

Reading practices among adult education participants

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Abstract

This study extends the literature on the relation between reading practices and individual characteristics of participants in adult education who have low literacy skills. Reading practices describe individuals' reading frequency for different types of written material, such as books, newspapers, magazines, technical materials, and work documents. Our survey of 213 participants considered individual characteristics such as age, gender, education level, reading level, learning disability status, and employment status. Univariate, bivariate, and multivariate analyses identified differences in reading practices by age, gender, learning disability status, and reading level. Complex interactions among these learner characteristics were also identified. We discuss the implications of our findings for educators of adults when matching curricular materials to salient learner characteristics, which could enhance the learners' persistence and success.

Key words: adult education, low literacy, reading practices

Reading practices among adult education participants

Smith (1996) identified reading practices as an important contributor to adults' reading proficiency. Thus, knowledge of a learner's current reading practices can be an important ingredient in an educator's plan for helping an adult improve literacy skills. As adult educators design programs, select and acquire curricular materials, and make instructional decisions, they can build on learners' current reading practices as well as cultivate increased reading frequency and exposure to new types of reading materials.

Reading practices, which Smith (1996) described as involving “literacy practices with different print contents, such as books, newspapers, magazines, and brief documents of various kinds” (p. 196), are in one sense an individualized construct; that is, each person has his or her own reading practices. Various demographic characteristics that affect both the opportunity to read and ability can shape reading practices (Guthrie, Seifert, & Kirsch, 1986). For this reason, previous research (e.g., Kirsch, Jungeblut, Jenkins, & Kolstad, 1993; Kutner, Greenberg, & Baer, 2005; Smith) that described adult reading practices in the United States in relation to variables such as age, education level, and reading proficiency is helpful for understanding adult learners in general.

Participants in adult education (AE) programs in the United States are a unique group because they have committed to improving their literacy skills by choosing to attend AE programs. A more specific understanding of the reading practices of this population could benefit adult educators as well as others interested in addressing adults' literacy needs, whether in federal or state social program policy initiatives such as welfare reform or employment training, or in other efforts to improve economic or employment outcomes, family literacy levels, or civic participation. By understanding learners' current reading practices, educators may match curricular materials used in instruction to salient learner characteristics in ways that can enhance learners' persistence and success in AE programs (Kruidenier, 2002; McShane, 2005). Therefore, our study extends national studies in the United States by describing the reading practices of this unique subpopulation, that is, individuals attending adult basic and secondary education programs. We identify the relation of age, gender, education level, reading level, self-reported learning-disability (LD) status, and employment status to reading practices of this population. In addition we discuss implications of our findings for AE programs and instructors who work with adults to improve literacy.

Literature review

Reading practices. Some studies showed that patterns of reading practices provide important clues about adult literacy proficiency (Kirsch, et al, 1993; Smith, 1996). Kirsch and Guthrie (1984) observed that literacy practices occur when a person uses reading skill within a specific context for a specific purpose. Smith suggested that social context guides reading practices by determining what and when a person reads.

In contrast to our study, the National Adult Literacy Survey (NALS; Kirsch, et al., 1993), and the National Assessment of Adult Literacy (NAAL; Kutner, Greenberg, & Baer, 2006) studied representative samples of adults ages 16 and older in the United States. The NAAL provided a longitudinal view of adult literacy and a more segmented view of individuals whose skills are defined at a literacy level below basic, including individuals who could not be tested due to language limitations and individuals who were tested using an alternative assessment. The NAAL "found little change between 1992 and 2003 in adults' ability to read and understand

sentences and paragraphs or to understand documents such as job applications" (U.S. Department of Education [USDE], 2005, p. 1). Kutner, et al. presented only a first look at the NAAL data (e.g., demographics by literacy levels, overall scores), and more in-depth analyses of the data have not yet entered the literature. Due to the limited amount of change between the 1992 NALS and 2003 NAAL overall results, we include studies that reference the more analyzed NALS data as well as the more recent NAAL data.

The NALS results indicated that adults who scored in the lowest levels of literacy were less likely to read a daily newspaper, whereas adults who scored in the highest proficiency levels were more likely to read a daily newspaper (Kirsch, et al., 1993). Furthermore, 18% of NALS participants responded that they rarely (less than once a week or never) engage in reading and more than 50% of the participants who rarely engage in reading did not complete high school or earn a General Educational Development (GED) credential (Finn, 2001). Smith (1996) found that adults who had high reading activity in at least one print medium per week (e.g., book, magazine, newspaper) scored higher in the NALS five literacy levels than adults who rarely read. In addition, frequent reading of books and work documents were strongly associated with higher literacy proficiency (Smith). Similarities may exist between the demographic characteristics of NALS respondents who scored in the lowest literacy proficiency levels and participants in AE programs.

Nationally, individuals attending AE programs tend to be under 25 years of age and tend to have low levels of educational attainment (Moore & Stavrianos, 1995). Prior studies indicated education and age were common predictors of learner outcomes in AE programs (e.g., Alamprese, 2003; Boudett & Friedlander, 1997; Edwards, 2003; Fitzgerald & Young, 1997; Moore & Stavrianos; Snow & Strucker, 2000; Wayman, 2001). Other studies associated adult literacy with other individual characteristics, such as socioeconomic status, employment, and earnings (e.g., Council for Advancement of Adult Literacy [CAAL], 2003; Kirsch, et al., 1993; Moore & Stavrianos; Snow & Strucker); learning disabilities (e.g., Alamprese; Corley & Taymans, 2002; Elliott & Hayward, 1996; Fowler & Scarborough, 1993; Moore & Stavrianos; Snow & Strucker) and gender (e.g., Beder, 1999; Smith, 1996; Wayman).

Education. Education level tends to affect reading practices and ability, as well as occupational ability and attainment, thus affecting income level and quality of life (Corcoran, 1995; Finn, 2001; Guthrie et al., 1986; Kirsch et al., 1993; Kirsch & Guthrie, 1984). Boudett and Friedlander (1997) concluded, "It appears that the greater the initial achievement level, the more likely an individual was to benefit academically from enrollment" (p. 581) in AE programs.

The NAAL study (Kutner, et al., 2005) reported 55% of individuals with below basic prose literacy did not graduate from high school or its equivalent compared to 15% of all adults. The NALS results implied education level had an especially strong association with literacy proficiency levels. College graduates were more likely to score in the highest two of the five proficiency levels, whereas only 10% to 13% of high school graduates scored in the highest levels (Kirsch, et al., 1993). In addition, 95% of adults who did not begin high school and 80% who did not complete high school had prose proficiencies in the lowest two proficiency levels. As Johnson (2001) stated, "One of the strongest findings of the NALS is that education is vitally important for literacy proficiency" (p. 99). Smith (1996) also found education level helps predict literacy proficiency: "Poorly educated adults who do not read perform worse than educated adults who do not read" (p. 215). Furthermore, Smith's analyses found a statistically significant interaction between education level and reading practices.

Age. Both Smith (1996) and Kirsch, et al. (1993) reported literacy proficiency increases with age until age 55, after which literacy levels start to drop. Kutner et al. (2005) reported 46% of individuals with below basic prose literacy were over the age of 50. Kirsch et al. suggested age may be associated with educational attainment as the NALS data showed that adults older than 55 completed fewer years of schooling than younger adults. Smith found literacy performance increased with each additional print medium as age increased, thus adults 65 and older who read four or five print media had similar literacy proficiency as younger adults who read only one print medium. Smith, however, showed that more than 25% of adults 65 years and over read few or no print media.

Variance in age corresponded with increasingly diverse learner characteristics, which have potentially significant implications for literacy programs' strategies for recruiting and retaining participants. Younger adults were likely to participate more often in AE programs; however, older adults were more likely to persist in such programs (Moore & Stavrianos, 1995). Younger adults, who have generally been away from school for less time, may have an advantage in achievement level. Age may be closely related to community size or "ruralness" (Cotton, 1996, p. 6).

Employment. Adults in the lowest levels of literacy were less likely to be employed. The NAAL indicated 65% of adults with below basic prose literacy were not in the labor force, unemployed, or were employed only part time, compared with only 36% of adults with proficiency in prose literacy (Kutner et al., 2005). Likewise, more than 50% of NALS respondents scoring in literacy level 1 were unemployed (Kirsch, et al., 1993). Only 30% of adults at proficiency level 1 and 45% at proficiency level 2 reported full-time employment. In contrast, 64% to 75% of adults who scored in the two highest literacy proficiency levels reported full-time employment (Kirsch, et al., 1993). Adults who were younger and employed tended to participate more in AE (Moore & Stavrianos, 1995). Still, research on AE participants (CAAL, 2003; Snow & Strucker, 2000) is consistent with NAAL and NALS results, namely, that substantial proportions of participants were unemployed.

Socioeconomic status and earnings. Findings from the NALS data indicated literacy proficiency levels were related to quality of life through socioeconomic status and earnings. Adults who had low literacy scores were more likely to be in poverty and on food stamps than adults who scored higher (Kirsch, et al., 1993).

Learning disabilities. Another common marker of low literacy is the presence of learning disabilities (Alamprese, 2003; Byers, 1993; Corley & Taymans, 2002; Elliott & Hayward, 1996; Snow & Strucker, 2000). An estimated 50% to 80% of AE program learners may have some form of LD, but "there is no consensus on the impact of learning disabilities on achievement in adult education programs" (Moore & Stavrianos, 1995, p. 33). Others (Corley & Taymans, 2002; Fowler & Scarborough, 1993), however, pointed to a connection between LD incidence and socioeconomic characteristics, as well as under identification of females with LD. The NAAL (Kutner et al., 2005) reported 3% of all adults and 4% of adults with below basic prose literacy had only LD; 9% of all adults and 21% of adults with below basic prose literacy had multiple disabilities, which could include LD.

Gender. The NAAL (Kutner et al., 2005) indicated more men than women had below basic prose literacy (men 15% versus women 12%), and 60% of women, compared to only 56% of men, achieved intermediate or proficient prose literacy. In addition to these differences in skill levels, Smith (1996) reported gender differences in reading practices. Adults also differ by gender in learning gains (Beder, 1999) and AE program completion (Wayman, 2001). Beder

indicated a finding from an evaluation of adult basic education programs: Female participants made more learning gains than males. Wayman identified a potential for interactions between gender and education level completed before attending AE, or gender and other variables, in determining the likelihood of adults completing a diploma or GED. However, Wayman found no significant effects of gender that could not be controlled through other variables.

Adult education participants' reading practices

AE participants are a unique subpopulation of adults who generally have practical goals associated with literacy instruction, such as GED attainment or vocational preparation (McShane, 2005). If educators of adults understand the reading practices of this subpopulation, they may be able to provide reading instruction more relevant to learners' goals and transferable to their daily lives (Kruidenier, 2002; McShane). Unlike the findings from the NAAL and NALS surveys, which represent reading practices of the entire adult population and a broad array of social contexts in the United States, our study provides educators of adults with low literacy insight into their students' specific reading practices. Thus, we formulated three research questions:

1. How are AE participants' reading practices scores and individual reading practices associated with individual characteristics (e.g., age, education, reading performance, gender, employment, learning disability)?
2. Adjusting for significant individual characteristics, does an AE participant's reading performance predict his or her reading practices?
3. How does reading performance differ by reading practice group and by significant individual characteristics among AE participants?

Methods

Research design

In conjunction with a larger study of adult education programs and instructional interventions, we created a structured interview questionnaire to collect demographic and reading practices data; from these data we calculated a reading practices score to represent reading practices. We selected two standardized assessments as summary measures of reading performance: the 1998 edition Woodcock Reading Mastery Test-Revised (WRMT-R) passage comprehension subtest (Woodcock, 1998), and the Comprehensive Adult Student Assessment System (CASAS) Reading assessment (CASAS, 2001). Finally, we performed univariate, bivariate, and multivariate analyses of the data on three dependent variables—reading practices score, WRMT-R passage comprehension score, and CASAS Reading score—to give us insight into the reading practices of this population and how those practices related to reading ability.

Setting

Examiners, graduate research assistants trained to criterion on the assessment instruments, collected data for the study from participants in 12 of Kansas' 31 adult education programs awarded state and federal Adult Education and Family Literacy Act (AEFLA) funding through Kansas Board of Regents and the U.S. Department of Education Office of Vocational and Adult Education (OVAE). The population of Kansas was nearly 2.7 million in 2000, and its community size varied from 13 residents in Oak Hill to 329,211 in Wichita (Kansas Department of Transportation, 2001; U.S. Census Bureau, 2004). The U.S. Census Bureau (2002) reported

14% of approximately 1.7 million adult Kansans 25 years and older in 2000 did not graduate from high school, one-third of who did not complete the ninth grade. Many of these individuals are likely to be in need of AE services provided to approximately 12,000 Kansans annually (Glass, 2004).

AE programs in Kansas were generally small, ranging in size from 67 to 1,745 participants, with a median number of 194 participants served annually ($M = 324.56$, $SD = 360.21$; Kansas Board of Regents [KBOR], 2004). Statewide, AE programs served 60% adult basic education (ABE) and adult secondary education (ASE) learners, and 40% English as a Second Language (ESL) learners; many programs served at least 80% ABE and ASE learners (KBOR, 2004). Kansas AE programs assess incoming students using the CASAS (2001). AE participants are placed into one of six functional levels of education based on their CASAS score. Nationally, adult learners entering at the four highest ABE and ASE levels represent three-fourths of all non-ESL learners, that is, 24.1% are Level 3 (Low-Intermediate ABE); 33.5% are Level 4 (High-Intermediate ABE); 9.7% are Level 5 (Low ASE); and 7.4% are Level 6 (High ASE; USDOE, 2004).

Participants

During the first class period of each AE session, research and AE program staff recruited study participants by presenting the study goals and processes to all ABE and ASE enrollees in the participating programs. Each participant had to be at least 16 years old and must have withdrawn from secondary education. From approximately 660 learners who expressed interest in participating, we drew a stratified random sample of 515 learners. We stratified the number of potential participants from individual AE programs by entry reading level proportionate to the reading levels of the subpopulation in Kansas AE programs. Learners who agreed to participate in the study were then entered into a pool of potential participants. Because few Level 3 learners were in the pool initially, we immediately accepted all of them into the study. We randomly selected learners from Levels 4, 5, and 6 and contacted them for participation in the study. About 29% of the stratified random sample ($n = 150$) could not be contacted for reasons such as a disconnected phone, relocation, or incarceration; about 17% of the sample ($n = 87$) declined to participate for various reasons, such as lack of interest, time, or transportation, and conflicts due to work schedules or family emergencies; and 1% of the sample ($n = 5$) was assessed only partially.

We conducted a full battery of assessments with the remaining 273 learners. Because we wanted to understand the reading practices of adults with low literacy skill levels and not adults with language differences, we excluded from our study individuals participating in ESL classes ($n = 27$). Further, we did not include in this study those individuals who read at the two lowest reading levels due to a small number of available participants in these subgroups ($n = 31$) and extreme outliers presenting multiple validity concerns ($n = 2$). Therefore, all 213 participants were classified as Levels 3 through 6 (Low-Intermediate ABE through High ASE). On average, the sample's entry level was Level 4 High-Intermediate ABE ($M = 4.5$, $SD = 1.1$), which is roughly equivalent to a ninth-grade reading skill. Table 1 compares demographic characteristics of participants with characteristics of individuals enrolled in AE programs nationally and in Kansas. Participants received nominal monetary compensation for their time.

Fifty-nine percent of the 213 participants were female. In addition, 51% of participants considered themselves members of a non-white race or ethnic group, a smaller percentage than the national average in AE programs due in part to the fact we did not sample data from adults in

ESL classes. Participants tended to be young; although the mean age was nearly 29 years ($M = 28.55$, $SD = 13.74$), the median age was 22 years. A majority lived in an urban area (71% of participants) and had been employed in the previous year (78% of participants). About half had never married and were not parents. On average their household income was estimated at US\$19,000, close to the federal poverty level for a family of four (U.S. Department of Health and Human Services, 2005). The household income group with the highest number of participants earned no more than US\$9,999 annually, placing their income at or below the federal poverty level for an individual.

Table 1. *Demographic Characteristics of Adult Education Participants in 2004*

Characteristic	United States		Kansas		Participants	
	<i>n</i>	Percent of total	<i>n</i>	Percent of total	<i>n</i>	Percent of total
Age						
16-18 years	372,584	14%	2,104	21%	55	26%
19-24 years	677,499	25%	2,784	28%	70	33%
25-44 years	1,200,608	45%	3,999	41%	54	25%
45-59 years	328,558	12%	749	8%	26	12%
60 years and over	97,779	4%	152	2%	8	4%
Total	2,677,028	100%	9,788	100%	213	100%
Race/Ethnicity						
African American	535,489	20%	1,019	10%	64	30%
Asian	189,734	7%	773	8%	4	2%
Hispanic	1,157,568	43%	3,972	41%	19	9%
White	737,529	28%	3,777	39%	104	49%
Other	56,708	2%	247	3%	22	10%
Total	2,677,028	100%	9,788	100%	213	100%
Gender						
Male	1,223,883	46%	4,270	44%	87	41%
Female	1,453,145	54%	5,518	56%	126	59%
Total	2,677,028	100%	9,788	100%	213	100%
Employment Status						
Employed	1,008,684	38%	4,620	47%	167	78%
Unemployed	1,054,507	39%	3,697	38%	46	22%
Not in labor force	324,863	12%	1,471	15%	--	--
Institutionalized	289,065	11%	--	--	--	--
Total	2,677,119*	100%	9,788	100%	213	100%

Notes. *National employment data from 2003, thus a different total from the 2004 data in all other categories; -- Data not collected in sample or data from state level disaggregated differently from national level.

Most participants (88%, $n = 187$) had not completed high school: 32 completed 8th grade or less; 41 completed 9th grade, 69 completed 10th grade, 45 completed 11th grade, and 26 completed 12th grade or higher. Twenty-four percent of participants ($n = 51$) self-reported diagnosis of LD, with prevalence rates of 29% ($n = 25$) for males and 22% ($n = 28$) for females. Seven percent of participants ($n = 15$) spoke Spanish while growing up, and 3% ($n = 6$) spoke languages other than English or Spanish.

Instruments and procedures

Examiners orally administered structured interviews with participants, as well as a written and oral battery of 14 measures of literacy in a private testing room at the AE program site. The interview covered demographic characteristics, education, health, occupation, family histories, and reading practices. Most participants completed the interview within 20 minutes. The interview questionnaire is available from the authors on request.

Examiners administered a literacy battery that included three measures of fluency, three measures of decoding skills, two measures of vocabulary, two measures of general language ability, and four measures of reading comprehension. The entire battery required about four hours per participant to complete. From this battery of tests, we chose the 1998 edition Woodcock Reading Mastery Test-Revised passage comprehension subtest (WRMT-R PC; Woodcock, 1998), and the Comprehensive Adult Student Assessment System Reading assessment (CASAS Reading; 2001) as our summary measures of reading performance.

We selected the WRMT-R's passage comprehension subtest because the test is widely used to measure individuals' ability to read and comprehend short passages of two to three sentences using a cloze procedure. WRMT-R PC takes about 12 to 35 minutes to administer, and contains 68 items arranged in order of difficulty. Nearly all (i.e., 207) participants completed the WRMT-R PC subtest.

CASAS is a standardized assessment used throughout AE programs in Kansas and human service and labor agencies, as well as in at least 20 other states for AE (National Institute For Literacy, 2004). We selected CASAS Reading for this study, not only for its broad use throughout the AE community as a measure of functional literacy, but also for its validity and strong psychometric properties (Flowerday, 2005). CASAS assesses adults with low skill levels in reading, writing, and math competencies by measuring attainment of specific competencies related to workplace and survival needs, such as reading technical manuals, tax forms, or prescription labels. Each assessment item is associated with curriculum materials from a variety of published sources for instruction and may be used to match students to curriculum content for instruction. Learners in the study had 45 minutes to complete 39 reading comprehension questions arranged in order of difficulty. For the reading-level variable, we matched participants' most recent CASAS Reading scores to the six reading levels as described in the National Reporting System for adult education (USD OE, 2004) using the Kansas AE programs' equivalency scale (i.e., Level 3 = 211 – 220; Level 4 = 221 – 235; Level 5 = 236 – 245; and Level 6 \geq 246).

Dependent variables

We selected three dependent variables for analysis: (a) reading practices score, (b) WRMT-R PC raw score, and (c) CASAS Reading diagnostic raw score. The reading practices score represents the sum of participant responses on eight items in the structured interview. These items were comparable to the types of print media in Smith's (1996) study of NALS data, with two exceptions. Our interview questionnaire added an item referring to e-mails, which are now much more prevalent than in 1992 when the NALS was conducted. We also consolidated the types of work-related materials into fewer categories than Smith used. In the first four items of our interview, participants were asked, with each item in parentheses representing a separate query: At home or at work, how often do you read (newspapers) (magazines) (books) (letters, notes, and e-mails) in English? Employed participants were then asked an additional four items: As part of your current, or most recent, job, how often have you read or used information from

(memos or letters other than email) (manuals or reference books, including catalogs or parts lists) (directions or instructions for medicines, recipes, or other products) (diagrams or schematics)?

We structured possible responses to individual items in a Likert-like scale: every day (5), a few times a week (4), once a week (3), less than once a week (2), or never (1). Participants who read all eight print media every day had the potential to score up to 40 in the summed scale (i.e., eight print media multiplied by the maximum reading frequency score of five). Persons who indicated they never read any of the eight print media had a reading practices score of eight. Adults who had not worked in a paid job in the prior 12 months and who indicated they never read any of the first four print media might have a reading practices score as low as four.

Independent variables

Independent variables used in our analyses were age group, education level completed before entering AE, reading level, gender, employment status and self-reported LD status. These variables were consistent with those variables identified as important in previous research as outlined in the preceding literature review. The reading practices score and CASAS Reading raw score also functioned as independent variables in one analysis and dependent variables in another analysis.

Variables were checked to ensure they met assumptions of normal distribution, central tendency, and multicollinearity. All variables were then plotted with another relevant variable in scatter plots for visual inspection following Tabachnick and Fidell's (2001) recommended data cleaning procedures and exploratory data analysis techniques.

Gender, employment status, and self-reported LD were dichotomous variables, and the variables females, employed, and individuals reporting a LD were dummy coded as 1. For univariate and bivariate analyses, ages were grouped according to national categories used for AE (USDE, 2004), and WRMT-R PC raw scores were not transformed. For the multivariate analyses the WRMT-R PC raw score was recalculated with a square root transformation to adjust for the sample's wide variability of raw scores. For reading practices groups, we segmented the sample by reading practices scores to reflect Low (scores from 8 to 19), Medium (scores from 20 to 27), and High (scores from 28 to 39) reading frequencies.

Data analysis

Analysis procedures included univariate, bivariate, and multivariate statistical analyses. At the univariate level, we identified descriptive numbers and percentages for characteristics of participants. In addition, we calculated means of reading practices, WMRT-R PC, and CASAS Reading scores for groups differing in age, education level, reading level, gender, employment status, and self-reported LD. We compared mean scores and calculated ω^2 as a measure of effect size for significant group differences (Stevens, 1999).

For bivariate analysis, we cross-tabulated individual reading practices with the eight print media by age group, education level, reading level, gender, employment status, and self-reported LD. For ordinal demographic variables (i.e., age group, education level, and reading level), we employed a Mantel-Haenzel chi-squared statistic, M^2 , to assess the degree of linear associations (Agresti, 1996). The standard normal statistic M , the square root of the Mantel-Haenzel chi-square statistic, is calculated as $M = r * \sqrt{(N-1)}$, where r estimates the strength of the association and is a Pearson correlation of the demographic variable's ranked score with the individual reading practices score. We opted for the Mantel-Haenzel chi-squared statistic because it relies on a single degree of freedom to test statistical dependency, regardless of number of ordinal

levels, and therefore has greater power than χ^2 , which uses multiple degrees of freedom. For dichotomous variables (i.e., gender, employment status, and self-reported LD) we used M^2 and r along with a Mann-Whitney statistic, U , to test whether ordinal differences in individual reading practices scores are significant between the two levels (Agresti, 1996; Grissom & Kim, 2005).

Because we were also interested in examining the relation between reading performance and reading practices, we conducted two multivariate analyses. For the first multivariate analysis we selected 70% of our total sample and completed a sequential multiple regression (Osborne, 2000) in three blocks—addressing significant individual characteristics—with reading practices score as a dependent variable. To cross-validate the model, we used the remaining 30% and compared the goodness of fit.

Our second multivariate analysis was a MANOVA to test whether reading performance on our two measures of reading performance differed by reading practices group (Low, Medium, High), considering significant individual characteristics. We decided a priori to follow up the MANOVA with a multiple regression for each reading measure for two reasons: (a) to determine whether any characteristic might be eliminated if another contributed minimally to variance, and (b) to confirm the findings of the MANOVA individually with CASAS Reading and WRMT-R PC (Patterson et al., 2003).

Results

Results of the univariate and bivariate analyses are presented in Tables 2, 3, and 4. The reading practices scores ranged from 8 to 39 ($M = 23.77$, $SD = 6.80$), with 19 as the most frequently occurring score. The mean score of 24 might depict someone who reads materials across eight media about once a week. A score of 19 approximates the reading practices of someone reading the eight media less than once a week.

WRMT-R PC raw scores ranged from a low of 13 correct answers (1.4 grade equivalency [GE]) to a high of 62 correct (16.9 GE) out of 68 possible items ($M = 43.31$, $SD = 9.60$). Scores of 49 (8.5 GE) occurred most frequently, and the median score was 44 (6.8 GE). Participants with high reading levels tended to have high raw scores on WRMT-R PC. Participants who were non-white, lacked a high school diploma or GED, or self-reported LD tended to have low WRMT-R PC raw scores. Scores tended to increase as reading level increased: Most Level 3 participants scored at a GE between 1.4 and 4.2; Levels 4 and 5 participants' scores varied between GE 4.4 and 8.5; and most Level 6 participants scored above GE 9.0.

CASAS Reading raw scores ranged from a low of 7 to a high of 36 correct out of 39 possible items ($M = 21.10$, $SD = 7.26$). The most frequently occurring CASAS Reading score was 20, which was also the median score.

In answer to our first research question, How are reading practices scores and individual reading practices associated with individual characteristics? we found no statistically significant differences in reading practices scores by age group, education level, reading level, or employment status. We, however, found statistically significant differences by gender and self-reported LD. We also found statistically significant differences in WRMT-R PC and CASAS Reading scores by reading level and self-reported LD, and by gender in CASAS. However, we found no statistically significant effects for reading performance by age group, education level, or employment status for either reading assessment.

Reading practices score. The overall reading practices score for all participants was 23.77 ($SD = 6.80$), which may be interpreted as reading once per week across all eight print media (see Table 2). For participants under 25 years, the mean reading practices score was less than the overall mean, but differences lacked statistical significance. When considered by reading level, the average reading practices score gradually increased as reading level increased, and adults with higher reading levels tended to read more. Females read more than males, $F(1, 212) = 10.19, p < .01, \omega^2 = .04$. Participants who self-reported LD read less often than participants not reporting LD, $F(1, 206) = 7.61, p < .01, \omega^2 = .03$.

Table 2. Scores for Reading Practices by Age, Education Level, Reading Level, Gender, Employment Status, and Self-reported Learning Disability Status (LD)

Characteristic	n	Reading Practices Score				
		M	SD	F	df	ω^2
All Participants	213	23.77	6.80			
Age				1.40	4	<.01
16–18 years	55	22.31	6.74			
19–24 years	70	23.51	6.80			
25–44 years	54	25.28	6.80			
45–59 years	26	24.15	6.62			
60 years and over	8	24.75	7.05			
Education level completed				0.87	4	<.01
8th grade or less	32	24.50	6.42			
9th grade	41	23.00	6.58			
10th grade	69	23.45	7.02			
11th grade	45	25.11	6.86			
12th grade or higher	26	22.65	6.94			
Reading level				1.45	3	<.01
Level 3 Low Intermediate ABE	53	23.00	7.66			
Level 4 High Intermediate ABE	53	23.38	6.98			
Level 5 Low ASE	52	23.25	6.20			
Level 6 High ASE	55	25.40	6.17			
Gender				10.19**	1	.04
Male	87	22.02	6.42			
Female	126	24.98	6.81			
Employment status				2.77	1	<.01
Employed	167	24.18	6.32			
Unemployed	46	22.30	8.21			
Self-reported LD				7.61**	1	.03
Yes	51	21.59	6.54			
No	162	24.50	6.56			

Note. The scale for the reading practices score ranges from 4 to 40.

** $p < .01$

Mean scores in reading performance differed by self-reported LD for WRMT-R PC, $F(1, 201) = 7.70, p < .01, \omega^2 = .03$, and for CASAS Reading, $F(1, 198) = 9.18, p < .01, \omega^2 = .04$.

Participants who self-reported LD tended to have lower scores in reading performance based on WRMT-R PC than participants who did not (see Table 3). Gender differences were not statistically significant on the WRMT-R. CASAS Reading scores followed a similar pattern, but females had higher scores on average than did males, $F(1, 203) = 9.78, p < .01, \omega^2 = .04$ (see Table 4). Reading performance on both measures tended to rise steadily as current reading level increased, for WRMT-R PC, $F(3, 203) = 49.11, p < .001, \omega^2 = .41$; and for CASAS Reading, $F(3, 201) = 61.19, p < .001, \omega^2 = .47$.

Table 3. *WRMT-R Passage Comprehension Raw Scores by Age, Education Level, Reading Level, Gender, Employment Status, and Self-reported Learning Disability Status (LD)*

Characteristic	n	WRMT-R Passage Comprehension raw score				
		M	SD	F	df	ω^2
All Examinees	207	43.31	9.60			
Age				2.06	4	.02
16–18 years	53	44.09	7.69			
19–24 years	68	44.84	8.06			
25–44 years	52	42.75	10.83			
45–59 years	26	41.00	12.66			
60 years and over	8	36.25	10.90			
Education level				0.91	4	<.01
8th grade or less	32	42.91	9.65			
9th grade	39	41.15	8.51			
10th grade	66	44.41	9.07			
11th grade	44	44.39	8.10			
12th grade or higher	26	42.42	13.93			
Reading level				49.11***	3	.41
Level 3 Low Intermediate ABE	52	34.85	9.58			
Level 4 High Intermediate ABE	51	41.51	7.31			
Level 5 Low ASE	50	44.64	6.56			
Level 6 High ASE	54	51.93	5.41			
Gender				0.52	1	<.01
Male	84	42.73	9.90			
Female	123	43.71	9.41			
Employment status				0.01	1	<.01
Employed	162	43.27	9.85			
Unemployed	45	43.44	8.77			
Self-reported LD				7.70**	1	.03
Yes	49	40.14	9.80			
No	154	44.45	9.35			

** $p < .01$ *** $p < .001$

We also cross-tabulated reading practices by age group, gender, self-reported LD, and reading level. Reading practices by age group summarized in Table 5 show how often participants reported reading each of the eight print media. As age group increased learners

tended to more often read newspapers, $M^2(1) = 4.98$, $M = 2.18$, $p < .05$, $r = .15$; books, $M^2(1) = 9.15$, $M = 3.05$, $p < .01$, $r = .21$; and work manuals or reference materials, $M^2(1) = 5.21$, $M = 2.12$, $p < .05$, $r = .15$. Younger learners tended to read magazines more often, $M^2(1) = 6.98$, $M = 2.62$, $p < .01$, $r = -.18$.

Table 4. *CASAS Reading Raw Scores by Age, Education, Reading Level, Gender, Employment Status, and Self-reported Learning Disability Status (LD)*

Characteristic	CASAS Reading raw score					
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>df</i>	ω^2
All Examinees	205	21.10	7.26			
Age				1.69	4	.01
16–18 years	50	21.02	6.81			
19–24 years	69	22.39	6.91			
25–44 years	52	20.87	7.92			
45–59 years	26	19.77	7.23			
60 years and over	8	16.25	7.40			
Education level				0.71	4	<.01
8th grade or less	30	20.80	7.42			
9th grade	38	20.39	6.31			
10th grade	68	22.03	7.50			
11th grade	44	21.39	7.13			
12th grade or higher	25	19.48	8.15			
Reading level				61.19***	3	.47
Level 3 Low Intermediate ABE	52	15.08	5.25			
Level 4 High Intermediate ABE	51	18.02	5.33			
Level 5 Low ASE	51	23.27	5.83			
Level 6 High ASE	51	28.14	4.69			
Gender				9.78**	1	.04
Male	82	19.20	7.20			
Female	123	22.37	7.05			
Employment status				0.50	1	<.01
Employed	160	21.29	7.21			
Unemployed	45	20.42	7.50			
Self-reported LD				9.18**	1	.04
Yes	50	18.48	6.83			
No	150	22.01	7.23			

** $p < .01$ *** $p < .001$

Learners between 16 and 18 years tended to read newspapers, magazines, and letters, notes, or e-mails most frequently, whereas 19 to 24-year-old learners read newspapers, and letters, notes, or e-mails most frequently. Participants aged 25–44 years, 45–59 years, and 60 years and over tended to most often read books, work memos or letters, and letters, notes, or e-mails. The 45–to 59-year-old participants also read newspapers frequently. Regardless of age group, the highest percentage of participants read work instructions or directions daily.

Table 5
Reading Practices by Age Group (N = 213)

Print medium	<i>n</i>	Never (% of <i>n</i>)	Less than once a week (% of <i>n</i>)	Once a week (% of <i>n</i>)	A few times a week (% of <i>n</i>)	Every day (% of <i>n</i>)
16–18 years						
Home or work practices						
Newspapers	55	22	20	18	33	7
Magazines	55	7	18	11	40	24
Books	55	20	33	20	9	18
Letters, notes, e-mails	55	6	13	9	38	34
Work only practices						
Memos/letters	50	28	24	16	14	18
Manuals/reference books	50	32	24	14	18	12
Directions/instructions	49 ^a	18	25	14	12	31
Diagrams/schematics	50	52	22	6	14	6
19–24 years						
Home or work practices						
Newspapers	70	7	19	23	28	23
Magazines	70	8	30	19	27	16
Books	70	11	36	6	26	21
Letters, notes, e-mails	70	10	10	7	23	50
Work only practices						
Memos/letters	67	34	13	15	21	17
Manuals/reference books	67	33	19	15	17	16
Directions/instructions	67	22	21	10	20	27
Diagrams/schematics	67	55	18	10	8	9
25–44 years						
Home or work practices						
Newspapers	54	7	28	24	15	26
Magazines	54	17	28	17	20	18
Books	54	15	11	9	35	30
Letters, notes, e-mails	54	7	6	2	26	59
Work only practices						
Memos/letters	52	23	12	11	23	31
Manuals/reference books	52	25	27	10	27	11
Directions/instructions	52	13	15	10	25	37
Diagrams/schematics	52	48	17	14	12	10
45–59 years						
Home or work practices						
Newspapers	26	4	19	19	23	35
Magazines	26	23	23	19	16	19
Books	26	15	23	11	12	39
Letters, notes, e-mails	26	15	8	12	23	42

Work only practices						
Memos/letters	24	33	21	0	8	38
Manuals/reference books	24	25	12	0	21	42
Directions/instructions	24	17	17	17	29	20
Diagrams/schematics	24	50	29	4	13	4
60 years and over						
Home or work practices						
Newspapers	8	0	25	38	12	25
Magazines	8	13	50	12	0	25
Books	8	0	25	0	37	38
Letters, notes, e-mails	8	25	13	12	12	38
Work only practices						
Memos/letters	7	0	43	14	0	43
Manuals/reference books	7	0	57	0	0	43
Directions/instructions	7	0	14	28	14	44
Diagrams/schematics	7	29	13	29	29	0

Notes. *n* differs by print medium within an age group because participants not employed in prior 12 months were not ask the work-only items. ^aOne participant responded "do not know."

Table 6 shows within-gender percentages for how often adults read the same eight print media. Among the males, the most-read print media were newspapers, magazines, and letters, notes, or e-mails. Compared to males, females tended to more often read newspapers, $M^2(1) = 7.66, U = 4318.50, p < .01, r = .19$; letters, notes, or e-mails, $M^2(1) = 5.76, U = 4436.00, p < .05, r = .17$; work letters or memos, $M^2(1) = 10.19, U = 3598.00, p < .01, r = .22$; and work directions or instructions, $M^2(1) = 6.52, U = 3782.50, p < .05, r = .18$. Among the females, the most read print media were newspapers, books, work memos or letters, work directions or instructions, and letters, notes, or e-mails.

Table 6. *Reading Practices by Gender (N = 213)*

Print medium	<i>n</i>	Frequency				
		Never (% of <i>n</i>)	Less than once a week (% of <i>n</i>)	Once a week (% of <i>n</i>)	A few times a week (% of <i>n</i>)	Every day (% of <i>n</i>)
Male						
Home or work practices						
Newspapers	87	16	26	16	29	13
Magazines	87	12	26	16	28	18
Books	87	15	35	11	18	21
Letters, notes, e-mails	87	16	7	8	32	37
Work only practices						
Memos/letters	81	36	23	12	14	15
Manuals/reference books	81	35	21	13	15	16
Directions/instructions	80 ^a	21	26	14	16	23
Diagrams/schematics	81	52	21	9	7	11

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Print medium	<i>n</i>	Never (% of <i>n</i>)	Less than once a week (% of <i>n</i>)	Once a week (% of <i>n</i>)	A few times a week (% of <i>n</i>)	Every day (% of <i>n</i>)
Female						
Home or work practices						
Newspapers	126	6	19	26	22	27
Magazines	126	13	26	16	25	20
Books	126	14	21	10	25	29
Letters, notes, e-mails	126	5	11	6	24	54
Work only practices						
Memos/letters	119	24	13	13	20	30
Manuals/reference books	119	24	24	9	23	20
Directions/instructions	119	15	15	12	23	35
Diagrams/schematics	119	50	19	11	15	5

Notes. *n* differs by print medium within a gender group because participants not employed in prior 12 months were not asked the work-only items. ^aOne participant responded "do not know."

Table 7 compares within-level percentages for participants self-reporting LD and participants who did not. Participants who self-reported LD, compared to participants who did not, tended to less often read newspapers, $M^2(1) = 10.04$, $U = 2876.5$, $p < .01$, $r = -.22$; and work letters or memos, $M^2(1) = 14.96$, $U = 2310.0$, $p < .001$, $r = -.27$. Among participants self-reporting LD the most-read print media were books, work directions or instructions, and letters, notes, or e-mails. Among AE learners not reporting LD, the most read print media were newspapers, magazines, and letters, notes, or e-mails. Although not a statistically significant difference, about three-fourths of the non-LD group and about two-thirds of the LD group read letters, notes, and emails frequently (i.e., a few times a week or daily).

As reading level increased, participants tended to read work letters or memos more often, $M^2(1) = 6.92$, $M = 2.54$, $p < .01$, $r = .18$. Individuals entering AE programs at the lowest and highest of the four reading levels included in this study tended to read the greatest variety of materials on a frequent basis, whereas participants in the two middle levels read fewer types of print media (see Table 8). Level 3, Low-Intermediate ABE learners most frequently read newspapers, magazines, books, work directions or instructions, and letters, notes, or e-mails. Newspapers, books, work directions or instructions, and letters, notes, or e-mails were the media Level 4 High-Intermediate ABE learners read most often. Level 5, Low-ASE learners most often read work directions or instructions, and letters, notes, or e-mails. Level 6 High ASE most frequently read the same types of materials as Level 3 learners, although they were less likely to read magazines and more likely to read work memos or letters.

Table 7. Reading Practices by Self-reported Learning Disability Status (LD)

Print medium	<i>n</i>	Frequency				
		Never (% of <i>n</i>)	Less than once a week (% of <i>n</i>)	Once a week (% of <i>n</i>)	A few times a week (% of <i>n</i>)	Every day (% of <i>n</i>)
No self-reported LD						
Home or work practices						
Newspapers	157	7	21	21	26	25
Magazines	157	8	27	18	28	19
Books	157	12	29	11	23	25
Letters, notes, e-mails	157	8	9	6	26	51
Work only practices						
Memos/letters	148	23	13	15	23	26
Manuals/reference books	148	22	26	13	21	18
Directions/instructions	148	17	20	15	20	28
Diagrams/schematics	148	49	21	11	13	6
Self-reported LD						
Home or work practices						
Newspapers	51	22	23	23	22	10
Magazines	51	24	24	11	17	24
Books	51	20	20	10	21	29
Letters, notes, e-mails	51	14	8	12	29	37
Work only practices						
Memos/letters	48	46	29	6	2	17
Manuals/reference books	48	48	15	6	14	17
Directions/instructions	47 ^a	21	17	7	21	34
Diagrams/schematics	48	61	19	8	4	8

Notes. *n* differs by print medium within an LD status group because participants not employed in prior 12 months were not ask the work-only items. ^aOne participant responded "do not know."

In answering our second question, Adjusting for significant individual characteristics, does an adult’s reading performance predict reading practices?, we found gender and LD status to be the most predictive characteristics. Correlations for all dependent and independent variables are presented in Table 9. On the basis of the results from univariate and bivariate analyses, we omitted age group, reading level, education level, and employment status from further multivariate analyses. We constructed a regression model with reading practices score as a dependent variable in three sequential blocks: gender in the first block, CASAS Reading raw score in the second block, and self-reported LD in the third block. In the sequential regression model summarized in Table 10, CASAS Reading score and self-reported LD accounted for a small proportion of variance, $F(3, 136) = 5.51, p < .001$, adjusted $R^2 = .09$, in reading practices score after adjusting for gender. We again noted statistically significant correlations between gender and reading practices score, and between self-reported LD and reading practices score. A validity coefficient of .103 for the cross-validation sample compared to the original R^2 of .108 indicates minimal shrinkage in the model.

Table 8. *Reading Practices by Reading Level (N = 213)*

Print medium	<i>n</i>	Never (% of <i>n</i>)	Less than once a week (% of <i>n</i>)	Once a week (% of <i>n</i>)	A few times a week (% of <i>n</i>)	Every day (% of <i>n</i>)
Level 3: Low Intermediate ABE						
Home or work practices						
Newspapers	53	17	21	19	19	24
Magazines	53	23	19	11	21	26
Books	53	15	19	6	30	30
Letters, notes, e-mails	53	15	6	6	26	47
Work only practices						
Memos/letters	46	37	22	11	11	19
Manuals/reference books	46	30	13	13	24	20
Directions/instructions	46	20	22	11	15	32
Diagrams/schematics	46	46	15	13	13	13
Level 4: High Intermediate ABE						
Home or work practices						
Newspapers	53	13	21	17	30	19
Magazines	53	9	17	26	25	23
Books	53	17	26	12	19	26
Letters, notes, e-mails	53	13	13	4	30	40
Work only practices						
Memos/letters	50	28	18	18	16	20
Manuals/reference books	50	34	20	10	14	22
Directions/instructions	49 ^a	22	18	10	20	29
Diagrams/schematics	50	54	18	8	12	8
Level 5: Low ASE						
Home or work practices						
Newspapers	52	8	25	31	15	21
Magazines	52	13	31	13	33	10
Books	52	15	42	10	15	17
Letters, notes, e-mails	52	6	6	10	28	50
Work only practices						
Memos/letters	50	34	16	10	16	24
Manuals/reference books	50	32	24	8	20	16
Directions/instructions	50	16	16	16	26	26
Diagrams/schematics	50	58	16	10	8	8

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Print medium	<i>n</i>	Never (% of <i>n</i>)	Less than once a week (% of <i>n</i>)	Once a week (% of <i>n</i>)	A few times a week (% of <i>n</i>)	Every day (% of <i>n</i>)
Level 6: High ASE						
Home or work practices						
Newspapers	55	4	20	22	34	20
Magazines	55	4	38	13	27	18
Books	55	11	20	16	26	27
Letters, notes, e-mails	55	4	13	9	23	51
Work only practices						
Memos/letters	54	17	15	11	26	31
Manuals/reference books	54	18	33	13	20	15
Directions/instructions	54	13	22	13	19	33
Diagrams/schematics	54	46	30	9	13	2

Notes. *n* differs by print medium within reading level groups because participants not employed in prior 12 months were not asked the work-only items. ^aOne participant responded "do not know."

Table 9. Correlation Matrix for Dependent and Independent Variables

Variable	1	2	3	4	5	6	7	8	9
1. Reading practices score	–								
2. WRMT-R PC score	.18*	–							
3. CASAS Reading score	.17*	.70**	–						
4. Age in years	.10	-.17*	-.14*	–					
5. Reading level	.12	.64**	.69**	-.21**	–				
6. Education level	-.05	.00	-.05	.04	-.03	–			
7. Gender female	.22**	.05	.21**	.10	.16*	-.02	–		
8. Employed	.11	-.01	.05	-.12	.03	-.04	-.07	–	
9. Self-reported LD	-.19**	-.19**	-.21**	.04	-.24**	.03	-.08	.05	–

* $p < .05$, ** $p < .01$, *** $p < .001$

Finally, we answered our third question, How does reading performance differ by reading practices group and by significant individual characteristics among AE participants? The effect of gender was statistically significant in the MANOVA, Wilks' $\Lambda = .937$, $F(2, 186) = .969$, $p = .002$, yet moderate in the effect size, partial $\eta^2 = .06$. The linear composite of reading scores differed for males and females. The three-way interaction of self-reported LD, gender, and reading practices group was also significant, Wilks' $\Lambda = .945$, $F(4, 372) = 2.64$, $p < .05$ and small partial $\eta^2 = .03$. Null hypotheses for equality of covariance matrices, $F(30, 14,378.1) = 24.30$, $p = .830$, and equality of error variances across groups were retained. The MANOVA model accounted for small to medium proportions of between-subjects variance in WRMT-R PC scores (as transformed, adjusted $R^2 = .04$), and CASAS Reading scores, (adjusted $R^2 = .13$).

Table 10. *Sequential Regression Analysis for Variables Predicting Reading Practices Score*

Block and variables	70% Sample Model (<i>n</i> = 139)		30% Sample Cross-Validation (<i>n</i> = 60)
	Adjusted R^2 for Block	Beta+	R_{yy}^2
			.103
Block 1	.06**		
Gender female		.26**	
Block 2	.06		
Gender female		.24**	
CASAS Reading raw score		.08	
Block 3	.09*		
Gender female		.25**	
CASAS Reading raw score		.04	
Self-reported LD		-.19*	

Note. + betas are standardized beta coefficients

* $p < .05$, ** $p < .01$

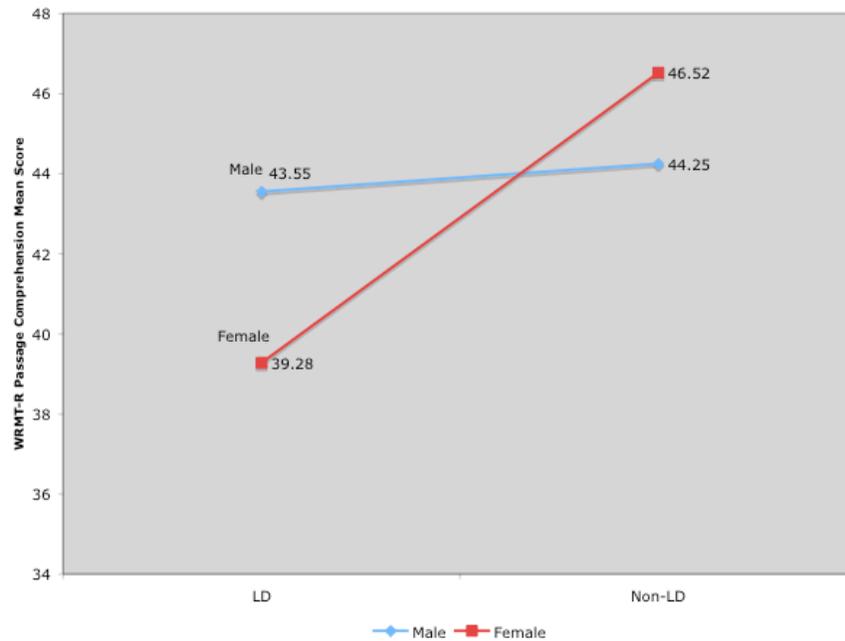
The effects of self-reported LD on CASAS Reading scores were small, $F(1, 187) = 5.62$, $p = .019$, partial $\eta^2 = .03$ (see Table 11). Participants self-reporting LD tended to have lower mean CASAS Reading scores. The two-way interaction of self-reported LD with gender was significant for WRMT-R PC, $F(1, 187) = 5.08$, $p = .025$, partial $\eta^2 = .03$. Females with LD had lower mean WRMT-R PC scores than males with LD; and females without LD had higher mean WRMT-R PC scores than males without LD (Figure 1). The two-way interaction was not significant for CASAS Reading scores.

Table 11. *Effects on CASAS Raw Score and WRMT-R PC Raw Score by Gender, Self-reported Learning Disability Status (LD), and Reading Practices Group (N = 199)*

Source	Dependent variable	<i>df</i>	<i>F</i>	η^2	<i>p</i>
Self-reported LD	CASAS Reading raw score	1	5.62	.03	.019
	WRMT-R PC raw score	1	1.65	.01	.201
Self-reported LD x Gender	CASAS Reading raw score	1	2.84	.02	.094
	WRMT-R PC raw score	1	5.08	.03	.025
Self-reported LD x Gender x Reading practices group	CASAS Reading raw score	2	3.93	.04	.021
	WRMT-R PC raw score	2	1.60	.02	.206
Error	CASAS Reading raw score	187			
	WRMT-R PC saw score	187			

For CASAS Reading scores, a three-way interaction was significant, $F(2, 187) = 3.93$, $p = .021$, partial $\eta^2 = .04$. The three-way interaction reflected both a difference of magnitude on the CASAS reading scores and a reversal of rank as graphed in Figure 2 in terms of reported LD status and in Figure 3 in terms of gender (Table 12; WRMT-R PC shown in Table 13 for comparison).

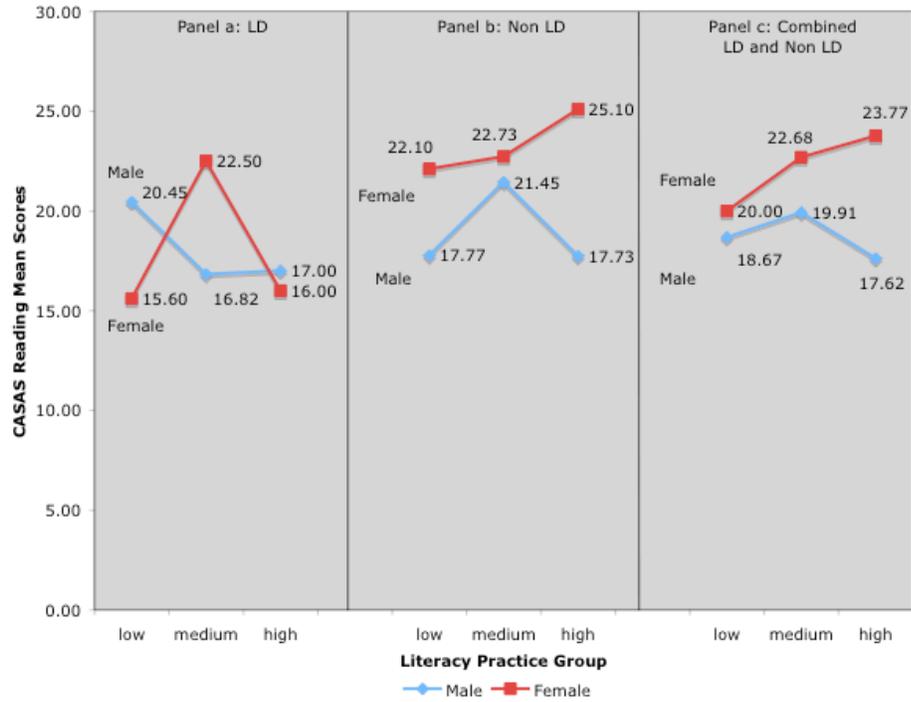
Figure 1. WRMT-R Passage Comprehension Raw Score Means by Gender and Self-reported Learning Disability Status (LD).



Our interpretation is guarded because of the small sample sizes in several of the cells. With that caution in mind, the interaction can be understood by examining the mean scoring changes across the three reading practices conditions (low, medium, and high). Under the low- and high-reading practices conditions, males with LD scored higher than females with LD. Under the medium-reading practices condition, the order reversed with the females with LD scoring higher than the males. In the medium-reading practices condition, CASAS scores for females with LD ($M = 22.5$; Figure 2, panel a) were similar in magnitude to scores for females reporting no LD in the low-reading practices ($M = 22.1$; Figure 2, panel b) and the medium-reading practices ($M = 22.73$; Figure 2, panel b) conditions.

For the persons who did not self-report LD (Figure 2, panel b), the females scored higher than the males across all three reading practices conditions. For the medium-reading practices group, the difference is the least (female $M = 22.73$; male $M = 21.45$).

Figure 2. CASAS Reading Score Means by Self-reported Learning Disability Status (LD), Gender, and Reading Practices Group.



We noticed in panel a of Figure 2 that the difference between females and males was greatest in the medium reading practices group. In Figure 2, panel c we see the influence of the larger sample of female participants, especially females without LD, because across the three reading practices conditions, females have higher mean scores than males.

Table 12. CASAS Reading Score Means by Self-Reported Learning Disability Status (LD), Gender, and Reading Practices Group

		LD				Non-LD			
		Low Reading Practices	Medium Reading Practices	High Reading Practices	Total	Low Reading Practices	Medium Reading Practices	High Reading Practices	Total
Male									
	<i>M</i>	20.45	16.82	17.00	18.50	17.77	21.45	17.73	19.24
	<i>SD</i>	6.58	8.40	4.24	7.33	6.82	7.78	5.93	7.18
	<i>n</i>	11	11	2	24	22	22	11	55
Female									
	<i>M</i>	15.60	22.50	16.00	17.92	22.10	22.73	25.10	23.61
	<i>SD</i>	4.35	6.72	4.55	5.98	5.21	6.31	7.67	6.79
	<i>n</i>	10	8	7	25	21	33	41	95
Total									
	<i>M</i>	18.14	19.21	16.22	18.20	19.88	22.22	23.54	22.01
	<i>SD</i>	6.03	8.07	4.24	6.61	6.40	6.89	7.89	7.23
	<i>n</i>	21	19	9	49	43	55	52	150
Combined LD and Non-LD					Combined Male and Female				
		Low Reading Practices	Medium Reading Practices	High Reading Practices	Total	Low Reading Practices	Medium Reading Practices	High Reading Practices	Total
Male									
	<i>M</i>	18.67	19.91	17.62	19.01	18.14	19.21	16.22	18.20
	<i>SD</i>	6.76	8.16	5.56	7.18	6.03	8.07	4.24	6.61
	<i>n</i>	33	33	13	79	21	19	9	49
Female									
	<i>M</i>	20.00	22.68	23.77	22.43	19.88	22.22	23.54	22.01
	<i>SD</i>	5.77	6.31	7.95	7.00	6.40	6.89	7.89	7.23
	<i>n</i>	31	41	48	120	43	55	52	150
Total									
	<i>M</i>	19.31	21.45	22.46	21.07	19.31	21.45	22.46	21.07
	<i>SD</i>	6.29	7.28	7.88	7.25	6.29	7.28	7.88	7.25
	<i>n</i>	64	74	61	199	64	74	61	199

Note. N = 199 with valid data for self-reported LD, gender, and reading practices group

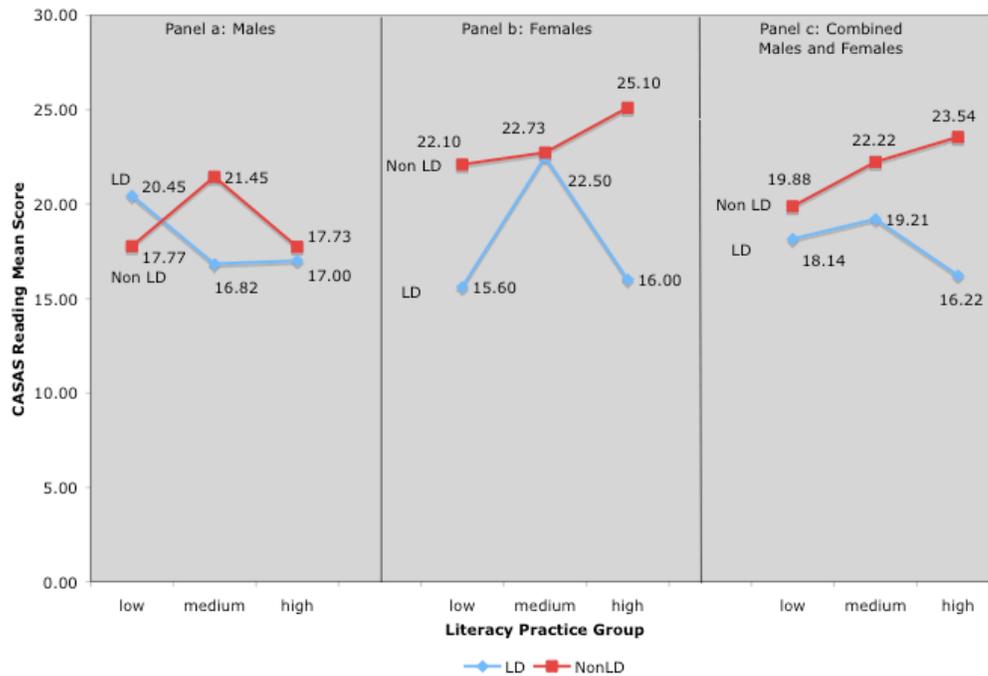
Table 13. *WRMT-R Passage Comprehension Raw Score Means by Self-Reported Learning Disability Status (LD), Gender, and Reading Practices Group*

		LD				Non-LD				
		Low Reading Practices	Medium Reading Practices	High Reading Practices	Mean	Low Reading Practices	Medium Reading Practices	High Reading Practices	Mean	
Male										
	<i>M</i>	41.18	41.00	50.00	41.83	<i>M</i>	41.00	44.52	43.55	43.00
	<i>SD</i>	11.61	10.31	8.49	9.35	<i>SD</i>	9.88	9.94	9.49	9.80
	<i>n</i>	11	11	2	24	<i>n</i>	22	25	11	58
Female										
	<i>M</i>	36.60	41.75	37.57	38.52	<i>M</i>	44.23	43.70	47.22	45.32
	<i>SD</i>	10.75	6.48	8.06	8.78	<i>SD</i>	8.16	8.54	9.65	9.01
	<i>n</i>	10	8	7	25	<i>n</i>	22	33	41	96
Total										
	<i>M</i>	39.00	41.32	40.33	40.14	<i>M</i>	42.61	44.05	46.44	44.45
	<i>SD</i>	11.18	8.69	9.37	9.80	<i>SD</i>	9.10	9.09	9.64	9.35
	<i>n</i>	21	19	9	49	<i>n</i>	44	58	52	154
Combined LD and Non-LD					Combined Male and Female					
		Low Reading Practices	Medium Reading Practices	High Reading Practices	Mean	Low Reading Practices	Medium Reading Practices	High Reading Practices	Mean	
Male										
	<i>M</i>	41.06	43.44	44.54	42.66	<i>M</i>	39.00	41.32	40.33	40.14
	<i>SD</i>	10.31	10.04	9.32	10.01	<i>SD</i>	11.18	8.69	9.37	9.80
	<i>n</i>	33	36	13	82	<i>n</i>	21	19	9	49
Female										
	<i>M</i>	41.84	43.32	45.81	43.92	<i>M</i>	42.61	44.05	46.44	44.45
	<i>SD</i>	9.57	8.14	9.97	9.35	<i>SD</i>	9.10	9.09	9.64	9.35
	<i>n</i>	32	41	48	121	<i>n</i>	44	58	52	154
Total										
	<i>M</i>	41.45	43.38	45.54	43.41	<i>M</i>	41.45	43.38	45.54	43.41
	<i>SD</i>	9.88	9.02	9.77	9.62	<i>SD</i>	9.88	9.02	9.77	9.62
	<i>n</i>	65	77	61	203	<i>n</i>	65	77	61	203

Notes. *N* = 203 with valid data for self-reported LD, gender, and reading practices group. These original raw scores are presented for descriptive purposes and were transformed prior to entry in the MANOVA analysis.

Figure 3 reflects the CASAS reading scores in terms of gender, and we note the pattern of scores is similar to the pattern described in Figure 2, which focused on the influence of the participants' LD status. As represented in panel a of Figure 3, males without a reported LD scored higher than males with a reported LD except for the low-reading practices condition. We are curious about why this reversal occurred among the males in the low-reading practices condition.

Figure 3. CASAS Reading Score Means by Gender, Self-reported Learning Disability Status (LD), and Reading Practices Group.



Similarly we are curious about why the CASAS scores are so low for the males who did not report LD but did report high reading practices (Figure 3, panel a). In panel b of Figure 3, we see the mean CASAS scores for females without LD increase across the three reading practices conditions (low $M = 22.1$ to medium $M = 22.73$ to high $M = 25.1$). Overall, as we expected the participants without LD had increasing CASAS scores across the three reading practices conditions. No other main effects or interactions were significant.

We included gender and self-reported LD in follow-up regression models after the MANOVA, with WRMT-R PC and CASAS reading scores as separate dependent variables for each model. Results from both follow-up models are shown in Table 14. Reading practices score and self-reported LD accounted for 4% of the variance in WRMT-R PC scores (as transformed). After adjusting for gender, reading practices score and self-reported LD accounted for 9% variance in CASAS Reading scores. Following cross-validation of the CASAS Reading model,

coefficients were strong between a standardized regression equation from a random 70% sample applied to a second standardized 30% sample ($R^2 = .111$, $R_{yy}^2 = .109$). The WRMT-R PC equation using the 70% sample did not successfully cross-validate with the 30% sample.

Table 14

Best-Fitting Multiple Regression Equations and Adjusted R^2 for Two Measures of Literacy

Variable	70% Sample Model ($n = 139$)		30% Sample Cross-Validation ($n = 60$)
	Beta+	Adjusted R^2	R_{yy}^2
WRMT-R Passage Comprehension		.04*	.120
Reading practices score	-.09∇		
Self-reported LD	+.20∇*		
CASAS Reading		.09*	.109
Gender female	.25**		
Reading practices score	.04		
Self-reported LD	-.19**		

Notes. ∇ a sign in the opposite direction resulted from transformation of the WRMT-R variable. +Betas are standardized coefficients.

$p < .05$, ** $p < .01$

Discussion

Multiple personal and contextual dimensions influence adults' reading behaviors. Smith (1996) enumerated how adults' reading practices (i.e., the variety of reading materials and the frequency with which they are read), vary with age, literacy proficiency, and educational level. Guthrie et al. (1986) showed the connection between reading in employment and school contexts and reading for work and leisure. In this study we further explored these relationships among 213 low-literate adults (median age 22) with a history of limited educational attainment (e.g., no high school diploma) yet who had made a commitment to improve their skills through participation in adult education. We examined the influence of age, gender, education level, reading level, self-reported LD status, and employment status to reading practices and reading performance. In the remainder of this section, we summarize and discuss the findings from our analyses.

Age related findings. The reading practices of this sample of lower literate adults only partly paralleled Smith's (1996) national sample. In general, individuals in our sample read relatively little prose, but older adults did report reading more formal materials (e.g., employment-related documents), a tendency possibly explained by their higher employment rates. Reading practices increased with age for formal reading materials (e.g. books, references, and manuals). Younger persons, especially 16 to 18-year-olds, were more likely to read magazines weekly. The picture is complex in that individuals with lower literacy levels were more likely to read magazines daily and higher level readers less so. Smith also found adults who read only magazines tended to have lower literacy proficiency. Thus, the task for adult educators and literacy providers is to recognize the variation in reading materials across the age groups.

Our sample of older employed participants frequently read employment materials in contrast to the younger participants who actively read magazines. We might speculate that one's use of time and the availability of materials might be strong influences on these reading practices. Perhaps the younger readers have less structured time and resources that would

influence their access to particular materials. They might also be more frequently accessing materials on the Internet that are free and user-directed. We also speculate the younger participants are less interested in employment-related reading and thus more interested in features or informational articles reported in magazines.

As instructors consider curricular materials, the relevance of the material for learners is important, and to some degree likely moderates the textual difficulty. A motivated and interested reader is likely to persevere with a difficult text. Rather than relying on hardcover books as source material for younger AE learners, periodicals may be the primary material on which lessons are planned and around which groups of lessons could be organized into units. Access to the Internet can simplify searching and retrieving such documents.

Employment. Because of the high rate of unemployment in low-literacy populations, we were surprised to find employment status was not a statistically significant variable in our analyses. We speculate the lack of statistical significance may be due to reasons unique to AE participants, or perhaps due to the previously discussed age-related issues. For example, AE participants, whether employed or unemployed, may have reading practices within the context of achieving success in the AE program (e.g., improving classroom reading skills, passing the GED exam).

Educational attainment level. Dissimilar to Smith's (1996) findings, education level was not a significant predictor of literacy proficiency or reading practices. Because this sample was fairly homogenous, as all participants have low educational attainment, we likely did not have enough variation in education level to find this association. Although education level does not appear to play a significant role in reading proficiency, the younger adults, who had likely recently attended formal education, outperformed older adults. For instructors, the implication is that a person's completed educational level or even functional level, such as from an AE placement test, may be too imprecise for instructional planning. AE instructors would be wise to invest in more specific measures of reading components (e.g., phonemic awareness, vocabulary, comprehension strategy selection, and comprehension monitoring) to pinpoint specific skills on which instruction should focus (Kruidenier, 2002).

Gender and LD status. The relation between gender and LD status appears complex. Generally, the persons not reporting LD status earned higher CASAS scores than persons reporting LD. Females tended to outscore males on the CASAS. But the analysis also indicated LD status did interact with gender and reading practices group. Reading practices appeared to be more highly associated with achievement for persons not reporting LD status than persons reporting LD status (see Figure 3, panel c), however this pattern was only evident for females not reporting LD (see Figure 3, panels a and b). In other words, reading practices were associated with achievement just for non-LD females. More study of this association is warranted given that effect sizes for the finding were relatively small (see Table 11).

When we looked more carefully at the reading practices by LD status, some differences were noted. All participants read newspapers, magazines, and correspondence as reflected in letters, notes and e-mail. The persons reporting LD did not appear to read as frequently and showed more variability in their reading materials. More specific information about the nature of persons' LD conditions might be helpful for gaining a better understanding of how reading practices might be influenced. For example, LD is not a unitary condition. The LD condition might be manifest in such diverse areas as oral expression; listening comprehension; written expression; reading recognition, comprehension, or fluency; or math calculation or reasoning.

We do not have the specific information from our participants to know in which area(s) their LD condition was manifested.

Females tended to read frequently for information: newspapers, work memos and letters, and work instructions and directions. Adults reporting LD were likely to more frequently read formal materials found in books and in work directions or instructions. Instructional staff teaching adults with LD or in settings with high proportions of women, particularly women who are employed, might keep these tendencies in mind as they select materials.

An encouraging finding is this sample of AE participants contained many active readers. Despite their lower literacy proficiency, most participants were actively engaged in some form of reading almost daily. Not surprisingly in contemporary society, participants across all groups frequently read letters, notes, or e-mails. Adult learners who were employed reported daily reading of work instructions or directions. With the exception of magazines and work memos or letters, our lowest level learners (Level 3) read the same types of print materials as frequently as the highest level learners (Level 6).

As Guthrie (2002) noted, the amount of reading is a strong predictor of reading comprehension. The findings of our MANOVA supported that claim: adults not reporting LD who read more often tended to have higher WRMT-R passage comprehension scores, and females not reporting LD who read more frequently tended to have higher CASAS Reading scores. The general principle is that instructional activities aimed at developing reading ability should incorporate use of current materials (e.g., newspapers and magazines) to increase the amount of reading. We are not clear what features are so attractive about periodical materials (e.g., they are current, they have broad appeal, they are relevant to their everyday life, they are readily available, or they provide a social connection to a larger group). Also, with such a high percentage of our participants employed (78%), the use of workplace materials would appear relevant. Thus, we are inclined to direct at least some of the practice or application of reading skills to periodical or workplace materials. For example, stories in periodicals would be suitable for developing fluency, increasing vocabulary, and practicing reading comprehension strategies (e.g., finding the main idea, paraphrasing, summarizing, and identifying supporting details).

Another advantage of this periodical approach is that the materials cover such a plethora of topics. Instructors should be able to find materials covering an assortment of interests based on age, occupation, family role, and hobbies. Periodicals provide the potential to bridge other resources such as books or Internet sources, which could provide greater, in-depth elaboration. We can imagine that the use of periodicals or workplace materials would be a great opportunity for expanding on adults' background knowledge and vocabulary, both of which are important to reading comprehension levels.

Limitations. Our sample was comparatively narrow, especially the levels of reading skills, in comparison to other adult literacy studies such as Smith's (1996) and the NAAL (Kutner et al., 2005) and NALS (Kirsch et al., 1993) surveys. Therefore, our recommendations should be considered as especially focused on an AE population or on other persons with similar skill levels. A better frame of reference might be for literacy and AE practitioners to consider these observations as testable hypotheses with their adult participants.

Our study is limited by the inherent biases of self-reported behaviors, such as overreporting socially desirable behaviors and underreporting undesirable ones. For example, participants may have overreported a learning disability, because it is a socially acceptable explanation for academic difficulty. To deal with the inherent biases of self-reported behaviors and to assure reasonable data reliability and validity, examiners completed a validity checklist

describing the participant and setting during the interview, and noting any validity issues they may have observed. Two cases with multiple validity concerns were omitted from this analysis.

Lastly, we did not collect data on textual difficulty in reading practices, which would have been difficult for participants to self-assess, or the duration of the reading done by participants. The NALS and NAAL surveys attempted to ascertain the text difficulty, and replication of their methodologies with the AE population may be warranted. A better understanding of the duration of reading practices would have benefited our study.

Finally, as a correlation study, it is not possible to know for certain the underlying influences that explain the relations revealed. For example, various intervening variables might be implicated (e.g., parental education level, geographical differences, or family status). Likewise, it is not appropriate to interpret causation from the dependent to independent variables. There may be reverse or reciprocal causation. For example, in such correlation data, we cannot say computer proficiency causes a higher reading practices score any more than we can say a higher reading practices score causes computer proficiency.

Future research. AE practitioners may benefit from greater insight into what motivates low-literate adults' current reading choices and their desire to improve literacy. Beder (1991) referred to "the enabling capacity of literacy" (p. 48), or the need for improved reading skills in order to perform basic life roles such as parenting, employment, or personal health care as the source of motivation for adults to acquire literacy. AE programs may become more effective in recruiting and retaining learners if researchers provide insight into literacy-improvement motives and topics of interest for low-literacy adults. We imagine that multiple research methodologies would be valuable in this endeavor. For example, with a qualitative design researchers might examine the value AE participants attach to reading and their perceived barriers to the breadth and depth of reading practices (e.g., access to relevant materials, the availability of their time to read, the priority they give to reading in their daily routines, and the difficulty levels of materials). Researchers might hypothesize that as alternative informational and entertainment media permeate our social settings and thus become more accessible, the value and need for reading might be diminished. With 24-hour news and entertainment readily available and human service agencies supporting persons' related needs, a less proficient reader might rely on these sources rather than being such an active reader. As a consequence, the motive for improved reading would seem reduced.

A quantitative research design could examine the scope and amount of reading tasks that employees confront in the occupational sectors in which the majority of AE participants are employed. We hypothesize that such employment settings place minimal demands of comprehension of print media and that the textual complexity does have a positive correlation with the wages and benefits. The findings from such studies could contribute to adult educators and literacy providers information base for planning and selecting curricular materials and instructional activities not only as matching learners' literacy needs but also their areas of interest.

AE programs may become more effective in recruiting and retaining learners if researchers provide insight into literacy-improvement motives and topics of interest for low-literacy adults. As local programs identify motives and interests of adults with low literacy skills, they could develop or enhance effective recruitment efforts to target those adults. If we accept the premise that, once in the AE program, a motivated and interested reader is likely to persevere with a difficult text, then the AE program has a greater chance of retaining that persevering reader until skill mastery occurs. Because many AE programs also rely on word-of-mouth

recruitment, learners who respond to recruitment efforts and experience success in reading would tend to promote the AE program among peers as an appealing place to learn reading. Further research is needed to provide insight on initial motives and topics of interest of literacy learners.

Conclusion

In summary, the literature indicates an adult's reading practices are highly related to reading proficiency. From our data on adults with low literacy in AE programs, we draw a similar conclusion. Adults with relatively lower skill levels were inclined to read daily, but the type of materials varied slightly from adults with higher skill levels. Segments of the AE population were more likely to engage in reading practices with particular materials, particularly periodicals, correspondence, and work instructions or directions. We suggest these observations can be valuable to AE and literacy programs and instructors as they consider curricular materials for reading acquisition and generalization-related activities. We also recognize a person's LD status and gender appear to influence reading activities. We await further large-scale efforts to cross-validate these findings and more precisely inform instruction.

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