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ABSTRACT

The purpose of this study was to validate the construct of explicit phonemic awareness. Performance on a phoneme segmentation measure that included words that were easy and hard to segment was compared across groups of adults: speech-language pathologists, first grade teachers, and adults who are not educators. Speech-language pathologists outperformed the other groups on easy and hard words. First grade teachers and adults who are not educators did not differ on easy words, but adults who are not educators outperformed first grade teachers on hard words. Results suggest that training affects adults' explicit phonemic awareness. Professional development in this area is needed for educators.

INTRODUCTION

Research has demonstrated the importance of teacher content knowledge in improving student literacy outcomes (Ferguson, 1991). However, research to date has utilized broad measures of teacher knowledge of literacy rather than measures of specific areas within literacy (e.g., phonemic awareness).

Phonemic awareness, the ability to analyze speech sounds of words in spoken language (Mattingly, 1972), is an important precursor to word decoding skills (Adams, 1990). To scaffold instruction for children who are learning to understand the written code, educators need strong knowledge about how print represents the sound structure of words and how spoken words can be segmented into phonemes. There is abundant evidence that educators do not have this strong knowledge base (e.g., Cunningham, Perry, Stanovich, & Stanovich, 2004).

Observations of early literacy development reveal that children have increasingly ability to analyze speech sounds in words, evident in the misspellings of young children (Read, 1986; Werfel & Schuele, 2012). Logically, researchers may assume that phonemic awareness acquired in the early stages of literacy acquisition is retained across the lifetime. However, adult performance challenges this assumption. Educator performance on sound analysis tasks has been consistently poor (e.g., Moats, 1994; Spencer, Schuele, Guillot, & Lee, 2008). For example, educators are far more likely to report that BOX has three sounds rather than four sounds. To conclude that this inaccurate sound analysis reflects deficient phonemic awareness appears illogical. After all, these educators are proficient readers and writers.

We suggest that the analysis of sounds in words by literate adults is best conceptualized as "explicit phonemic awareness," or as Moats and Lyon (1996) explained "think(ing) beyond print while analyzing speech" (p. 83). When preliterate children and emergent readers analyze sounds in words, they do so without reference to established mental grapheme representations (MGR). In contrast, when adults analyze sounds in words, they are influenced by what they know about print – that is, MGRs for individual words and orthographic pattern knowledge (how sounds are represented in print; see Figure 1).

Spencer et al. (2008) found that educators were 82% accurate on identifying the number of sounds in words for which orthography closely matched phonemes (e.g., cat) but were only 54% accurate in identifying the number of sounds in words for which orthography did not closely match phonemes (e.g., fuse). Therefore, assessing adults' ability to segment "hard" words appears to be the best measure of explicit phonemic awareness as their responses reflect sound analysis not print analysis.

The purpose of this study was to validate the construct of explicit phonemic awareness.

THEORETICAL MODEL: EXPLICIT PHONEMIC AWARENESS

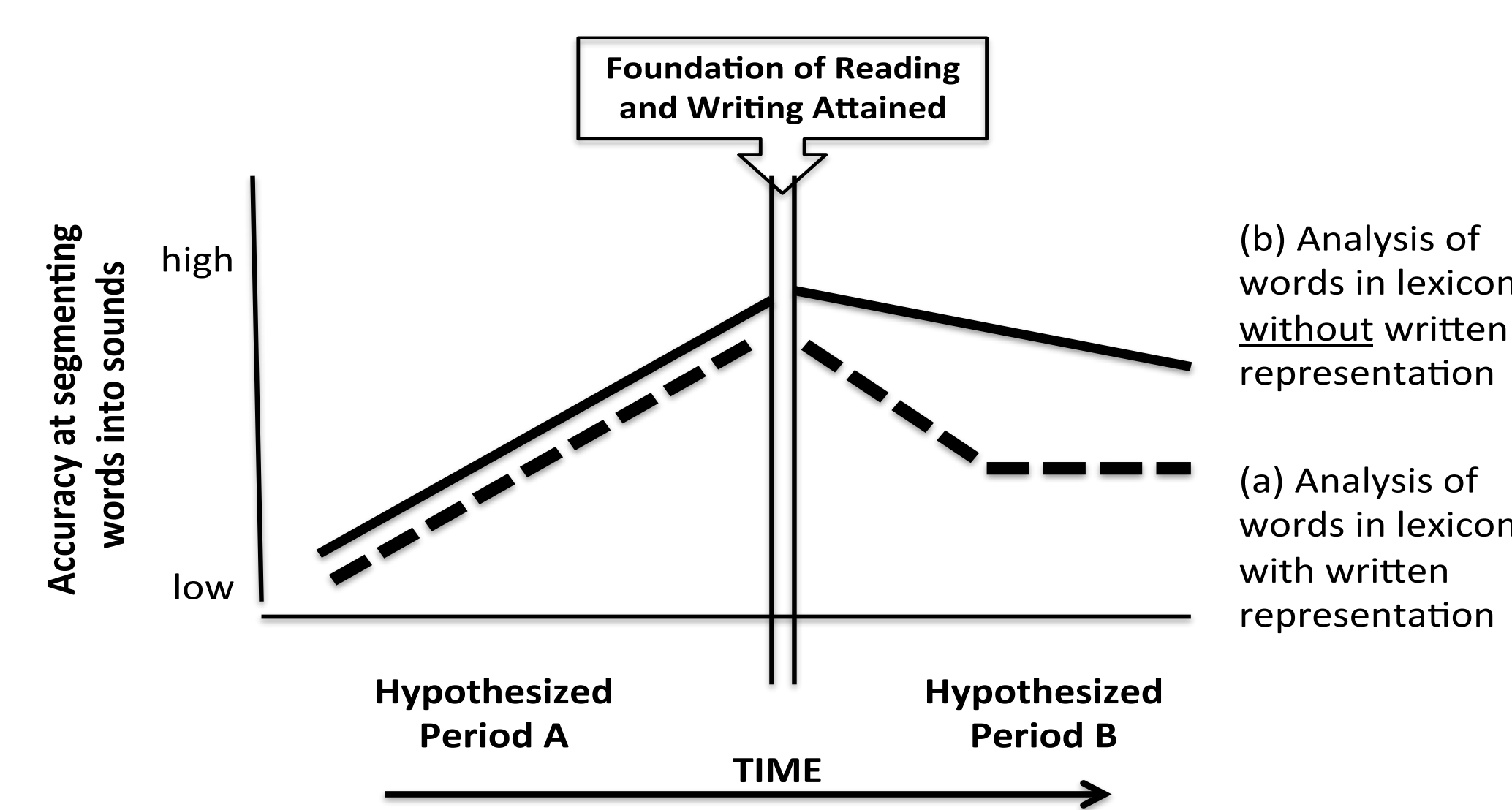


Figure 1. A theoretical model of phonemic awareness performance contingent on literacy ability. We have divided time into two periods (A and B) differentiated based on literacy proficiency. In Period A persons are learning to read and write whereas in Period B persons are proficient readers and writers. Period A clearly encompasses the preschool and early school years. The development of phonemic awareness in this period has been described extensively (e.g., Lonigan, Burgess, Anthony, & Barker, 1998). Period B certainly encompasses the adult years; however, when (age, level of literacy proficiency) and how (instantaneously, gradually) a person passes from Period A to Period B is open to question. We suggest that the analysis of the sound structure of words in Period B is best conceptualized as "explicit phonemic awareness." Further, we suggest that explicit phonemic awareness depends on the types of training an individual receives as an adult.

METHOD

PARTICIPANTS

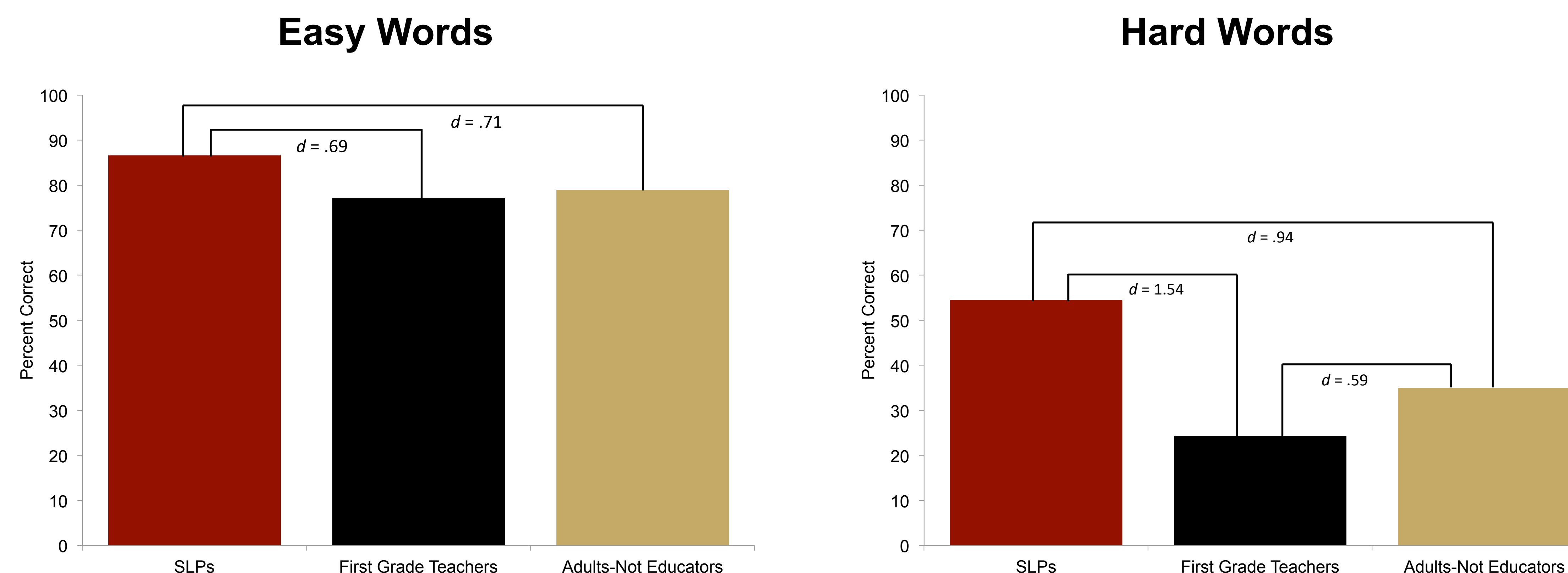
Participants were 158 speech-language pathologists (SLPs), 112 first grade teachers, and 36 adults who are not educators. Data from SLPs and teachers were gathered over a 5-year period at professional education workshops. Adults who are not educators were recruited via a social media website. We chose these three groups to represent the different training received as adults. SLPs are trained to explicitly analyze sounds in words. First grade teachers are trained to teach children how letters represent spoken words with a focus on orthography. Finally, adults who are not educators receive no special training to think about sounds or spellings of words.

PROCEDURES

Study data were collected using one of two methods: (a) SLPs and general educators completed a paper/pencil measure of phoneme segmentation and (b) adults who are not educators completed the same measure using an online assessment distributed using REDCap electronic data capture tools hosted at Vanderbilt University (Harris et al., 2009).

The phoneme segmentation measure consisted of 21 words that varied in length from two to five phonemes (11 easy, 10 hard). Easy words had close mappings of speech and print (e.g., cat), whereas hard words had less transparent mappings (e.g., fuse). Participants were asked to report the number of sounds in each word.

RESULTS



Results (Wilks' Lambda) revealed a significant multivariate group effect [$F(4, 604) = 35.49, p = .000$]. Subsequent examination of univariate F 's indicated main effects of group for both easy words [$F(2, 303) = 19.40, p = .000$] and hard words [$F(2, 303) = 77.18, p = .000$]. Follow-up Tukey tests indicated that first grade teachers ($M = 77.08, SD = 17.7$) and adults who are not educators ($M = 78.94, SD = 13.1$) did not differ on easy words and both scored lower than speech-language pathologists ($M = 86.60, SD = 7.9$). For hard words, speech-language pathologists ($M = 54.49, SD = 21.9$) scored higher than adults who are not educators ($M = 35.00, SD = 19.3$) and first grade teachers ($M = 24.38, SD = 16.8$), and adults who are not educators scored higher than first grade teachers.

DISCUSSION

The findings support our model of explicit phonemic awareness. As predicted in our theoretical model, adults differed in their explicit phonemic awareness performance based on types of training they have received as adults. The influence of type of training followed predictions.

SLPs, who are explicitly trained to analyze **sounds** (and not letters), performed higher than first grade teachers and adults who are not educators on segmenting both easy and hard words. First grade teachers, who are explicitly trained to teach **letters** and letter sounds, were less accurate at segmenting hard words than both SLPs and adults who are not educators. Adults who are not educators, and thus not trained to pay special attention to either sounds or letters, were not as influenced by print as first grade teachers but neither were they as accurate at analyzing sounds as SLPs.

The tendency of educators to be influenced by orthography when asked to analyze sounds may be the result of educator training programs that focus heavily on phonics. Moats and Lyon (1996) argued that educators must be able to "think beyond print" (p. 83) to provide effective instruction. Perhaps teacher training programs should re-evaluate the types of skills targeted during pre-professional training. Additionally, the poor performance of first grade teachers on analyzing sounds in hard words suggests that professional development in this area is needed.

SLPs outperformed first grade teachers and adults who are not educators on hard words; however, as a group they correctly analyzed sounds in only about half of the words. SLPs, like first grade teachers, likely would benefit from professional development in explicit phonemic awareness.

FUTURE DIRECTIONS

One future direction in validating this theoretical model is to compare the incorrect responses on hard words to expected responses if in fact adults are relying on orthography to analyze sounds in words. We hypothesize that incorrect responses are overwhelmingly tied to orthography of words.

Another future direction in this line of research is to evaluate the effects of educators' explicit phonemic awareness on student phonemic awareness and literacy outcomes. Given the difficulties that educators have in analyzing the sound structure of words, professional development is likely needed to increase educators' abilities to analyze phonological representations words without interference from stored MGRs of words.

ACKNOWLEDGEMENTS

This study was supported by a Preparation of Leadership Personnel grant (H325D080075; PI: Schuele), US Department of Education. Study data were managed using REDCap electronic data capture tools hosted at Vanderbilt University (1 UL1 RR024975 from NCCRR/NIH). The content is solely the responsibility of the authors and does not necessarily represent the views of funding agencies.

Poster presented at the 2013 Convention of the American Speech-Language-Hearing Association, Chicago, IL

References available upon request: language@vanderbilt.edu
Poster available at: www.mc.vanderbilt.edu/languagelab

*This work was completed while Krystal Werfel was a doctoral student at Vanderbilt University.