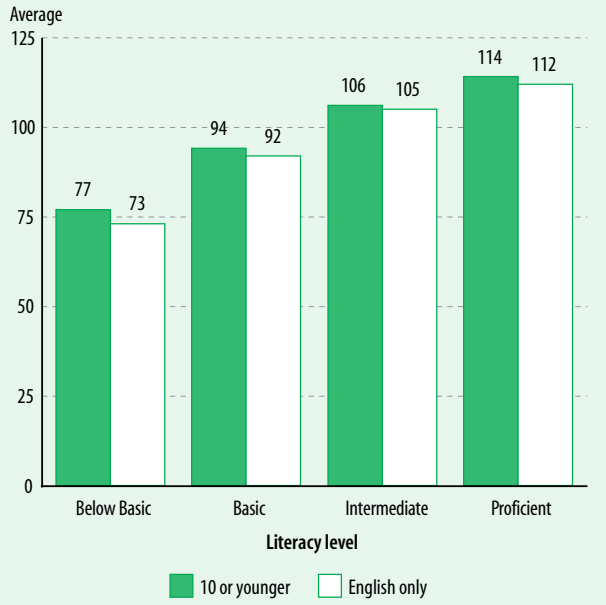
Age learned English	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
10 or younger	77	94	106	114
11–15	66	80	94	100
16–20	59	79	91	91
21 or older	54	76	89	86

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults who spoke a language other than English before starting school include those who spoke a language other than or in addition to English before starting school.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Age Learned English

Adults with a non-English language background who learned English before age 11 had the highest average BRS score of adults with a non-English language background across the literacy levels (table 3-6). Moreover, the average BRS scores of adults who spoke a non-English language before starting school but who learned English before age 11 were not different across the literacy levels from the average BSR scores of adults who spoke English only before starting school (figure 3-11).

Figure 3-11. Average number of words correctly read per minute for Basic Reading Skills score in each prose literacy level, by adults who learned to speak English as a second language at age 10 or younger and adults who spoke only English before starting school: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Summary

This chapter reported results from the Fluency Addition to NAAL, an assessment of the basic reading skills of America's adults. The average BRS score for adults in the supplemental assessment population was 64 points lower than the score for adults in the main assessment population. Of the four tasks included in the fluency assessment, scores were highest for passage reading. Among population groups, BRS scores were lowest for Hispanic adults. Differences in BRS scores between adults with a non-English language background who learned to speak English before age 11 and adults who spoke English only before starting school were not significant.

Analyses of the relationship between basic reading skills and prose literacy revealed that adults with *Intermediate* and *Proficient* prose literacy read passages with greater speed and accuracy than they read random lists of digits and letters. At the lowest levels of prose literacy (*Below Basic 1* and *Below Basic 2*), word reading did not differ from passage reading. Among adults with *Below Basic* prose literacy, approximately half (49 percent) read fewer than 60 words correctly per minute. Among adults who spoke Spanish before starting school with *Below Basic* prose literacy, 72 percent read fewer than 60 words correctly per minute.

4

CHAPTER FOUR

Characteristics of America's Least Literate Adults

What the Least Literate Adults Can and Cannot do

Letter Reading

Word Identification

Word Reading

Comprehension

Summary

The Basic Reading Skills of America's Least Literate Adults as Measured by Adult Literacy Supplemental Assessment (ALSA)

This chapter presents results from the Adult Literacy Supplemental Assessment (ALSA), an alternative literacy assessment administered to adults with the lowest levels of English literacy. The results were based on 3 percent of the adult population who could participate in ALSA, but not the 2 percent who are also in the least literate population, but who could not be tested with the main or the supplemental assessment because they were unable to communicate in English or Spanish. The information collected from the supplemental assessment provides insight into the skills that low literacy adults possess, particularly their abilities to read letters, identify words, read words, and answer basic comprehension questions. Some results are shown separately for the English and Spanish versions of the assessment because the adults in each population may have different sets of skills. The ability to perform tasks successfully may be influenced by an adult's familiarity with and experience reading the text on a particular product or item; therefore, the data are also disaggregated by whether an adult indicated familiarity with each of the nine items used in the assessment.

Characteristics of America's Least Literate Adults

To provide a context for interpreting the results from the supplemental literacy assessment, table 4-1 compares the characteristics of adults in the supplemental assessment, *Below Basic* prose, and all adult populations (i.e., the population of U.S. adults ages 16 and older). Hispanic adults, who represent 12 percent of the NAAL population, account for 39 percent of adults with *Below Basic* prose literacy and 63 percent of adults in the supplemental assessment population. Of Hispanic adults, the majority in each population were of Mexican descent.

The percentage of men in both the supplemental assessment and the *Below Basic* prose populations was higher than the percentage of women in each popula-

Table 4-1. Percentage of adults in the supplemental assessment, Below Basic prose, and adult population by selected characteristics: 2003

Characteristic	Supplemental assessment	*Below Basic*	All adults
Percent of adult population	3	14	100
Race/ethnicity			
White	18	37	70
Black	15	20	12
Hispanic	63	39	12
Asian/Pacific Islander	3	4	4
American Indian/Alaska Native	#	1	1
Multiracial	1	1	2
Hispanic background			
Mexican	69	64	58
Puerto Rican	6	6	10
Cuban	5	5	4
Central or South American	15	18	16
Other	5	7	12
Gender			
Male	57	54	49
Female	43	46	51
Age			
16–18	2	5	6
19–24	11	9	11
25–39	29	25	28
40–49	19	16	20
50–64	18	20	21
65 and older	21	26	15
Language spoken before starting school			
English only	30	52	81
English and Spanish	2	2	2
English and other	1	2	4
Spanish	59	35	8
Other language	8	9	5
Age learned English			
10 or younger	23	33	70
11–15	13	14	10
16–20	14	17	7
21 or older	49	37	13

See footnotes on second page of this table.

Table 4-1. Percentage of adults in the supplemental assessment, Below Basic prose, and adult population by selected characteristics: 2003—Continued

Characteristic	Supplemental assessment	*Below Basic*	All adults
Educational attainment			
Still in high school	5	3	3
Less than/some high school	71	55	15
GED/high school equivalency	3	4	5
High school graduate	16	23	26
Vocational/trade/business school	3	4	6
Some college	1	4	11
Associate's/2-year degree	1	3	12
Bachelor's degree	1	2	12
Graduate studies/degree	#	1	11
Poverty threshold			
Below poverty threshold	58	44	17
100–125% above	10	12	7
126–150% above	9	8	6
151–175% above	8	7	6
Above 175%	15	28	64
Disability status			
Vision problem only	11	7	5
Hearing problem only	2	4	5
Learning disability only	2	4	3
Other disability only	7	10	8
Multiple disabilities	22	21	9
No disability	57	54	70

Rounds to zero.

NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults in the supplemental assessment population are also incuded in the *Below Basic* population. All adults of Hispanic origin are classified as Hispanic, regardless of race. Black includes African American. The Asian/Pacific Islander category includes Native Hawaiians. The English and Spanish category includes adults who spoke only English and Spanish, as well as adults who spoke English, Spanish, and another non-English language. The Spanish category includes adults who spoke only Spanish, as well as adults who spoke Spanish and another non-English language. The Other language category includes only adults who did not speak English or Spanish. Adults included in the results for Age learned English are those who spoke a language other than or in addition to English before starting school. See appendix A for definitions of variables presented in this table.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

tion. There was a higher percentage of older adults, ages 65 and older, in the supplemental assessment population than in the population of all adults. Adults ages 65 and older represented 15 percent of all adults, but 21 percent of the supplemental assessment population 26 percent of the *Below Basic* population. Consistent with the results for race and ethnicity, 59 percent of adults in the supplemental assessment population spoke Spanish or Spanish and a non-English language before starting school. Of adults who spoke a non-English language before starting school, those who learned to speak English after age 20 accounted for the highest percentage of adults in the supplemental assessment population (49 percent).

The results for educational attainment show that adults with the least amount of schooling (less than or some high school) accounted for the largest percentage of the *Below Basic* prose and supplemental assessment populations (55 and 71 percent, respectively). The percentage of adults living below the federal poverty threshold in the *Below Basic* prose and supplemental assessment populations was also higher than the percentage of adults in these populations from other income categories. Among adults with *Below Basic* prose literacy, 44 percent lived in families with incomes below the poverty line, as did 58 percent of adults in the supplemental assessment population. Although the majority of adults in all

three populations indicated that they did not have any disability, 22 percent of adults in the supplemental assessment population and 21 percent of the *Below Basic* population reported that they had multiple disabilities compared to 9 percent of the total adult population.

To further understand the relationship between disabilities and the supplemental assessment population, table 4-2 separates the supplemental assessment population by language of administration (English or Spanish) and reported disabilities. The percentage of English language assessment population who reported multiple disabilities including vision, hearing, learning, or other disabilities (35 percent) was higher than the percentage of Spanish language assessment population who reported multiple disabilities (12 percent). Overall, fewer adults in the Spanish language supplemental assessment population had been diagnosed with disabilities than adults in the English language supplemental assessment population: 71 percent of the Spanish language group reported no disabilities, in contrast to 40 percent of the English language group.

Table 4-2. Percentage of adults in each disability status category, by language of administration of the supplemental assessment: 2003

Disability status	English	Spanish
Vision problem only	9	12
Hearing problem only	2	1
Learning disability only	4	1
Other disability only	11	3
Multiple disabilities	35	12
No disability	40	71

NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

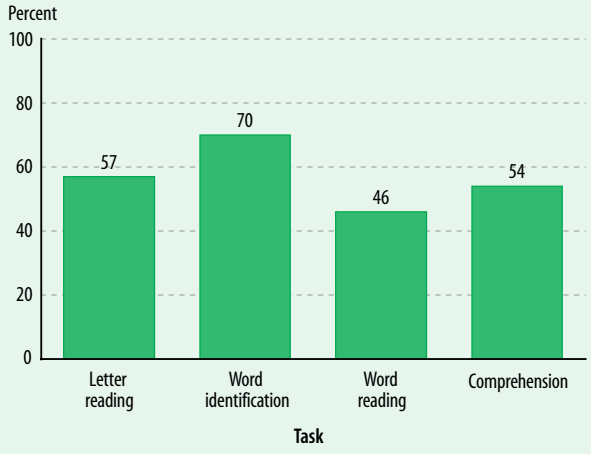
What the Least Literate Adults Can and Cannot Do

As discussed in chapter 2, four kinds of tasks were included on the alternative assessment:

- Letter reading
- Word identification
- Word reading
- Comprehension

Figure 4-1 shows the percentage of adults in the supplemental assessment population who successfully completed the letter-reading, word-identification, word-reading, and comprehension tasks. Seventy percent of the adults completed the word-identification tasks correctly as compared with 46 percent for word-reading tasks. The higher percent correct

Figure 4-1. Percentage of correct responses among adults in the supplemental assessment population for tasks included on the supplemental assessment: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

on the comprehension questions relative to the word-reading questions suggests that even if some low literacy adults cannot read certain words, many still possess the skills to make sense of and use some printed materials.

The correlations shown in table 4-3 provide insight into the relationships among the four types of tasks on the supplemental assessment. Comprehension was more highly correlated with word identification (.76) and word reading (.69) than with letter reading (.44). Similar to the digit- and letter-reading tasks included on the oral reading fluency assessment, letter reading on the supplemental assessment is of less interest because letter reading is distinct from the ability to recognize words or read continuous text.

Figure 4-2 illustrates differences between adults in the English and Spanish language supplemental assessment populations. The results reveal that adults in the Spanish and English language groups had different sets of skills. Those in the English language population had strong letter-reading skills (80 percent correct), especially relative to adults in the Spanish language group (38 percent correct).

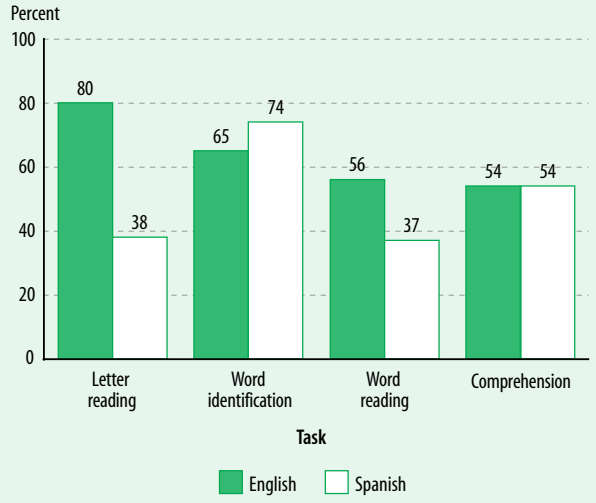
Table 4-3. Correlations between tasks included on the supplemental assessment among adults in the supplemental assessment population: 2003

Task	Word identification	Word reading	Comprehension
Letter reading	.39	.69	.44
Word identification		.65	.76
Word reading			.69

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Correlation coefficient ranges from -1 to 1. A correlation of 1 (or -1) means there is a perfect positive (or negative) linear relationship between two variables. A correlation of 0 means there is no linear relationship between two variables.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

However, the percentage of words correctly identified by adults in the Spanish language supplemental assessment population was higher than the percentage of words correctly identified by adults in the English language group (74 percent compared with 65 percent correct). In contrast, word reading was higher among the population assessed in English, but there was not a significant difference in the percentage of comprehension questions answered correctly between the two populations. Adults in both, the English and the Spanish language supplemental assessment populations had a higher percentage of correct word identification tasks than word reading tasks.

Figure 4-2. Percentage of correct responses among adults in the supplemental assessment population for tasks included on the supplemental assessment, by language of administration: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Letter Reading

Five letter-reading tasks were included on the supplemental assessment. Results for each of the tasks are presented in table 4-4. The table illustrates how familiarity with the items used in the letter-reading task is related to the results for respondents in two groups: respondents who took the assessment in English, and respondents who took it in Spanish. Contrasting the percentage of correct responses among all adults with the percentage of correct responses disaggregated by familiarity and language of administration reveals differences across groups that might otherwise be obscured.

Among adults in the English language supplemental assessment population, the percentage of letters correctly read was higher for those adults familiar with the products used in the letter-reading tasks. For adults in the Spanish language population, in contrast, letter-reading ability was different by familiarity only on two tasks based on the "No eating or drinking" sign, but not on the other three tasks related to the carbonated beverage can. The percentage of letters correctly read was higher for those Spanish language adults familiar with the "No eating or drinking" sign.

However, adults in the Spanish language supplemental assessment population who were unfamiliar with signs prohibiting eating and drinking had difficulty reading the two letters they were asked to find. Five percent in the "unfamiliar" group correctly read the letter in the first letter-reading task and 10 percent correctly read the letter in the second letter-reading task (compared with 45 and 55 percent correct responses, respectively, among Spanish language adults who were familiar with such signs).

Word Identification

However, adults who participated in the supplemental assessment were asked to complete nine word-identification tasks using six different materials. The results shown in table 4-5 indicate that adults familiar with some of the products in the word identification tasks (i.e., "No eating and drinking" sign, baking mix box, utility bill, and newspaper map) perform better compared with those who are unfamiliar with the products. Among adults in the English language population, the percentage of correct responses for the word-identification tasks was higher for those who were familiar with a particular product for seven of the nine items. For adults in the Spanish language population, the percentage of correct responses for

Table 4-4. Percentage of correct responses for letter-reading tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003

Material and task	English		Spanish	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Carbonated beverage can				
Task 1	87	67	44	46
Task 2	79	55	27	31
Task 3	85	57	35	36
No eating or drinking sign				
Task 1	89	63	45	5
Task 2	92	65	55	10

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

all word-identification tasks was higher for those familiar with the products used in the tasks, with the exception of the task based on carbonated beverage can.

Examining differences in word-identification abilities between adults in the English and Spanish language supplemental assessment populations who were familiar with each of the products they were asked to read helps reveal differences in the skills possessed by adults in the two language groups. Because all of these adults indicated familiarity with the products, variations in performance on the word-identification tasks can be attributed to underlying skills rather than to background knowledge of a particular product.

Among adults in the supplemental assessment population who were familiar with the products used in the word-identification tasks, adults in the Spanish language group correctly identified more words than adults in the English language group on five of the nine tasks.

Word Reading

The supplemental assessment included 12 word-reading tasks using all nine of the real-world products. Similar to the letter- and word-identification tasks, adults who were familiar with the materials used in the word-reading tasks had a higher percentage of correct responses than adults who were unfamiliar with the materials (table 4-6). For nine of the word-reading tasks for speakers of English and eight of the tasks for speakers of Spanish, adults who were familiar with specific products had greater success reading words than their peers who were unfamiliar with the same products. These results are consistent with the results for letter and word identification: the adults who were familiar with the products they were asked to read generally were better able to read letters and identify words.

The results for adults familiar with the products used in the word-reading tasks reveal an opposite pattern from the word-identification tasks. With the

Table 4-5. Percentage of correct responses for word-identification tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003

Material and task	English		Spanish	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Carbonated beverage can				
Task 1	74	65	91	90
No eating or drinking sign				
Task 1	76	58	59	16
Task 2	81	57	88	58
Baking mix box				
Task 1	82	63	76	64
Cold medicine box				
Task 1	69	62	86	73
Utility bill				
Task 1	79	27	89	52
Newspaper map				
Task 1	79	49	92	74
Task 2	85	50	92	62
Task 3	70	32	85	46

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

exception of the task related to the grocery advertisement, adults in the English language supplemental assessment population read words with greater accuracy than did adults in the Spanish language population (differences between the two groups for the task using the television program schedule were not significant).

For the task using the grocery advertisement, a higher percentage of adults in the Spanish language population were able to successfully complete the task than adults in the English language population (38 and 26 percent, respectively, among adults familiar with grocery store advertisements). Unlike the other eight word-reading tasks, the grocery advertisement task was the only task in which neither the interviewer nor the respondent pointed to the word that was to be read aloud.[13] Thus, this word-reading task also had an element of comprehension: the respondent had to scan the newspaper advertisement, locate the store name, and then read the name.

Comprehension

Adults who attempted the supplemental assessment were asked a variety of comprehension questions for eight of the nine products used in the assessment (no comprehension question was associated

[13] The interviewer pointed to all words in the word-reading tasks, with the exception of the word in the grocery store advertisement and the word in the utility bill. In both tasks, the respondent was asked to read aloud the name of the company. For the utility bill task, the respondent was first asked to point to the name of the company (a word-identification task). Next, the respondent was asked to read the name of the company to which he or she pointed.

Table 4-6. Percentage of correct responses for word-reading tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003

Material and task	English		Spanish	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Carbonated beverage can				
Task 1	81	62	71	75
Task 2	67	62	47	51
Task 3	62	53	26	20
No eating or drinking sign				
Task 1	81	49	58	11
Baking mix box				
Task 1	74	58	58	35
Task 2	63	45	24	11
Cold medicine box				
Task 1	62	46	31	33
Grocery advertisement				
Task 1	26	17	38	13
Yard sale sign				
Task 1	80	32	46	11
Utility bill				
Task 1	61	9	34	14
Newspaper map				
Task 1	72	43	53	18
Television program schedule				
Task 1	57	29	55	20

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

with the carbonated beverage can). The difficulty of the comprehension tasks ranged from easy questions (interpreting the meaning of a sign that prohibited eating and drinking using text as well as symbols) to the types of tasks that might be found on the document scale of the main literacy assessment (using a television program guide to determine the starting time of a particular program).

For adults in both the English language and the Spanish language supplemental assessment populations, familiarity with a product was related to the ability to correctly answer comprehension questions (table 4-7). For all but one question, the percentage of correct comprehension responses from adults in the English language supplemental assessment population who were familiar with the products they were asked to read was higher than the percentage of correct comprehension responses from adults unfamiliar with the products (understanding the purpose of the sign prohibiting eating and drinking was the one exception; differences between the two groups were not significant). Adults in the Spanish language assessment population who were familiar with the

Table 4-7. Percentage of correct responses for comprehension tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003

Material and task	English		Spanish	
	Familiar	Unfamiliar	Familiar	Unfamiliar
No eating or drinking sign				
Task 1	82	47	71	51
Task 2	93	78	88	58
Baking mix box				
Task 1	56	30	42	18
Task 2	73	44	70	42
Task 3	61	26	43	22
Cold medicine box				
Task 1	51	35	49	44
Grocery advertisement				
Task 1	79	49	95	68
Task 2	79	51	71	46
Task 3	82	57	79	51
Task 4	76	47	80	49
Yard sale sign				
Task 1	78	26	85	46
Task 2	94	40	93	53
Utility bill				
Task 1	72	21	67	29
Task 2	48	10	49	20
Newspaper map				
Task 1	55	20	60	27
Television program schedule				
Task 1	73	40	53	27
Task 2	54	21	48	34
Task 3	48	15	56	26
Task 4	51	20	52	27

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

products used in the assessment also answered more comprehension questions correctly than Spanish language adults unfamiliar with the products with the exception of the cold medicine box task.

Summary

This chapter examined the profile and skills of America's least literate adults. The majority of adults in the supplemental assessment population were Hispanic and had not completed a GED or received a high school diploma. The percentage of adults with multiple disabilities was also higher in the supplemental assessment population than in the main assessment population. Among adults in the English language and Spanish language supplemental assessment populations, the percentage of adults who spoke English and had multiple disabilities was higher than the percentage of Spanish-speaking adults with multiple disabilities.

Performance on the letter-reading, word-identification, and word-reading tasks also varied by language background. For most tasks, adults who were familiar with a particular product used in the assessment were better able to complete the literacy tasks than those adults who were unfamiliar with the products. Among those familiar with the item, adults in the English language supplemental assessment population answered more letter-reading and word-reading questions correctly. Although the percentage of correct word-identification responses was higher among adults in the Spanish language population, the ability to answer comprehension questions did not differ systematically between the two language groups.

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Definitions of All Subpopulations and Background Variables Reported

This appendix describes the population groups and background variables used in this report. For the exact wording of background questions, see http://nces.ed.gov/naal.

Total Population

The 2003 National Assessment of Adult Literacy included two samples: (1) adults ages 16 and older living in households and (2) inmates ages 16 and older in federal and state prisons. The household sample also included adults in six states that chose to participate in a concurrent State Assessment of Adult Literacy: Kentucky, Maryland, Massachusetts, Missouri, Oklahoma, and New York. Each sample was weighted to represent its share of the total population of the United States (99 percent for the household sample and 1 percent for the prison sample). The household and prison samples were combined to create a nationally representative sample of America's adults. Household data collection was conducted from March 2003 through February 2004; prison data collection was conducted from March through July 2004.

Age

All respondents were asked to report their birthdates, and this information was used to calculate their age. Age groups reported are 16 to 18, 19 to 24, 25 to 39, 40 to 49, 50 to 64, and 65 and older. Age groups were selected to correspond to key life stages of many adults:

16–18: Completion of secondary education

19–24: College or job training

25–39: Early career

40–49: Mid career

50–64: Late career

65 and older: Retirement

Age Learned English

Respondents who indicated they spoke a language other than or in addition to English before starting school were asked their age when they learned to speak English. They were classified into one of the following categories: 10 or younger, 11 to 15, 16 to 20, 21 or older.

Disability Status

All respondents were asked the following four questions:

1. Do you have any difficulty seeing the words and letters in ordinary newspaper print even when wearing glasses or contact lenses, if you usually wear them?
2. Do you have any difficulty hearing what is said in a normal conversation with another person even when using a hearing aid, if you usually wear one?
3. Have you ever been diagnosed or identified as having a learning disability?
4. Do you have any other health problem, impairment, or disability now that keeps you from participating fully in work, school, housework, or other activities?

The data were recoded into the following six categories:

- Vision problem only
- Hearing problem only
- Learning disability only
- Other disability only
- Multiple disabilities
- No disabilities

Respondents who reported single disabilities were assigned to the appropriate category (Vision problem only, Hearing problem only, Learning disability only, and Other disability only). Respondents who reported multiple disabilities were assigned to the "Multiple disabilities" category. Respondents who reported no disabilities were assigned to the "No disabilities" category.

Highest Educational Attainment

All respondents were asked to indicate the highest level of education they had completed. The following options were provided:

- Still in high school
- Less than high school
- Some high school
- GED or high school equivalency
- High school graduate
- Vocational, trade, or business school after high school
- College: less than 2 years
- College: Associate's degree (A.A.)

- College: 2 or more years, no degree
- College graduate (B.A. or B.S.)
- Postgraduate, no degree
- Postgraduate degree (M.S., M.A., Ph.D., M.D., etc.)

Respondents who reported less than high school or some high school were asked how many years of education they had completed. For certain analyses, some of these groups were collapsed. For example, respondents who had completed postgraduate studies but had not received a degree were generally combined with those who had completed a postgraduate degree.

Gender

Interviewers recorded the gender of each respondent.

Language Spoken Before Starting School

All respondents were asked what language or languages they learned to speak before starting school. Their responses were then used to divide respondents into five groups: English only, English and Spanish, English and other language, Spanish only, Other language(s). The English and Spanish category includes adults who spoke languages in addition to both English and Spanish. The Spanish category includes adults who spoke Spanish and additional non-English languages.

Poverty Status

Respondents were asked to report the number of persons living in their household as well as the family's total income from all sources, including jobs, investments, Social Security or retirement, and public assistance. The responses were used to construct the poverty status variable on the basis of the federal 2003 poverty income thresholds (U.S. Census Bureau 2004).

These thresholds are based on family size (number of adults and children) and family income. Respondents were identified as below poverty threshold, 101 to 125 percent of poverty threshold, 126 to 150 percent of poverty threshold, 151 to 175 percent of poverty threshold, and above 175 percent of poverty threshold. Income was reported as a categorical variable, and some respondents chose income ranges that overlapped the boundaries of poverty categories for their family size. In these cases, respondents were classified on the basis of the lower boundary of the income range they identified.

Race and Ethnicity

In 2003, all respondents were asked two or three questions about their race and ethnicity. The first question asked them to indicate whether they were Hispanic or Latino.

If a respondent answered that he or she was Hispanic or Latino, the respondent was asked to choose one or more of the following groups to describe his or her Hispanic origin:

- Mexican, Mexican American, or Chicano
- Puerto Rican or Puerto Rican American
- Cuban or Cuban American
- Central or South American
- Other Hispanic or Latino background

Respondents who identified more than one of the groups to describe their Hispanic origin were classified as "Other Hispanic or Latino background."

Then, all respondents, including those who indicated they were Hispanic or Latino, were asked to choose one or more of the following groups to describe themselves:

- White
- Black or African American

- Asian
- American Indian or Alaskan Native
- Native Hawaiian or other Pacific Islander

Individuals who responded yes to the first question were coded as Hispanic, regardless of their answer to the race question. Individuals who identified more than one group on the second question were coded as Multiracial. Respondents of Native Hawaiian or Pacific Islander origin were grouped with those of Asian origin to ensure a large enough group sample size. A minimum sample size of 45 cases was required to permit accurate estimate of literacy proficiency and/or background results for any subgroup (see Baldi 2008). The White, Black, and Hispanic groups are reported separately. If the respondent refused to answer the question, the interviewer recorded the race/ethnicity of the respondent on the basis of what the interviewer observed.

Technical Notes

This appendix describes the sampling, data collection, weighting and variance estimation, scaling (for details, see Baldi, 2008), and statistical testing procedures used to collect and analyze the data for the 2003 National Assessment of Adult Literacy (NAAL). Household data collection was conducted from March 2003 through February 2004; prison data collection was conducted from March through July 2004.

Sampling

The 2003 National Assessment of Adult Literacy included two samples: (1) adults ages 16 and older living in households (99 percent of the sample weighted) and (2) inmates ages 16 and older in federal and state prisons (1 percent of the sample weighted). Each sample was weighted to represent its share of the total population of the United States, and the samples were combined for reporting.

Household Sample

The 2003 National Assessment of Adult Literacy household sample included a nationally representative probability sample of 35,365 households. The household sample was selected on the basis of a four-stage, stratified area sample: (1) primary sampling units (PSUs) consisting of counties or groups of contiguous counties; (2) secondary sampling units (referred to as segments) consisting of area

blocks; (3) housing units containing households; and (4) eligible persons within households. Person-level data were collected through a screener, a background questionnaire, the literacy assessment, and the oral module. Of the 35,365 sampled households, 4,671 were either vacant or not a dwelling unit, resulting in a sample of 30,694 households.[1] A total of 25,123 households completed the screener, which was used to select survey respondents. The unit screener response rate was 82.2 percent weighted with screener base weights.

On the basis of the screener data, 23,732 respondents ages 16 and older were selected to complete the background questionnaire and the assessment; 18,186 actually completed the background questionnaire. Of the 5,546 respondents who did not complete the background questionnaire, 355 were unable to do so because of a literacy-related barrier, either the inability to communicate in English or Spanish (the two languages in which the background questionnaire was administered) or a mental disability.

The unit response rate for the background questionnaire, which included respondents who completed the background questionnaire and respondents who were unable to complete the background questionnaire because of language problems or a mental disability, was 75.6 percent weighted with background questionnaire base weights. Of the 18,186 adults ages 16 and older who completed the background questionnaire, 17,178 completed at least one question on each of the three scales—prose, document, and quantitative—measured in the adult literacy assessment. An additional 149 were unable to answer at least one question on each of the three scales for literacy-related reasons.[2] The unit response rate for the literacy assessment, which included respondents who answered at least one question on each scale plus the 149 respondents who were unable to do so because of language problems or a mental disability, was 95.6 percent weighted with background questionnaire base weights.

Cases were considered complete if the respondent completed the background questionnaire and at least one question on each of the three scales or if the respondent was unable to answer any questions because of language issues (an inability to communicate in English or Spanish) or a mental disability. All other cases that did not include a complete screener, a background questionnaire, and responses to at least one question on each of the three literacy scales were considered incomplete or missing. The overall response rate for the household sample was 59.4 percent weighted.

For respondents who did not complete any literacy tasks on any scale, no information is available about their performance on the literacy scale they were missing. Completely omitting these individuals from the analyses would have resulted in unknown biases in estimates of the literacy skills of the national population because refusals cannot be assumed to have occurred randomly. For 859 respondents[3] who answered the background questionnaire but refused to complete the assessment for reasons other than language issues or a mental disability, regression-based imputation procedures were applied to impute responses to one assessment item on each

[1] To increase the number of Black and Hispanic adults in the NAAL sample, segments with moderate to high concentrations of Black and Hispanic adults were given a higher selection probability. Segments in which Blacks or Hispanics accounted for 25 percent or more of the population were oversampled at a rate up to three times that of the remainder of the segments.

[2] Of the 149 respondents who were unable to answer at least one question on each of the three scales for literacy-related reasons, 65 respondents answered at least one question on one scale. The remaining 84 respondents did not answer any questions on any scale.

[3] Of the 18,186 household respondents who completed the background questionnaire, 17,178 completed at least one question on each of the three scales and 149 were unable to answer at least one question on one or more of the scales for literacy-related reasons. The remaining 859 respondents completed the background questionnaire but refused to complete the assessment.

scale by using the NAAL background data on age, gender, race/ethnicity, education level, country of birth, census region, and metropolitan statistical area status.[4]

On the prose and quantitative scales, a response was imputed for the easiest task on each scale. On the document scale, a response was imputed for the second easiest task because that task was also included on the health literacy scale. In each of the logistic regression models, the estimated regression coefficients were used to predict missing values of the item to be imputed. For each nonrespondent, the probability of answering the item correctly was computed and then compared with a randomly generated number between 0 and 1. If the probability of getting a correct answer was greater than the random number, the imputed value for the item was 1 (correct). Otherwise it was 0 (wrong). In addition, a wrong response on each scale was imputed for 65 respondents who started to answer the assessment but were unable to answer at least one question on each scale because of language issues or a mental disability.[5]

The final household reporting sample—including the imputed cases—consisted of 18,102 respondents. These 18,102 respondents are the 17,178 respondents who completed the background questionnaire and the assessment, plus the 859 respondents who completed the background questionnaire but refused to do the assessment for non-literacy-related reasons and have imputed responses to one item on each scale, plus the 65 respondents who started to answer the assessment items but were unable to answer at least one question on each scale because of language issues or a mental disability. After including the cases for which responses to the assessment questions were imputed, the adjusted weighted response rate for the household sample was 62.1 percent.

Among the reporting sample, all respondents who completed the main literacy assessment or the supplemental assessment were administered the FAN assessment. The unit response rate of the FAN assessment for the household sample was 94.2 percent weighted with background questionnaire base weights.

The household sample was subject to unit nonresponse from the screener, background questionnaire, literacy assessment, and oral module and to item nonresponse to background questionnaire items. Although all background questionnaire items had response rates of more than 85 percent, two stages of data collection—the screener and the background questionnaire—had unit response rates below 85 percent and thus required an analysis of the potential for nonresponse bias (see section on nonresponse bias). The overall unit response rate of the FAN assessment for the household sample was 58.5 percent weighted.

Table B-1 presents a summary of the household response rate.

Table B-1. Weighted and unweighted household response rate, by survey component: 2003

Survey component	Weighted response rate (percent)	Unweighted response rate (percent)
Screener	82.2	81.8
Background questionnaire	75.6	78.1
Literacy assessment	95.6	95.3
Oral module	94.2	93.7
Overall[1] response rate before assessment imputation	59.4	60.9
Overall[1] response rate for FAN	58.5	59.9
Overall[1] adjusted response rate after assessment imputation	62.1	63.9

[1] Overall response rate is the product of the screener, background questionnaire, and assessment/FAN response rates.
NOTE: Base weights were used for the calculations of weighted response rates.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

[4] A metropolitan statistical area (MSA) is a metropolitan area (MA) that is not closely associated with another MA. An MSA consists of one or more counties, except in New England, where MSAs are defined in terms of county subdivisions (primarily cities and towns). Metropolitan statistical area status includes two options: MSA and non-MSA.

[5] For a more detailed discussion of imputation see Little and Rubin (2002).

Prison Sample

The 2003 assessment also included a nationally representative probability sample of inmates in federal and state prisons. A total of 114 prisons were selected to participate in the adult literacy assessment. Of these 114 prisons, 107 agreed to participate, 3 refused, and 4 were ineligible. The final prison response rate was 97.5 percent weighted with prison-level base weights. From among the inmates in those prisons, 1,298 inmates ages 16 and older were randomly selected to complete the background questionnaire and assessment. Of those 1,298 selected inmates, 1,161 completed the background questionnaire. Of the 137 who did not complete the background questionnaire, 12 were unable to do so because of a literacy-related barrier, either the inability to communicate in English or Spanish (the two languages in which the background questionnaire was administered) or a mental disability.

The final response rate for the prison background questionnaire, which included respondents who completed the background questionnaire and respondents who were unable to complete the background questionnaire because of language problems or a mental disability, was 90.6 percent weighted with background questionnaire base weights. Of the 1,161 inmates who completed the background questionnaire, 1,125 completed at least one question on each of the three scales—prose, document, and quantitative—measured in the adult literacy assessment. An additional 8 were unable to answer at least one question on each of the three scales for literacy-related reasons. The final response rate for the literacy assessment, which included respondents who answered at least one question on each scale or were unable to do so because of language problems or a mental disability, was 97.6 percent weighted with background questionnaire base weights.

The same definition of a complete case used for the household sample was also used for the prison sample, and the same rules were followed for imputation. Before imputation, the final response rate for the prison sample was 86.2 percent weighted.

One response on each scale was imputed on the basis of background characteristics for 28 inmates who completed the background questionnaire but had incomplete or missing assessments for reasons that were not literacy related. The statistical imputation procedures were the same as for the household sample. The background characteristics used for the missing data imputation for the prison sample were prison security level, region of country/prison type, age, gender, educational attainment, country of birth, race/ethnicity, and marital status. A wrong response on each scale was imputed for the 3 inmates who started to answer the assessment but were unable to answer at least one question on each scale because of language issues or a mental disability. The final prison reporting sample—including the imputed cases—consisted of 1,156 respondents. After the cases for which responses to the assessment questions were imputed were included, the weighted response rate for the prison sample was 88.3 percent.

Same as the household sample, inmates who completed the main literacy assessment or the supplemental assessment were administered the FAN assessment. The unit response rate of the FAN assessment for the prison sample was 95.1 percent weighted with background questionnaire base weights. The overall unit response rate of the FAN assessment for the prison sample was 84.0 percent weighted.

Table B-2 presents a summary of the prison response rate.

Table B-2. Weighted and unweighted prison response rate, by survey component: 2003

Survey component	Weighted response rate (percent)	Unweighted response rate (percent)
Prison	97.5	97.3
Background questionnaire	90.6	90.4
Literacy assessment	97.6	97.6
Oral module	95.1	95.1
Overall[1] response rate before imputation	86.2	85.8
Overall[1] response rate for FAN	84.0	83.6
Overall[1] response rate after imputation	88.3	88.0

[1] Overall response rate is the product of the response rates from the prison level, background questionnaire, and assessment/FAN.
NOTE: Base weights were used for the calculations of weighted response rates.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Nonresponse Bias

National Center for Education Statistics (NCES) statistical standards require a nonresponse bias analysis when the unit response rate for a sample is less than 85 percent. The nonresponse bias analysis of the household sample revealed differences in the background characteristics of respondents who participated in the assessment compared with those who refused.

In bivariate unit-level analyses at the screener and background questionnaire stages, estimated percentages for respondents were compared with those for the total eligible sample to identify any potential bias owing to nonresponse. Although some statistically significant differences existed, the potential for bias was small because the absolute difference between estimated percentages was less than 2 percent for all domains considered. Multivariate analyses were conducted to further explore the potential for nonresponse bias by identifying the domains with the most differential response rates. These analyses revealed that the lowest response rates for the screener were among dwelling units in segments with high median income, small average household size, and a large proportion of renters. The lowest response rates for the background questionnaire were among males ages 30 and older in segments with high median income. However, the variables used to define these areas and other pockets with low response rates were used in weighting adjustments. The analysis showed that weighting adjustments was highly effective in reducing the bias. The general conclusion was that the potential amount of nonresponse bias attributable to unit nonresponse at the screener and background questionnaire stages was likely to be negligible. Nonresponse bias analyses were detailed by Baldi (2008).

Data Collection

Household interviews took place in respondents' homes; prison interviews generally took place in a classroom or library in the prison. Whenever possible, interviewers administered the background questionnaire and assessment in a private setting. Unless there were security concerns, a guard was not present in the room when inmates were interviewed.

Interviewers used a computer-assisted personal interviewing (CAPI) system programmed into laptop computers. The interviewers read the background questions from the computer screen and entered all responses directly into the computer. Skip patterns and follow-up probes for contradictory or out-of-range responses were programmed into the computer.

After completing the background questionnaire, respondents were handed a booklet with the assessment questions. The interviewers followed a script that introduced the assessment booklet and guided the respondent through the assessment.

Each assessment booklet began with the same seven questions. After the respondent completed those questions, the interviewer asked the respondent for the book and used the algorithm to determine on the basis of

the responses to the first seven questions whether the respondent should continue in the main assessment or be placed in the supplemental assessment.

A respondent who continued in the main assessment was given back the assessment booklet, and the interviewer asked the respondent to complete the tasks in the booklet and guided the respondent through the tasks. The main assessment consisted of 12 blocks of tasks with approximately 11 questions in each block, but each assessment booklet included only 3 blocks of questions. The blocks were spiraled so that across the 26 different configurations of the assessment booklet, each block was paired with every other block and each block appeared in each of the three positions (first, middle, last) in a booklet.

Supplemental Studies: Fluency Addition to NAAL and Adult Literacy Supplemental Assessment

Fluency Addition to NAAL (FAN)

The measure of interest from the fluency assessment was the number of words read correctly per minute (WCPM) for each task. The measure was calculated as follows:

$$\frac{\text{total number of words correctly read} \times 60 \text{ seconds}}{\text{amount of time to complete task}}$$

For example, if a respondent read 79 words correctly on the grade 3 passage in 49 seconds, the WCPM score would be calculated as $(79 \times 60)/49 = 97.0$ words correctly read per minute. If a respondent completed the entire FAN assessment, he or she had WCPM scores for 10 tasks.

Following the calculation of the WCPM scores, each task was examined for missing data. Scores may have been missing for the FAN tasks for one of three reasons:

Administrative error. Administrative errors include malfunctions with the recording equipment or occasions when a respondent attempted the wrong task and was halted by the interviewer.

Respondent refusal. Respondent refusals are instances when a respondent elected not to attempt a task in the assessment.

Quitting a task. Respondents were classified as quitting a task if they (1) failed to complete the task and (2) read for less than 1/6 of the time allotted for the task. One-sixth of the time allotted for a task corresponds to reading for less than 10 seconds for the passages, less than 2.5 seconds for the digit and letter lists, and less than 3.3 seconds for the word and decoding lists.

Respondents with missing data for all 10 tasks were excluded from the fluency analyses. For all other respondents with missing task data, task values were imputed using a multiple regression model. In the model, a respondent's missing task value (e.g., number of words read correctly per minute on the grade 3 passage reading) was predicted on the basis of his or her scores for all other valid tasks (up to 9 other tasks), in addition to the following background characteristics:

- Race/ethnicity (Black, Hispanic, Asian, or Other)
- Age (65 or older)
- Language spoken before starting school (English and Spanish, English and Other, or Non English)
- Educational attainment (less than high school, some college, or college graduate)

This multiple regression imputation method is a single imputation method. Because the imputed values fall directly on a regression surface, the imputed data lack the residual variation present in the hypo-

thetically complete data. As a result, standard errors associated with FAN data estimates could be underestimated. This underestimation would be very small, because only 5 percent of the data were imputed.

Once the imputations were complete, the scores for the tasks within each of the four task groups (digit and letter reading, word reading, decoding, and passage reading) were summed and divided by the number of tasks in the group:

- $\frac{\text{Digit reading} + \text{Letter reading}}{2} = \text{Digit and letter reading}$
- $\frac{\text{Easiest word list} + \text{moderate word list} + \text{hardest word list}}{3} = \text{Word reading}$
- $\frac{\text{Easiest pseudo-word list} + \text{moderate pseudo word list} + \text{hardest pseudo-word list}}{3} = \text{Decoding}$
- $\frac{\text{Grade 3 passage} + \text{Grade 8 passage}}{2} = \text{Passage reading}$

The Basic Reading Skills (BRS) score was calculated by taking the average of the following task scores: passage reading, word reading, and decoding (pseudo-word reading). The digit- and letter-reading score was excluded from the BRS because the skills used to complete these tasks—the ability to recognize a series of letters and numbers—are distinct from the skills measured in the passage-reading, word-reading, and decoding tasks.

A principal components factor analysis supported classifying the oral reading fluency tasks into three task groups: passage reading, word reading and decoding. Digit and letter reading was excluded from the analysis because it is an elemental skill that is distinct from the ability to recognize words or read continuous text. Because the tasks included in the oral reading fluency assessment were designed to measure three sets of skills—word reading, decoding, and passage reading—the principal components analysis was forced to yield a three-factor solution. The three factors explained 92 percent of the variance in the eight measures: the first factor accounted for 74 percent of the variance, the second factor accounted for 10 percent, and the third factor accounted for 8 percent. Factor loadings for the tasks that made up the three factors are shown in table B-3. Note that factor loadings were not used to generate the BRS score. The BRS score is a simple arithmetic average of word reading, decoding, and passage reading scores. It is not a linear composite of the weighted reading fluency task scores (i.e., a factor score).

Table B-3. Factors and factor loadings for measures of oral reading fluency

Factor and oral reading fluency task	Factor loading
Passage reading	
Passage 1	0.87
Passage 2	0.85
Word list reading	
Word list 1	0.85
Word list 2	0.85
Word list 3	0.79
Decoding	
Pseudo-word list 1	0.78
Pseudo-word list 2	0.85
Pseudo-word list 3	0.84

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

In chapter 3, figure 3-8 shows the relationship between measures derived from the oral reading fluency assessment (the four tasks included on the assessment as well as the composite BRS score) and the NAAL prose literacy levels. To examine the relationship between basic reading skills and prose literacy, the *Below Basic* prose literacy level was subdivided into fifths. In the figure, the midpoints

for each of the prose literacy levels—the subdivided *Below Basic* prose levels as well as the *Basic, Intermediate,* and *Proficient* levels—are plotted. Table B-4 shows the range of scores included in each prose literacy level as well as the corresponding midpoints.

Table B-4. Score ranges and midpoints for prose literacy levels plotted in figure 3-8

Prose literacy level	Score ranges	Midpoint
Below Basic 1	0–41	21
Below Basic 2	42–83	63
Below Basic 3	84–125	105
Below Basic 4	126–166	146
Below Basic 5	167–209	188
Basic	210–264	237
Intermediate	265–339	302
Proficient	340–500	420

Source: Hauser, R.M., Edley, C.F. Jr., Koenig, J.A., and Elliott, S.W. (Eds.). (2005). Measuring Literacy: Performance Levels for Adults. Washington, DC: The National Academies Press.

Adult Literacy Supplemental Assessment (ALSA)

The Adult Literacy Supplemental Assessment was administered to respondents who attempted the core literacy questions but were unable to answer a sufficient number correctly to be assigned to the main literacy assessment. A total of 798 adults were included in the supplemental assessment sample, 769 from the household sample and 29 from the prison sample.

A scoring algorithm was used to determine whether respondents should complete the main literacy assessment or the supplemental assessment. Interviewers were trained to score the core literacy tasks immediately after the respondent completed the items and enter the respondent's answers into the CAPI system. On the basis of the interviewer's evaluation of whether the core item responses were correct, incorrect, or not provided, the CAPI system indicated which assessment to administer. The algorithm took into account the response to the core literacy tasks and the language in which the core items were administered (English or Spanish). The algorithm directed the respondent to the supplemental assessment under three scenarios:

- Core literacy tasks CC001 through CC006 were all wrong or were not answered, and the items were administered in English.
- Core literacy task CC007 was wrong or was not answered and was administered in English, and no answer was provided for core items CC003 and CC004.
- The core literacy tasks were administered in Spanish, fewer than five of core items CC001 through CC006 were correct, and core literacy task CC007 was incorrect or not answered.

Under all other circumstances, the interviewer was instructed to administer the main literacy assessment.

The supplemental assessment comprised a total of 45 tasks divided into four task groups: 5 letter-reading tasks, 9 word-identification tasks, 12 word-reading tasks, and 19 comprehension tasks. For each respondent, performance on each of the four task groups was calculated as the percentage of tasks correctly answered within a group. For example, a respondent who answered 3 of the 5 letter-reading tasks correctly was assigned a score of 6 (60 percent correct). The scores were then averaged across all respondents to calculate the overall percent correct for each of the four groups of tasks. The percent correct for specific tasks was calculated by averaging the percentage of correct responses for each task across all respondents.

Weighting and Variance Estimation

A complex sample design was used to select assessment respondents. The properties of a sample selected through a complex design could be very different

from those of a simple random sample, in which every individual in the target population has an equal chance of selection and in which the observations from different sampled individuals can be considered to be statistically independent of one another. Therefore, the properties of the sample for the complex data collection design were taken into account during the analysis of the data. Standard errors calculated as though the data had been collected from a simple random sample would generally underestimate sampling errors. One way of addressing the properties of the sample design was by using sampling weights to account for the fact that the probabilities of selection were not identical for all respondents. All population and subpopulation characteristics based on the NAAL data used sampling weights in their estimation.

The statistics presented in this report are estimates of group and subgroup performance based on a sample of respondents, rather than the values that could be calculated if every person in the nation answered every question on the instrument. It is therefore important to have measures of the degree of uncertainty of the estimates. Accordingly, in addition to providing estimates of percentages of respondents and their average scale score, this report provides information about the uncertainty of each statistic.

Because the assessment used clustered sampling, conventional formulas for estimating sampling variability that assume simple random sampling and hence independence of observations are inappropriate. For this reason, the NAAL assessment uses a Taylor series procedure based on the *sandwich estimator* to estimate standard errors (Binder 1983).

Statistical Testing

The statistical comparisons in this report were based on the *t* statistic. Statistical significance was determined by calculating a *t* value for the difference between a pair of means, or proportions, and comparing this value with published tables of values at a certain level of significance, called the alpha level. The alpha level is an a priori statement of the probability of inferring that a difference exists when, in fact, it does not. The alpha level used in this report is .05, based on a two-tailed test. The formula used to compute the *t* statistic was as follows:

$$t = \frac{(P_1 - P_2)}{\sqrt{(SE_1^2 + SE_2^2)}},$$

where P_1 and P_2 are the estimates to be compared and SE_1 and SE_2 are their corresponding standard errors.

The formula above is appropriate to use when it is reasonable to assume that the groups being compared have been independently sampled for the assessment (e.g., when comparing the basic reading scores of men with the basic reading scores of women). However, when comparing results for groups that share a considerable proportion of adults in common, it is not appropriate to ignore such dependencies. When the dependence in group results is due to the overlap in samples (e.g., when a subgroup is being compared with a total group), a modified formula can be used:

$$t = \frac{(P_{Total} - P_{Subgroup})}{\sqrt{(SE^2_{Total} + SE^2_{Subgroup} - 2pSE^2_{Subgroup})}},$$

where P_{Total} and $P_{Subgroup}$ are the estimates to be compared, and p is the proportion of the total group contained in the subgroup. This formula was used for this report when comparing the percentage of adults in the supplemental assessment, *Below Basic,* and all adult populations.

APPENDIX C

Estimates and Standard Errors for Tables and Figures

Table C3-1. Estimates and standard errors for Figure 3-1. Average number of words correctly read per minute among adults, by Basic Reading Skills score and measures of oral reading fluency: 2003

Measure of basic reading	Average
BRS score	97 (0.6)
Passage reading	154 (0.9)
Digit and letter reading	146 (0.7)
Word reading	105 (0.6)
Decoding	51 (0.4)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults with Spanish language background include adults who spoke only Spanish, as well as adults who spoke Spanish and another non-English language.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-2. Estimates and standard errors for Figure 3-2. Average number of words correctly read per minute among adults for Basic Reading Skills score, by race/ethnicity: 2003

Race/ethnicity	Average
White	102 (0.6)
Black	85 (0.8)
Hispanic	78 (1.1)
Asian/Pacific Islander	94 (1.3)
American Indian/Alaskan Native	93 (3.5)
Multiracial	93 (2.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race. Black includes African American. The Asian/Pacific Islander category includes Native Hawaiians.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-3. Estimates and standard errors for Figure 3-3. Average number of words correctly read per minute among adults for Basic Reading Skills score, by Hispanic background: 2003

Hispanic background	Average
Mexican	76 (1.6)
Puerto Rican	89 (2.7)
Cuban	76 (6.1)
Central or South American	72 (2.8)
Other	87 (2.8)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-4. Estimates and standard errors for Figure 3-4. Average number of words correctly read per minute among adults for Basic Reading Skills score, by language spoken before starting school: 2003

Language spoken before starting school	Average
English only	100 (0.6)
English and Spanish	96 (1.7)
English and other	103 (1.3)
Spanish	66 (1.4)
Other language	86 (1.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The English and Spanish category includes adults who spoke languages in addition to both English and Spanish. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-5. Estimates and standard errors for Figure 3-5. Average number of words correctly read per minute among adults who spoke a language other than English before starting school for Basic Reading Skills score, by age learned English: 2003

Age learned English	Average
10 or younger	100 (0.8)
11–15	81 (1.9)
16–20	73 (2.5)
21 or older	65 (1.8)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults who spoke a language other than English before starting school include those who spoke a language other than or in addition to English before starting school.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-6. Estimates and standard errors for Figure 3-6. Average number of words correctly read per minute among adults for Basic Reading Skills score and measures of oral reading fluency, by main assessment and supplemental assessment populations: 2003

Assessment population	BRS score	Passage reading	Digit and letter reading	Word reading	Decoding
Main assessment	98 (0.5)	156 (0.8)	148 (0.6)	106 (0.6)	52 (0.4)
Supplemental assessment	34 (1.1)	40 (2.1)	77 (1.9)	42 (1.4)	22 (0.9)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults who spoke a language other than English before starting school include those who spoke a language other than or in addition to English before starting school.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-7. Estimates and standard errors for Figure 3-7. Average number of words correctly read per minute among adults in the supplemental assessment population for Basic Reading Skills score, by language of administration for supplemental assessment: 2003

Language	Average
English	37 (2.1)
Spanish	32 (1.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-8. Estimates and standard errors for Figure 3-8. Average number of words correctly read per minute among adults within detailed prose literacy levels, by oral reading fluency tasks and Basic Reading Skills score: 2003

Measure of basic reading	*Below Basic 1*	*Below Basic 2*	*Below Basic 3*	*Below Basic 4*	*Below Basic 5*	*Basic*	*Intermediate*	*Proficient*
BRS score	41 (1.6)	45 (1.7)	48 (1.2)	57 (0.8)	73 (0.9)	90 (0.5)	104 (0.5)	112 (0.6)
Passage reading	53 (2.6)	60 (2.7)	68 (2.0)	85 (1.7)	113 (1.7)	143 (0.9)	166 (0.7)	178 (0.8)
Digit and letter reading	86 (2.4)	91 (2.8)	97 (1.8)	107 (1.3)	124 (1.2)	142 (0.8)	153 (0.7)	157 (0.9)
Word reading	50 (2.1)	54 (2.4)	57 (1.6)	66 (0.9)	81 (1.0)	99 (0.6)	112 (0.6)	118 (0.9)
Decoding	25 (1.0)	26 (1.2)	27 (1.0)	30 (0.8)	36 (0.6)	46 (0.4)	56 (0.4)	62 (0.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-9. Estimates and standard errors for Figure 3-9. Percentage of adults in each Basic Reading Skills level, by prose literacy level: 2003

Literacy level	Fewer than 60 words correct per minute	60–74 words correct per minute	75–89 words correct per minute	90–104 words correct per minute	105 or more words correct per minute
Below Basic	49 (1.8)	22 (1.5)	15 (1.2)	8 (1.1)	6 (1.1)
Basic	11 (0.6)	13 (0.8)	23 (1.0)	26 (1.2)	27 (1.5)
Intermediate	3 (0.3)	4 (0.4)	11 (0.6)	27 (0.9)	55 (1.2)
Proficient	2 (0.4)	1 (0.4)	2 (0.7)	14 (1.9)	81 (2.1)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-10. Estimates and standard errors for Figure 3-10. Percentage of adults in each Basic Reading Skills level, by prose literacy level and language spoken before starting school: 2003

Literacy level and language spoken before starting school	Fewer than 60 words correct per minute	60–74 words correct per minute	75–89 words correct per minute	90–104 words correct per minute	105 or more words correct per minute
English only					
Below Basic	39 (2.3)	24 (2.2)	18 (1.8)	10 (1.8)	8 (1.7)
Basic	10 (0.7)	13 (0.9)	23 (1.2)	27 (1.4)	28 (1.7)
Intermediate	3 (0.3)	4 (0.4)	11 (0.7)	27 (1.0)	56 (1.3)
Proficient	2 (0.4)	1 (0.4)	2 (0.7)	14 (2.1)	82 (2.3)
Spanish					
Below Basic	72 (2.3)	15 (1.6)	10 (1.6)	3 (0.9)	1 (0.7)
Basic	10 (2.5)	18 (2.9)	28 (3.2)	23 (3.1)	22 (3.3)
Intermediate	1 (0.9)	5 (2.2)	18 (3.8)	30 (4.3)	47 (5.0)
Proficient	# (†)	# (†)	10 (15.5)	18 (20.2)	72 (25.3)

Rounds to zero
† Not applicable.
NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-11. Estimates and standard errors for Table 3-3. Average number of words correctly read per minute among adults for Basic Reading Skills score in each prose literacy level, by race/ethnicity: 2003

Race/ethnicity	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
White	76 (1.2)	94 (0.6)	106 (0.6)	113 (0.7)
Black	67 (1.3)	85 (0.8)	97 (0.9)	103 (2.2)
Hispanic	53 (1.0)	86 (0.9)	103 (0.9)	111 (1.6)
Asian/Pacific Islander	70 (4.4)	86 (1.8)	101 (1.3)	112 (2.6)
American Indian/Alaskan Native	63 (8.5)	91 (2.6)	103 (3.3)	110 (3.4)
Multiracial	67 (3.9)	86 (2.6)	100 (2.5)	107 (3.3)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race. Black includes African American. The Asian/Pacific Islander category includes Native Hawaiians.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-12. Estimates and standard errors for Table 3-4. Average number of words correctly read per minute among adults for Basic Reading Skills score in each prose literacy level, by Hispanic background: 2003

Hispanic background	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
Mexican	51 (1.3)	86 (1.0)	104 (1.2)	114 (1.8)
Puerto Rican	64 (3.0)	91 (2.6)	102 (2.3)	105 (4.5)
Cuban	52 (2.1)	82 (5.4)	104 (3.4)	102 (5.4)
Central or South American	52 (2.1)	80 (2.1)	97 (2.2)	107 (6.7)
Other	59 (3.5)	88 (2.8)	104 (2.4)	111 (4.9)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-13. Estimates and standard errors for Table 3-5. Average number of words correctly read per minute among adults for Basic Reading Skills score in each prose literacy level, by language spoken before starting school: 2003

Language spoken before starting school	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
English only	73 (1.1)	92 (0.6)	105 (0.5)	112 (0.6)
English and Spanish	76 (3.1)	93 (1.9)	105 (1.8)	106 (3.2)
English and other	86 (3.4)	96 (2.0)	107 (1.3)	115 (2.2)
Spanish	49 (1.1)	82 (1.4)	97 (1.1)	105 (3.0)
Other language	65 (2.2)	84 (1.5)	97 (1.3)	106 (2.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The English and Spanish category includes adults who spoke languages in addition to both English and Spanish. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-14. Estimates and standard errors for Table 3-6. Average number of words correctly read per minute among adults who spoke a language other than English before starting school for Basic Reading Skills score in each prose literacy level, by age learned English: 2003

Age learned English	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
10 or younger	77 (1.8)	94 (1.1)	106 (0.7)	114 (1.0)
11–15	66 (3.2)	80 (2.0)	94 (2.1)	100 (3.8)
16–20	59 (1.9)	79 (3.0)	91 (3.4)	91 (4.4)
21 or older	54 (1.8)	76 (1.7)	89 (2.5)	86 (4.3)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults who spoke a language other than English before starting school include those who spoke a language other than or in addition to English before starting school.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C3-15. Estimates and standard errors for Figure 3-11. Average number of words correctly read per minute for Basic Reading Skills score in each prose literacy level, by adults who learned to speak English as a second language at age 10 or younger and adults who spoke only English before starting school: 2003

Learned to speak English before age 10 or spoke only English before starting school	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
10 or younger	77 (1.8)	94 (1.1)	106 (0.7)	114 (1.0)
English only	73 (1.1)	92 (0.6)	105 (0.5)	112 (0.6)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-1. Estimates and standard errors for Table 4-1. Percentage of adults in the supplemental assessment, Below Basic prose, and adult population by selected characteristics: 2003

Characteristic	Supplemental assessment	*Below Basic*	All adults
Percent of adult population	3 (0.4)	14 (0.6)	100 (†)
Race/ethnicity			
White	18 (3.4)	37 (2.5)	70 (1.3)
Black	15 (2.7)	20 (1.8)	12 (0.8)
Hispanic	63 (4.8)	39 (3.1)	12 (1.2)
Asian/Pacific Islander	3 (1.4)	4 (0.8)	4 (0.5)
American Indian/Alaskan Native	# (†)	1 (0.3)	1 (0.1)
Multiracial	1 (0.5)	1 (0.4)	2 (0.2)
Hispanic background			
Mexican	69 (5.0)	64 (4.7)	58 (4.3)
Puerto Rican	6 (1.8)	6 (1.2)	10 (1.3)
Cuban	5 (2.6)	5 (1.9)	4 (1.6)
Central or South American	15 (2.6)	18 (2.7)	16 (2.1)
Other	5 (2.0)	7 (1.3)	12 (1.4)
Gender			
Male	57 (2.0)	54 (1.7)	49 (0.5)
Female	43 (2.0)	46 (1.7)	51 (0.5)
Age			
16–18	2 (0.7)	5 (0.8)	6 (0.3)
19–24	11 (1.6)	9 (0.9)	11 (0.4)
25–39	29 (2.1)	25 (1.2)	28 (0.5)
40–49	19 (1.9)	16 (1.3)	20 (0.5)
50–64	18 (2.2)	20 (1.2)	21 (0.4)
65 and older	21 (2.5)	26 (1.5)	15 (0.6)
Language spoken before starting school			
English only	30 (4.3)	52 (2.8)	81 (1.1)
English and Spanish	2 (0.7)	2 (0.5)	2 (0.3)
English and other	1 (0.5)	2 (0.4)	4 (0.3)
Spanish only	59 (5.2)	35 (2.8)	8 (0.8)
Other language	8 (1.8)	9 (1.0)	5 (0.4)
Age learned English			
10 or younger	23 (3.9)	33 (2.8)	70 (1.6)
11–15	13 (3.2)	14 (1.7)	10 (0.8)
16–20	14 (3.2)	17 (1.6)	7 (0.6)
21 or older	49 (5.7)	37 (2.3)	13 (0.9)

See footnotes on second page of this table.

Table C4-1. Estimates and standard errors for Table 4-1. Percentage of adults in the supplemental assessment, Below Basic prose, and adult population by selected characteristics: 2003—Continued

Characteristic	Supplemental assessment	*Below Basic*	All adults
Educational attainment			
Still in high school	5 (1.8)	3 (0.6)	3 (0.2)
Less than/some high school	71 (2.4)	55 (1.8)	15 (0.6)
GED/high school equivalency	3 (0.9)	4 (0.7)	5 (0.3)
High school graduate	16 (2.2)	23 (1.6)	26 (0.6)
Vocational/trade/business school	3 (0.8)	4 (0.7)	6 (0.3)
Some college	1 (0.3)	4 (0.6)	11 (0.4)
Associate's/2-year degree	1 (0.3)	3 (0.6)	12 (0.4)
Bachelor's degree	1 (0.4)	2 (0.4)	12 (0.5)
Graduate studies/degree	# (†)	1 (0.3)	11 (0.5)
Poverty threshold			
Below poverty threshold	58 (3.8)	44 (2.0)	17 (0.7)
100–125% above	10 (1.9)	12 (1.1)	7 (0.3)
126–150% above	9 (1.4)	8 (0.9)	6 (0.3)
151–175% above	8 (1.2)	7 (0.8)	6 (0.3)
Above 175%	15 (1.8)	28 (2.0)	64 (1.0)
Disability status			
Vision problem only	11 (1.1)	7 (0.7)	5 (0.3)
Hearing problem only	2 (0.6)	4 (0.5)	5 (0.2)
Learning disability only	2 (0.6)	4 (0.6)	3 (0.2)
Other disability only	7 (1.1)	10 (0.9)	8 (0.3)
Multiple disabilities	22 (2.7)	21 (1.3)	9 (0.4)
No disability	57 (2.8)	54 (1.8)	70 (0.7)

†Not applicable.
Rounds to zero.
NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race. Black includes African American. The Asian/Pacific Islander category includes Native Hawaiians. The English and Spanish category includes adults who spoke only English and Spanish, as well as adults who spoke English, Spanish, and another non-English language. The Spanish category includes adults who spoke only Spanish, as well as adults who spoke Spanish and another non-English language. The Other language category includes only adults who did not speak English or Spanish. Adults included in the results for Age learned English are those who spoke a language other than or in addition to English before starting school. See appendix B for definitions of variables presented in this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-2. Estimates and standard errors for Table 4-2. Percentage of adults in each disability status category, by language version of the supplemental assessment: 2003

Disability status	English	Spanish
Vision problem only	9 (1.6)	12 (1.8)
Hearing problem only	2 (1.3)	1 (0.5)
Learning disability only	4 (1.2)	1 (0.5)
Other disability only	11 (2.2)	3 (1.0)
Multiple disabilities	35 (4.6)	12 (1.7)
No disability	40 (4.2)	71 (2.2)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-3. Estimates and standard errors for Figure 4-1. Percentage of correct responses among adults in the supplemental assessment population for tasks included on the supplemental assessment: 2003

Task	Percent
Letter reading	57 (3.4)
Word identification	70 (1.6)
Word reading	46 (2.7)
Comprehension	54 (1.4)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-4. Estimates and standard errors for Figure 4-2. Percentage of correct responses among adults in the supplemental assessment population for tasks included on the supplemental assessment, by language of administration: 2003

Task	English	Spanish
Letter reading	80 (2.2)	38 (3.4)
Word identification	65 (2.5)	74 (1.7)
Word reading	56 (2.6)	37 (3.3)
Comprehension	54 (1.9)	54 (2.0)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-5. Estimates and standard errors for Table 4-4. Percentage of correct responses for letter-reading tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003.

	English		Spanish	
Material and task	Familiar	Unfamiliar	Familiar	Unfamiliar
Carbonated beverage can				
Task 1	87 (2.8)	67 (8.4)	44 (3.4)	46 (4.9)
Task 2	79 (3.1)	55 (9.0)	27 (4.6)	31 (4.1)
Task 3	85 (3.1)	57 (9.4)	35 (5.4)	36 (5.8)
No eating or drinking sign				
Task 1	89 (2.5)	63 (6.6)	45 (3.2)	5 (1.8)
Task 2	92 (2.2)	65 (6.2)	55 (3.8)	10 (4.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-6. Estimates and standard errors for Table 4-5. Percentage of correct responses for word-identification tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003

	English		Spanish	
Material and task	Familiar	Unfamiliar	Familiar	Unfamiliar
Carbonated beverage can				
Task 1	74 (3.4)	65 (6.0)	91 (1.8)	90 (3.6)
No eating or drinking sign				
Task 1	76 (4.0)	58 (5.9)	59 (2.9)	16 (5.3)
Task 2	81 (3.9)	57 (6.9)	88 (1.9)	58 (6.0)
Baking mix box				
Task 1	82 (3.6)	63 (5.8)	76 (3.5)	64 (3.6)
Cold medicine box				
Task 1	69 (5.8)	62 (4.7)	86 (2.4)	73 (3.4)
Utility bill				
Task 1	79 (4.1)	27 (6.3)	89 (1.2)	52 (8.1)
Newspaper map				
Task 1	79 (3.2)	49 (4.4)	92 (2.8)	74 (2.8)
Task 2	85 (4.8)	50 (4.4)	92 (2.6)	62 (3.9)
Task 3	70 (6.0)	32 (3.9)	85 (3.4)	46 (4.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-7. Estimates and standard errors for Table 4-6. Percentage of correct responses for word-reading tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003

	English		Spanish	
Material and task	Familiar	Unfamiliar	Familiar	Unfamiliar
Carbonated beverage can				
Task 1	81 (3.2)	62 (8.5)	71 (4.1)	75 (5.6)
Task 2	67 (4.4)	62 (6.7)	47 (5.3)	51 (6.1)
Task 3	62 (4.4)	53 (8.2)	26 (3.9)	20 (4.4)
No eating or drinking sign				
Task 1	81 (4.0)	49 (7.5)	58 (4.5)	11 (4.2)
Baking mix box				
Task 1	74 (5.2)	58 (5.3)	58 (4.1)	35 (5.6)
Task 2	63 (4.7)	45 (6.3)	24 (2.7)	11 (3.1)
Cold medicine box				
Task 1	62 (4.8)	46 (5.2)	31 (3.4)	33 (7.4)
Grocery advertisement				
Task 1	26 (3.8)	17 (5.6)	38 (4.3)	13 (4.5)
Yard sale sign				
Task 1	80 (3.7)	32 (6.8)	46 (5.4)	11 (3.7)
Utility bill				
Task 1	61 (5.3)	9 (3.0)	34 (3.6)	14 (3.2)
Newspaper map				
Task 1	72 (5.4)	43 (5.3)	53 (6.1)	18 (3.5)
Television program schedule				
Task 1	57 (5.2)	29 (3.8)	55 (5.8)	20 (3.4)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table C4-8. Estimates and standard errors for Table 4-7. Percentage of correct responses for comprehension tasks among adults in the supplemental assessment population, by language of administration and familiarity with material: 2003

Material and task	All	English		Spanish	
		Familiar	Unfamiliar	Familiar	Unfamiliar
No eating or drinking sign					
Task 1	69 (3.0)	82 (3.0)	47 (9.8)	71 (3.9)	51 (7.5)
Task 2	87 (2.1)	93 (1.7)	78 (7.7)	88 (2.1)	58 (9.1)
Baking mix box					
Task 1	37 (2.2)	56 (4.2)	30 (5.0)	42 (4.6)	18 (3.1)
Task 2	59 (2.5)	73 (4.1)	44 (5.5)	70 (4.0)	42 (4.4)
Task 3	39 (2.7)	61 (5.0)	26 (3.9)	43 (5.1)	22 (4.5)
Cold medicine box					
Task 1	45 (2.5)	51 (4.3)	35 (5.7)	49 (2.9)	44 (5.3)
Grocery advertisement					
Task 1	81 (2.3)	79 (3.0)	49 (10.6)	95 (1.8)	68 (5.1)
Task 2	69 (3.6)	79 (3.5)	51 (10.4)	71 (4.8)	46 (9.4)
Task 3	74 (2.3)	82 (4.0)	57 (9.4)	79 (2.3)	51 (4.7)
Task 4	71 (2.5)	76 (3.6)	47 (10.6)	80 (3.2)	49 (6.3)
Yard sale sign					
Task 1	69 (2.0)	78 (3.9)	26 (6.9)	85 (2.4)	46 (6.1)
Task 2	80 (1.7)	94 (1.8)	40 (6.3)	93 (1.6)	53 (6.4)
Utility bill					
Task 1	58 (3.5)	72 (4.0)	21 (5.2)	67 (5.6)	29 (6.7)
Task 2	40 (2.9)	48 (3.7)	10 (3.5)	49 (5.2)	20 (5.0)
Newspaper map					
Task 1	36 (2.6)	55 (5.1)	20 (3.4)	60 (4.7)	27 (3.3)
Television program schedule					
Task 1	43 (3.4)	73 (3.7)	40 (4.7)	53 (5.0)	27 (4.5)
Task 2	37 (2.2)	54 (5.3)	21 (3.6)	48 (3.9)	34 (4.1)
Task 3	32 (1.8)	48 (4.2)	15 (2.7)	56 (5.2)	26 (3.5)
Task 4	33 (2.6)	51 (5.7)	20 (3.5)	52 (5.5)	27 (3.3)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

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