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Writing Behaviors Relation to Literacy and Problem Solving in Technology-Rich Environments: Results from the 2012 and 2014 U.S. PIAAC Study

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**Writing Behaviors Relation to Literacy and Problem Solving in Technology-Rich Environments:
Results from the 2012 and 2014 U.S. PIAAC Study**

July 10, 2019

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Abstract

Writing is a fundamental skill used in everyday life and in the workplace, yet there is a paucity of research describing adults' self-reported writing behaviors as a function of their measured literacy and digital skills. Writing is a critical survival skill in the 21st century as adults need to fill out forms or write emails or letters in both paper-based and digital environments for many different reasons such as health care, banking, voting, and education. Empirical evidence has found that in children, reading and writing skills are positively related, yet little is known about this relationship for adults. To deepen our understanding of this relationship, the study aims: a. to gain an understanding of relations among overall reading and writing behaviors at home and at work; b. to examine functional writing behaviors (writing emails/letters/memos, filling in forms) among lower- and higher-skilled adults in the Program for the International Assessment of Adult Literacy (PIAAC) Literacy and Problem Solving in Technology-Rich Environments (PSTRE) by varying demographic characteristics (age, race, native language status, job category); and c. to examine the predictive relations of Literacy, PSTRE, and reading behaviors to writing behaviors at home and at work and whether the relations of reading behaviors to writing behaviors depends on higher or lower literacy skills.

Methods and Data Source: We ran several sets of analyses for three distinct research questions on the 2012 and 2014 combined U.S. PIAAC Data using SPSS and the IDB Analyzer. We studied the cognitive skills of Literacy and PSTRE for both the entire population and for those with below and above basic literacy skills as defined by OECD convention. Reading and writing behaviors were considered both as OECD-developed indices for behaviors at work and at home and as individual variables indicating both type and frequency of reading and writing behaviors. We also considered demographic characteristics of age, race, native language status, and job category. Finally, we considered predictive relations among literacy, PSTRE, and reading behaviors (and whether these depended on literacy skill level) to writing behaviors. All appropriate weighting and plausible values

were utilized for the analysis of Pearson's as well as Spearman's correlations, multiple regressions with moderation, mean differences tests (*t*-tests and *F*-tests), and descriptive statistics.

Results: Our results are divided into three distinct research questions with varying complexity. For our first research question, *“What are the relations between writing behaviors (indices at home/at work) and reading behaviors (indices at home/at work) for the general population of adults (ages 16-74)? How do these relations differ for adults with lower literacy skills?”*, the main findings were moderate, positive relations between reading and writing behaviors at work ($r_s = .50$) for the full PIAAC U.S. sample (ages 16-74) as well as low-skilled adults. For the first part of our second research question, *“What are the relations among functional daily reading behaviors at home/at work (reading directions, letters/emails, newspapers/magazines, books) and functional daily writing behaviors at home/at work (writing letters/emails, filling out forms) for lower-skilled adults in Literacy and in PSTRE?”*, we found weak to strong, positive relations ($r_s = .06-.66$) among functional reading behaviors (e.g., reading directions) and functional writing behaviors (e.g., filling in forms) at home and at work for adults with low literacy and PSTRE skills. For the second part of our second research question, *“Do the relations of functional writing behaviors vary by demographic characteristics (age, race, native language status, job category) for adults with lower Literacy and lower PSTRE skills?”*, a series of *t*-tests and ANOVAs were conducted to investigate differences in self-reported frequencies of functional writing behaviors (write emails/memos/letters, fill in forms) at home and at work by adults with low and high Literacy and PSTRE skills for queried demographics. Broadly, there were many significant differences in reported self-frequency of writing behaviors between low- and high-skilled adults (in Literacy and PSTRE) by age, race, native language status, and job categories, with higher-skilled adults always reporting more frequent writing engagement. Specific to low-skilled, there are weak to strong positive relations among all functional reading and writing behaviors, with the strongest correlations between reading and writing emails/letters/memos at work.

For our third research question, “*Are Literacy, PSTRE, and reading behaviors (indices at home/at work) jointly and uniquely predictive of writing behaviors at home and/or at work for the general population of adults? Does literacy level (high versus low) moderate the relations between reading indices and writing behaviors?*”, we conducted two multiple regression analyses with moderation, examining PSTRE, literacy, reading behavior indices, and the interaction between literacy (high vs. low) and reading behavior indices on writing behaviors at home and at work. For writing at home, PSTRE and reading at home were uniquely predictive and there were no differences by literacy level. For writing at work, PSTRE and reading at work were uniquely predictive and there were no differences by literacy level.

Conclusion: Our findings indicate that reading and writing behaviors may be context-specific, that is people who read more at work also write more at work. In addition, controlling for PSTRE and reading behaviors, literacy proficiency levels do not predict writing at home or at work behaviors. Only reading and writing letters/emails are strongly correlated for people with low literacy and low PSTRE. The relationship between frequencies of reading and writing on the same task (e.g. letters/memos/emails) implies that there is an integrated system of skills that learners can engage with. Reading and writing on the job are important and are highly correlated; strengthening reading and writing skills in context may also help lower skilled adults achieve better jobs in higher occupations.

Introduction

The Importance of Writing

Writing has been hypothesized as a vehicle for learning, which has led to the use of the term “writing-to-learn” in educational research (Ackerman, 1993). Bangert-Drowns, Hurley, and Wilkinson (2004) conducted a meta-analysis of studies that tested the impact of writing-to-learn interventions for samples of undergraduates or school-age children. In all of these studies, students in the treatment condition completed prompt-based writing activities that deviated from the regular curriculum, and the

treatment group was compared to a group receiving conventional instruction. These studies involved multiple disciplines, including math, literature, social studies, earth science, chemistry, and biology. The meta-analysis concluded that engaging in writing-to-learn tasks results in gains in academic achievement. More recent research also supports the use of writing-to-learn activities in diverse academic contexts (e.g., Balgopal & Wallace, 2009; Chen, Hand, & McDowell, 2013; Stewart, Myers, & Culley, 2009). These findings suggest that writing is associated with positive educational outcomes.

Institutions of higher education have recognized the importance of writing ability in the academic and professional context. Remedial programs are widely used in two- and four-year institutions in the United States with the goal to address perceived deficits in basic writing skills that are required for expository writing at the undergraduate level (Chen, 2016). Most institutions have established a writing center or similar resource for individualized writing assistance available to enrolled students (National Census of Writing, 2015). Additionally, some courses include components that focus on developing discipline-specific writing competencies with the aim to increase students' chances of success in their chosen fields of work (Cole, Inada, Smith, & Haaf, 2013; Cronje, Murray, Rohlinger, & Wellnitz, 2013; Luttrell, Bufkin, Eastman & Miller, 2010).

Relation between Writing and Other Skills

Theoretically, writing and reading can be considered separate skills that draw upon a common pool of knowledge, which includes knowledge of text attributes, individual strategies, various subjects or domains, and methods of recalling and using previously accumulated information (Fitzgerald & Shanahan, 2000). Moreover, the goal-oriented nature of most reading and writing tasks often necessitates the use of both skills (Shanahan, 2016). For example, a college student writing a research paper would typically first read scientific articles to synthesize information. Similarly, a student reading a biology text may take notes to improve comprehension. Thus, it is possible that the frequencies of writing and reading behaviors are strongly related in everyday life.

Studies with children demonstrate that writing contributes to reading. Writing ability can explain individual differences in reading ability, even after controlling for the contributions of known reading component skills, such as word reading and listening comprehension (Jenkins et al., 2004). A meta-analysis of the writing abilities of school-aged children indicated that direct instruction on writing topics, such as sentence structure and paragraph construction, positively influences students' reading outcomes (Graham & Hebert, 2011). Students who receive such instruction tend to make gains in reading comprehension and, in the case of younger students, in foundational reading skills (e.g., decoding). Of particular interest is Abbot et al.'s (2010) longitudinal study that followed a cohort of students from first to seventh grade. Writing composition and reading comprehension skills exhibited moderate to strong correlations throughout these seven years. While the magnitude of this correlation declined noticeably in fourth and fifth grades, it increased in sixth and seventh grades. From one year to the next, reading and writing appeared to have a reciprocal relationship. Writing ability in one grade could predict reading comprehension development in the next grade, and vice versa. These relations have yet to be explored thoroughly with adult samples.

There is a paucity of studies examining the relationship between reading and writing in adults with low literacy skills. The limited body of research indicates that a shared skill set is involved in the reading and writing processes of this population. Strategy use, for example, is important for success in both comprehending texts and writing essays (Hock & Mellard, 2005; MacArthur & Lembo, 2009). Additionally, both reading comprehension and spelling ability are predicted by metalinguistic awareness in the realms of phonology (the sound system of a language), orthography (letter patterns in a language), and morphology (the structure of meaning within words in a language) (Fracasso, Bangs, & Binder, 2016; Talwar, Cote, & Binder, 2014; Tighe & Binder, 2015). This overlap in component skills suggests that writing and reading may be related for adults as well.

We are also interested in understanding writing behaviors of adults of all literacy levels as they relate to digital environments; very little research has been conducted to understand if and how writing

behaviors are related to the use of digital technologies (Fortunati & Vincent, 2014). Among children and adolescents aged seven to 16, self-reported outside-of-class writing frequency seems to decrease with age, and those who use social media or own a blog are significantly more likely to write regularly (Clark & Douglas, 2011; Clark & Dugdale, 2009). Some research suggests that younger and older adults approach digital writing with different competencies and understanding these differences could lead to essential developments in human-computer design (Kalman, Kave, & Umanski, 2015). This is particularly important as more daily functions become computerized and as older Americans continue to increase as a portion of both the general and the working population (DeSilver, 2016).

The Program for the International Assessment in Adult Competencies (PIAAC) data presents a unique opportunity to understand factors that predict adults' writing behaviors by examining reading behaviors and directly assessed cognitive performance (Literacy and Problem Solving in Technology-Rich Environments [PSTRE]). PIAAC is an international survey conducted under the auspices of the Organization for Economic Cooperation and Development (OECD). Representative samples of 5,000 adults between the ages of 16-65 were surveyed in each of the 24 participating countries in 2012; a second round of data collection was conducted in 9 additional countries in 2014 as well as to an additional sample of 3,660 U.S. adults with oversampled young adults (ages 16-34), unemployed adults (ages 16-65), and to add older adults ages 66-74 (Rampey, Finnegan, Goodman et al., 2016). PIAAC also collected detailed demographic and skills use data including age, race, native language status, job category, self-reported reading and writing behaviors at home and at work both in frequency (how much, how often) and variety of tasks (emails, letters, filling in forms, etc.).

The purpose of this study is to explore potential relations among the PIAAC Literacy domain (LIT), the PIAAC PSTRE domain, reading behaviors at work and at home, and various demographic characteristics to adults' writing behaviors at home and at work for both the general population and compare if such relations are similar for the population with lower LIT (Level 2 and below) and lower PSTRE skills (Level 1 and below) by leveraging the PIAAC data. In order to do so, we look at both

specific functional daily writing and reading behaviors as well as broader writing and reading indices which are comprised of these and other functional daily behaviors. The following research questions are addressed:

1. What are the relations between writing behaviors (continuous indices at home/at work) and reading behaviors (continuous indices at home/at work) for the general population of adults (ages 16-74)? How do these relations differ for adults with lower literacy skills (at or below Level 2 Literacy proficiency)?

2. What are the relations among functional daily reading behaviors at home/at work (frequencies of reading directions, letters/emails, newspapers/magazines, books) and functional daily writing behaviors at home/at work (frequencies of writing letters/emails, filling out forms) for lower-skilled adults in Literacy (below Level 2)? What are the relations among these functional daily reading behaviors at home/at work and functional daily writing behaviors at home/at work for lower-skilled adults in PSTRE (below Level 1)? Do the relations of functional writing behaviors vary by demographic characteristics (age, race, native language status, job category) for adults with lower Literacy and lower PSTRE skills?

3. Are Literacy, PSTRE, and reading behaviors (continuous indices at home/at work) jointly and uniquely predictive of writing behaviors at home and/or at work for the general population of adults? Does literacy level (high versus low) moderate the relations between reading indices and writing behaviors?

Methods

The data in this study are from the full PIAAC data for the United States. In our analyses, we included variables from the cognitive assessments involving the Literacy and PSTRE domains. Results for each domain are presented in proficiency levels: Literacy and Numeracy proficiency are often reported in five levels (Below Level 1, Level 1, Level 2, Level 3 and Level 4/5) and PSTRE in four

levels (Below Level 1, Level 1, Level 2, and Level 3), each on a 500 point scale (OECD, 2013). We considered at or below Level 2 appropriate for lower literacy skills because these are the levels that primarily took the PIAAC reading components subsection, which was administered to understand foundational reading skills for lower-skilled adults (Sabatini, 2015). Moreover, including up to proficiency Level 2 allowed us to increase our sample size and is consistent with reports of lower skilled levels from the National Center for Educational Statistics (Goodman, Finnegan, Mohadjer et al., 2013). For PSTRE, we consider Level 1 as lower PSTRE skills according to National Center for Educational Statistics convention (Goodman et al., 2013). We also included self-reported variables from the background questionnaire that describe participants' demographic characteristics (i.e., age, race, native language status, and job category), writing behaviors, and reading behaviors. Age, race, and native language status have been shown to affect reading and writing behaviors, attitudes, and skill levels in young adults (Raines, 2003); job category may have an impact on the types of reading and writing behaviors at work and as such may be a factor that affects literacy and PSTRE skills (National Research Council, 2012).

Cognitive Assessments

In the PIAAC survey, participants' Literacy, Numeracy, and PSTRE skills were directly assessed using computer-adaptive (Literacy, Numeracy, and PSTRE) and paper-based (Literacy and Numeracy only) tasks. Our analyses involved the Literacy and PSTRE domains.

Literacy. Participants' proficiency in Literacy was measured by assessing their skills in reading, understanding, and applying different kinds of texts for specific purposes (PIAAC Literacy Expert Group, 2009a). To account for the measurement error of the PIAAC literacy assessment, all 10 plausible values (PVs), generated (PVLIT 1-10) based on the participant's responses to the items administered to them, were used for the analysis. Literacy scores fall on a scale of 0 to 500 and correspond to different proficiency levels as shown in Table 1. In our analyses, participants who scored at or below Level 2

(i.e., below 276) are considered to have lower literacy skills (see Table 1 for a percentage breakdown of the total US adult sample by Literacy proficiency level [$N = 8,488$]).

Problem Solving in Technology-Rich Environments. Participants' proficiency in PSTRE was measured by assessing their skills in using digital technology and tools to gather information and complete realistic activities with specific goals (PIAAC Expert Group in Problem Solving in Technology-Rich Environments, 2009b). Similar to literacy, to account for measurement error, 10 PVs were generated based on the participant's performance on the PSTRE items administered to them, used for the analysis (PVPSL 1-10). In our analyses, participants who scored at or below Level 1 (i.e., below 291) are considered to have lower PSTRE skills (see Table 1 for a percentage breakdown of the total US adult sample by PSTRE proficiency level [$N = 6,880$]).

Table 1
Proficiency Levels for PIAAC Literacy and PSTRE, Score Range 0-500

	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Literacy Scores	0-175	176-225	226-275	276-325	326-375	376-500
Percentage	3.1%	15.6%	35.8%	34.6%	10.6%	0.3%
PSTRE Scores	0-240	241-290	291-340	341-500	NA	NA
Percentage	23.5%	43.7%	29.6%	3.2%	NA	NA

Note: For Literacy, lower skilled is defined as below 276 (Level 2 and below). For PSTRE, lower skilled is defined as below 291 (Level 1 and below).

Background Questionnaire Variables

In addition to the cognitive assessments, a background questionnaire was administered to each participant in the PIAAC survey. Participants were asked questions about their demographic background and their reading and writing behaviors in various contexts. The following variables included in the current study were derived from participants' responses to such questions.

Age. Participants were asked to report their age. We used an ordinal variable (AGEG10LFSEXT) provided in the PIAAC database that classifies participants into one of six age bands: 24 years or younger, 25 to 34 years, 35 to 44 years, 45 to 54 years, 55 to 65 years, and 66 years or older. We compared mean index scores of reading/writing skill use across age groups by lower and higher LIT and PSTRE skill levels.

Race. Participants were asked to identify their race. We used a categorical variable (RACETHN_5CAT) provided in the PIAAC data that classifies participants into one of five race categories: Hispanic, White, Black, Asian or Pacific Islander, and Other. We compared mean index scores of reading/writing skill use across race categories by lower and higher LIT and PSTRE skill levels.

Native Language Status. Participants were asked to identify their native language. We used a dichotomous variable (NATIVESPEAKER) provided in the PIAAC data that indicates whether or not participants were native speakers of English. We compared these two groups on their mean Literacy and PSTRE scores as well as differences by lower- and higher-skilled adults in Literacy and PSTRE.

Job Category. Participants were asked about their occupation. We used an ordinal variable (ISCOSKIL4) in the PIAAC database that classifies participants into one of four job categories: skilled occupations, semi-skilled white-collar occupations, semi-skilled blue-collar occupations, and elementary occupations. We compared mean scores on Literacy and PSTRE among these four job categories and between lower- and higher skilled adults in Literacy and PSTRE.

Specific Writing and Reading Behaviors. Participants were asked questions about their frequency of engagement in specific writing and reading activities in everyday life. For each type of reading or writing activity, participants could choose one of five frequency levels as their response: never (1), less than once a month (2), less than once a week but at least once a month (3), at least once a

week but not every day (4), or every day (5). Participants could also indicate that they do not know the answer or refuse to answer.

Questions about the following writing activities were of interest in the current study because these represented functional daily activities low-skilled adults may engage in: writing letters, emails, or memos at home (H_Q02A); filling in forms at home (H_Q02D); writing letters, emails, or memos at work (G_Q02A); and filling in forms at work (G_Q02D). Questions about the following reading activities were of interest in the current study: reading directions or instructions at home (H_Q01A); reading letters, emails, or memos at home (H_Q01B); reading articles in newspapers, magazines, or newsletters at home (H_Q01C); reading books, fiction or non-fiction, at home (H_Q01E); reading directions or instructions at work (G_Q01A); reading letters, emails, or memos at work (G_Q01B); reading articles in newspapers, magazines, or newsletters at work (G_Q01C); and reading books, fiction or non-fiction, at work (G_Q01E). These specific daily behaviors contribute to the derived indices as described below.

Index of Writing at Home. Based on participants' responses to questions about writing activities at home, a continuous index of writing at home (WRITHOME) was derived and provided in the PIAAC data, which we included in the study (von Davier et al., 2016). Specific functional variables included in this index are writing letters/memos/emails, writing articles for newspaper/magazine/newsletter, writing reports, and filling in forms in everyday life. Please see Appendix A for details on each individual variable.

Index of Writing at Work. Similarly, we used the continuous index of writing at work (WRITWORK) that was derived from participants' responses to questions about writing activities at work. Specific functional variables included in this index are writing letters/memos/emails, writing articles for newspaper/magazine/newsletter, writing reports, and filling in forms at work. Please see Appendix A for details on each individual variable.

Index of Reading at Home. We used the continuous index of reading at home (READHOME) that was derived from participants' responses to questions about reading activities at home (von Davier et al., 2016). Specific functional variables included in this index are reading directions/instructions, reading letters/memos/email, reading articles in newspaper/magazine/newsletter, reading articles in professional journals or scholarly publications, reading fiction or non-fiction books, reading manuals or reference material, reading bills/invoices/bank statements/other financial statements and reading diagrams/maps/schematics in everyday life. Please see Appendix A for details on each individual variable.

Index of Reading at Work. Similarly, we used the continuous index of reading at work (READWORK) that was derived from participants' responses to questions about reading activities at work (von Davier et al., 2016). Specific functional variables included in this index are reading directions/instructions, reading letters/memos/email, reading articles in newspaper/magazine/newsletter, reading articles in professional journals or scholarly publications, reading fiction or non-fiction books, reading manuals or reference material, reading bills/invoices/bank statements/other financial statements and reading diagrams/maps/schematics at work. Please see Appendix A for details on each individual variable.

Results To address our research questions, we utilized a series of descriptive analyses, correlational analyses, analysis of variance (ANOVAs), and multiple regression analyses with the full sample of United States PIAAC participants (2012 and 2014 cohorts; total $N = 8,670$) as well as separately by adults with lower skills (at or below Level 2 on PIAAC Literacy; at or below Level 1 on PIAAC PSTRE). It is important to note that PSTRE was only administered with a computer adaptive format and therefore, has an overall smaller sample size than the Literacy domain (which is given in paper-and-pencil as well as computer adaptive formats). Analyses for RQ1 and RQ2 were conducted in SPSS

through the IDB Analyzer, which took into account all appropriate sampling and replicate weights and plausible values. We used online calculators to compute F -tests and significance values¹ based on the unweighted analyses provided by the IDB Analyzer. Moderation analyses for RQ3 were initially computed in SPSS (because moderation analyses are not available in the IDB analyzer) and averaged across the 10 plausible values and standard errors were aggregated in accordance with the PIAAC protocol. Because these non-weighted interaction terms emerged as non-significant in all models, these terms were dropped from the regression models and the subsequent multiple regression analyses were re-run in the IDB Analyzer to ensure proper weighting was achieved. All items within PIAAC Literacy, PSTRE, reading and writing indices were included. We present specific analyses by research question below.

RQ1: Relations among Reading and Writing Behaviors

Pearson's correlational analyses were used to explore whether relations exist among our primary outcome variable of interest (indices of writing behaviors at home and at work) and indices of reading behaviors at home and at work for the full PIAAC sample of working adults². In addition, we considered these correlations separately for adults who are lower skilled in literacy (at or below Level 2; cut point of 276). We report the correlation coefficients and significance values.

¹ These are links to online calculators that were used to determine significance values for correlations (RQ1) and significance values for our t -tests and F -tests (RQ2) using means and degrees of freedom based on the unweighted sample sizes provided by the IDB Analyzer (see Tables 6, 7, 10, 11, 18, and 19 for means and degrees of freedom for ANOVAs; for t -tests only means and unweighted sample sizes for each group were used in the calculator):

<http://www.socscistatistics.com/pvalues/pearsondistribution.aspx> (correlations),

<https://www.danielsoper.com/statcalc/calculator.aspx?id=8> (ANOVAs),

https://www.medcalc.org/calc/comparison_of_means.php (t -tests)

² The full PIAAC household sample is 8,760; however, our full sample of US working adults only consist of adults that are employed and answered PIAAC background questions pertaining to reading and writing characteristics at home and at work (N s range from 4,785-7,771 based on any given pair of variables included in our analyses [lower N corresponding to work variables and higher N corresponding to home variables]).

RQ2: Relations Among Functional Reading and Writing Behaviors for Lower-Skilled Adults

A first, more exploratory question, was to examine functional daily reading and writing behaviors (with a particular emphasis on lower-skilled adults in the Literacy and PSTRE domains). Descriptive frequencies for each functional writing behavior variable (writing letters/memos/emails and filling in forms at home and at work) for adults with lower Literacy scores (below 276) will be reported and compared to those with higher Literacy scores (at or above 276). Similarly, the descriptive frequencies on each functional writing behavior variable will be reported and compared for adults with lower PSTRE scores (below 291) and higher PSTRE scores (at or above 291) with *t*-tests and *F*-tests. We used bar graphs to show key differences in frequencies by higher and lower Literacy and PSTRE scores by the categories provided for each functional writing behavior (“Less Than Once a Month”, “Less Than Once a Week But at Least Once a Month”, “At Least Once a Week But Not Every Day”, “Every Day”). Next, Spearman’s correlational analyses were conducted using the separate functional daily reading behavior variables (reading directions, letters/emails, newspapers/magazines, books at home and at work) and separate functional daily writing behavior variables (writing letters/emails, filling out form at home and at work) for adults with lower Literacy skills as well as adults with lower PSTRE scores. Finally, we report mean differences for the functional writing behavior variables by different demographics (age, race, native language status, job category) for those with lower Literacy scores (below 276) versus those with higher Literacy scores (at or above 276). We also repeated these analyses to compare those with lower PSTRE scores (below 291) versus those with higher PSTRE scores (at or above 291). We report means, standard deviations, *t*-values, and significance values for these analyses. These analyses included comparisons within the low literacy group (e.g., skilled vs blue collar) as well as between the high and low literacy group (e.g., low vs high skilled on the same category) in both LIT and PSTRE. We also created bar graphs to highlight key findings among the differing demographics and proficiency levels on writing behaviors.

RQ3: Literacy, PSTRE, and Reading Behaviors as Predictors of Writing Behaviors

Two multiple regression analyses were used to examine the joint and unique predictive relations of Literacy, PSTRE, reading behavior indices at work, reading behavior indices at home, and the interaction between reading behaviors (either at home or at work depending on the outcome variable) and literacy level (high/low) to writing behavior indices at home and at work for the full sample of adults ages 16-74. In the first regression, we included five predictors (Literacy, PSTRE, reading behaviors at work, reading behaviors at home, and the interaction between reading at home and literacy level) with the writing behavior index at home variable as the outcome. In the second regression, we included the same five predictors (except the interaction term will be reading at work and literacy level) with the writing behavior index at work variable as the outcome. For all regression analyses, we report standardized estimates (β s), standard errors, t -values for the regression coefficients, and significance values for each predictor. We also report total R^2 values for each regression model.

Results

Research Question 1: Relations Between Reading and Writing Behaviors

To address our first research question, “What are the relations between writing behaviors (indices at home/at work) and reading behaviors (indices at home/at work) for the general population of adults (ages 16-74)? How do these relations differ for adults with lower literacy skills?”, Pearson’s correlations were computed between continuous reading and writing behavior indices at home and at work separately for the full PIAAC adult sample (Table 2) as well as for low-skilled adults in literacy (at or below 276 [Level 2]; Table 3). All indices were positively and significant correlated (r s ranging from .18-.50), with the strongest relation observed between reading and writing behaviors at work for both samples. The pattern of results was very similar between the full sample and low-skilled adults in literacy.

Table 2

Pearson Correlations of Reading and Writing Indices for Sample of Working Adults

Scale	Writing at Home	Writing at Work	Reading at Work	Reading at Home
Writing at Home	1.00	.18*	.19*	.44*
Writing at Work		1.00	.50*	.19*
Reading at Work			1.00	.37*
Reading at Home				1.00

Note: Unweighted *Ns* based on complete data for any given pair of variables range from 4,785-5,807 (for pairs of work variables or home/work variable pairs) to 7,771 (for the pair of home variables) **p*<.05

Table 3

Pearson Correlations of Reading and Writing Indices for Sample of Working Adults with Low Literacy (Level 2 and Below)

Scale	Writing at Home	Writing at Work	Reading at Work	Reading at Home
Writing at Home	1.00	.18*	.20*	.42*
Writing at Work		1.00	.50*	.22*
Reading at Work			1.00	.41*
Reading at Home				1.00

Note: Unweighted *Ns* based on complete data for any given pair of variables range from 2,213-2,714 (for pairs of work variables or home/work variables) to 3,930 (for the pair of home variables).

**p*<.05

Research Question 2: Functional Daily Writing Behaviors

Our second research question was two-pronged. First, we utilized Spearman's correlations to examine the relations among functional reading behaviors at home and at work (read directions, read emails/memos/letters, read newspapers/magazines, read books) and functional writing behaviors at home and at work (write emails/memos/letters, fill in forms) for low-skilled adults in literacy (at or below 276 [Level 2]) and PSTRE (at or below 291 [Level 1]). Second, we conducted *t*-tests and ANOVAs to examine variations in functional writing behaviors by queried demographics (age, race, native language status, and job category) within low-skilled groups as well as low-skilled versus high-skilled adults in literacy and PSTRE (at/below 276 vs. above 276; at/below 291 vs. above 291, respectively).

Spearman's rank order correlation analyses revealed weak to strong, positive relations among all functional reading and writing behaviors for low-skilled adults in literacy ($r_s = .06-.66$; Table 4) and low-skilled adults in PSTRE ($r_s = .03-.69$; Table 5). In particular, for low-skilled adults in literacy and PSTRE, the strongest observed correlations were between reading emails/memos/letters at work and writing emails/memos/letters at work. The lowest patterns of correlations were observed for reading books at home with functional behaviors at work (e.g., filling in forms, reading directions, writing emails/memos/letters) for low-skilled adults in literacy and PSTRE.

Table 4

Spearman's Rank Order Correlations of Functional Reading and Writing Variables for Low Literacy (Level 2 and Below)

	Write Letters/Emails Home	Fill in Forms Home	Write Letters/Emails Work	Fill in Forms Work	Read Directions Work	Read Letters/Emails Work	Read Newspapers/Magazines Work	Read Books Work	Read Directions Home	Read Letters/Emails Home	Read Newspapers/Magazines Home	Read Books Home
Write Letters/Emails Home	1.00	.31	.31	.18	.12	.26	.16	.17	.31	.54*	.27	.31
Fill in Forms Home		1.00	.18	.20	.13	.17	.16	.17	.31	.26	.19	.23
Write Letters/Emails Work			1.00	.48*	.29	.66*	.47*	.37	.11	.27	.20	.12
Fill in Forms Work				1.00	.41*	.48*	.33	.24	.14	.21	.15	.07
Read Directions Work					1.00	.43*	.32	.25	.19	.17	.13	.06
Read Letters/Emails Work						1.00	.56*	.35	.14	.32	.25	.11
Read Newspapers/Magazines Work							1.00	.45*	.12	.22	.32	.12
Read Books Work								1.00	.14	.17	.17	.19
Read Directions Home									1.00	.37	.26	.28
Read Letters/Emails Home										1.00	.38	.27
Read Newspapers/Magazines Home											1.00	.28
Read Books Home												1.00

Note: $N_s = 3,001 - 4,626$ (unweighted N size)

Note: Variables involving at home behaviors include the full sample of low literacy participants ($N_s = 3,852-4,626$ for pairs of variables involving home only behaviors),; variables involving at work behaviors only include those who are low literacy and have reported employment ($N_s = 3,001-3,192$ for pairs of variables involving work or home/work behavior variables. *Significant at $p < .05$

Table 5

Spearman's Rank Order Correlations of Functional Reading and Writing Variables for Low PSTRE (Level 1 and Below)

	Write Letters/Emails Home	Fill in Forms Home	Write Letters/Emails Work	Fill in Forms Work	Read Directions Work	Read Letters/Emails Work	Read Newspapers/Magazines Work	Read Books Work	Read Directions Home	Read Letters/Emails Home	Read Newspapers/Magazines Home	Read Books Home
Write Letters/Emails Home	1.00	.25	.27	.11	.11	.22	.15	.16	.20	.49*	.27	.23
Fill in Forms Home		1.00	.11	.14	.10	.11	.14	.14	.26	.19	.16	.18
Write Letters/Emails Work			1.00	.44*	.29	.69*	.49*	.34	-.01	.21	.19	.08
Fill in Forms Work				1.00	.38	.43*	.29	.20	.07	.14	.11	.03
Read Directions Work					1.00	.41*	.32	.24	.17	.11	.11	.07
Read Letters/Emails Work						1.00	.58*	.33	.03	.25	.22	.08
Read Newspapers/Magazines Work							1.00	.45*	.05	.17	.31	.11
Read Books Work								1.00	.09	.13	.15	.17
Read Directions Home									1.00	.26	.20	.23
Read Letters/Emails Home										1.00	.37	.20
Read Newspapers/Magazines Home											1.00	.25
Read Books Home												1.00

Note: $N_s = 3,386 - 4,619$ (unweighted N size) Note: Variables involving at home behaviors include the full sample of low PSTRE participants ($N_s = 4,611-4,619$ for pairs of variables involving home only behaviors); variables involving at work behaviors only include those who are low PSTRE and have reported employment ($N_s = 3,386-3,392$ for pairs of variables involving work and home/work behavior variables..

*Significant at $p < .05$

A series of *t*-tests and ANOVAs were conducted to compare functional daily writing behaviors by the queried demographics within low-skilled and high-skilled literacy and PSTRE groups as well as between low- versus high-skilled groups (Tables 6-21 in Appendix B; Figures 1-16 in Appendix B). There are two sets of tables – one compares within low skilled and high skilled groups and the other compares between low and high skilled groups.

Age.

Differences within skill levels by age group. For low-skilled adults in both PSTRE and literacy, there were some reported significant differences in frequencies of functional writing behaviors by age bands (24 or less, 25-34, 35-44, 45-54, 55-65, 66 plus; see Tables 6,7 for means and *p*-values). Generally, younger (24 or less) and older (66+) reported less frequent engagement in writing behaviors at work relative to the other age groups. At home, younger (24 or less) and older (66+) tended to report similar levels of writing engagement, if not increased engagement, relative to the other age bands.

Differences between skill levels for different age groups. For PSTRE, differences between the high- and low-skilled in the frequency of both writing emails/memos/letters at home and at work were significant for all the age bands, with higher-skilled adult reporting more frequent engagement (Table 8, Figures 1-4). For filling out forms at work, there are differences by skill level for those in the youngest age band (24 or less) and those who are 25-34. For filling out forms at home, there are differences by skill level for everyone except those 66 and over. For literacy, significant differences were observed within all age bands for writing emails/memos/letters at home and at work and filling in forms at home, in favor of higher-skilled adults (Table 9; Figures 1-4). For filling in forms at work, significant differences were reported for all age bands except those 55+ (Table 9).

Race.

Differences within skill levels by race. For both low-skilled adults in PSTRE and literacy, there were only some reported significant differences in frequencies of functional writing behaviors by racial categories (Hispanic, White, Black, Asian American, Other; see Tables 10,11 for means and *p*-values).

Of note, was that within the low-skilled literacy group, adults who self-reported as Hispanic tended to have lower reported frequencies of at work and at home behaviors (filling in forms, writing emails) than those reported by other racial groups.

Differences between skill levels for all races. Differences were noted by race when considering writing behavior frequency differences for high- versus low-skilled adults by racial categories. For PSTRE, significant reported writing frequency differences were observed among all racial categories for writing emails/memos/letters at home and at work, in favor of higher-skilled adults reporting more frequent engagement (Table 12, Figures 5-8). Significant reported writing frequency differences were observed for Hispanic and White groups for filling in forms at home and at work, again in favor of higher-skilled adults (see Table 12). For literacy, significant reported writing frequency differences were observed among all racial categories for writing emails/memos/letters at home, in favor of higher-skilled adults reporting more frequent engagement (Table 13; Figures 5-8). Some significant writing frequency differences were reported for Hispanic, White, and Black groups for filling in forms at home and at work (see Table 13).

Native Language Status.

Differences among skill levels for native language status. For PSTRE, low-skilled native English speakers reported significantly greater frequencies of writing emails/memos/letters and filling in forms at work compared to low-skilled non-native English speakers (Table 14). In contrast, high-skilled non-native speakers reported significantly greater frequencies of filling in forms at work compared to high-skilled native English speakers. No differences by functional writing behaviors at home were observed for within low- or high-skilled adult groups by native language status (Table 14).

Differences between skill levels for native language status For literacy, low-skilled native speakers reported significantly greater frequencies for all functional writing behaviors at home and at work compared to low-skilled non-native speakers (Table 15). In contrast, high-skilled non-native speakers reported higher frequencies of writing emails/memos/letters only at home compared to high-

skilled native speakers. No other differences were observed for reported behaviors within the high-skilled group (Table 15). Comparing between high- versus low-skilled native speakers and high- versus low-skilled non-native speakers for PSTRE revealed significant differences in all writing behaviors (except filling in forms at work), in favor of greater reported frequencies for the high-skilled adults (Table 16; Figures 9-12). Comparing between high- versus low-skilled native speakers and high- versus low-skilled non-native speakers for literacy revealed significant differences in all writing behaviors, in favor of greater reported frequencies for the high-skilled adults (Table 17; Figures 9-12).

Job Category.

Differences within skill levels by job category. For PSTRE, significant differences were observed between job categories (skilled, semi-skilled white collar, semi-skilled blue collar, elementary) for low-skilled adults (see Table 18 for reported means, *p*-values, and exceptions). Similar patterns of reported functional writing behaviors between job categories were observed for those high-skilled in PSTRE (Table 18). In particular, higher skilled occupations (skilled, semi-skilled white collar) tended to report the most frequent functional writing behaviors regardless of higher or lower PSTRE skills. For literacy, identical patterns were exhibited for low-skilled and high-skilled adults, such that the significant differences were observed for all functional writing behaviors between most job categories (see Table 19 for means, *p*-values, and exceptions).

Differences between skill levels by job category. Comparing between job categories for high- versus low-skilled adults for PSTRE revealed significant differences in favor of greater reported frequencies for the high-skilled adults (Table 20; Figures 13-16). Most of the exceptions were non-significant differences between low-skilled and high-skilled adults in PSTRE for those in elementary occupations. Comparing between job categories for high- versus low-skilled adults for literacy revealed significant differences in favor of greater reported frequencies for high-skilled adults (Table 21; Figures 13-16). Overall, skilled occupations tended to report the highest frequencies of engaging in writing

behaviors and elementary occupations tended to report the lowest frequencies of engaging in writing behaviors.

Research Question 3: Predictive Relations of Literacy, PSTRE, and Reading Behaviors to Writing Behaviors by Literacy Skill Level

To address our third research question, two multiple regression analyses were conducted in SPSS. The outcome variables were writing at home and writing at work. The initial regression models were conducted in SPSS (in order to include interaction terms) and included the predictors of literacy, PSTRE, reading behaviors (at home and at work) and the interaction between reading behaviors (either at home or at work depending on the outcome variable) and literacy level (high/low). Literacy level was dummy coded by using the high/low Literacy cutoff score of 276 (low = 0-276 was coded as 0; high = 277-500 was coded as 1) for each plausible value (analyses were run and averaged across the 10 plausible values). We used a dummy code because we wanted to compare between lower (Level 2 and below) and higher (Level 3 and above) Literacy levels in our moderation analyses. In both regression models, the interaction terms (reading at home*literacy level and reading at work*literacy level) emerged as non-significant ($ps > .05$), indicating that the relation of the reported frequency of reading behaviors either at home or at work do not vary by literacy skill level (high vs. low). Thus, we excluded the interaction terms from the regression models.

We re-ran the two regression models with the four predictors (PSTRE, literacy, reading at home, reading at work) and writing at home and at work as the outcome variables in the IDB analyzer to ensure that the regression estimates were properly weighted (Tables 22, 23)³. Because the interaction term was removed, we no longer needed to dummy code the Literacy predictor. Thus, all predictors were continuous in these models (Literacy and PSTRE 0-500 scales; reading and writing indices varied

³ Multicollinearity among the predictors was not an issue in the two regression models as all Variance Inflation Factors (VIFs) for predictors were in the acceptable range (1.12-2.91 for the model with writing at home as the outcome; 1.14-2.85 for the model with writing at work as the outcome). VIFs under 5 are generally considered acceptable (Akinwande, Dikko, & Samson, 2015).

between -1.30-7.43). In the first regression model, the four predictors (PSTRE, literacy, reading at home, reading at work) jointly accounted for 23% of the variance in reported frequency of writing behaviors at home. Reading at home ($\beta = .43, p < .001$) and PSTRE performance ($\beta = .11, p = .001$) were the only significant unique predictors of reported frequency of writing behaviors at home (Table 22).

In the second regression model, the four predictors (PSTRE, literacy, reading at home, reading at work) jointly accounted for 27% of the variance in reported frequency of writing behaviors at work. Reading at work ($\beta = .51, p < .001$) and PSTRE performance ($\beta = .13, p = .010$) were the only significant unique predictors of reported frequency of writing behaviors at work (Table 23).

Table 22

Predictive Relations of PSTRE, Literacy, and Reading Behaviors to Writing Behaviors at Home

Predictor	b	SE	B	t	Sig
PSTRE	.00	.00	.11	3.43	.001
Literacy	.00	.00	.06	1.77	.083
Read Work	.01	.02	.01	.41	.367
Read Home	.51	.02	.43	26.78	<.001

Total $R^2 = .23$

Note: Continuous Literacy and PSTRE scores were used

Table 23

Predictive Relations of PSTRE, Literacy, and Reading Behaviors to Writing Behaviors at Work

Predictor	b	SE	B	t	Sig
PSTRE	.00	.00	.13	2.71	.010
Literacy	.00	.00	-.06	-1.23	.187
Read Work	.59	.03	.51	23.47	<.001
Read Home	.00	.02	.00	-.18	.393

Total $R^2 = .27$

Note: Continuous Literacy and PSTRE scores were used

Discussion

We were interested in exploring potential relations among the PIAAC literacy domain (LIT), the PIAAC Problem Solving in Technology-Rich Environments domain (PSTRE), reading behaviors at work and at home, and various demographic characteristics to adults' writing behaviors at home and at work for both the general population and for the population with lower LIT (Level 2 and below) and lower PSTRE skills (Level 1 and below). Writing skills are critical for adults to meet personal, social, educational, and workplace demands. People who are poor readers may also be poor writers. Reading and writing share some of the same cognitive and linguistic demands such as vocabulary, spelling, syntax, and text structures; research shows that frequent writing improves reading. Literacy skills such as reading and writing also extend to the use of digital technology; successful digital literacy in all facets of life require reading skills and writing skills as well (National Academies, 2009).

When looking at overall relations between reading and writing indices, we see that the magnitudes of correlations between these indices are similar for the full adult sample and the low literacy sample which suggests that literacy proficiency levels do not play a role in these relations. This may indicate that the relationship between reading and writing behaviors may not be dependent on literacy proficiency, i.e., people who read more, write more and people who read less, write less regardless of literacy skills. These correlations may also indicate that reading and writing are context-specific, that is people who read more at work also write more at work, but may not necessarily write more at home. Our findings show that there is a stronger relationship between behaviors of different types in a single location (e.g., reading and writing at home; reading and writing at work) than between a single behavior in both locations (e.g., writing at home and writing at work). The lowest correlations observed were between writing at home and writing at work for the general sample and low-skilled adults. The integration of reading and writing at the workplace may occur because these tasks are accomplished with different registers, tasks, and demands relating to context. Reading and writing at

home may be for social, educational, or personal use while reading and writing at work is primarily workplace or job related.

We observe the finding that literacy proficiency levels do not predict either writing at home or at work indices, controlling for PSTRE and reading behavior indices. Instead, the significant unique predictors of writing behaviors are reading in the same context (home/work) and PSTRE. Much writing today occurs using some sort of technology rather than traditional paper-pencil writing (Manderino & Castek, 2016). This may suggest that technology skills are more relevant to functional writing behavior indices than literacy skills; the proliferation of digital devices and ease of connectivity have changed the way people collaborate and communication. Reading and writing anchor the skills used in digital technology both at home and in the workplace such as online searching, integrating media with text, using software packages, and organizing information from multiple sources. Although PSTRE does not claim to measure digital literacy, it does measure abilities in a digital format using literacy skills and perhaps these types of literacies are more directly connected to the amount of writing we do at home and at work.

When assessing specific functional daily reading behaviors at home/at work (reading directions, letters/emails, newspapers/magazines, books) and functional daily writing behaviors at home/at work (writing letters/emails, filling out forms), we found that the strongest correlations for adults with low literacy and low PSTRE were between reading and writing letters/emails at work. There were also relatively strong, positive relations (above .5) for reading newspapers/magazines at work and reading letters/emails at work for adults with low literacy and low PSTRE; and between writing letters/emails at home and reading letters/emails at home for adults with low literacy skills. There was a smaller relationship between reading at home and writing at work which tells us that the relationship between frequency of reading and writing is contextual. Prior research indicates that, in general, increased reading leads to more writing for children in grades K-12 (Graham, Liu, Bartlett et al., 2017); a deeper look at adult-level specific functional writing behaviors shows that this may not be the case for adults

since, for example, reading more books at home did not relate to writing more either at home or at work. This indicates that reading and writing for one purpose do not necessarily generalize to reading and writing for another purpose.

Age shows greater differences when comparing high-skilled versus low-skilled within each age band (e.g., age 35-44 high-skilled has greater writing frequency than 35-44 low-skilled) rather than between age bands of similarly skilled (e.g., 25-34 high skilled vs 35-44 high skilled). This could indicate that younger adults (irrespective of skill level) are not more likely than older adults to engage with writing emails either at home or at work, either because they do not have skilled occupations that require more email writing or perhaps because they use other forms of writing such as texting with greater frequency. With regard to race, there is not much difference in writing frequencies among categories of race for low-skilled adults, which tells us that literacy and PSTRE skill levels (high versus low) matter more for writing behaviors than race alone does. The largest differences seen in either low- or high-skilled levels for literacy and PSTRE are between Hispanics and Whites, which could indicate that, like language nativity, choice of language matters in writing frequency.

Native English speakers generally report greater frequencies in functional writing behaviors for both low literacy and PSTRE, and at both home and work. Overall, this may indicate that choice of language matters for adults with low literacy and low PSTRE when writing which is not surprising since English is the primary language spoken and written in the United States (BLS, 2017). However, we were surprised to note that high-skilled non-natives speakers reported greater frequency in writing than high-skilled native speakers, which may be related to occupation or the fact that the writing questions did not indicate which language participants wrote in. When comparing job categories, we find that skilled occupations write more frequently both at home and at work than semi-skilled or elementary occupations. Skilled occupations include legislators, senior officials and managers, professionals, technicians, and associate professionals; semi-skilled white-collar occupations include clerks, service workers, and sales workers (OECD, 2013). Semi-skilled blue collar workers include skilled agricultural

and fisher workers, craft and related trades workers, plant and machine operators, and assemblers; unskilled include laborers and other elementary occupations (OECD, 2013). This indicates that higher categories of jobs have more writing demands than lower skilled jobs and again is not a surprising finding. We surmise that those who write more at work may also write more at home because they have a greater proficiency and comfort in writing.

Implications

For adults with low skills and non-native English speakers, reading and writing instruction for specific contexts such as workplace letters/emails may be critical for achieving better jobs in higher occupations; this instruction could be formal, that is guided by a specific curriculum with a credential, or non-formal which may or may not be guided by a formal curriculum but is taught by a qualified teacher, such as in continuing education courses. Improving writing skills as part of formal adult education classes may be important for adults with low basic skills as they seek employment and may need to write as part of their jobs. Developing technology as tools for writing instruction can help adults at varying literacy and PSTRE levels increase their workplace skills as more and more adults write using digital technology rather than pencil and paper. Engagement with digital technology can also help adults breach the digital divide by engaging with both hardware and software for personal and work purposes. . Further, there is a relationship between reading and writing on the same task (e.g. letters/memos/emails) that implies a certain system of skills for adults. While we know that Reading and writing on the job are highly correlated; strengthening reading and writing skills in context may also help lower skilled adults achieve better jobs in higher occupations. Data shows that reading and writing are correlated for children; our study further shows that this may also be true for adults as well, particularly when the reading and writing are within the same context.

Limitations and Plans for Future Research

A limitation of this study is that we do not have actual direct assessment of writing skills, only self-report frequencies and types of writing. As previously noted, there is considerable evidence to suggest a strong relation between reading and writing abilities and that writing-to-learn tasks and interventions have positive effects on several academic outcomes (e.g., math, science, literacy; Balgopal & Wallace, 2009; Bangert-Drowns, Hurley, and Wilkinson, 2004; Chen, Hand, & McDowell, 2013; Stewart, Myers, & Culley, 2009). A key assumption for this study was using frequencies of reading and writing behaviors as a proxy for reading and writing skills. Reports of different literacy behaviors are valuable, as they offer a unique lens into the real world practices of individuals (Lynch, Anderson, Anderson, & Shapiro, 2006; Neuman & Roskos, 1992). However, we acknowledge that self-reported data can be problematic. One of the major drawbacks of self-reports is the potential bias toward socially desirable responses (i.e., inflating the frequencies of one's own writing and reading behaviors), although the anonymity promised by the PIAAC survey may have dampened this bias (Chan, 2009). To circumvent such issues, it would be ideal to have actual writing samples of adults to be able estimate the relations of writing accuracy with PIAAC literacy and component skills (e.g., sentence processing, passage comprehension) as well as the writing frequency behaviors. Also, establishing a link between actual writing ability (direct orthographic skills, style, structure, choice of language) and writing behaviors (the frequency of writing) could help design workplace training for adults who need to engage more frequently in writing practices but also to strengthen actual writing skills. This could serve as an impetus for future work to begin delving into analyzing corpus of chirographic and digital writing data if a relation is found for reading/writing behaviors.

A second limitation of this study is the differences in sample sizes among the different analyses, which may limit generalizability of the findings to the broader US population of adults. The sample sizes varied dependent upon the number of cases included (e.g., many of our analyses included just

participants low-skilled in literacy or PSTRE and there was also some variability in our outcome variables [writing at home and at work] because some participants did not hold jobs). As a means to increase generalizability of our findings, we ran supplementary descriptive analyses to investigate the distributions, frequencies, and means and standard deviations of participants included in our analyses (limited to those that are low skilled in literacy or PSTRE) compared with the full sample of adults on demographic variables (gender, race/ethnicity, age, and native language status; see Appendix B, Table 24) as well as our outcome variables (writing at home and at work; see Appendix B, Table 25). Of note, the low-skilled PSTRE sample is more similar to the full sample in terms of mean reported frequencies of writing behaviors at home and at work. The low-skilled literacy sample was characterized by a higher percentage of non-native speakers, a greater percentage of older participants (66 plus), and higher percentages of Hispanic and Black participants compared to the full sample and low-skilled PSTRE group. Thus, these findings should be interpreted with some caution as they may not generalize to all adults in the US. Relatedly, we did not assess the overlap of individuals who scored low or high on both Literacy and PSTRE domains. Future studies should consider profiles of adults (e.g., deficits in literacy and PSTRE; strengths in literacy and PSTRE; relative strength in one domain and deficits in the other) and how this relates to the demographics (e.g., age, race).

The proposed study stands to benefit future research in several ways. First, a descriptive report of the writing behavior of adults across various demographic categories and cognitive skill levels will provide a starting point for other researchers interested in studying adults' writing. Second, if the study establishes a link between adults' writing behavior and reading, particularly for low-skilled adults, researchers can design adult literacy instruction that simultaneously improves outcomes for both writing and reading. Third, a better understanding of the demographic and cognitive factors that influence writing behavior can help researchers target specific profiles of adults in educational as well as job training interventions. Future research should consider the relationships between low-skilled and high-skilled individuals, not only the relationship between low-skilled and the general population. In addition,

a more nuanced study on the relationship between the PIAAC literacy and PSTRE items and existing reading comprehension research (including any overlap between measured skills and self-reported skills) would create a connection to the larger body of literature on adult literacy. Finally, future research needs to extend beyond self-reported data and verify these relations using objective measures in order to inform development of writing skills curricula.

References

- Abbott, R. D., Berninger, V. W., & Fayol, M. (2010). Longitudinal relationships of levels of language in writing and between writing and reading in grades 1 to 7. *Journal of Educational Psychology, 102*(2), 281-298.
- Ackerman, J. M. (1993). The promise of writing to learn. *Written Communication, 10*(3), 334-370.
- Akinwande, M., Dikko H., & Samson, A. (2015). Variance inflation factor: As a condition for the inclusion of suppressor variable(s) in regression analysis. *Open Journal of Statistics, 5*, 754-767.
- Balgopal, M. M., & Wallace, A. M. (2009). Decisions and dilemmas: Using writing to learn activities to increase ecological literacy. *The Journal of Environmental Education, 40*(3), 13-26.
- Bangert-Drowns, R. L., Hurley, M. M., & Wilkinson, B. (2004). The effects of school-based writing-to-learn interventions on academic achievement: A meta-analysis. *Review of Educational Research, 74*(1), 29-58.
- Bureau of Labor Statistics, www.census.gov/topics/population/language.html.us. 2017
- Berninger, V. W., Abbott, R. D., Abbott, S. P., Graham, S., & Richards, T. (2002). Writing and reading: Connections between language by hand and language by eye. *Journal of learning disabilities, 35*(1), 39-56.

- Chan, D. (2009). So why ask me? Are self-report data really that bad? In C. E. Lance & R. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp. 309-336). New York, NY: Routledge.
- Chen, Y. C., Hand, B., & McDowell, L. (2013). The effects of writing-to-learn activities on elementary students' conceptual understanding: Learning about force and motion through writing to older peers. *Science Education, 97*(5), 745-771.
- Chen, X. (2016). Remedial coursetaking at U.S. public 2-and 4-year institutions: scope, experiences, and outcomes. Statistical Analysis Report. NCES 2016-405. *National Center for Education Statistics*.
- Cole, M. S., Rubin, R. S., Feild, H. S., & Giles, W. F. (2007). Recruiters' perceptions and use of applicant résumé information: Screening the recent graduate. *Applied Psychology, 56*(2), 319-343.
- Cole, K. E., Inada, M., Smith, A. M., & Haaf, M. P. (2013). Implementing a grant proposal writing exercise in undergraduate science courses to incorporate real-world applications and critical analysis of current literature. *Journal of Chemical Education, 90*(10), 1316-1319.
- Cronje, R., Murray, K., Rohlinger, S., & Wellnitz, T. (2013). Using the science writing heuristic to improve undergraduate writing in biology. *International Journal of Science Education, 35*(16), 2718-2731.
- DeSilver, D. More older Americans are working, and working more, than they used to. Pew Research Center, June 20, 2016. <http://www.pewresearch.org/fact-tank/2016/06/20/more-older-americans-are-working-and-working-more-than-they-used-to/>, accessed on August 11, 2017.
- Fortunati, L. & Vincent, J. (2014). Sociological insights on the comparison of writing/reading on paper with writing/reading digitally. *Telematics and Information 31*(1) 39-51.
- Fitzgerald, J., & Shanahan, T. (2000). Reading and writing relations and their development. *Educational Psychologist, 35*(1), 39-50.

- Fracasso, L. E., Bangs, K., & Binder, K. S. (2016). The contributions of phonological and morphological awareness to literacy skills in the adult basic education population. *Journal of Learning Disabilities, 49*(2), 140-151.
- GED Testing Service. (n.d.). *2014 GED Test*. Retrieved from <https://www.gedtestingservice.com/educators/2014test>
- Goodman, M., Finnegan, R., Mohadjer, L., Krenzke, T., and Hogan, J. (2013). Literacy, Numeracy, and Problem Solving in Technology-Rich Environments Among U.S. Adults: Results from the Program for the International Assessment of Adult Competencies 2012: First Look (NCES 2014-008). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved [date] from <http://nces.ed.gov/pubsearch>.
- Graham, S., & Hebert, M. (2011). Writing to read: A meta-analysis of the impact of writing and writing instruction on reading. *Harvard Educational Review, 81*(4), 710-744.
- Graham, S., Liu, X., Bartlett, B., Ng, C., Harris, K., Aitken, A., Barkel, A., Kavanaugh, C. and Talukdar, J. (2017). Reading for writing: A met-analysis of the impact of reading interventions on writing. *Review of Educational Research 88*(2), 243-284.
- Hock, M., & Mellard, D. (2005). Reading comprehension strategies for adult literacy outcomes. *Journal of Adolescent & Adult Literacy, 49*(3), 192-200.
- Jenkins, J. R., Johnson, E., & Hileman, J. (2004). When is reading also writing: Sources of individual differences on the new reading performance assessments. *Scientific Studies of Reading, 8*(2), 125-151.
- Kalman, Y., Kave, G., & Umanski, D. (2015). Writing in a Digital World: Self-Correction While Typing in Younger and Older Adults. *International Journal of Environmental Research and Public Health 12*(10), 12723-12734.
- Luttrell, V. R., Bufkin, J. L., Eastman, V. J., & Miller, R. (2010). Teaching scientific writing: Measuring student learning in an intensive APA skills course. *Teaching of Psychology, 37*(3), 193-195.

- Lynch, J., Anderson, J., Anderson, A., & Shapiro, J. (2006). Parents' beliefs about young children;s literacy development and parents' literacy behaviors. *Reading Psychology*, 27(1), 1-20.
- MacArthur, C. A., & Lembo, L. (2009). Strategy instruction in writing for adult literacy learners. *Reading and Writing*, 22(9), 1021-1039.
- https://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_071757.pdf
- Manderino, M. & Castek Jill. (2016). Digital Literacies for Disciplinary Learning: A Call to Action. *Journal of Adolescent & Adult Literacy*, 60(1),79–81. doi: 10.1002/jaal.565
- National Census for Writing. (2015). Retrieved from <https://writingcensus.swarthmore.edu/>
- National Research Council (2012). *Improving Adult Literacy Instruction: Options for Practice and Research*. Committee on Learning Sciences: Foundations and Applications to Adolescent and Adult Literacy, A.M. Lesgold and M. Welch-Ross, Eds. Division of Behavioral and Social Sciences and Education. Washington DC: The National Academies Press.
- Neuman, S. B., & Roskos, K. (1992). Literacy objects as cultural tools: Effects on children's literacy behaviors in play. *Reading Research Quarterly*, 27(3), 203-225.
- OECD (2013), Time for the U.S. to Reskill?: What the Survey of Adult Skills Says, OECD Skills Studies, OECD Publishing. <http://dx.doi.org/10.1787/9789264204904-en>
- OECD (2016), *The Survey of Adult Skills: Reader's Companion, Second Edition*, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264258075-en>
- PIAAC Literacy Expert Group (2009). PIAAC Literacy: A Conceptual Framework. *OECD Education Working Papers No. 34*. Paris: OECD Publishing. <http://dx.doi.org/10.1787/220348414075>
- PIAAC Expert Group in Problem Solving in Technology-Rich Environments (2009). PIAAC Problem Solving in Technology-Rich Environments: A Conceptual Framework. *OECD Education Working Papers No. 36*. Paris: OECD Publishing. <http://dx.doi.org/10.1787/220262483674>
- Raines, Claire. *Connecting Generations: The Sourcebook for a New Workplace*. Boston: Crisp/Course Technology, 2003.

- Rampey, B.D., Finnegan, R., Goodman, M., Mohadjer, L., Krenzke, T., Hogan, J., and Provasnik, S. (2016). Skills of U.S. Unemployed, Young, and Older Adults in Sharper Focus: Results From the Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014: First Look (NCES 2016-039rev). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved [date] from <http://nces.ed.gov/pubsearch>.
- Sabatini, J. P. (2015). Understanding the basic reading skills of U.S. adults: Reading components in the PIAAC literacy survey. Educational Testing Service, Princeton, NJ. Retrieved December 1, 2017 from <https://www.ets.org/s/research/report/reading-skills/ets-adult-reading-skills-2015.pdf>.
- Schneider, B. & Andre, J. (2005). University preparation for workplace writing. *Journal of Business Communication*, 42(2), 195-218. The impact of writing assignments in business education: Toward a competitive advantage in the workplace. *American Journal of Business Education* 7(3), 265-270.
- Schramm, R. M., & Neil Dortch, R. (1991). An analysis of effective resume content, format, and appearance based on college recruiter perceptions. *The Bulletin of the Association for Business Communication*, 54(3), 18-23.
- Shanahan, T. (2016). Relationships between reading and writing development. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research*, 2nd edition (pp. 194-207). New York, NY: Guilford.
- Shanahan, T., & Tierney, R. J. (1990). Reading-writing connections: The relations among three perspectives. In *National Reading Conference Yearbook*. National Reading Conference.
- Stewart, T. L., Myers, A. C., & Culley, M. R. (2009). Enhanced learning and retention through “writing to learn” in the psychology classroom. *Teaching of Psychology*, 37(1), 46-49.

- Talwar, A., Cote, N. G., & Binder, K. S. (2014). Investigating predictors of spelling ability for adults with low literacy skills. *Journal of Research and Practice for Adult Literacy, Secondary, and Basic Education*, 3(2), 35-50.
- Tighe, E. L., & Binder, K. S. (2015). An investigation of morphological awareness and processing in adults with low literacy. *Applied Psycholinguistics*, 36(2), 245-273.
- von Davier, M., Weeks, J., Chen, H., Allen, J., & van der Velden, R. (2016). Creating simple and complex derived variables and validation of background questionnaire data. In *Survey of Adult Skills Technical Report, Second Edition* (pp. 20-1—20-22). Retrieved from <http://www.oecd.org/skills/piaac/publications.htm>

Appendix A

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Composition of Derived Index Variables

Writing at Home (WRITHOME)

1. H_Q02A: In everyday life, how often do you usually write letters, memos, or e-mails?

Response Frequencies (by full sample): Never (N = 1,172), Less than once a month (N = 953), Less than once a week but at least once a month (N = 972), At least once a week but not every day (N = 2,260), Every day (N = 3,122).

2. H_Q02B: In everyday life, how often do you usually write articles for newspapers, magazines, or newsletters?

Response Frequencies (by full sample): Never (N = 7,559), Less than once a month (N = 537), Less than once a week but at least once a month (N = 190), At least once a week but not every day (N = 123), Every day (N = 70).

3. H_Q02C: In everyday life, how often do you usually write reports?

Response Frequencies (by full sample): Never (N = 6,119), Less than once a month (N = 878), Less than once a week but at least once a month (N = 655), At least once a week but not every day (N = 624), Every day (N = 203).

4. H_Q02D: In everyday life, how often do you usually fill in forms?

Response Frequencies (by full sample): Never (N = 2,529), Less than once a month (N = 2,646), Less than once a week but at least once a month (N = 1,741), At least once a week but not every day (N = 1,151), Every day (N = 411).

Writing at Work (WRITWORK)

1. G_Q02A: In your job/last job, how often do/did you usually write letters, memos, or e-mails?

Response Frequencies (by full sample): Never (N = 2,123), Less than once a month (N = 397), Less than once a week but at least once a month (N = 340), At least once a week but not every day (N = 757), Every day (N = 2,574).

2. G_Q02B: In your job/last job, how often do/did you usually write articles for newspapers, magazines, or newsletters?

Response Frequencies (by full sample): Never (N = 5,298), Less than once a month (N = 512), Less than once a week but at least once a month (N = 193), At least once a week but not every day (N = 124), Every day (N = 64).

3. G_Q02C: In your job/last job, how often do/did you usually write reports?

Response Frequencies (by full sample): Never (N = 2,878), Less than once a month (N = 731), Less than once a week but at least once a month (N = 698), At least once a week but not every day (N = 788), Every day (N = 1,094).

4. G_Q02D: In your job/last job, how often do/did you usually fill in forms?

Response Frequencies (by full sample): Never (N = 1,596), Less than once a month (N = 756), Less than once a week but at least once a month (N = 675), At least once a week but not every day (N = 887), Every day (N = 2,276).

Reading at Home (READHOME)

1. H_Q01A: In everyday life, how often do you usually read directions or instructions?

Response Frequencies (by full sample): Never (N = 723), Less than once a month (N = 1,179), Less than once a week but at least once a month (N = 1,219), At least once a week but not every day (N = 2,284), Every day (N = 3,069).

2. H_Q01B: In everyday life, how often do you usually read letters, memos, or e-mails?

Response Frequencies (by full sample): Never (N = 587), Less than once a month (N = 382), Less than once a week but at least once a month (N = 499), At least once a week but not every day (N = 1,478), Every day (N = 5,531).

3. H_Q01C: In everyday life, how often do you usually read articles in newspapers, magazines, or newsletters?

Response Frequencies (by full sample): Never (N = 740), Less than once a month (N = 567), Less than once a week but at least once a month (N = 860), At least once a week but not every day (N = 2,485), Every day (N = 3,825).

4. H_Q01D: In everyday life, how often do you usually read articles in professional journals or scholarly publications?

Response Frequencies (by full sample): Never (N = 3,199), Less than once a month (N = 1,598), Less than once a week but at least once a month (N = 1,421), At least once a week but not every day (N = 1,491), Every day (N = 764).

5. H_Q01E: In everyday life, how often do you usually read books, fiction or non-fiction?
Response Frequencies (by full sample): Never (N = 1,602), Less than once a month (N = 1,673), Less than once a week but at least once a month (N = 1,185), At least once a week but not every day (N = 1,716), Every day (N = 2,303).

6. H_Q01F: In everyday life, how often do you usually read manuals or reference materials?
Response Frequencies (by full sample): Never (N = 2,193), Less than once a month (N = 2,362), Less than once a week but at least once a month (N = 1,682), At least once a week but not every day (N = 1,476), Every day (N = 762).

7. H_Q01G: In everyday life, how often do you usually read bills, invoices, bank statements, or other financial statements?
Response Frequencies (by full sample): Never (N = 1,030), Less than once a month (N = 784), Less than once a week but at least once a month (N = 1,743), At least once a week but not every day (N = 2,861), Every day (N = 2,061).

8. H_Q01H: In everyday life, how often do you usually read diagrams, maps, or schematics?
Response Frequencies (by full sample): Never (N = 3,312), Less than once a month (N = 2,177), Less than once a week but at least once a month (N = 1,396), At least once a week but not every day (N = 1,113), Every day (N = 480).

Reading at Work (READWORK)

1. G_Q01A: In your job/last job, how often do/did you usually read directions or instructions?

Response Frequencies (by full sample): Never (N = 860), Less than once a month (N = 654), Less than once a week but at least once a month (N = 580), At least once a week but not every day (N = 1,145), Every day (N = 2,950).

2. G_Q01B: In your job/last job, how often do/did you usually read letters, memos, or e-mails?

Response Frequencies (by full sample): Never (N = 1,394), Less than once a month (N = 343), Less than once a week but at least once a month (N = 343), At least once a week but not every day (N = 690), Every day (N = 3,418).

3. G_Q01C: In your job/last job, how often do/did you usually read articles in newspapers, magazines, or newsletters?

Response Frequencies (by full sample): Never (N = 2,242), Less than once a month (N = 693), Less than once a week but at least once a month (N = 673), At least once a week but not every day (N = 1,272), Every day (N = 1,309).

4. G_Q01D: In your job/last job, how often do/did you usually read articles in professional journals or scholarly publications?

Response Frequencies (by full sample): Never (N = 2,948), Less than once a month (N = 883), Less than once a week but at least once a month (N = 787), At least once a week but not every day (N = 1,024), Every day (N = 547).

5. G_Q01E: In your job/last job, how often do/did you usually read books, fiction or non-fiction?

Response Frequencies (by full sample): Never (N = 3,597), Less than once a month (N = 1,046), Less than once a week but at least once a month (N = 525), At least once a week but not every day (N = 454), Every day (N = 567).

6. G_Q01F: In your job/last job, how often do/did you usually read manuals or reference materials?

Response Frequencies (by full sample): Never (N = 1,399), Less than once a month (N = 1,256), Less than once a week but at least once a month (N = 1,101), At least once a week but not every day (N = 1,163), Every day (N = 1,269).

7. G_Q01G: In your job/last job, how often do/did you usually read bills, invoices, bank statements, or other financial statements?

Response Frequencies (by full sample): Never (N = 3,121), Less than once a month (N = 535), Less than once a week but at least once a month (N = 548), At least once a week but not every day (N = 791), Every day (N = 1,192).

8. G_Q01H: In your job/last job, how often do/did you usually read diagrams, maps, or schematics?

Response Frequencies (by full sample): Never (N = 2,841), Less than once a month (N = 850), Less than once a week but at least once a month (N = 627), At least once a week but not every day (N = 771), Every day (N = 1,099).

Appendix B

Table 6
Anova Results Comparing Age Within PSTRE Proficiency Level for Functional Writing Skills

Outcome	Age	Proficiency Level	mean	st dev	F (dfn, dfd), <i>p</i>	NOTE
WORK - write letters, memos, or emails G_Q02A	(1) 24 or less	Below 291	2.32	1.64	206.414 (5, 3382) <i>p</i> <.001*	Differences between each group are significant except 1:3, 2:6, 4:5, 4:6
	(2) 25-34	Below 291	3.24	1.74		
	(3) 35-44	Below 291	2.41	1.74		
	(4) 45-54	Below 291	3.58	1.69		
	(5) 55-65	Below 291	3.7	1.63		
	(6) 66+	Below 291	3.12	1.70		
	(1) 24 or less	At or Above 291	2.73	1.74	101.58 (5, 1928), <i>p</i> <.001*	Differences between each group are significant except 2:5, 2:6, 3:4, 3:5, 4:5
	(2) 25-34	At or Above 291	4.21	1.36		
	(3) 35-44	At or Above 291	4.49	1.10		
	(4) 45-54	At or Above 291	4.54	1.03		
	(5) 55-65	At or Above 291	4.36	1.21		
	(6) 66+	At or Above 291	3.88	1.40		
WORK - fill in forms - G_Q02D	(1) 24 or less	Below 291	2.74	1.72	88.768 (5, 3381), <i>p</i> <.001*	Differences between each group are significant except 1:6, 2:3, 2:4, 2:5, 3:4, 3:5, 4:5

	(2) 25-34	Below 291	3.54	1.62		
	(3) 35-44	Below 291	3.57	1.54		
	(4) 45-54	Below 291	3.64	1.55		
	(5) 55-65	Below 291	3.56	1.48		
	(6) 66+	Below 291	3.02	1.64		
	(1) 24 or less	At or Above 291	2.84	1.64	27.5505 (5, 1928), <i>p</i> <.001*	Differences between each group are significant except 1:6, 2:3, 2:4, 3:5, 5:6
	(2) 25-34	At or Above 291	3.75	1.40		
	(3) 35-44	At or Above 291	3.57	1.37		
	(4) 45-54	At or Above 291	3.82	1.26		
	(5) 55-65	At or Above 291	3.39	1.3		
	(6) 66+	At or Above 291	3.05	1.42		
	HOME - write letters, memos, or emails H_Q02A	(1) 24 or less	Below 291	3.66	1.37	7.432 (5, 4585), <i>p</i> =.001*
(2) 25-34		Below 291	3.64	1.39		
(3) 35-44		Below 291	3.64	1.39		
(4) 45-54		Below 291	3.55	1.36		
(5) 55-65		Below 291	3.58	1.33		
(6) 66+		Below 291	3.86	1.27		
(1) 24 or less		At or Above 291	4.03	1.03	6.0310 (5, 2283), <i>p</i> <.001*	Significant differences only between 1:2, 1:3,1:4, 1:5, 1:6
(2) 25-34		At or Above 291	4.24	1.01		

	(3) 35-44	At or Above 291	4.35	0.93		
	(4) 45-54	At or Above 291	4.20	1.05		
	(5) 55-65	At or Above 291	4.25	0.96		
	(6) 66+	At or Above 291	4.38	0.84		
HOME - fill in forms - H_Q02D	(1) 24 or less	Below 291	2.38	1.3	5.728 (5, 4585), <i>p</i> =.001	Significant differences only between 1:4, 1:5, 1:6, 2:4, 2:5, 2:6
	(2) 25-34	Below 291	2.35	1.24		
	(3) 35-44	Below 291	2.31	1.15		
	(4) 45-54	Below 291	2.19	1.14		
	(5) 55-65	Below 291	2.21	1.07		
	(6) 66+	Below 291	2.18	1.01		
	(1) 24 or less	At or Above 291	2.56	1.06	.3466 (5, 2283), <i>p</i> =.885	No significant differences observed between groups.
	(2) 25-34	At or Above 291	2.51	1.04		
	(3) 35-44	At or Above 291	2.50	1.02		
	(4) 45-54	At or Above 291	2.51	0.92		
	(5) 55-65	At or Above 291	2.48	0.88		
	(6) 66+	At or Above 291	2.57	0.8		

*Significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences. Dfn = degrees of freedom numerator. Dfd = degrees of freedom denominator.

Table 7
Anova Results Comparing Age Within LIT Proficiency Level for Functional Writing Skills

Outcome	Age	Proficiency Level	Mean	st dev	F (dfn, dfd), <i>p</i>	NOTE
WORK - write letters, memos, or emails G_Q02A	(1) 24 or less	Below 276	2.22	1.63	52.764 (5, 3035) <i>p</i> <.001*	Significant differences between 1:2, 1:3, 1:4, 1:5, 1:6, 3:5, 4:5, 5:6
	(2) 25-34	Below 276	2.88	1.78		
	(3) 35-44	Below 276	2.79	1.80		
	(4) 45-54	Below 276	2.82	1.78		
	(5) 55-65	Below 276	3.05	1.79		
	(6) 66+	Below 276	2.65	1.71		
	(1) 24 or less	At or Above 276	2.68	1.71	100.4135 (5, 3144), <i>p</i> <.001*	Differences between each group are significant except 2:5, 3:4,3:5, 4:5
	(2) 25-34	At or Above 276	4.01	1.47		
	(3) 35-44	At or Above 276	4.22	1.37		
	(4) 45-54	At or Above 276	4.24	1.35		
	(5) 55-65	At or Above 276	4.13	1.38		
	(6) 66+	At or Above 276	3.31	1.65		
WORK - fill in forms - G_Q02D	(1) 24 or less	Below 276	2.65	1.74	47.719 (5, 3034), <i>p</i> <.001*	Significant differences between 1:2, 1:3, 1:4, 1:5, 2:6, 3:6, 4:6, 5:6
	(2) 25-34	Below 276	3.28	1.73		
	(3) 35-44	Below 276	3.23	1.72		

	(4) 45-54	Below 276	3.23	1.74		
	(5) 55-65	Below 276	3.36	1.68		
	(6) 66+	Below 276	2.79	1.69		
	(1) 24 or less	At or Above 276	2.85	1.65	38.311 (5, 3144), <i>p</i> <.001*	Differences between each group are significant except 1:6, 2:3, 2:4, 3:5
	(2) 25-34	At or Above 276	3.72	1.43		
	(3) 35-44	At or Above 276	3.58	1.41		
	(4) 45-54	At or Above 276	3.80	1.33		
	(5) 55-65	At or Above 276	3.45	1.36		
	(6) 66+	At or Above 276	2.88	1.56		
HOME - write letters, memos, or emails H_Q02A	(1) 24 or less	Below 276	3.56	1.45	71.724 (5, 4651), <i>p</i> <.001*	Significant differences between each group are significant except 4:5, 4:6, 5:6
	(2) 25-34	Below 276	3.38	1.51		
	(3) 35-44	Below 276	3.18	1.56		
	(4) 45-54	Below 276	2.9	1.52		
	(5) 55-65	Below 276	2.85	1.51		
	(6) 66+	Below 276	2.96	1.58		
	(1) 24 or less	At or Above 276	4.02	1.06	5.324 (5, 3816), <i>p</i> <.001*	Significant differences between 1:2, 1:3, 1:4, 1:5, 2:6, 3:6, 4:6, 5:6
	(2) 25-34	At or Above 276	4.14	1.08		
	(3) 35-44	At or Above 276	4.17	1.08		

	(4) 45-54	At or Above 276	4.02	1.15		
	(5) 55-65	At or Above 276	3.93	1.17		
	(6) 66+	At or Above 276	3.88	1.24		
HOME - fill in forms - H_Q02D	(1) 24 or less	Below 276	2.32	1.29	23.329 (5, 4650), <i>p</i> <.001*	Significant differences only between 1:3, 1:4, 1:5, 1:6, 2:4, 2:5, 2:6, 3:4
	(2) 25-34	Below 276	2.23	1.28		
	(3) 35-44	Below 276	2.14	1.15		
	(4) 45-54	Below 276	1.9	1.11		
	(5) 55-65	Below 276	2.01	1.11		
	(6) 66+	Below 276	1.94	1.01		
	(1) 24 or less	At or Above 276	2.53	1.14	2.8189 (5, 3822), <i>p</i> =.015*	Significant differences only between 1:5, 2:5, 3:5, 4:5
	(2) 25-34	At or Above 276	2.47	1.05		
	(3) 35-44	At or Above 276	2.45	1.07		
	(4) 45-54	At or Above 276	2.44	1.02		
	(5) 55-65	At or Above 276	2.32	0.93		
	(6) 66+	At or Above 276	2.39	0.93		

*Significant at *p*<.05

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences. Dfn = degrees of freedom numerator. Dfd = degrees of freedom denominator.

Table 8
t-test Results Comparing PSTRE Proficiency Level within Age for Functional Writing Skills

Outcome	Age	Low Proficiency Mean	Low Proficiency st dev	High Proficiency Mean	High Proficiency st dev	Difference in Means	t-value (se)	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	24 or less	2.32	1.64	2.73	1.74	.50	4.24 (0.097)	<.001*
	25-34	3.24	1.74	4.21	1.36	.97	11.904 (0.081)	<.001*
	35-44	2.41	1.74	4.49	1.10	2.08	19.29 (0.108)	<.001*
	45-54	3.58	1.69	4.54	1.03	.96	8.221 (.116)	<.001*
	55-65	3.7	1.63	4.36	1.21	.66	4.897 (0.135)	<.001*
	66+	3.12	1.70	3.88	1.40	.76	2.706 (0.281)	.008*
WORK - fill in forms - G_Q02D	24 or less	2.74	1.72	2.84	1.64	.10	1.026 (0.097)	.305
	25-34	3.54	1.62	3.75	1.40	.21	2.677 (0.078)	.008*
	35-44	3.57	1.54	3.57	1.37	0	0 (0.104)	1
	45-54	3.64	1.55	3.82	1.26	.18	1.614 (0.111)	.107
	55-65	3.56	1.48	3.39	1.3	.17	-1.342 (0.127)	.180
	66+	3.02	1.64	3.35	1.48	.33	.109 (0.274)	.913
HOME - write letters, memos, or emails H_Q02A	24 or less	3.66	1.37	4.03	1.03	.37	5.909 (0.063)	<.001*
	25-34	3.64	1.39	4.24	1.01	.6	10.062 (0.060)	<.001*
	35-44	3.64	1.39	4.35	.93	.71	.8708 (0.082)	<.001*
	45-54	3.55	1.36	4.20	1.05	.65	7.16 (0.091)	<.001*
	55-65	3.58	1.33	4.25	.96	.67	6.849 (0.0980)	<.001*

	66+	3.86	1.27	4.38	.84	.52	3.271 (0.159)	.001*
HOME - fill in forms - H_Q02D	24 or less	2.38	1.3	2.56	1.06	.18	2.97 (0.061)	.003*
	25-34	2.35	1.24	2.51	1.04	.16	2.882 (0.056)	.0040*
	35-44	2.31	1.15	2.50	1.02	.19	2.628 (0.072)	.009*
	45-54	2.19	1.14	2.51	.92	.32	4.169 (0.077)	<.001*
	55-65	2.21	1.07	2.48	.88	.27	3.357 (0.08)	.001*
	66+	2.18	1.01	2.57	.8	.39	-1.398 (0.129)	.163

**Significant at p<.05*

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 9
t-test Results Comparing LIT Proficiency Level within Age for Functional Writing Skills

Outcome	Age	Low Proficiency Mean	Low Proficiency st dev	High Proficiency Mean	High Proficiency st dev	Difference in Means	t-value (se)	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	24 or less	2.22	1.63	2.68	1.71	.46	5.166 (.089)	<.001*
	25-34	2.88	1.78	4.01	1.47	1.13	14.46 (.078)	<.001*
	35-44	2.79	1.8	4.22	1.37	1.43	14.122 (.101)	<.001*
	45-54	2.82	1.78	4.24	1.35	1.42	14.259(.1)	<.001*
	55-65	3.05	1.79	4.13	1.38	1.08	9.573 (.113)	<.001*
	66+	2.65	1.71	3.31	1.65	.66	3.111(.212)	.002*
WORK - fill in forms - G_Q02D	24 or less	2.65	1.74	2.85	1.65	.2	2.202 (.091)	.028*
	25-34	3.28	1.73	3.72	1.43	.44	5.791 (.076)	<.001*
	35-44	3.23	1.72	3.58	1.41	.35	3.505 (.1)	.001*
	45-54	3.23	1.74	3.80	1.33	.57	5.839 (.098)	<.001*
	55-65	3.36	1.68	3.45	1.36	.09	.834 (.108)	.405
	66+	2.79	1.69	2.88	1.56	.09	.437(.206)	.662
HOME - write letters, memos, or emails H_Q02A	24 or less	3.56	1.45	4.02	1.06	.37	7.803 (.059)	<.001*
	25-34	3.38	1.51	4.14	1.08	.76	13.177 (.058)	<.001*
	35-44	3.18	1.56	4.17	1.08	.99	12.851 (.077)	<.001*
	45-54	2.9	1.52	4.02	1.15	1.12	14.522(.077)	<.001*
	55-65	2.85	1.51	3.93	1.17	1.08	13.491(.08)	<.001*
	66+	2.96	1.588	3.88	1.24	.92	7.916 (.116)	.001*

HOME - fill in forms - H_Q02D	24 or less	2.32	1.29	2.53	1.14	.21	3.771 (.056)	<.001*
	25-34	2.23	1.28	2.47	1.05	.24	4.654 (.052)	<.001*
	35-44	2.45	1.07	1.9	1.11	.55	8.942 (.06)	,.001*
	45-54	1.9	1.11	2.44	1.02	.54	8.942 (.060)	<.001*
	55-65	2.01	1.11	2.32	.93	.31	5.134 (.06)	<.001*
	66+	1.94	1.01	2.39	.93	.45	5.805 (.078)	<.001*

*Significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 10

Anova Results Comparing Race Within PSTRE Proficiency Level for Functional Writing Skills

Outcome	Race	Proficiency Level	Mean	st dev	F (dfn, dfd) <i>p</i>	NOTE
WORK - write letters, memos, or emails G_Q02A	(1) Hispanic	Below 291	2.91	1.73	46.4143 (4, 3377) <i>p</i> < .001*	Significant differences between groups 1:2, 1:4, 2:3, 2:4, 2:5, 3:4, 3:5
	(2) White	Below 291	3.38	1.73		
	(3) Black	Below 291	3.08	1.79		
	(4) Asian American	Below 291	3.82	1.56		
	(5) Other	Below 291	2.71	1.82		
	(1) Hispanic	At or Above 291	3.87	1.51	8.7924 (4, 1927) <i>p</i> =.003*	Significant differences between groups 1:4, 2:4, 2:5, 3:5,4:5
	(2) White	At or Above 291	4.04	1.50		
	(3) Black	At or Above 291	4.10	1.48		
	(4) Asian American	At or Above 291	4.44	1.23		
	(5) Other	At or Above 291	3.43	1.68		
WORK - fill in forms - G_Q02D	(1) Hispanic	Below 291	3.21	1.72	11.194 (4, 3376) <i>p</i> =.002*	Significant differences between groups 1:2, 1:3, 4:5
	(2) White	Below 291	3.45	1.59		
	(3) Black	Below 291	3.58	1.62		
	(4) Asian American	Below 291	3.21	1.54		

	(5) Other	Below 291	3.34	1.72		
	(1) Hispanic	At or Above 291	3.63	1.49	5.3412 (4, 1927) <i>p</i> =.039*	Significant differences between groups 1:4, 2:4, 3:4
	(2) White	At or Above 291	3.47	1.45		
	(3) Black	At or Above 291	3.74	1.39		
	(4) Asian American	At or Above 291	3.15	1.52		
	(5) Other	At or Above 291	3.60	1.53		
HOME - write letters, memos, or emails H_Q02A	(1) Hispanic	Below 291	3.48	1.43	10.970 (4, 4577) <i>p</i> <.001*	Significant differences between groups 1:2, 1:3, 1:4, 2:4, 3:4, 4:5
	(2) White	Below 291	3.63	1.36		
	(3) Black	Below 291	3.64	1.36		
	(4) Asian American	Below 291	4.01	1.19		
	(5) Other	Below 291	3.57	1.35		
	(1) Hispanic	At or Above 291	3.98	1.13	4.1912 (4, 2279) <i>p</i> =.001*	Significant differences between groups 1:2, 1:4
	(2) White	At or Above 291	4.23	0.99		
	(3) Black	At or Above 291	4.16	0.98		
	(4) Asian American	At or Above 291	4.45	0.83		
	(5) Other	At or Above 291	4.14	1.05		
HOME - fill in forms - H_Q02D	(1) Hispanic	Below 291	2.23	1.24	23.1299 (4, 4582) <i>p</i> <.001*	Significant differences only between 1:3, 1:5, 2:3, 2:5

	(2) White	Below 291	2.20	1.1		
	(3) Black	Below 291	2.53	1.33		
	(4) Asian American	Below 291	2.39	1.18		
	(5) Other	Below 291	2.56	1.26		
	(1) Hispanic	At or Above 291	2.51	1.07	.3076 (4, 2279) <i>p</i> =.885	No significant differences observed between groups
	(2) White	At or Above 291	2.51	0.98		
	(3) Black	At or Above 291	2.58	1.06		
	(4) Asian American	At or Above 291	2.52	1.11		
	(5) Other	At or Above 291	2.62	1.97		

*Significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences. Dfn = degrees of freedom numerator. Dfd = degrees of freedom denominator.

Table 11
Anova Results Comparing Race Within LIT Proficiency Level for Functional Writing Skills

Outcome	Race	Proficiency Level	mean	st dev	F(DF) <i>p</i>	NOTE
WORK - write letters, memos, or emails G_Q02A	(1) Hispanic	Below 276	2.28	1.65	52.802 (4, 3028) <i>p</i> <.001*	Significant differences between groups 1:2, 1:3, 1:4, 3:4, 4:5
	(2) White	Below 276	2.90	1.79		
	(3) Black	Below 276	2.79	1.80		
	(4) Asian American	Below 276	3.37	1.70		
	(5) Other	Below 276	2.56	1.77		
	(1) Hispanic	At or Above 276	3.71		42.8837 (4, 3141) <i>p</i> <.001*	Significant differences between groups 1:4, 2:4, 3:4, 1:5, 2:5, 3:5, 4:5
	(2) White	At or Above 276	3.89	1.55		
	(3) Black	At or Above 276	3.85	1.56		
	(4) Asian American	At or Above 276	4.35	1.60		
	(5) Other	At or Above 276	3.22	1.31		
WORK - fill in forms - G_Q02D	(1) Hispanic	Below 276	2.63	1.78	53.547 (4, 3027) <i>p</i> <.001*	Significant differences between groups 1:2, 1:3, 1:4, 1:5
	(2) White	Below 276	3.27	1.70		
	(3) Black	Below 276	3.39	1.72		
	(4) Asian American	Below 276	3.23	1.59		

	(5) Other	Below 276	3.10	1.79		
	(1) Hispanic	At or Above 276	3.59	1.48	9.4164 (4, 3141) <i>p</i> =.002*	Significant differences between groups 1:4, 2:3, 2:4,3:4
	(2) White	At or Above 276	3.49	1.47		
	(3) Black	At or Above 276	3.76	1.43		
	(4) Asian American	At or Above 276	3.16	1.50		
	(5) Other	At or Above 276	3.54	1.54		
HOME - write letters, memos, or emails H_Q02A	(1) Hispanic	Below 276	2.88	1.60	24.631 (4, 4641) <i>p</i> <.001*	Significant differences between groups 1:2, 1:3, 1:4, 1:5, 2:4, 3:4, 4:5
	(2) White	Below 276	3.16	1.53		
	(3) Black	Below 276	3.19	1.51		
	(4) Asian American	Below 276	3.58	1.42		
	(5) Other	Below 276	3.24	1.44		
	(1) Hispanic	Below 276	3.91	1.13	6.3834 (4, 3810) <i>p</i> <.001*	Significant differences between 1:2, 1:4, 2:4, 3:4, 4:5
	(2) White	At or Above 276	4.06	1.12		
	(3) Black	At or Above 276	3.96	1.16		
	(4) Asian American	At or Above 276	4.33	0.97		
	(5) Other	At or Above 276	3.90	1.21		
HOME - fill in forms - H_Q02D	(1) Hispanic	Below 276	1.96	1.21	29.253 (4, 4640) <i>p</i> <.001*	Significant differences between 1:3, 1:4, 1:5, 2:3, 2:4, 2:5

	(2) White	Below 276	2.02	1.08		
	(3) Black	Below 276	2.32	1.31		
	(4) Asian American	Below 276	2.28	1.20		
	(5) Other	Below 276	2.50	1.24		
	(1) Hispanic	Below 276	2.51	1.08	1.8390 (4, 3810) <i>p</i> =.153	No significant differences observed between groups
	(2) White	At or Above 276	2.42	1.02		
	(3) Black	At or Above 276	2.55	1.17		
	(4) Asian American	At or Above 276	2.46	1.16		
	(5) Other	At or Above 276	2.53	1.09		

*Significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences. Dfn = degrees of freedom numerator. Dfd = degrees of freedom denominator.

Table 12
t-test Results Comparing PSTRE Proficiency Level within Race for Functional Writing Skills

Outcome	Proficiency Level	Race	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	Below 291	Hispanic	2.91	1.73	5.853	0.164	<.001*
	At or Above 291	Hispanic	3.87	1.51			
	Below 291	White	3.38	1.73	11.94	0.055	<.001*
	At or Above 291	White	4.04	1.50			
	Below 291	Black	3.08	1.79	5.761	0.177	<.001*
	At or Above 291	Black	4.10	1.48			
	Below 291	Asian American	3.82	1.56	3.214	0.193	.002*
	At or Above 291	Asian American	4.44	1.23			
	Below 291	Other	2.71	1.82	2.288	0.315	.023*
	At or Above 291	Other	3.43	1.68			
WORK - fill in forms - G_Q02D	Below 291	Hispanic	3.21	1.72	2.579	0.163	.010*
	At or Above 291	Hispanic	3.63	1.49			
	Below 291	White	3.45	1.59	0.386	0.052	.699
	At or Above 291	White	3.47	1.45			
	Below 291	Black	3.58	1.62	0.995	0.161	.320
	At or Above 291	Black	3.74	1.39			
	Below 291	Asian American	3.21	1.54	-0.293	0.205	.770
	At or Above 291	Asian American	3.15	1.52			
	Below 291	Other	3.34	1.72	0.882	0.295	.379
	At or Above 291	Other	3.60	1.53			
	Below 291	Hispanic	3.48	1.43	4.268	0.117	<.001*

HOME - write letters, memos, or emails H_Q02A	At or Above 291	Hispanic	3.98	1.13			
	Below 291	White	3.63	1.36	16.07	0.037	<.001*
	At or Above 291	White	4.23	0.99			
	Below 291	Black	3.64	1.36	15.522	0.034	<.001*
	At or Above 291	Black	4.16	0.98			
	Below 291	Asian American	4.01	1.19	3.414	0.129	.001*
	At or Above 291	Asian American	4.45	0.83			
	Below 291	Other	3.57	1.35	2.82	0.202	.005*
	At or Above 291	Other	4.14	1.05			
HOME - fill in forms - H_Q02D	Below 291	Hispanic	2.23	1.24	2.716	0.103	.007*
	At or Above 291	Hispanic	2.51	1.07			
	Below 291	White	2.20	1.1	9.648	0.032	<.001*
	At or Above 291	White	2.51	0.98			
	Below 291	Black	2.53	1.33	0.427	0.117	.670
	At or Above 291	Black	2.58	1.06			
	Below 291	Asian American	2.39	1.18	0.942	0.138	.347
	At or Above 291	Asian American	2.52	1.11			
	Below 291	Other	2.56	1.26	0.258	0.233	.797
	At or Above 291	Other	2.62	1.97			

*Significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 13

t-test Results Comparing LIT Proficiency Level within Age for Functional Writing Skills

Outcome	Proficiency Level	Race	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	Below 276	Hispanic	2.28	1.65	11.011	0.13	<.001*
	At or Above 276	Hispanic	3.71	1.55			
	Below 276	White	2.90	1.79	18.434	0.054	<.001*
	At or Above 276	White	3.89	1.56			
	Below 276	Black	2.79	1.80	8.44	0.126	<.001*
	At or Above 276	Black	3.85	1.60			
	Below 276	Asian American	3.37	1.70	5.397	0.182	<.001*
	At or Above 276	Asian American	4.35	1.31			
	Below 276	Other	2.56	1.77	2.487	0.265	.014*
	At or Above 276	Other	3.22	1.76			
WORK - fill in forms - G_Q02D	Below 276	Hispanic	2.63	1.78	7.047	0.136	<.001*
	At or Above 276	Hispanic	3.59	1.48			
	Below 276	White	3.27	1.70	4.332	0.051	<.001*
	At or Above 276	White	3.49	1.47			
	Below 276	Black	3.39	1.72	3.13	0.118	.002*
	At or Above 276	Black	3.76	1.43			
	Below 276	Asian American	3.23	1.59	-0.375	0.187	.708
	At or Above 276	Asian American	3.16	1.50			
	Below 276	Other	3.10	1.79	1.732	0.254	.085
	At or Above 276	Other	3.54	1.54			

HOME - write letters, memos, or emails H_Q02A	Below 276	Hispanic	2.88	1.60	10.064	0.102	<.001*
	At or Above 276	Hispanic	3.91	1.13			
	Below 276	White	3.16	1.53	24.624	0.037	<.001*
	At or Above 276	White	4.06	1.12			
	Below 276	Black	3.19	1.51	8.56	0.09	<.001*
	At or Above 276	Black	3.96	1.16			
	Below 276	Asian American	3.58	1.42	6.066	0.124	<.001*
	At or Above 276	Asian American	4.33	0.97			
	Below 276	Other	3.24	1.44	3.753	0.176	<.001*
	At or Above 276	Other	3.90	1.21			
HOME - fill in forms - H_Q02D	Below 276	Hispanic	1.96	1.21	6.812	0.0081	<.001*
	At or Above 276	Hispanic	2.51	1.08			
	Below 276	White	2.02	1.08	13.36	0.03	<.001*
	At or Above 276	White	2.42	1.02			
	Below 276	Black	2.32	1.31	2.873	0.08	.004*
	At or Above 276	Black	2.55	1.17			
	Below 276	Asian American	2.28	1.20	1.496	0.12	.136
	At or Above 276	Asian American	2.46	1.16			
	Below 276	Other	2.50	1.24	0.195	0.154	.845
	At or Above 276	Other	2.53	1.09			

*Significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 14

t-test Results Comparing Native Language Status Within PSTRE Proficiency Level for Functional Writing Skills

Outcome	Nativity Status	Proficiency Level	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	native	Below 291	3.30	1.76	-2.075	0.087	.038*
	non-native	Below 291	3.12	1.72			
	native	At or Above 291	4.01	1.51	2.24	0.121	.025*
	non-native	At or Above 291	4.28	1.30			
WORK - fill in forms - G_Q02D	native	Below 291	3.47	1.61	-3.752	0.08	.002*
	non-native	Below 291	3.17	1.66			
	native	At or Above 291	3.50	1.46	-1.948	0.118	.052
	non-native	At or Above 291	3.27	1.49			
HOME - write letters, memos, or emails H_Q02A	native	Below 291	3.62	1.36	0.53	0.057	.597
	non-native	Below 291	3.65	1.35			
	native	At or Above 291	4.21	1.00	0.691	0.072	.490
	non-native	At or Above 291	4.26	0.99			
HOME - fill in forms - H_Q02D	native	Below 291	2.28	1.16	-0.808	0.05	.419
	non-native	Below 291	2.24	1.21			
	native	At or Above 291	2.52	0.99	0.139	0.072	.890
	non-native	At or Above 291	2.53	1.06			

*significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 15

t-test Results Comparing Native Language Status Within LIT Proficiency Level for Functional Writing Skills

Outcome	Nativity	Proficiency	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	native	Below 276	2.87	1.79	-5.84	0.08	<.001*
	non-native	Below 276	2.40	1.69			
	native	At or Above 276	3.87	1.57	1.894	0.095	.058
	non-native	At or Above 276	4.05	1.47			
WORK - fill in forms - G_Q02D	native	Below 276	3.28	1.71	-7.555	0.078	<.001*
	non-native	Below 276	2.69	1.75			
	native	At or Above 276	3.51	1.47	-1.787	0.09	.074
	non-native	At or Above 276	3.35	1.48			
HOME - write letters, memos, or emails H_Q02A	native	Below 276	3.18	1.53	-3.869	0.057	.001*
	non-native	Below 276	2.96	1.57			
	native	At or Above 276	4.04	1.13	1.99	0.06	.047*
	non-native	At or Above 276	4.16	1.06			
HOME - fill in forms - H_Q02D	native	Below 276	2.12	1.17	-3.442	0.044	.006*
	non-native	Below 276	1.97	1.18			
	native	At or Above 276	2.44	1.03	0.537	0.056	.592
	non-native	At or Above 276	2.47	1.14			

*significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 16

t-test Results Comparing PSTRE Proficiency Level within Native Language Status for Functional Writing Skills

Outcome	Proficiency Level	Nativity Status	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	Below 291	Native	3.30	1.76	14.096	0.05	<.001*
	At or Above 291	Native	4.01	1.51			
	Below 291	non-native	3.12	1.72	7.973	0.145	<.001*
	At or Above 291	non-native	4.28	1.30			
WORK - fill in forms - G_Q02D	Below 291	Native	3.47	1.61	0.64	0.047	.523
	At or Above 291	Native	3.50	1.46			
	Below 291	non-native	3.17	1.66	0.689	0.145	.491
	At or Above 291	non-native	3.27	1.49			
HOME - write letters, memos, or emails H_Q02A	Below 291	native	3.62	1.36	17.436	0.034	<.001*
	At or Above 291	native	4.21	1.00			
	Below 291	non-native	3.65	1.35	6.059	0.101	<.001*
	At or Above 291	non-native	4.26	0.99			
HOME - fill in forms - H_Q02D	Below 291	native	2.28	1.16	8.011	0.03	<.001*
	At or Above 291	native	2.52	0.99			
	Below 291	non-native	2.24	1.21	3.107	0.093	.002*
	At or Above 291	non-native	2.53	1.06			

*significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 17

t-test Results Comparing LIT Proficiency Level within Native Language Status for Functional Writing Skills

Outcome	Proficiency Level	Nativity Status	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails G_Q02A	Below 276	native	2.87	1.79	21.643	0.046	<.001*
	At or Above 276	native	3.87	1.57			
	Below 276	non-native	2.40	1.69	14.381	0.115	<.001*
	At or Above 276	non-native	4.05	1.47			
WORK - fill in forms - G_Q02D	Below 276	native	3.28	1.71	5.26	0.044	<.001*
	At or Above 276	native	3.51	1.47			
	Below 276	non-native	2.69	1.75	5.597	0.118	<.001*
	At or Above 276	non-native	3.35	1.48			
HOME - write letters, memos, or emails H_Q02A	Below 276	native	3.18	1.53	26.908	0.032	<.001*
	At or Above 276	native	4.04	1.13			
	Below 276	non-native	2.96	1.57	13.728	0.087	<.001*
	At or Above 276	non-native	4.16	1.06			
HOME - fill in forms - H_Q02D	Below 276	native	2.12	1.17	12.267	0.026	<.001*
	At or Above 276	native	2.44	1.03			
	Below 276	non-native	1.97	1.18	7.029	0.071	<.001*
	At or Above 276	non-native	2.47	1.14			

*significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 18

Anova Results Comparing Job Category Within PSTRE Proficiency Level for Functional Writing Skills

Outcome	Job Category	Proficiency Level	mean	st dev	F (dfn, dfd) <i>p</i>	NOTE
WORK - write letters, memos, or emails G_Q02A	(1) Skilled Occupations	Below 291	4.19	1.34	353.539 (3, 3326) <i>p</i> <.001*	Differences between each group are significant
	(2) Semi-Skilled White Collar	Below 291	2.95	1.73		
	(3) Semi-Skilled Blue Collar	Below 291	2.29	1.62		
	(4) Elementary Occupations	Below 291	1.77	1.37		
	(1) Skilled Occupations	At or Above 291	4.54	1.04	390.8423 (3, 1902) <i>p</i> <.001*	Differences between each group are significant
	(2) Semi-Skilled White Collar	At or Above 291	3.41	1.69		
	(3) Semi-Skilled Blue Collar	At or Above 291	2.90	1.76		
	(4) Elementary Occupations	At or Above 291	1.80	1.26		
WORK - fill in forms - G_Q02D	(1) Skilled Occupations	Below 291	3.83	1.36	107.679 (3, 3326) <i>p</i> <.001*	Differences between each group are significant except 2:3
	(2)Semi-Skilled White Collar	Below 291	3.30	1.69		
	(3)Semi-Skilled Blue Collar	Below 291	3.21	1.72		
	(4)Elementary Occupations	Below 291	2.21	1.56		

	(1)Skilled Occupations	At or Above 291	3.59	1.33	44.7039 (3, 1902) <i>p</i> <.001*	Differences between each group are significant except 1:2, 1:3, 2:3
	(2)Semi-Skilled White Collar	At or Above 291	3.43	1.63		
	(3)Semi-Skilled Blue Collar	At or Above 291	3.30	1.63		
	(4)Elementary Occupations	At or Above 291	2.41	1.52		
HOME - write letters, memos, or emails H_Q02A	(1) Skilled Occupations	Below 291	3.88	1.25	124.814 (3, 3861) <i>p</i> <.001*	Differences between each group are significant
	(2)Semi-Skilled White Collar	Below 291	3.68	1.36		
	(3)Semi-Skilled Blue Collar	Below 291	2.98	1.40		
	(4)Elementary Occupations	Below 291	3.37	1.40		
	(1)Skilled Occupations	At or Above 291	4.32	0.94	24.771 (3, 2103) <i>p</i> <.001*	Differences between each group are significant except 3:4
	(2)Semi-Skilled White Collar	At or Above 291	4.16	0.99		
	(3)Semi-Skilled Blue Collar	At or Above 291	3.72	1.21		
	(4)Elementary Occupations	At or Above 291	3.80	1.17		
HOME - fill in forms - H_Q02D	(1) Skilled Occupations	Below 291	2.34	1.14	17.116 (3, 3861) <i>p</i> <.001*	Significant differences only between groups 1:3, 2:3, 3:4
	(2)Semi-Skilled White Collar	Below 291	2.32	1.22		

	(3)Semi-Skilled Blue Collar	Below 291	2.01	1.15		
	(4)Elementary Occupations	Below 291	2.25	1.28		
	(1)Skilled Occupations	At or Above 291	2.51	0.95	.1981(3, 2103) <i>p</i> =.898	No significant differences between groups
	(2)Semi-Skilled White Collar	At or Above 291	2.53	1.06		
	(3)Semi-Skilled Blue Collar	At or Above 291	2.47	1.12		
	(4)Elementary Occupations	At or Above 291	2.48	0.98		

**significant at p*<.05

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences. Dfn = degrees of freedom numerator. Dfd = degrees of freedom denominator.

Table 19

Anova Results Comparing Job Category Within LIT Proficiency Level for Functional Writing Skills

Outcome	Job Category	Proficiency Level	mean	st dev	F(dfn, dfd) <i>p</i>	NOTE
WORK - write letters, memos, or emails G_Q02A	(1) Skilled Occupations	Below 276	3.93	1.52	712.738 (3, 2978) <i>p</i> <.001*	Differences between each group are significant
	(2) Semi-Skilled White Collar	Below 276	2.71	1.74		
	(3) Semi-Skilled Blue Collar	Below 276	1.98	1.50		
	(4) Elementary Occupations	Below 276	1.56	1.22		
	(1) Skilled Occupations	At or Above 276	4.47	1.11	692.9454 (3, 3098) <i>p</i> <.001*	Differences between each group are significant
	(2) Semi-Skilled White Collar	At or Above 276	3.30	1.69		
	(3) Semi-Skilled Blue Collar	At or Above 276	2.67	1.71		
	(4) Elementary Occupations	At or Above 276	1.81	1.31		
WORK - fill in forms - G_Q02D	(1) Skilled Occupations	Below 276	3.81	1.46	122.333 (3, 2977) <i>p</i> <.001*	Differences between each group are significant except 2 vs 3
	(2)Semi-Skilled White Collar	Below 276	3.14	1.74		
	(3)Semi-Skilled Blue Collar	Below 276	2.93	1.78		
	(4)Elementary Occupations	Below 276	2.00	1.55		
	(1)Skilled Occupations	At or Above 276	3.65	1.32	90.3488 (3, 3098) <i>p</i> <.001*	Differences between each group are significant except 2 vs 3

	(2)Semi-Skilled White Collar	At or Above 276	3.38	1.64		
	(3)Semi-Skilled Blue Collar	At or Above 276	3.33	1.64		
	(4)Elementary Occupations	At or Above 276	2.40	1.53		
HOME - write letters, memos, or emails H_Q02A	(1) Skilled Occupations	Below 276	3.60	1.41	197.208 (3, 3616) <i>p</i> <.001*	Differences between each group are significant
	(2)Semi-Skilled White Collar	Below 276	3.34	1.50		
	(3)Semi-Skilled Blue Collar	Below 276	2.55	1.46		
	(4)Elementary Occupations	Below 276	2.77	1.57		
	(1)Skilled Occupations	At or Above 276	4.22	1.01	80.8768 (3, 3434) <i>p</i> <.001*	Differences between each group are significant
	(2)Semi-Skilled White Collar	At or Above 276	4.01	1.12		
	(3)Semi-Skilled Blue Collar	At or Above 276	3.36	1.33		
	(4)Elementary Occupations	At or Above 276	3.67	1.22		
HOME - fill in forms - H_Q02D	(1) Skilled Occupations	Below 276	2.28	1.19	25.273 (3, 616) <i>p</i> <.001*	Differences between each group are significant except 1 vs 2 and 3 vs 4
	(2)Semi-Skilled White Collar	Below 276	2.21	1.22		
	(3)Semi-Skilled Blue Collar	Below 276	1.81	1.11		
	(4)Elementary	Below 276	1.92	1.18		

	Occupations					
	(1)Skilled Occupations	At or Above 276	2.46	0.99	5.2085 (3, 3434) <i>p</i> =.003*	Significant Differences only between 1 vs 3 and 2 vs 3
	(2)Semi-Skilled White Collar	At or Above 276	2.46	1.12		
	(3)Semi-Skilled Blue Collar	At or Above 276	2.25	1.10		
	(4)Elementary Occupations	At or Above 276	2.32	1.08		

*significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences. Dfn = degrees of freedom numerator. Dfd = degrees of freedom denominator.

Table 20
t-test Results Comparing PSTRE Proficiency Level within Job Category for Functional Writing Skills

Outcome	Proficiency Level	Job Category	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails - G_Q02A	below 291	Skilled Occupations	4.19	1.34	7.138	0.049	<.001*
	at or above 291	Skilled Occupations	4.54	1.04			
	below 291	Semi-Skilled White Collar	2.95	1.73	4.95	0.092	<.001*
	at or above 291	Semi-Skilled White Collar	3.41	1.69			
	below 291	Semi-Skilled Blue Collar	2.29	1.62	0.955	0.154	<.001*
	at or above 291	Semi-Skilled Blue Collar	2.90	1.76			
	below 291	Elementary Occupations	1.77	1.37	0.195	0.152	.843
	at or above 291	Elementary Occupations	1.80	1.26			
WORK - fill in forms - G_Q02D	below 291	Skilled Occupations	3.83	1.36	-4.382	0.055	<.001*
	at or above 291	Skilled Occupations	3.59	1.33			
	below 291	Semi-Skilled White Collar	3.30	1.69	1.45	0.09	.147
	at or above 291	Semi-Skilled White Collar	3.43	1.63			
	below 291	Semi-Skilled Blue Collar	3.21	1.72	0.567	0.159	.571

	at or above 291	Semi-Skilled Blue Collar	3.30	1.63			
	below 291	Elementary Occupations	2.21	1.56	1.146	0.175	.253
	at or above 291	Elementary Occupations	2.41	1.52			
HOME - write letters, memos, or emails - H_Q02A	below 291	Skilled Occupations	3.88	1.25	10.167	0.043	<.001*
	at or above 291	Skilled Occupations	4.32	0.94			
	below 291	Semi-Skilled White Collar	3.68	1.36	7.685	0.062	<.001*
	at or above 291	Semi-Skilled White Collar	4.16	0.99			
	below 291	Semi-Skilled Blue Collar	2.98	1.40	6.155	0.12	<.001*
	at or above 291	Semi-Skilled Blue Collar	3.72	1.21			
	below 291	Elementary Occupations	3.37	1.40	2.987	0.144	.003*
	at or above 291	Elementary Occupations	3.80	1.17			
HOME - fill in forms - H_Q02D	below 291	Skilled Occupations	2.34	1.14	4.151	0.041	<.001*
	at or above 291	Skilled Occupations	2.51	0.95			
	below 291	Semi-Skilled White Collar	2.32	1.22	3.614	0.058	<.001*
	at or above 291	Semi-Skilled White Collar	2.53	1.06			
	below 291	Semi-Skilled Blue Collar	2.01	1.15	4.556	0.101	<.001*

	at or above 291	Semi-Skilled Blue Collar	2.47	1.12			
	below 291	Elementary Occupations	2.25	1.28	1.769	1.28	.078
	at or above 291	Elementary Occupations	2.48	0.98			

**significant at $p < .05$*

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 21
t-test Results Comparing LIT Proficiency Level within Job Category for Functional Writing Skills

Outcome	Proficiency Level	Job Category	mean	st dev	t-value	Std Error	<i>p</i>
WORK - write letters, memos, or emails - G_Q02A	below 276	Skilled Occupations	3.93	1.34	10.118	0.053	<.001*
	at or above 276	Skilled Occupations	4.47	1.04			
	below 276	Semi-Skilled White Collar	2.71	1.73	7.466	0.079	<.001*
	at or above 276	Semi-Skilled White Collar	3.30	1.69			
	below 276	Semi-Skilled Blue Collar	1.98	1.62	6.195	0.111	<.001*
	at or above 276	Semi-Skilled Blue Collar	2.67	1.76			
	below 276	Elementary Occupations	1.56	1.37	2.275	0.11	.023*
	at or above 276	Elementary Occupations	1.81	1.26			
WORK - fill in forms - G_Q02D	below 276	Skilled Occupations	3.81	1.46	-2.745	0.058	.006*
	at or above 276	Skilled Occupations	3.65	1.32			
	below 276	Semi-Skilled White Collar	3.14	1.74	3.075	0.078	.002*
	at or above 276	Semi-Skilled White Collar	3.38	1.64			
	below 276	Semi-Skilled Blue Collar	2.93	1.78	3.246	0.123	.001*
	at or above 276	Semi-Skilled Blue Collar	3.33	1.64			

	below 276	Elementary Occupations	2.00	1.55	2.933	0.135	.004*
	at or above 276	Elementary Occupations	2.40	1.53			
HOME - write letters, memos, or emails - H_Q02A	below 276	Skilled Occupations	3.60	1.41	13.487	0.046	<.001*
	at or above 276	Skilled Occupations	4.22	1.01			
	below 276	Semi-Skilled White Collar	3.34	1.50	11.745	0.057	<.001*
	at or above 276	Semi-Skilled White Collar	4.01	1.12			
	below 276	Semi-Skilled Blue Collar	2.55	1.46	8.616	0.094	<.001*
	at or above 276	Semi-Skilled Blue Collar	3.36	1.33			
	below 276	Elementary Occupations	2.77	1.57	7.267	0.124	<.001*
	at or above 276	Elementary Occupations	3.67	1.22			
HOME - fill in forms - H_Q02D	below 276	Skilled Occupations	2.28	1.19	4.27	0.042	<.001*
	at or above 276	Skilled Occupations	2.46	0.99			
	below 276	Semi-Skilled White Collar	2.21	1.22	5.032	0.05	<.001*
	at or above 276	Semi-Skilled White Collar	2.46	1.12			
	below 276	Semi-Skilled Blue Collar	1.81	1.11	6.01	0.073	<.001*
	at or above 276	Semi-Skilled Blue Collar	2.25	1.10			

	below 276	Elementary Occupations	1.92	1.18	4.168	0.096	<.001*
	at or above 276	Elementary Occupations	2.32	1.08			

*significant at $p < .05$

Please note these analyses were conducted using the IDB Analyzer and therefore represent weighted means; however, we used unweighted Ns to calculate the significant differences.

Table 24
Demographic Variables by Low-Skilled Literacy, Low-Skilled PSTRE, and the Full Sample

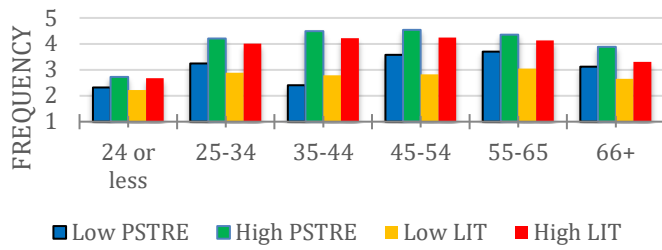
Group	Variable	N	Percent
Low-Skilled Literacy	Gender		
	Female	2,480	53.6
	Male	2,151	46.4
Low-Skilled PSTRE	Gender		
	Female	2,611	56.5
	Male	2,010	43.5
Full Sample	Gender		
	Female	4,659	53.7
	Male	4,011	46.3
Low-Skilled Literacy	Race		
	Hispanic	824	17.9
	White	2,294	49.5
	Black	1,143	24.8
	Asian	191	4.1
	Other	160	3.5
Low-Skilled PSTRE	Race		
	Hispanic	615	13.3
	White	2,640	57.3
	Black	988	21.4
	Asian	211	4.6
	Other	157	3.4
Full Sample	Race		
	Hispanic	1,101	13.0
	White	5,269	62.3
	Black	1,450	17.1
	Asian	385	4.6
	Other	256	3.0

Low-Skilled Literacy	Age (10 Year Bands)		
	24 or less	1,153	24.9
	25-34	980	21.2
	35-44	627	13.5
	45-54	697	15.1
	55-65	682	14.7
	66 or older	492	10.6
Low-Skilled PSTRE	Age (10 Year Bands)		
	24 or less	1,199	25.9
	25-34	1,066	23.1
	35-44	666	14.4
	45-54	714	15.5
	55-65	655	14.2
	66 or older	321	6.9
Full sample	Age (10 Year Bands)		
	24 or less	2,038	23.5
	25-34	2,100	24.2
	35-44	1,253	14.5
	45-54	1,301	15.0
	55-65	1,229	14.2
	66 or older	749	8.6
Low-Skilled Literacy	Native English Speaker		
	Yes	3,728	80.6
	No	897	19.4
Low-Skilled PSTRE	Native English Speaker		
	Yes	3,928	85.0
	No	693	15.1
Full Sample	Native English Speaker		
	Yes	7,198	84.9
	No	1,282	15.1

Table 25
Writing Behavior Descriptives by Low-Skilled Literacy, Low-Skilled PSTRE, and Full Sample

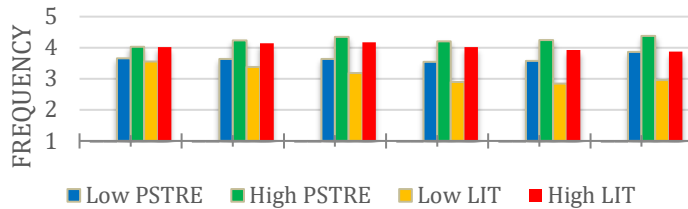
Group	Variable	N	M	SD
Low-Skilled Literacy	Writing at Home	3,931	2.10	1.10
	Writing at Work	2,168	1.97	1.20
Low-Skilled PSTRE	Writing at Home	4,308	2.23	1.03
	Writing at Work	2,751	2.09	1.14
Full Sample	Writing at Home	7,710	2.27	1.00
	Writing at Work	5,062	2.12	1.11

Figure 1
Write Letters/Memos/Emails at Work by Age and Proficiency Levels



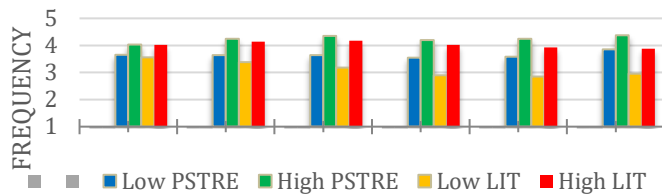
Note: For all age groups, the differences between low and high PSTRE and low and high LIT are significant.

Figure 2
Write Letters/Memos/Emails at Home by Age and Proficiency Levels



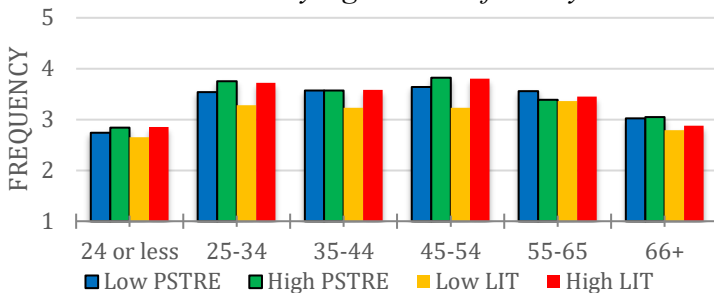
Note: For PSTRE, all age groups showed significant differences between low and high PSTRE. For LIT, all age groups showed significant differences except 24 or less.

Figure 3
Fill in Forms at Work by Age and Proficiency Levels



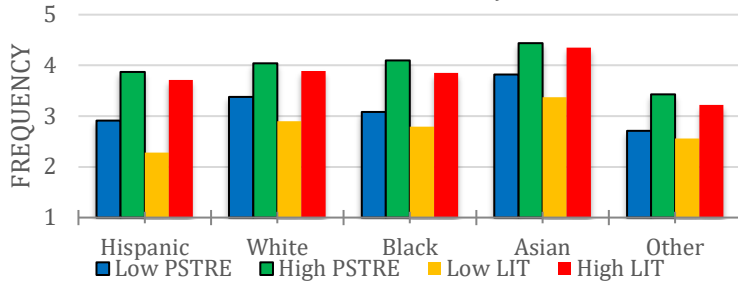
Note: For PSTRE, the only age group that showed significant differences between low and high was 25-34. For LIT, all age groups showed significant differences except 55-65 and 66 plus.

Figure 4
Fill in Forms at Home by Age and Proficiency Levels



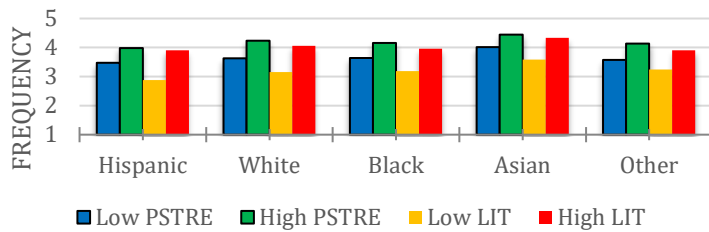
Note: For PSTRE, all age groups showed significant differences between low and high except 66 plus. For LIT, all age groups showed significant differences.

Figure 5
Write Letters/Memos/Emails at Work by Race



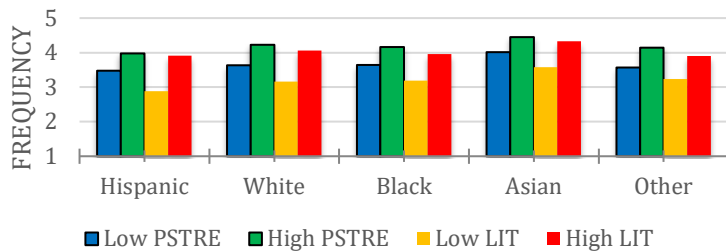
Note: For all age groups, the differences between low and high PSTRE and low and high LIT are significant.

Figure 6
Write Letters/Memos/Emails at Home by Race



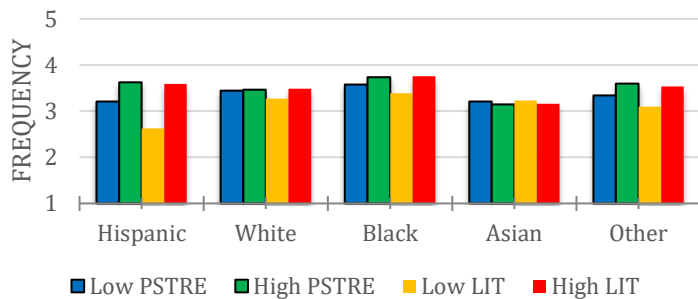
Note: For all age groups, the differences between low and high PSTRE and low and high LIT are significant.

Figure 7
Fill in Forms at Work by Race



Note: For PSTRE there were no significant differences. For LIT, only Hispanic and White showed significant differences.

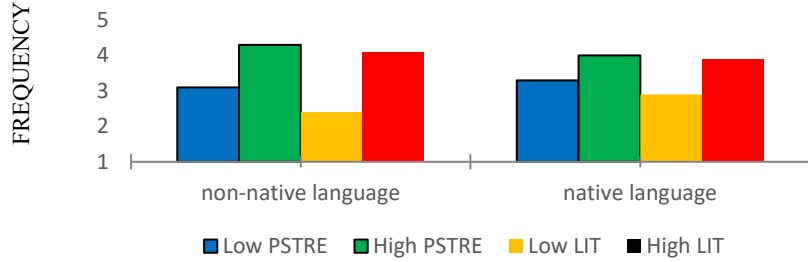
Figure 8
Fill in Forms at Home by Race



Note: For PSTRE, there were significant differences for Hispanic and White only. For LIT, there were significant differences for Hispanic, White and Black.

Figure 9

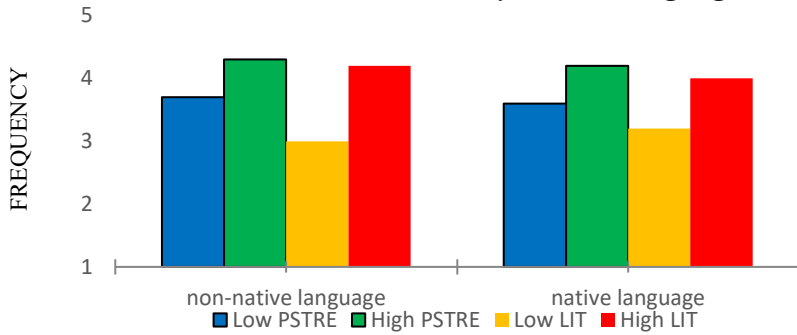
Write Letters/Memos/Emails at Work by Native Language Status



Note: For both language groups, the differences between low and high PSTRE and low and high LIT are significant.

Figure 10

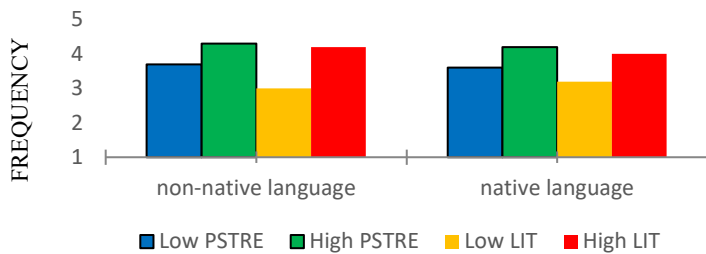
Write Letters/Memos/Emails at Home by Native Language Status



Note: For both language groups, the differences between low and high PSTRE and low and high LIT are significant

Figure 11

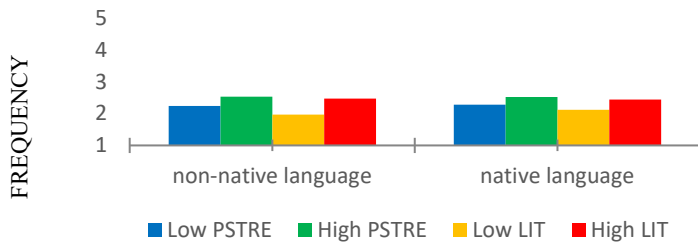
Fill in Forms at Work by Native Language Status



Note: For PSTRE, there were no significant differences, For LIT there were significant differences for both language groups.

Figure 12

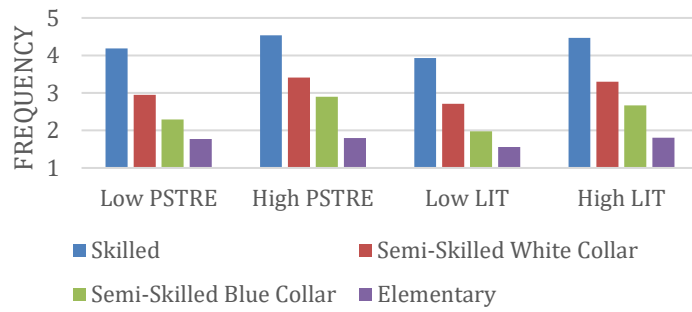
Fill in Forms at Home by Native Language Status



Note: For both language groups, the differences between low and high PSTRE and low and high LIT are significant

Figure 13

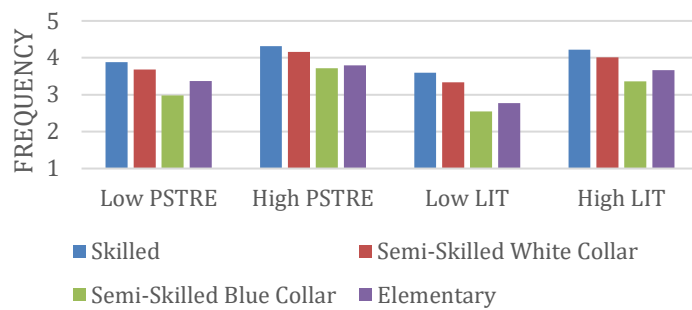
Write Letters/Memos/Emails at Work by Job Category and Proficiency Levels



Note: For all occupations, the differences between low and high PSTRE and low and high LIT are significant

Figure 14

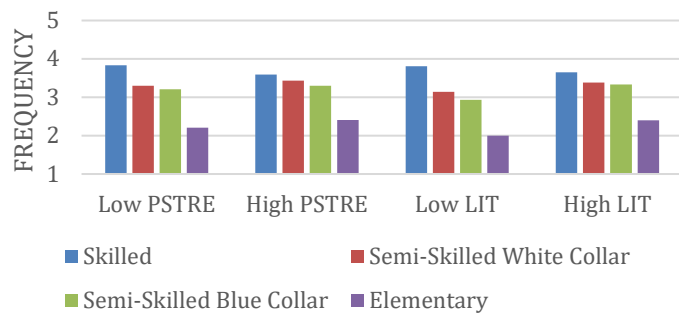
Write Letters/Memos/Emails at Home by Job Category and Proficiency Levels



Note: For all occupations, the differences between low and high PSTRE and low and high LIT are significant

Figure 15

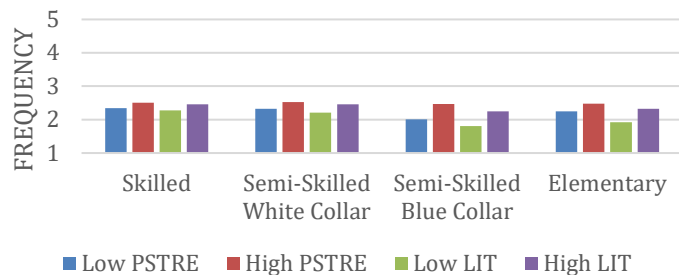
Fill in Forms at Work by Job Category and Proficiency Levels



Note: For PSTRE, the only difference that was significant was for skilled occupations. For LIT, all occupations showed significant differences.

Figure 16

Fill in Forms at Home by Job Category and Proficiency Levels



Note: For PSTRE, all occupations showed significant differences except elementary. For LIT, all occupations showed significant differences.