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Literacy Skill Differences between Adult Native English and Native Spanish Speakers

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Abstract

The goal of this study was to compare the literacy skills of adult native English and native Spanish ABE speakers. Participants were 169 native English speakers and 124 native Spanish speakers recruited from five prior research projects. The results showed that the native Spanish speakers were less skilled on morphology and passage comprehension tasks but were equally skilled on the phonology and vocabulary tasks. Morphology, coupled with phonology, was a stronger predictor of vocabulary and comprehension abilities for the native Spanish speakers, which suggests that instruction focused on morphology is likely to have a greater impact on this group.

According to the U.S. Department of Education, approximately 40 million adults have limited literacy capabilities, meaning they do not have a high school diploma or equivalent (Lasater & Elliott, 2005). Thirty-three percent of these adults report that English is not their first language. The employment statistics for this group of low literate, nonnative English speakers are particularly troubling: 57% percent are not in the labor force or are unemployed. Adult Basic Education (ABE) programs offer hope to those whose employment potential is limited by poor literacy skills.

Based on these statistics, it is not surprising that students enrolled in ABE programs come from diverse backgrounds with varying English proficiency. What is surprising, however, is that research on literacy skill acquisition has often neglected adult learners, with even less attention paid to adult nonnative English speakers' acquisition of English literacy skills. The aim of the current investigation is to compare the literacy skills of native English and native Spanish ABE speakers and propose targeted instruction for these distinct groups of learners. The literacy skills we were specifically interested in were phonological and morphological awareness, vocabulary, and how these skills relate to higher-level literacy skills.

Phonological Awareness

Phonological awareness, the understanding that different sounds form words, is an essential component of literacy acquisition, and an important predictor of children's reading

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comprehension (Adams, 1990; National Reading Panel, 2000). The smallest units of sound within a language are called phonemes. While research on phonological awareness in adults is relatively limited, studies that have focused on adults show a strong link between phonological ability and reading skill; adults who are less skilled readers also have limited phonological awareness (Pratt & Brady, 1988). In studies where children and adults are matched by reading grade level, children outperform adults on phoneme recognition (Thompkins & Binder, 2003) and other phonologically complex tasks such as nonword decoding, phoneme deletion and phoneme segmentation (Greenberg, Ehri & Perin, 1997). Phonological awareness is also a predictor of reading comprehension abilities in adults (Binder, Snyder, Ardoin, & Morris, 2011). Additionally, research has found that some adult learners can compensate for poor phonological skills by relying on other skills (e.g. spelling patterns and context) (Binder & Lee, 2012; Greenberg, Ehri & Perin, 2002).

While research has shed some light on phonological skill among the ABE population, there is still much we do not know about the large subset of nonnative English speakers enrolled in these programs. Davidson and Strucker's (2002) study, one of few to compare native and nonnative English speakers' literacy skills, found that performance on Word Attack, a decoding task, was nearly identical for the two groups. However, when the researchers conducted an error analysis of the decoding abilities of the two groups, they found that the nonnative English speakers made fewer real-word substitutions than the native English speakers. The researchers believe this is because the nonnative English speakers know the meanings of fewer English words. Additionally, those whose first language has a transparent phonology, meaning there is a one-to-one correspondence between letters and sounds, are using a skill that helped them acquire their native language but results in phonetically plausible errors rather than real-word substitutions. Earlier research with Spanish-speaking children supports this cross-language transfer of phonological skill. Children who performed well on phonological awareness tasks in Spanish were more likely to be able to read English words and English-like pseudo-words in reading tasks than children with weaker phonological awareness (Durgunoglu, Nagy & Hancin-Bhatt, 1993). These studies suggest that phonological skill may be comparable for native and nonnative speakers of English, but the nonnative English speaker's native language, specifically whether it is alphabetic or not, may affect decoding skills differently.

Morphological Awareness

Morphemes are the smallest units of meaning in words, and morphological awareness is the ability to reflect on and manipulate different morphemes to form more complex words (Carlisle, 1995). There are two main categories of morphologically complex words: inflected and derived. Inflected morphemes alter the tense or quantity of a word through the addition of suffixes while preserving the meaning of the root word. For example, adding *–ed* to the root *walk* changes the word's tense from present to past. Adding *–s* to the root *dog* changes the quantity. Derived morphemes typically alter a word's part of speech and/or meaning. For example, the word *quick* shifts from an adjective to an adverb with the addition of the morpheme *–ly*, making it *quickly*. Adding the prefix *un-* to the word *likely* makes it *unlikely*, which changes the meaning of the root to its opposite.

Because English is a morphophonemic language, many words are represented in writing according to the way they sound as well as their meanings, both phonological and morphological awareness are important contributors to literacy acquisition. However, educators are typically more knowledgeable of phonemes than morphemes (Carlisle, 2003). Within the last decade, researchers have begun to focus more attention on morphological awareness and investigate its independent contribution to literacy skills. Research on children has found that morphological awareness is an important factor in single word reading among children of many ages, even after controlling for phonological awareness (e.g. Deacon & Kirby, 2004; Nagy, Berninger, Abbott, Vaughan & Vermeulen, 2003). Tighe and Binder's (2014) study of ABE adults also found that morphological awareness was a unique contributor to passage comprehension after controlling for phonological awareness. These and other investigations with children and adults suggest that morphological awareness plays an important role in contributing to reading skill separate from phonological awareness, though they are related.

Fewer studies have investigated the morphological skills of nonnative English speakers who are learning English (for a review of the literature on morphological awareness in children from a cross-linguistic perspective, please see Kuo & Anderson, 2006). One of the few studies to focus on Spanish-speaking children learning English followed a cohort from the fourth to fifth grade and found a significant and moderately large relationship between derivational morphological awareness and reading comprehension and this relationship increased between the fourth and fifth grades (Kieffer & Lesaux, 2008). Despite the fact that Spanish is a phonologically transparent language, Ramirez, Chen, Geva and Kiefer (2010) studied a sample of Spanish-speaking children learning English and found that morphological awareness explained unique variance in word reading in both Spanish and English. As with phonological awareness, there are also cross-language effects of morphological awareness on word reading from Spanish to English (Ramirez et al., 2010). Additionally, one study that compared third through fifth grade monolingual students and Spanish-speaking English language learners saw fluent English students outperforming Spanish-English language minority students on a morphology test (Goodwin et al., 2011). While this body of literature is growing, researchers are beginning to demonstrate the important links between morphology and higher-level literacy skills among nonnative English-speaking samples.

While some research has compared the reading skills of native and nonnative English-speaking low literate adults (e.g. MacArthur, Konold, Glutting & Alamprese, 2012), to the best of our knowledge, no studies have directly compared the morphological skills of native English and native Spanish speakers. Tighe and Binder's (2014) study included both native English speakers and English speakers of other languages, but limited power prevented them from further dividing their sample into these two groups, though their sample was representative of the U.S. adult ABE population (National Research Council, 2012). One goal of the current study was to compare morphological awareness and other important literacy skills between native English- and native Spanish-speaking adults.

Vocabulary Skill

School-aged children learn an estimated 6,000 root word meanings by the end of their second grade year and about 10,000 by the end of their sixth grade year (e.g. Anglin, 1993; Biemiller, 2005). When students encounter unfamiliar words, having an awareness of word structure can assist in understanding these new word meanings. Anglin (1993) calls this "morphological problem solving," a skill that can increase both the size of one's vocabulary and the rate of its growth. Vocabulary knowledge is an important component of literacy development (National Reading Panel, 2000) and numerous studies suggest that vocabulary skill is a major factor of text knowledge and reading comprehension in children (e.g. Nagy & Herman, 1987, Nelson & Stage, 2007, Ouellette, 2006; Verhoeven & Van Leeuwe, 2008), including children who are Spanish-English bilinguals (i.e., Proctor, Carlo, August & Snow, 2005).

Research specific to English language learners is limited (see August, Carlo, Dressler & Snow, 2005, for a review) but typically shows that nonnative English speaking children score well below their native English-speaking peers on receptive vocabulary (e.g. Umbel, Pearson, Fernandez & Oller, 1992) and vocabulary depth (e.g. Verhallen & Schoonen, 1993). Because nonnative English-speaking children know fewer English vocabulary words and know less about the meaning of those words compared to monolingual peers, reading comprehension is likely to suffer (Carver, 1994). In fact, national reading test data of fourth-graders shows that children who lived in homes where a language other than English was always used scored 22–29 points lower than monolingual children (Developmental Associates, 2003).

One might expect low literate adult learners to have larger vocabularies than children because they have more experience with language, but recent research does not support this concept. Pae, Greenberg and Williams (2012) compared adult struggling readers with third-grade children using the Peabody Picture Vocabulary Test-IIIB, and found that the two groups had comparable correct raw scores. However, it should be noted that the adults performed poorly compared to the PPVT-IIIB normative group and scored a mean age equivalency score of 11.40 years. After looking closer at the data, adults showed poorer performance compared to the children on the lower (i.e., easier) items while the children showed poorer performance compared to the adults on the higher (i.e., more difficult) items. Since the items are presented in sequential difficulty, these results were surprising. The researchers postulate that these differences could result from differential environmental exposure. For example, children scored better than adults on words like archaeologist and amphibian, words common to school texts. Pae et al. (2012) did not report the native languages of their sample and to the best of our knowledge no previous studies have directly compared the vocabulary skills of native and nonnative English speakers. Consequently, another aim of the current investigation was to compare the vocabulary skills of native English and native Spanish-speaking ABE learners.

Current Study

There were two main goals of this study. First, we conducted a quantitative analysis of the literacy skill differences between native English and native Spanish speakers enrolled in ABE programs. The specific skills we were interested in were phonological awareness, morphological awareness, receptive vocabulary, and passage comprehension. Research has typically limited studies of Spanish speaker's literacy achievement to school-aged learners. Given the unique needs of adult learners, we wanted to understand how adult Spanish speakers compared to their native English-speaking peers.

The second aim was to propose how skill differences could be addressed in the classroom setting. Research-based papers on literacy acquisition often fail to provide concrete classroom applications. This study attempted to bridge the gap between research and practical application by providing specific teaching recommendations.

The present study addressed four research questions:

1. Are there skill differences between native English and native Spanish speakers?
2. Are literacy skills correlated differently for the native English speakers and the native Spanish speakers?
3. What variables predict higher-level reading abilities?
4. How can classroom instruction best support the needs of different ABE populations?

Because Spanish is a phonologically transparent language, and previous research shows cross-language transfer of phonological skill from Spanish to English in children (Durgunoglu, et al., 1993), we hypothesized that, of all the literacy skills we tested for, phonological awareness might be better for the native Spanish-speaking adults compared to their native English-speaking peers. Next, we hypothesized that native English speakers would outperform the native Spanish speakers on the morphology tasks and that native Spanish speakers would also have a weaker receptive vocabulary than native English speakers as is shown in previous research with children (Umbel et al., 1992). Also, we predicted that performance on the passage comprehension task would be weaker for the native Spanish speakers.

Method

Participants

The study included 293 adult learners from Adult Basic Education (ABE) programs in western Massachusetts. Participants were recruited between 2009 and the spring of 2013 for five different research projects. In order to be selected for this study, participants needed to be either native English speakers or adult learners whose native language was Spanish. We limited our nonnative English speaker group to Spanish speakers because very few adults were speakers of a language other than Spanish. A total of 169 native English speakers and 124 native Spanish speakers were included in this study. All participants received monetary compensation for their time.

Participants in the native English speaker group included 52 females and 30 males (we did not have information about gender for 51% of the participants in this group). The racial and ethnic breakdown was as follows: Black/African American 46%, White 23%, Hispanic 20%, Multiracial 8%, Asian 2%, Native American < 1%. The mean age for the native English speakers was 32 (*SD* = 14, range 17 to 69).

Participants in the native Spanish speaker group included 39 females and 19 males (we did not have information about gender for 53% of the participants in this group). Eighty-six percent of the group was Hispanic, 6% Black/African American, 3% White, 2% Asian and 2% Multiracial. The mean age for the native Spanish speakers was 30 (*SD* = 10, range 16 to 58). An independent samples t-test determined that there was no statistically significant difference in age between the native Spanish and native English speakers, t (281.97) = 1.11, $p > .05$[1].

A limited amount of demographic information was available for this study due to differences in data collection procedures between the five research projects. However, the demographic information for these participants should be similar to that reported in Binder et al. (2011).

Materials

Phonological Awareness Test—All of the studies included Word Attack, a subtest of the Woodcock-Johnson III achievement test (Woodcock, McGrew & Mather, 2001), to assess phonological decoding skill. Specifically, word attack assesses an individual's ability to decode nonsense words (e.g. *nat* and *ib*). Participants read the nonsense words of increasing difficulty aloud. Testing is discontinued after a participant pronounces six total words incorrectly. Their score is the total number of correctly pronounced words.

Morphological Awareness Tests—Three tests were used to assess morphological skill and were included in four of the five studies. These tests were the Test of Morphological Structure: Derivation, the Test of Morphological Structure: Production and the Derivational Suffix Choice Test of Pseudowords. These tasks were chosen because they are consistently found in the morphological literature and correlate well with each other.

The Test of Morphological Structure: Derivation was adapted from Carlisle (2000). During this task, an individual is asked to transform a base word into a derived word; for example, when the experimenter reads, "Farm. My uncle is a _____ (blank)," the participant is expected to fill in the blank with the word *farmer*. The entire test is administered orally and is discontinued after a participant answers six items incorrectly. As previously mentioned, four of the five studies included this task; however the total number of items administered varied from 30 to 35. Therefore, for this study, a proportion of correct items was computed for each participant's final score on this test.

The Test of Morphological Structure: Production was also adapted from Carlisle (2000) and assesses an individual's ability to decompose words; for example, when the experimenter reads, "Driver. Children are too young to _____ (blank)," the participant is

[1]The homogeneity of variances assumption was not met and therefore we are reporting the corrected *t*.

expected to fill in the blank with the word *drive*. As with the derivation test described above, this test is administered orally and discontinued after an individual gives six incorrect answers. The total number of items administered varied from 30 to 35 for each of the four studies, so a proportion of correct items was computed for each participant's final score on this test as well.

The final test of morphological skill was the Derivational Suffix Choice Test of Pseudowords (Mahony, 1994; Singson, Mahony & Mann, 2000). This test assesses an individual's ability to manipulate morphemes using non-words. The inclusion of non-words is important because participants are not limited by their vocabulary, but instead are required to use syntactic and derivational knowledge. At the start of this test, the experimenter gives the participant a paper that displays sentences, each with a missing word. The sentences are followed by four answer choices (all non-words). The experimenter reads the sentence and answer choices aloud and then asks the participant to select the word that best fits the sentence. For example, "Our teacher taught us to _____ long words." The answer choices include *jittling*, *jittles*, *jittled*, and *jittle*. The correct response, *jittle*, would earn the participant one point. The test is discontinued after the participant makes six errors. Three of the four studies administered the same version of this test (n = 161), while the fourth administered a version where 50% of the items were the same as the other studies. Because the total number of items administered varied on this task for that one study, a proportion of correct items was computed for each participant's final score on this test.

Two sets of correlations were computed to compare the relationships between the three morphological awareness tests: one included participants in the three studies that used the same version of the Derivational Suffix Choice Test of Pseudowords and the other was limited to the participants in the study that used the different version. Although the two versions of this test were distinct, the pattern of relationships was the same. The Derivational Suffix Choice Test was positively and significantly correlated with the other two morphological awareness tests.[2]

Vocabulary

Three of the studies included the Peabody Picture Vocabulary Test-Third Edition (PPVT, Dunn & Dunn, 1997) to measure a participant's receptive vocabulary. For this test, participants are shown a series of pages, each with four pictures on it. The experimenter reads a word and the participant must point to the picture that best represents that word. Testing continues until the participant makes eight or more errors within a set. Each set consists of twelve vocabulary words. Scores are calculated by subtracting the total number of errors (up until the stopping point) from the number of the last item in the last set they completed.

[2]For the single study, the correlations between the Suffix Choice Test and the Derivation and Production Tests were $r = 0.37$ ($p < 0.05$) and $r = 0.56$ ($p < 0.01$), respectively. For the three studies that used the same version of the Suffix Choice Test, the correlations were $r = 0.60$ and $r = 0.55$ respectively ($p < 0.01$ for both).

Passage Comprehension

Three of the studies included the Passage Comprehension subtest of the Woodcock-Johnson III achievement test (Woodcock et al., 2001), to assess the individual's ability to rely on contextual clues to identify a missing word in a sentence. For example, "The drums were pounding in the distance. We could _____ them." The participant is expected to identify *hear* as the missing word. For this task the sentence is displayed on a page and the participant is expected to respond orally. This test is discontinued after a total of six errors.

Results

Skill Differences

One of our primary goals was to compare the literacy skills of the native English and native Spanish speakers. We ran several independent-samples *t*-tests and, contrary to our hypotheses, found no difference in performance on the decoding task ($p = .98$) and the vocabulary task ($p = .46$). As hypothesized, there were significant differences between the groups on all three morphology tests. On the Derivation Test, the native English speakers ($M = 64.90$, $SD = 26.52$) scored higher than the native Spanish speakers ($M = 44.12$, $SD = 27.13$), $t\ (188) = 5.14$, $p < .001$. The native English speakers ($M = 87.15$, $SD = 17.72$) also did significantly better than the native Spanish speakers ($M = 76.13$, $SD = 25.34$) on the Production Test, $t\ (121.03) = 3.32$, $p < .01$[3]. Performance on the Suffix Choice Test yielded similar results: the native English speakers ($M = 63.13$ $SD = 23.96$) outperformed the native Spanish speakers ($M = 49.12$, $SD = 24.00$), $t\ (191) = 3.94$, $p < .001$.

Also, in addition to the morphology tasks, the native English speakers ($M = 29.98$, $SD = 5.59$) scored significantly higher than the native Spanish speakers ($M = 25.92$ $SD = 6.37$) on the Passage Comprehension task, $t\ (194.29) = 4.97$, $p < .001$[4].

Correlations

We examined the patterns of correlations among the literacy skill assessments separately for the native English and native Spanish speakers. Based on past research, we expected that the morphology tasks would be highly correlated for both groups. As seen in Tighe and Binder (2014), morphological awareness was significantly correlated to all measures of phonological awareness, decoding and reading comprehension for adults enrolled in ABE courses. Also, we expected to get positive and moderate correlations overall, but did not have specific predictions about how the relationships might differ between the two groups.

For the native English speakers, all correlations between the three morphology tasks were positive and statistically significant, ranging from .51 to .70. Similarly, the morphology task correlations for the native Spanish speakers were positive and statistically significant and ranged from .58 to .65. (see Table 1 for these statistics).

When we compared the correlations between the morphology tasks and the other literacy tasks, differences between the native English and native Spanish speakers emerged. For the

[3]The homogeneity of variances assumption was not met and therefore we are reporting the corrected *t*.
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native English speakers, the correlations between the three morphology tasks and the Passage Comprehension task were positive and significant and ranged from .30 (for the Production task) to .48 (for the Suffix Choice task). The relationships between the morphology tasks and the Passage Comprehension task were also significant for the native Spanish speakers but were much stronger, ranging from .66 (for the production task) to .78 (for the derivation task). Because the two groups had very different correlations, we used the Fisher's *Z* transformation to compare them and found that all the correlations were indeed significantly different. The relationships between the morphology variables and Passage Comprehension were significantly stronger for the native Spanish speakers than the native English speakers.

Regressions

We conducted regression analyses to decipher which variables predicted higher-level skills and reading abilities. For the first analysis, vocabulary skill was the outcome variable. Passage comprehension was the outcome variable for the second analysis. In both analyses, the phonology task, the three morphology tasks, language group, and the interaction between language group and the other variables were the predictor variables. For vocabulary abilities, the R^2 (.17) was significant, $F(9, 125) = 2.76$, $p = .006$. The derived morphology task and language group were unique significant predictors. (See Table 2 for *Beta* weights). When passage comprehension was the outcome variable, the R^2 (.44) was also significant, $F(9, 112) = 11.39$, $p < .001$. The derived morphology task was the only unique predictor in this model (see Table 2).

Discussion

The purpose of this study was to combine information from several data sets to examine the literacy skills of native English and native Spanish ABE learners and explore how any differences could be addressed within the instructional setting. We first wanted to compare these two groups because past research has typically limited studies of Spanish speaker's literacy skill acquisition to school-aged learners. The differences we found were striking. When compared to their native English-speaking peers, native Spanish-speaking ABE learners were significantly less skilled on the morphology and passage comprehension tasks. One may attribute this to the fact that the native Spanish speakers were tested in English, but if this did put them at a testing disadvantage, we would expect to see poorer performance on the other tasks as well and this was not the case; both groups were equally skilled on the phonology and vocabulary tasks. Prior studies of adult second language learners indicate they are less sensitive to morphological structure and rely more on lexical storage (for a review of this literature, see Clahsen, Felser, Neubauer, Sato & Silva, 2010), which is one potential explanation for the difference in morphological awareness between the groups.

An additional goal of this study was to investigate how reading skills were correlated for the native English and native Spanish speakers. Here again group differences emerged. The relationships between each of the morphology tasks and the Passage Comprehension task were significantly stronger for the native Spanish speakers than the native English speakers. Overall, those who did well on the morphology tasks also did well on our measure of

comprehension, but this connection was more pronounced for the native Spanish-speaking group. Researchers propose that nonnative speakers are more likely to process morphologically complex English words as whole units rather than individual parts or pieces (Ullman, 2005); therefore, as morphological skills improve, one would expect comprehension and vocabulary skills to improve as well.

Finally, we tested the morphology and phonology measures as predictors of vocabulary and comprehension skill. We discovered that morphological awareness is a strong predictor of vocabulary and passage comprehension abilities, but more of the variance is accounted for with the native Spanish-speaking group than the native English speakers (this was found when each regression was run on each group, not in the combined analysis). Previous research has begun to describe the importance of morphological awareness in reading, both Spanish and English, for Spanish-speaking English language learners (e.g. Kieffer & Lesaux, 2007; Ramirez et. al, 2010), but to the best of our knowledge this is the first study comparing the relationship between morphological awareness and other literacy skills for these specific groups of adult learners.

Overall, these findings suggest that Spanish-speakers in ABE programs have a limited knowledge of morphology, which is related to their poor performance on the comprehension task, and therefore, they would benefit from classroom instruction specific to morphology. Additionally, since morphology (coupled with phonology) is more strongly correlated with vocabulary and comprehension abilities for the native Spanish speakers, the impact of such focused instruction is likely to be greater for them and influence higher-level cognitive tasks. A recent study assessing the effects of a decoding curriculum on the development of reading skills supports this hypothesis. Nonnative English speakers showed greater reading skill gains than native speakers on 7 of the 11 reading measures, which suggests that helping nonnative speakers learn the patterns of English vocabulary bolsters their word recognition (Alamprese, MacArthur, Price & Knight, 2011).

Program implications

For all ABE learners, direct instruction in morphological awareness would be beneficial. However, it’s important to note that the trajectory for acquiring this information may be different for adults than it is for children. For example, children acquire knowledge concerning inflected morphemes (affixes that change the number or tense of a word) very early in development (e.g., Anglin, 1993; Carlisle, 2003). However, some research with adults has demonstrated that ABE learners often leave these inflected endings off when spelling these words (e.g., Worthy & Viise, 1996). In our lab, we have noticed that ABE learners often leave off word endings during oral reading behavior as well. Thus, explicit instruction in these endings would be beneficial to all ABE learners.

The best ordering of words within a morphological intervention for native Spanish speakers has not been addressed specifically in the research, but we do know that morphological awareness becomes increasingly important in decoding during the elementary and middle school years. So lessons on morphemes should not be for beginning adult readers, but rather be targeted to those with a higher English reading grade equivalent. When introducing morphemes, Moats (2011) recommends starting with transparent or obvious morphemes

with stable meanings and spellings (e.g. *ex* means out of and *tract* means to pull, so *extract* means to pull out of), focusing on the more common morphemes (e.g. *ject*, which is in words like subject, project, interject) and sticking with words where the addition of the morpheme or morphemes maintains the root word spelling and pronunciation (e.g. unbreakable, with the prefix *un* and the suffix *able*), before moving on to more complicated morphemes. Also, research suggests that ABE instructors should not shy away from using linguistic terms like morpheme, suffix and prefix because adult learners are interested in learning about how the English language works (Alamprese et al., 2011).

Adult learners also benefit from the use of real-life literacy activities and materials. Purcell-Gates, Degener, Jacobson and Soler's (2002) analysis of literacy outcomes for ABE students showed a greater change in daily literacy practices for learners who were taught using real life materials than those who were taught using non-authentic texts and writing activities. Therefore, nonnative adult learners who are studying for U.S. Citizenship might benefit from an analysis of key vocabulary that appears with morphological variations within study guides. The word nation, and its derivatives *national, nationalistic and nationalism* would support both contextualized needs and morphological awareness aimed at developing vocabulary depth.

Study Limitations

While the current study included a large number of participants from multiple programs, both of which we consider strengths, there were some challenges that limited our analyses. Because not all data collection procedures across the five studies were exact, we were missing a significant amount of demographic and additional task information. Also, we did not have enough information on each native Spanish speaker's reading proficiency in Spanish, which prevented us from doing a more detailed analysis in which Spanish literacy skill was a factor. Because past research has shown that literacy in one's native language plays a significant role in contributing to second language acquisition (Goldenberg, 2010), future research should look at this variable more closely.

Additionally, while we can contribute to the literature on the differences between native English and native Spanish-speaking adult learners, we cannot explain why such differences exist or assume these differences are similar for native speakers of languages other than Spanish. We can only speculate why the relationships between morphology and other variables is stronger for the native Spanish speakers compared to the native English speakers. Research on adult literacy would benefit from studies that attempt to answer these questions.

Conclusion

Adult Basic Education programs have the challenging task of instructing a diverse group of learners. Time is limited, attrition rates are high, engaging and age-appropriate materials are often difficult to obtain, and classes are comprised of learners with a wide range of needs and abilities. In order for instructors to optimize their time in the classroom, lessons on morphology should follow the above recommendations and avoid a one-size-fits-all approach.

Despite an increased interest in morphological awareness in the adult basic education population, there is still much we do not know about the best ways to introduce morphological awareness for native and nonnative English speakers. The present study takes a first step in understanding the literacy skill differences of native English and native Spanish ABE learners, but future studies need to explore possible explanations for such differences.

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References

Adams, MJ. Beginning to read: Thinking and learning about print. Cambridge, MA: MIT Press; 1990.

Alamprese JA, MacArthur CA, Price C, Knight D. Effects of a structured decoding curriculum on adult literacy learners' reading development. Journal of Research on Educational Effectiveness. 2011; 4:154–172. [PubMed: 22163055]

Anglin JM. Vocabulary development: A morphological analysis. Monographs of the Society for Research in Child Development. 1993; 58:1–166.

August D, Carlo M, Dressler C, Snow C. The critical role of vocabulary development for English language learners. Learning Disabilities Research and Practice. 2005; 20:50–57.

Biemiller, A. Size and sequence in vocabulary development: Implications for choosing words for primary grade vocabulary instruction. In: Hiebert, EH.; Kamil, ML., editors. Teaching and learning vocabulary: Bringing research to practice. Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2005. p. 223-242.

Binder KS, Lee CS. Reader profiles for adults with low literacy skills: A quest to find resilient readers. Journal of Research and Practice for Adult Literacy, Secondary, and Basic Education. 2012; 1:78–89.

Binder KS, Snyder MA, Ardoin SP, Morris RK. Dynamic indicators of basic early literacy skills: An effective tool to assess adult literacy students? Adult Basic Education and Literacy Journal. 2011; 5:150–160.

Carlisle, JF. Morphological awareness and early reading achievement. In: Feldman, LB., editor. Morphological aspects of language processing. Mahwah, NJ: Erlbaum; 1995. p. 189-209.

Carlisle JF. Awareness of the structure and meaning of morphologically complex words: Impact on reading. Reading and Writing. 2000; 12:169–190.

Carlisle JF. Morphology matters in learning to read: A commentary. Reading Psychology. 2003; 24:291–322.

Carver RP. Percentage of unknown vocabulary words in text as a function of the relative difficulty of text: Implications for instruction. Journal of Literacy Research. 1994; 26:413–437.

Clahsen H, Felser C, Neubauer K, Sato M, Silva R. Morphological structure in native and nonnative processing. Language Learning. 2010; 60:21–43.

Davidson RK, Strucker J. Patterns of word-recognition errors among adult basic education native and nonnative speakers of English. Scientific Studies of Reading. 2002; 6:299–316.

Deacon SH, Kirby JR. Morphological awareness: Just "more phonological"? The roles of morphological and phonological awareness in reading development. Applied Psycholinguistics. 2004; 25:223–238.

Developmental Associates. The descriptive study of services to LEP students and LEP students with disabilities (OELA report EDOO-CO-0089). 2003. Retrieved May 16, 2013 from http://www.ncela.gwu.edu/files/rcd/BE021195/policy_report.pdf

Dunn, LM.; Dunn, LM. Peabody Picture Vocabulary Test. 3. Circle Pines, MN: American Guidance Service; 1997.

Durgunoglu AY, Nagy WE, Hancin-Bhatt BJ. Cross-language transfer of phonological awareness. Journal of Educational Psychology. 1993; 85:453–465.

Goldenberg, C. Improving achievement for English learners: Conclusions from recent reviews and emerging research. In: Edwards, LG., editor. Best Practices in ELL Instruction. New York: The Guilford Press; 2010. p. 15-44.

Goodwin AP, Huggins CA, Carlo M, Malabonga V, Kenyon D, Louguit M, August D. Development and validation of extract the base: An English derivational morphology test for third through fifth grade monolingual students and Spanish-speaking English language learners. Language Testing. 2011; 29:265–289.

Greenberg D, Ehri LC, Perin D. Are word reading processes the same or different in adult literacy students and 3rd–5th graders matched for reading level? Journal of Educational Psychology. 1997; 89:262–275.

Greenberg D, Ehri LC, Perin D. Do adult literacy students make the same word-reading and spelling errors as children matched for word-reading age? Scientific Studies of Reading. 2002; 6:221–243.

Kieffer MJ, Lesaux NK. The role of derivational morphology in the reading comprehension of Spanish-speaking English language learners. Reading and Writing. 2008; 21:783–804.

Kuo L, Anderson RC. Morphological awareness and learning to read: A cross-language perspective. Educational Psychologist. 2006; 41:161–180.

Lasater, B.; Elliott, B. Information from the 2000 census. U.S. Department of Education; Washington, DC: Division of Adult Education and Literacy; 2005. Profiles of the adult education target population.

MacArthur CA, Konold TR, Glutting JJ, Alamprese JA. Subgroups of adult basic education learners with different profiles of reading skills. Reading and Writing. 2012; 25:587–609. [PubMed: 22518070]

Mahony DL. Using sensitivity to word structure to explain variance in high school and college level reading ability. Reading and Writing. 1994; 6:19–44.

Moats, L. Morphology instruction for reading, spelling and vocabulary. Focus: The Newsletter of the Pennsylvania and Delaware Branch of the International Dyslexia Association. 2011 Spring-Summer. Retrieved from http://www.pbida.org/FocusSpring11.pdf

Nagy WE, Berninger V, Abbott R, Vaughan K, Vermeulen K. Relationship of morphology and other language skills to literacy skills in at-risk second-grade readers and at-risk fourth-grade writers. Journal of Educational Psychology. 2003; 95:730–742.

Nagy, WE.; Herman, PA. Breadth and depth of vocabulary knowledge: Implications for acquisition and instruction. In: McKeown, M.; Curtis, M., editors. The nature of vocabulary acquisition. Hillsdale, NJ: Erlbaum Associates; 1987. p. 19-35.

National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups. Bethesda, MD: National Institute of Child Heather and Human Development; 2000.

National Research Council. Improving adult literacy instruction: Options for practice and research. In: Lesgold, AM.; Welch-Ross, M., editors. Committee on learning sciences: Foundations and applications to adolescent and adult literacy. Washington, DC: National Academies Press; 2012.

Nelson JR, Stage SA. Fostering the development of vocabulary knowledge and reading comprehension through contextually based multiple meaning vocabulary instruction. Education and Treatment of Children. 2007; 30:1–22.

Ouellette GP. What's meaning got to do with it: The role of vocabulary in word reading and reading comprehension. Journal of Educational Psychology. 2006; 98:554–566.

Pae HK, Greenberg D, Williams RS. An analysis of differential response patterns on the peabody picture vocabulary test-IIIB in struggling adult readers and third-grade children. Reading & Writing. 2012; 25:1239–1258.

Pratt AC, Brady S. Relation of phonological awareness to reading disability in children and adults. Journal of Educational Psychology. 1988; 80:319–323.

Proctor PC, Carlo M, August D, Snow C. Native Spanish-speaking children reading in English: Toward a model of comprehension. Journal of Educational Psychology. 2005; 97:246–256.

Purcell-Gates V, Degener SC, Jacobson E, Soler M. Impact of authentic adult literacy instruction on adult literacy practices. Reading Research Quarterly. 2002; 37:70–92.

Ramirez G, Chen X, Geva E, Kiefer H. Morphological awareness in Spanish-speaking English language learners: Within and cross-language effects on word reading. Reading and Writing. 2010; 23:337–358.

Singson M, Mahoney D, Mann V. The relation between reading ability and morphological skills: Evidence from derivational suffixes. Reading and Writing. 2000; 12:219–252.

Thompkins AC, Binder KS. A comparison of the factors affecting reading performance of functionally illiterate adults and children matched by reading level. Reading Research Quarterly. 2003; 38:236–255.

Tighe EL, Binder KS. An investigation of morphological awareness and processing in adults with low literacy. Manuscript accepted for publication in. Applied Psycholinguistics. (in press).

Ullman, M. A cognitive neuroscience perspective on second language acquisition: The declarative/procedural model. In: Sanz, C., editor. Mind and context in adult second language acquisition: Methods, theory and practice. Washington, DC: Georgetown University Press; 2005. p. 141-178.

Umbel VM, Pearson BZ, Fernandez MC, Oller DK. Measuring bilingual children's receptive vocabularies. Child Development. 1992; 63:1012–1020. [PubMed: 1505238]

Verhallen M, Schoonen R. Lexical knowledge of monolingual and bilingual children. Applied Linguistics. 1993; 14:344–363.

Verhoeven L, Van Leeuwe J. Prediction of the development of reading comprehension: A longitudinal study. Applied Cognitive Psychology. 2008; 22:407–423.

Woodcock, RW.; McGrew, KS.; Mather, N. Woodcock-Johnson III Test of Achievement. Itasca, IL: Riverside Publishing; 2001.

Worthy J, Viise NM. Morphological, phonological, orthographic differences between the spelling of normally achieving children and basic literacy adults. Reading and Writing. 1996; 8(2):139–159.

Table 1

Correlation Coefficients between Morphology, Phonology, Passage Comprehension and Receptive Vocabulary for Native English Speakers (above the diagonal) and Native Spanish Speakers (below the diagonal)

Task	1	2	3	4	5	6
Production		.69**	.51**	.46**	.30**	.14
Derivation	.62**		.52**	.51**	.42**	.27*
Suffix Choice	.58**	.65**		.56**	.48**	.28**
Word Attack	.52**	.56**	.52**		.60**	.19
Passage Comp.	.66**	.78**	.72**	.53**		.34*
Vocabulary	.24	.44**	.35*	.17	.65**	

Note:

* $p < .05$,

** $p < .01$.

Morphological Awareness assessments: 1. Production, 2. Derivation, 3. Suffix Choice. Phoneme decoding efficiency: 4. Word Attack. Reading Skill assessments: 5. Passage Comprehension, Receptive Vocabulary: 6. Peabody Picture Vocabulary Test.

Table 2

Regression Analysis for Vocabulary Ability and Reading Comprehension

Tasks	*β*	*t*
Vocabulary		
Word Attack	−.35	−1.85
Production	.29	1.50
Derivation	.46	2.09*
Suffix Choice	−.11	−.58
Language Group	.16	2.08*
Word Attack X Group	.31	1.58
Production X Group	−.06	−.31
Derivation X Group	−.14	−.66
Suffix X Group	−.04	−.19
Reading Comprehension		
Word Attack	.04	.23
Production	.24	1.26
Derivation	.41	2.31*
Suffix Choice	.17	1.54
Language Group	.03	.35
Word Attack X Group	.09	.57
Production X Group	.05	.31
Derivation X Group	−.14	−.85
Suffix X Group	−.07	−.63

Note:

* $p < .05$