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# Stability of Spoken Root Morpheme in the Mental Lexicon: A comparison between readers with dyslexia and typically developed readers

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# Abstract

The morphological organization within in the mental lexicon is one of the central topics in psycholinguistic investigation. The lexicon is organized according to morphological units called morphemes. These are the smallest units of meaning in a language, which in combination with each other form most of the words in Hebrew - such as a root or a word pattern. The spoken root morpheme is formed as an abstract and stable representation in the lexicon of typically developed readers. This representation is not affected by the phonological connections between the words. To date, it has not yet been examined whether the spoken root morpheme stands on its own as an abstract representation in a lexicon of readers with dyslexia, disconnected from phonology. This study focuses on the morphological organization of the spoken mental lexicon of readers with dyslexia, examining the stability of the spoken root morpheme in the lexicon. For this purpose, we have defined two sub-goals.

The first aim of the study is to examine the stability of the representation of root morpheme, in terms of the order of root consonants, in the mental lexicon of readers with dyslexia in the auditory modality. We ask whether readers with dyslexia are sensitive to the correct order of root consonants when recognizing a spoken word. Specifically, we examine whether the morphological representations of spoken words having the same root consonants but in a different order are represented in the mental lexicon separately. Sensitivity to the order of root consonants is a central morphological principle in the organization of words in the mental lexicon of speakers of Semitic languages, which is not apparent in languages with other typological characteristics, such as Indo-European languages. (Frost, 2012; Velan & Frost, 2007, 2009, 2011).

The second aim of the study is to explore the stability root morpheme representation in terms of the phonological structure of the word, in the mental lexicon of readers with dyslexia in the auditory modality. That is, can readers with dyslexia decompose morphologically complex words with a defective root, in which the phonological

pattern of the word is violated. Such inconsistency in the appearance of root consonants makes it difficult to establish the stability of defective root morpheme, as a linking representation between words from the same morphological family. Findings from previous studies examining implicit morphological knowledge have shown that readers with dyslexia only decompose words with regular roots. However, the morphological decomposition of spoken words with a defective root has not yet been studied, and this work is the first to examine this process among readers with dyslexia.

In order to achieve the study goals, we used the short-term priming paradigm in auditory modality. 66 Hebrew-speaking university students (24 men and 42 women), ranging in age from 34 to 21 completed two tasks - a task for each study purpose. The students belonged to two research groups: 28 students were diagnosed with dyslexia and 38 students had normal development. The dependent variables were accuracy and reaction time.

Findings from the first task show that readers with dyslexia are sensitive to the correct order of root consonants in a spoken word similarly to typically developed readers. Results from the second task reveal that readers with dyslexia are able to decompose words with a defective root similar to typically developed readers. Overall, findings from this study support the hypothesis that words are morphologically organized in the mental lexicon of readers with dyslexia. Despite the phonological similarity between words that share the same root consonants but in different order, these words are organized according to the abstract representation of the root morpheme having the correct consonant order. In addition, there appear to be morphological connections between the two representations of defective root, the three-consonant root and the

two-consonant root, even though the lack of the root consonant significant damaged the phonological structure of the word.

Findings from this study indicate that the morphological organization of spoken words in the mental lexicon of readers with dyslexia is independent of the phonological similarity between the morphemes or the phonological regularity in their appearance. That is, the mental representation of the root morpheme constitutes a stable and abstract organizing principle in the lexicon, similar to that of typically developed readers.

This study makes an important theoretical and practical contribution. Theoretically, the study promotes a deeper understanding of the morphological organization of spoken words in the mental lexicon of readers with dyslexia, as having an independent status unaffected by overlapping morphemic phonological characteristics. Pedagogically, the findings of the study may assist in developing specific and accurate diagnostic tools to assess the morphological abilities of readers with dyslexia, while distinguishing between spoken and written words. The findings can also aid in the development of intervention programs which rely on the spoken mental lexicon to advance the morphological knowledge of readers with dyslexia.