Preparing for Life Beyond Prison Walls: The Literacy of Incarcerated Adults Near Release

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Introduction

During the past 20 years, the United States' population of incarcerated adults has dramatically increased. Since 1980, this population has increased by approximately 334 percent; more than 2.1 million individuals were in jails or prisons in 2006 (Bureau of Justice Statistics 2006). In 2007, there were an estimated 509 sentenced prisoners per 100,000 U.S. residents (Bureau of Justice Statistics 2007). This population clearly represents a large number of U.S. adults, many of whom will be released and re-entering the job market and life in general. Inmates released from prison who lack literacy skills may find it difficult to adjust to life beyond a correctional institution. To help incarcerated adults succeed after their release, it is important that they have the literacy required to find and retain employment and to manage everyday tasks.

Using data collected from the 2003 National Assessment of Adult Literacy (NAAL), this report examines the literacy of incarcerated adults who indicated that they were scheduled to be released within two years, or "near release," for the purposes of this report. The computation of a release date is a complex one that may be recalculated continually on the basis of a variety of factors such as state statutes, court decisions, sentence length versus expected time served, and inmate behavior. For this report, the concept of near release is based on the self-reported release date provided by respondents and therefore may not reflect an accurately calculated anticipated release date. Many analyses using the full sample of all incarcerated adults were conducted as part of the *Literacy Behind Bars: Results From the 2003 National Assessment of Adult Literacy Prison Survey* report (Greenberg, Dunleavy, and Kutner 2007). However, the analyses described in this report look specifically at the characteristics of inmates who reported that they were near release, compare the literacy of incarcerated adults who were near release with the literacy of adults in the general population, and identify the characteristics of inmates near release that are most associated with low literacy. Many of the background variables examined in this report are based on self-reported data, and because many of the variables are related to one another, complex interactions and relationships among them cannot be explored. Therefore, readers are cautioned not to draw causal inferences based solely on the results presented here.

The 2003 NAAL assessed the English literacy of incarcerated adults for the first time since 1992. The assessment was administered to approximately 1,200 inmates (ages 16 and older) in state and federal prisons, as well as to approximately 18,000 adults (ages 16 and older) living in households. In the prison sample, 702 inmates were near release (i.e., within two years of release). In addition to assessing the literacy skills of respondents, the NAAL gathered extensive background information on their demographic and socioeconomic characteristics (e.g., age, gender, country of birth, schooling), as well as on their literacy practices.

The NAAL measured respondents' proficiency on three literacy scales: *prose*, *document*, and *quantitative*. Proficiency was measured on a scale that ranged from 0 to 500. Scores on each of the three literacy scales were characterized in terms of four literacy proficiency levels: *Below Basic*, *Basic*, *Intermediate*, and *Proficient*.[1] These analyses focused on the prose and quantitative literacy scales; in some sections, the analyses focused on the prose literacy scale only. A detailed description of background variables and methodology used in this report is provided in Appendix A: Methodology and Technical Notes.

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[1] For an interpretation of the literacy scales and performance levels on the NAAL prison assessment, see Greenberg, E., Dunleavy, E., and Kutner, M. (2007). *Literacy Behind Bars: Results From the 2003 National Assessment of Adult Literacy Prison Survey* (NCES 2007-473). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Profile of Incarcerated Adults Who Were Near Release

Background Characteristics

Demographic Characteristics

As shown in Table 1, incarcerated adults who were near release tended to be male, ages 25-39, and U.S. natives. More than 90 percent of the incarcerated adults near release were males and only 9 percent were females. The majority (51%) of incarcerated adults near release were ages 25-39. Forty-five percent of incarcerated adults near release were Black and 35 percent were White. A higher percentage of White incarcerated adults were near release compared with White incarcerated adults not near release. As found in the *Literacy Behind Bars* report for all incarcerated adults, there were more Blacks (nearly half of both those near release and those not near release) in the population of incarcerated adults than in the general household population.

Table 1. Percentage distribution of incarcerated adults near release, incarcerated adults not near release, and the household population, by selected characteristics: 2003

Characteristic	Incarcerated adults near release	Incarcerated adults not near release	Household adults
Gender			
Male	91	97	48*
Female	9	—	52*
Age			
16-24	18	13	17
25-39	51	52	27*
40-49	25	26	20*
50 or older	6	9	36*
Race/ethnicity			
White	35	27*	71*
Black	45	48	11*
Hispanic	16	19	12
Other	—	—	6
Country of birth			
U.S.	92	90	86*
Other	8	10	14*
Language spoken before starting school			
English only or with other	91	90	87*
Other only	9	10	13*
Self-assessment: Understand English when it is spoken to you			
Very well	80	72*	83
Well	18	23*	12*
Not well	—	—	3
Not at all	—	—	1

See notes at end of table.

Characteristic	Incarcerated adults near release	Incarcerated adults not near release	Household adults
Self-assessment: Speak English			
Very well	71	68	77*
Well	25	27	18*
Not well	—	—	4
Not at all	—	—	2
Self-assessment: Read English			
Very well	66	58*	76*
Well	24	33*	17*
Not well	8	—	5*
Not at all	—	—	2
Self-assessment: Write in English			
Very well	61	52*	70*
Well	27	35*	21*
Not well	10	9	6*
Not at all	—	—	3
Highest educational attainment			
Less than/some H.S.	35	40	19*
H.S grad/GED or equivalency diploma	41	42	31*
Postsecondary	24	18*	51*
Have you used a computer?			
Yes	26	24	77*
No	74	76	24*
Computer literacy			
At least some computer literacy	16	14	70*
No computer literacy	84	86	30*

*Significantly different from incarcerated adults who were near release at the significance level of .05.
— Sample size is insufficient to permit a reliable estimate.
NOTES: Percentages may not sum to 100 because of rounding. The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and Multiracial adults.

The large majority of all incarcerated adults were native to the United States; however, a higher percentage of incarcerated adults near release were born in the United States than adults in the household population. The large majority of all incarcerated adults reported that they learned English only or with another language prior to starting school.

The NAAL respondents were asked to self-assess their English proficiency in terms of how well they understood English when spoken to and how well they spoke, read, and wrote English. The large majority of incarcerated adults near

release reported that they spoke, read, wrote, and understood spoken English "very well" or "well." Higher percentages of incarcerated adults near release reported that they read and wrote English "very well" than inmates not near release. However, a smaller percentage of inmates near release reported that they read and wrote English "very well" than adults in the household population.

Highest Educational Attainment and Computer Literacy

Thirty-five percent of incarcerated adults near release had attained less than/some high school education. Forty-one percent of adults in this group had earned a high school diploma, General Educational Development (GED) certificate, or equivalency diploma. Compared with adults living in households, a higher percentage of incarcerated adults near release had a high school diploma, GED certificate, or equivalency diploma and a lower percentage of inmates near release (24%) had postsecondary education. A higher percentage of inmates near release had attained a postsecondary education than inmates not near release.

Approximately three-quarters of all inmates reported that they had not used a computer. This is considerably different from the household population, in which more than three-quarters (77%) reported they had used a computer. Similar to these results, the majority of incarcerated adults were not computer literate: 84 percent of those who were near release and 86 percent of those who were not near release. A smaller percentage (30%) of adults in the household population was not computer literate.

Prison Experiences

The NAAL prison background questionnaire collected data from respondents on various types of prison experiences. With regard to classes about life and career skills, the group of inmates near release was nearly split in reported participation, as shown in Table 2: 47 percent had not taken any of these types of classes, whereas 54 percent had taken at least one class. A higher percentage of incarcerated adults who were near release reported taking at least one class compared to those who were not near release.

Comparable to the results of the *Literacy Behind Bars* report for all incarcerated adults, approximately two-thirds of the incarcerated adults who were near release had work assignments at the time of the assessment. Among this group, 54 percent reported that they "never" read and 57 percent reported they "never" wrote as part of their prison job(s). One-third (34%) of these individuals reported that they read and 23 percent that they wrote "every day" as part of their job(s). Excluding prison work assignments, 73 percent of incarcerated adults near release had not been a student in a vocational training program since their most recent admission to prison.

As expected, and shown in Table 2, the majority (76%) of inmates near release had the shortest expected sentences (60 months or less). By contrast, 59 percent of incarcerated adults not near release were those with expected sentences of 121 months or longer. Fifteen percent of inmates not near release were sentenced to 61-120 months.

Table 2. Percentage distribution of incarcerated adults near release and incarcerated adults not near release, by selected prison experience characteristics: 2003

| Characteristic	Incarcerated adults near release	Incarcerated adults not near release
Life and career skills classes		
Yes	54	46*
No	47	54*
Currently have any work assignments		
Yes	67	70
No	33	30
Read as part of your current job (s) in prison		
Every day	34	35
Less than every day	13	17
Never	54	48
Write as part of your current job(s) in prison		
Every day	23	27
Less than every day	20	19
Never	57	54
In vocational training program in prison		
Yes	27	32
No	73	68
Length of sentence		
0-60 months	76	12*
61-120 months	15	30*
121 months or more	9	59*

*Significantly different from incarcerated adults who were near release at the significance level of .05.
NOTE: Percentages may not sum to 100 because of rounding.

Prose and Quantitative Literacy

Estimates of the mean prose and quantitative literacy scores of incarcerated adults near release and not near release, along with estimates of the mean scores for the household population, are displayed in Figure 1. The mean prose and quantitative literacy scores of the incarcerated adults who were near release and incarcerated adults not near release were equal. However, as reported in the *Literacy Behind Bars* report for all incarcerated adults, both the mean prose and quantitative literacy scores of the incarcerated adults who were near release were lower than those of the general household population.

Figure 1.   Average prose and quantitative literacy scores
of incarcerated adults near release, incarcerated adults
not near release, and the household population: 2003
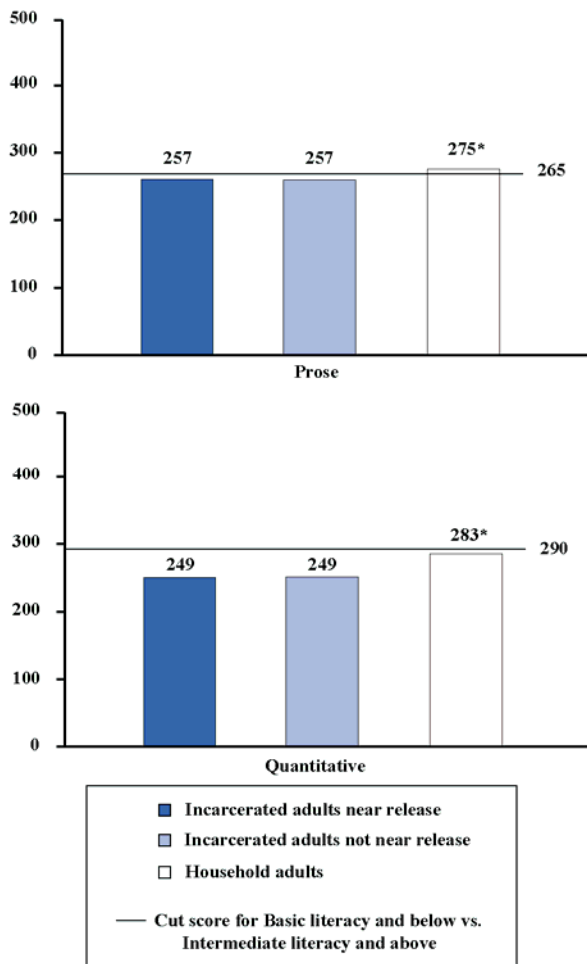
*Significantly different from incarcerated adults who were near release
at the significance level of .05.

Figure 2.   Percentage of incarcerated adults near release,
incarcerated adults not near release, and the
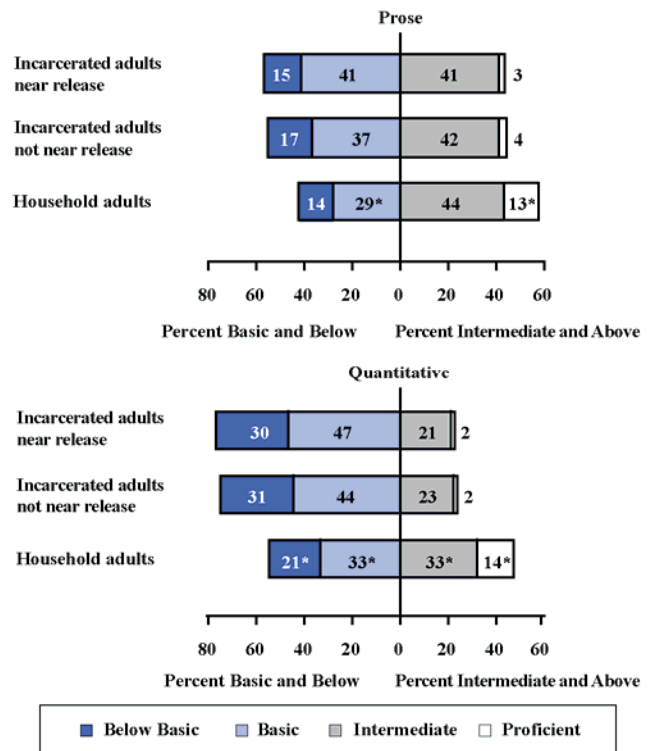household population in each literacy level: 2003

*Significantly different from incarcerated adults who were near release
at the significance level of .05.

The literacy scores can also be used to assign individuals to one of the four levels of literacy performance. The percentage distributions across proficiency levels on prose and quantitative scales are displayed in Figure 2. With regard to prose literacy, inmates near release and inmates not near release had nearly the same distributions among the four proficiency levels. More than half of the incarcerated adults near release had *Below Basic* or *Basic* prose literacy: 15 percent of those near release had *Below Basic* and 41 percent of those near release had *Basic* prose literacy.

Thirty percent of inmates near release had *Below Basic* quantitative literacy, and nearly half (47%) of this group had *Basic* quantitative literacy. Significantly smaller percentages of the household population had *Below Basic* or *Basic* quantitative literacy than did incarcerated adults who were near release.

Profile of Incarcerated Adults Who Were Near Release with Low Prose Literacy

This section compares the characteristics of incarcerated adults who were near release with the two lowest prose proficiency levels (i.e., *Below Basic* and *Basic*), referred to as the lower literacy or less literate group in this report, with the characteristics of those with *Intermediate* and *Proficient* prose literacy, referred to as the higher literacy or more literate group. Special focus was paid to the incarcerated adults near release with lower literacy because they were considered to be of the greatest interest in terms of potential literacy interventions that would improve their skills and employability upon release.

Background Characteristics

Demographic Characteristics

Table 3 shows selected demographic characteristics of lower literacy incarcerated adults near release in comparison to lower literacy adults not near release and lower literacy adults in the general household population.

Table 3. Percentage distribution of incarcerated adults near release with low prose literacy, adults not near release with low prose literacy, and the household population with low prose literacy, by selected characteristics: 2003

Characteristic	Incarcerated adults near release with low prose literacy	Incarcerated adults not near release with low prose literacy	Household adults with low prose literacy
Age			
16-24	19	13	17
25-39	47	50	24*
40-49	29	26	17*
50 or older	5	11*	42*
Race/ethnicity			
White	25	21	54*
Black	53	49	18*
Hispanic	19	26	22
Other	—	—	6
Country of birth			
U.S.	87	85	76*
Other	13	15	24*
Language spoken before starting school			
English only or with other	88	85	76*
Other only	12	16	24*
Self-assessment: Understand English when it is spoken to you			
Very well/well	98	92	89*
Not well/not at all	—	—	11
Self-assessment: Speak English			
Very well/well	94	91	87*
Not well/not at all	—	—	13
Self-assessment: Read English			
Very well/well	83	83	84
Not well/not at all	17	18	16
Self-assessment: Write in English			
Very well/well	81	78	80
Not well/not at all	19	22	20
Highest educational attainment			
Less than/some H.S.	51	58	34*
H.S. grad/GED or equivalency diploma	33	33	38
Postsecondary	16	9*	28*

See notes at end of table.

Table 3. Percentage distribution of incarcerated adults near release with low prose literacy, adults not near release with low prose literacy, and the household population with low prose literacy, by selected characteristics: 2003—Continued

Characteristic	Incarcerated adults near release with low prose literacy	Incarcerated adults not near release with low prose literacy	Household adults with low prose literacy
Have you used a computer?			
Yes	24	21	57*
No	76	79	43*
Computer literacy			
At least some computer literacy	14	12	48*
No computer literacy	86	88	52*

*Significantly different from incarcerated adults who were near release at the significance level of .05.
— Sample size is insufficient to permit a reliable estimate.
NOTES: Percentages may not sum to 100 because of rounding. The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and Multiracial adults.

Nearly half (47%) of the lower literacy inmates who were near release were ages 25-39 and 29 percent were ages 40-49. There was a greater number of lower literacy incarcerated adults near release ages 25-39 and ages 40-49 than their lower literacy counterparts in the household population. A higher percentage of inmates not near release with lower prose literacy than those near release with lower prose literacy were age 50 or older.

Among lower literacy incarcerated adults near release, 53 percent were Black, 25 percent were White, and 19 percent were Hispanic. In comparison to the less literate household population, Blacks were overrepresented and Whites were underrepresented among lower literacy incarcerated adults near release. Specifically, a considerably smaller percentage of lower literacy inmates near release were White than in the lower literacy household population. A higher percentage of less literate incarcerated adults who were near release were Black (53%) than in the less literate household population (18%).

The large majority (87%) of lower literacy incarcerated adults near release were born in the United States. A higher percentage of lower literacy incarcerated adults near release were born in the United States than those with lower literacy in the household population (76%).

Eighty-eight percent of lower literacy adults near release spoke English (only or with another language) as their first language. A higher percentage of lower literacy incarcerated adults near release spoke English (only or with another

language; 88%) than those with lower literacy in the household population (76%).

Interestingly, with regard to their abilities to understand English when spoken to and to speak, read, and write English, overall, lower literacy incarcerated adults near release tended to overestimate their abilities, as shown in Table 3. Specifically, lower literacy incarcerated adults near release had significantly more favorable self-assessments (i.e., "very well" and "well" responses) of their abilities to understand English when spoken to and to speak and read English than adults in the less literate household population. This has potential implications for literacy-related programming because such programs are often voluntary. If incarcerated adults with lower literacy are unable to recognize their need for literacy-based improvements, they may not elect to participate in such programs.

Highest Educational Attainment and Computer Literacy

More than half of all lower literacy inmates had attained less than/some high school education. One third of the lower literacy inmates who were near release and inmates not near release had a high school diploma, GED certificate, or equivalency diploma. A higher percentage of lower literacy inmates near release had less than/some high school than adults with lower literacy in the household population.

Approximately three-quarters of lower literacy inmates near release had not used a computer. A considerably higher percentage (57%) of adults in the household population had used a computer. Eighty-six percent of lower literacy incarcerated adults near release were not computer literate. The percentage of less literate incarcerated adults near release who were not computer literate was considerably higher than that of less literate adults in the household population.

Prison Experiences

As shown in Table 4, inmates with both low and high prose literacy shared similar profiles. Sixty-four percent of lower literacy incarcerated adults near release had a work assignment in prison. Among those in this group with work assignments, slightly more than one-third (35%) read "every day" as a part of their job(s). Fifty-three percent of those in this group "never" read as part of their jobs. Fifty-five percent of those with work assignments and lower prose literacy reported that they "never" wrote as part of their job(s). Seventy-four percent of lower literacy incarcerated adults who were near release had not participated in vocational training in prison. Three-fourths of lower literacy, near-release incarcerated adults had a prison sentence of 60 months or less.

Table 4. Percentage distribution of incarcerated adults near release with low prose literacy and incarcerated adults near release with high prose literacy, by selected prison experience characteristics: 2003

Characteristic	Incarcerated adults near release with low prose literacy	Incarcerated adults near release with high prose literacy
Currently have any work assignments		
Yes	64	70
No	36	30
Read as part of your current job(s) in prison		
Every day	35	32
Less than every day	12	13
Never	53	55
Write as part of your current job(s) in prison		
Every day	22	25
Less than every day	24	15*
Never	55	60
In vocational training program in prison		
Yes	26	27
No	74	73
Length of sentence		
0-60 months	75	78
61-120 months	16	14
121 months or more	9	8

*Significantly different from incarcerated adults who were near release at the significance level of .05.
NOTE: Percentages may not sum to 100 because of rounding.

Characteristics Most Associated with Low Prose Literacy Among Incarcerated Adults Who Were Near Release

To identify characteristics most associated with the low prose literacy of incarcerated adults near release, we conducted multivariate analyses (see Appendix A for details on the methodology). Such analyses allowed us to disentangle differences in the characteristics among incarcerated adults near release with *Below Basic*, *Basic*, and *Above Basic* (i.e., *Intermediate* and *Proficient*) prose literacy.

In general, among the factors investigated, educational attainment, race/ethnicity, and being foreign- or native-born were found to be associated with the literacy level of incarcerated adults near release.

For example, inmates near release who lacked a high school diploma or a GED certificate were, not surprisingly, nearly four times more likely than those who had received postsecondary education to have *Below Basic* prose literacy relative to *Above Basic* prose literacy. A similar pattern was found between these two educational groups with regard to their likelihood of having *Basic* over *Above Basic* literacy. Similarly, foreign-born inmates were nearly three times more likely than their native-born counterparts to have *Basic* prose literacy relative to *Above Basic* prose literacy. Also, among all incarcerated adults near release, Black inmates were 1.6 times more likely than White inmates to have *Above Basic* over *Basic* prose literacy.

Summary

This report, based on the 2003 NAAL Prison Survey assessment data, examines the characteristics of incarcerated adults who were near release as well as the relationship between the various characteristics and English literacy proficiency of this population group.

Although the focus of this report is on incarcerated adults near release, several findings were true of both inmates near release and inmates not near release. Key findings that were true of each subgroup are as follows:

- Incarcerated adults had lower mean prose and quantitative literacy scores than adults in the household population.
- More than 90 percent of incarcerated adults were male; this is significantly more than in the general household population (48%).
- Black inmates were overrepresented in comparison to the household population, while White inmates were underrepresented.
- Lower percentages of incarcerated adults (16% of those near release and 14% of those not near release) had at least some computer literacy than respondents in the household population (70%).
- Incarcerated adults with lower literacy tended to overestimate their self-assessments of their abilities to understand English when spoken to and to speak and read English (i.e., with responses of "very well" and "well") compared with adults in the lower literacy household population.

Additional key findings in this report are as follows:

- A higher percentage of incarcerated adults near release were White than incarcerated adults not near release.
- Higher percentages of incarcerated adults near release reported that they read and wrote English "very well" than incarcerated adults not near release. By contrast, lower percentages of inmates near release reported they read and wrote English "very well" than adults in the general household population.

- As expected, similar percentages of incarcerated adults who were near release and those who were not near release had less than a high school diploma, GED certificate, or equivalency diploma.
- A higher percentage of incarcerated adults who were near release reported taking at least one class related to life and career skills in prison than those who were not near release.
- Two-thirds of incarcerated adults who were near release had work assignments. Among this group, 54 percent reported that they "never" read and 57 percent reported they "never" wrote as part of their prison job(s).
- The majority (76%) of inmates near release had the shortest expected sentence lengths (60 months or less). By contrast, half (50%) of incarcerated adults not near release were those with expected sentences of 121 months or longer.
- Approximately three-quarters of lower literacy incarcerated adults near release had not used a computer and 86 percent were not computer literate.
- Among inmates near release, inmates who lacked a high school diploma or a GED certificate, Black incarcerated adults, and inmates who were born outside of the United States were more likely to have low prose literacy.

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Appendix A: Methodology and Technical Notes

This section describes the background variables and statistical procedures used in this report. It also provides a brief explanation of the direct estimation method and the plausible values method used to estimate the NAAL proficiency scores. For information on survey methodology (e.g., sampling, data collection, weighting and variance estimation, scaling) for the NAAL, see *Literacy in Everyday Life: Results from the 2003 National Assessment of Adult Literacy* (Kutner, Greenberg, Jin, Boyle, Hsu, and Dunleavy 2007).

Descriptions of Background Variables

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

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

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, or Other language(s). The English and Spanish category includes adults who spoke languages in addition to both English and Spanish.

Self-Assessment of English Proficiency
The NAAL respondents were asked to assess their English proficiency regarding how well they understood English when spoken to and how well they spoke, read, and wrote English. Respondents assessed their proficiency in each of these skills by responding "*very well*," "*well*," "*not well*," or "*not at all*."

Highest Educational Attainment
All respondents were asked to indicate the highest level of education they had completed prior to their most recent admission to prison. The following options were provided:

- Less than high school (0-8 years)
- Some high school (9-12 years but did not graduate)
- 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.

Computer Literacy
The NAAL background questionnaire collected data from respondents on performing various activities using a computer. Specifically, respondents were asked how often (every day, a few times a week, once a week, less than once a week, never) do they:

- Send or receive an email message
- Write using a word processing program
- Use a spreadsheet program or use a financial program
- Look up information on a CD-ROM
- Find information on the Internet

On the basis of these questionnaire items, a computer literacy scale was created such that respondents who had never performed any of these five computer activities were considered to have no computer literacy, whereas those who had at least some experience with at least one of the five items were considered to have at least some computer literacy.

Expected Date of Release
Inmates were asked whether they had a definite date on which they expected to be released, in what month and year they would be released, or whether they expected to ever be released from prison. The computation of a release date is a complex one that may be recalculated continually on the basis of a variety factors such as state statutes, court decisions, sentence length versus expected time served, and inmate behavior. Therefore, for the purposes of this report, the

expected date of release is based solely on the respondent's self-report. Using the respondent's report, the date of release was categorized as two years or less or more than two years from the date of the interview. This variable was used to distinguish the "near release" and "not near release" subgroups, respectively.

Participation in Life and Career Skills Classes
The NAAL prison background questionnaire collected data from respondents on their participation in a variety of life skills courses while in prison. Specifically, the question asked respondents whether, since their most recent admission to prison, they participated in:

- Employment counseling (including how to find a job or interviewing skills)
- Classes in parenting or child rearing skills
- Classes in life skills and community adjustment, including anger management, conflict resolution, personal finance, or other life skills

On the basis of these questions, a life and career skills scale was created. Respondents who answered "yes" to any one of the three questions were considered to have participated in life and career skills classes; those who answered "no" to all three questions were considered to have not participated.

Vocational Training Participation
Inmates were asked whether since their most recent admission to prison they had been a student in a vocational training program, excluding prison work assignments, and whether they were currently students in a vocational training program. Inmates were identified as no participation, past participation, or current participation in vocational training in prison.

Work Assignment
Inmates were asked whether they currently had a prison work assignment.

Reading as Part of Prison Work Assignment
Inmates were asked to indicate how often they read as part of their current jobs in prison. They were given the following options: every day, a few times a week, once a week, less than once a week, or never.

Writing as Part of Prison Work Assignment
Inmates were asked to indicate how often they wrote as part of their current jobs in prison. They were given the following options: every day, a few times a week, once a week, less than once a week, or never.

Length of Sentence
Inmates were asked to indicate in what month and year they were admitted to prison most recently and whether they had a definite date on which they expected to be released. If they answered "yes" to having a definite date to be released, they were asked in what month and year they would be released. Those who did not have a definite date to be released were asked the month and year of their earliest possible release

date. Their responses to these questions were used to calculate the length of their incarceration: 0-60 months, 61-120 months, 121 or more months/do not expect to be released.

Statistical Procedures

Tests of Statistical Significance

All comparisons discussed in this report have been tested for statistical significance using 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. Differences in the means and proportions between subgroups were calculated using the following t statistic:

$$t = \frac{(p_1 - p_2)}{\sqrt{(se_1^2 + se_2^2)}}$$

where p_1 and p_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors. When a subgroup was compared to a total group, a modification of the standard error of difference was made to adjust for group dependence. The formula for the adjusted standard error of difference was as follows:

$$SE_{Total-Subgroup} = \sqrt{SE_{Total}^2 + SE_{Subgroup}^2 - 2pSE_{Subgroup}^2}$$

where p is the proportion of the total group contained in the subgroup.

Minimum Sample Sizes for Reporting Subgroup Results

In the NAAL reports, the sample sizes were not always large enough to permit accurate estimates of proficiency and/or background results for one or more categories of variables. For results to be reported for any subgroup, a minimum sample size of 45 was required. This number was arrived at by determining the sample size needed to detect an effect size of 0.5 with a probability of 0.8 or greater, using a design effect of 1.5. This design effect implies a sample design-based variance 1.5 times that of a simple random sample. The effect size of 0.5 pertains to the true difference in a given mean estimate (e.g., mean proficiency) between the subgroup in question and the total population, divided by the standard deviation of that estimate in the total population. An effect size of 0.5 was chosen following Cohen (1988), who classifies effect size of this magnitude as "medium" as well as to be consistent with what was done in the 1992 National Adult Literacy Survey (NALS).[2]

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[2] Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (second edition). Hillsdale, NJ: Lawrence Erlbaum Associates.

Multinomial Logistic Regression Analyses

Proficiency on the NAAL literacy scales (i.e., prose, document, and quantitative) is measured on a scale that ranges from 0 to 500. The performance of adults on the assessment can be reported as either mean scores on the scale or on the basis of the distribution of adults across the NAAL performance levels (*Below Basic*, *Basic*, *Intermediate*, and *Proficient*). Each performance level describes the abilities associated with score ranges on the NAAL scale.

In investigating the effects of multiple factors on low literacy for incarcerated adults, we conducted multinomial logistic regression analyses. Such analyses allowed us to disentangle differences between the characteristics of incarcerated adults near release with *Below Basic* literacy and those of incarcerated adults near release with *Basic* literacy, while holding constant a series of other explanatory variables. Similarly, it also allowed us to examine differences between the characteristics of incarcerated adults near release with *Basic* literacy and those with literacy levels in the next highest categories (*Intermediate* and *Proficient*).

Multinomial logistic regression is a form of regression used when the dependent variable is categorical with more than two classes and the independent variables are of any type.[3] It allows the simultaneous comparison of more than one contrast (e.g., the probability of *Below Basic* vs. *Basic* literacy, *Basic* vs. *Above Basic* literacy, *Below Basic* vs. *Above Basic* literacy) and usually expresses the impact of predictor variables on dependent variables in terms of odds ratios.

The odds ratio for a given independent variable represents the factor by which the odds change in the dependent variable for a one-unit change in the independent variable. For example, if the odds ratio for success in a given performance test for females versus male is 3.5, and if this odds ratio is statistically significant, we would say that the odds of success for females are 3.5 times as large as for males.

The statistical significance of the odds ratio estimates are indicated by the confidence interval for the odds ratio. If the confidence interval around the odds ratio contains the value of 1.0, then the change in the value of the independent variable is not associated with change in the odds of the dependent variable. Thus, that independent variable is not considered a useful predictor in the logistic model.

In our multinomial logistic regression analyses, the outcome measure was the NAAL literacy performance level: *Below Basic*, *Basic*, and *Above Basic* (i.e., *Intermediate* and *Proficient* combined). Using the literacy levels rather than the NAAL scale scores as the dependent variables in the model made the analyses more easily interpretable. If the continuous NAAL scale scores had been used, the results would need to be discussed in terms of unit changes on the NAAL scale per unit change in an independent variable. The impact of specific variables would be more difficult to grasp in this approach, given the abstract nature of the NAAL scale. The predictor variables in the model were age, race/ethnicity, language spoken before starting school, country of birth, educational attainment, participation in basic skills training, participation in life and career skills classes, prison work assignments, participation in vocational training in prison, length of sentence, computer literacy, and oral passage reading scores as measured in Fluency Addition to NAAL.[4]

Table A-1 reports the odds ratio estimates from the multinomial regression of the prose literacy performance level on the set of predictor variables described above.

Estimation of Literacy Proficiency

The NAAL used a complex assessment design that allowed maximum coverage of the broad domain of literacy while minimizing the time burden on any one respondent. Under this design, the NAAL administered only a fraction of the assessment items on each literacy scale to each respondent. Although individual respondents were required to take only a small portion of the entire pool of assessment questions, the aggregate results across the entire assessment allowed broad reporting of literacy for the targeted population. However, because respondents did not receive enough literacy tasks to provide reliable information about individual performance, traditional test scores for individual respondents would have resulted in biased estimates of population characteristics and therefore were not appropriate to use for estimates of population statistics.

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[3] For more information on multinomial logistic regression, see Hosmer, D., and Lemeshow, S. (2004). *Applied Logistic Regression*. New York: John Wiley & Sons.

[4] As part of the NAAL assessment, adults were asked to read a series of short passages aloud. Their responses were recorded and later scored for accuracy and speed.

Table A.1. Odds ratio estimates from multinomial regression for incarcerated adults near release

Effect	Below Basic vs. Basic			Basic vs. Above Basic			Below Basic vs. Above Basic		
	Point Estimate	95% Wald Confidence Limits		Point Estimate	95% Wald Confidence Limits		Point Estimate	95% Wald Confidence Limits	
Race/ethnicity: Black vs. White	--	--	--	1.62	1.05	2.51	--	--	--
Country of birth: Foreign vs. U.S.	--	--	--	2.89	1.00	8.40	--	--	--
Education: Less than/some high school vs. Postsecondary	--	--	--	2.58	1.40	4.77	3.94	1.51	10.34
Oral passage reading score	0.98	0.97	0.99	0.99	0.99	1.00	0.97	0.96	0.98

-- Estimates not significant and not shown.
Note: Results were only shown for predictors with significant odds ratio estimates.

To obtain unbiased estimates of population statistics (e.g., subgroup means or percentages in each proficiency level), the NAAL used methods derived from Marginal Maximum Likelihood (MML) estimation. Such MML estimation procedures were available with AM software.[5] Estimates for average literacy scores and percentages in each literacy proficiency level in this report were all obtained using the direct estimation method with AM. The multinomial logistic regression analyses could not be conducted using MML direct estimation because the procedure is not available in AM. Instead, an alternative estimation procedure called plausible values methodology was used for the multinomial logistic regression analyses. Plausible values were initially developed for the National Assessment of Educational Progress (NAEP; Mislevy 1984, 1985, 1991; Thomas, 1993) to allow secondary users to estimate statistics derived from individual data. Plausible values are multiple imputations randomly drawn from a distribution derived from the MML parameter estimates for an extensive conditioning model (Allen, Carlson, and Zelenak 1999).

It is important to recognize that plausible values are not test scores for individual, and they should not be treated as such. Plausible values are randomly drawn from the distribution of scores that could be reasonably assigned to each individual. As such, the plausible values contain random error variance components and are not optimal as scores for individuals.

In our multivariate analyses, five plausible values for each adult were obtained as estimates of scores on the prose literacy scale. These plausible values were then used to assign each individual to one of the NAAL performance levels. Five sets of multinomial regression analysis were conducted, using each of the five plausible values. The reported odds ratio estimates are the average of the five odds ratio estimates using each of the five plausible values. It should be noted, however, that the standard errors used in the significance tests for the reported odds ratio estimates were not adjusted for variation among the five sets of results given the complexity of the computations and the unavailability of an estimation procedure in the statistical software. Therefore, the confidence limits around the odds ratio estimates might be narrower than they would be, had the standard errors been corrected.

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[5] For more information on direct estimation methodology followed for NAAL and the use of AM, see Baldi, S. (Ed.) et al. (Forthcoming). *Technical Report and Data File User's Manual for the 2003 National Assessment of Adult Literacy*. U.S. Department of Education. Washington, DC: National Center for Education Statistics.