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The Nature and Treatment of Phonological Text Agraphia

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Introduction

Phonological alexia and agraphia are acquired syndromes characterized by marked difficulty reading and spelling nonwords relative to real words. The underlying problem is impairment to central phonological processing skills, evident on letter-to-sound/sound-to-letter transcoding tasks, as well as those requiring more demanding phonemic awareness and manipulation skills. The deficit is typically associated with left perisylvian damage, with relative preservation of lexical-semantic processing abilities that support single-word reading and spelling. In many instances, reading at the text level is marked by errors reading words/segments with low semantic weight, including functors and inflectional affixes: a profile referred to as phonological text alexia (Friedman, 1996). Little attention has been paid to the nature of text-level *writing* skills in individuals with phonological agraphia, other than to acknowledge that writing is often more impaired than reading. Here we present three individuals with phonological alexia/agraphia who demonstrated marked impairment of text-level writing prior to treatment to improve phonological skills.

Method

Three individuals with anomic aphasia due to left middle cerebral artery stroke participated in this study. They varied with regard to age (37 - 78 years) and time post stroke (1 - 10 years). Comprehensive language assessment revealed that they all had relatively preserved lexical-semantic knowledge, with marked phonological impairment. Their single-word reading and spelling profiles were consistent with phonological alexia and phonological agraphia (reading words ~90% vs. nonwords ~40%; spelling words ~80% vs. nonwords ~30%). Spoken and written narratives were analyzed using a modified quantitative production analysis (Berndt et al., 2000, Wilson et al., 2010) to examine grammatical structure, and discourse analysis procedures to examine content (Nicholas & Brookshire, 1993). Written sentences were marred by omission or mis-selection of functors and inflectional markers. Assessment was followed by a phonological treatment protocol implemented with each participant in a manner consistent with Beeson et al., (2010).

Results

The participants successfully completed the phonological treatment sequence implemented over 12-15 weeks, and each demonstrated marked improvement of sound-letter and letter-sound conversion skills, as well as improved phonological manipulation skills. Of particular interest was the significant increase in the proportion of grammatically correct, well-formed written sentences produced on standard written picture descriptions. As shown in the figure, grammatical complexity of written narratives improved to the extent that it was on par with spoken narratives.

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Discussion

The purpose of this study was to characterize text-level writing in individuals with phonological agrafia, and to investigate the effects of a phonological treatment sequence on written production. At the outset, participants demonstrated relatively preserved single-word spelling abilities, but marked impairment in the ability to write well-formed sentences, a profile that we refer to as phonological text agrafia. Of considerable interest was the finding that significant improvement in phonological skills was accompanied by enhanced ability to write grammatically well-formed sentences. Thus, it appeared that the boost in sublexical phonological skills provided support to retrieve and produce the orthography for semantically weak words (e.g., functors) and inflectional markers. These findings offer valuable new insight regarding the nature and treatment of written language impairment following left perisylvian damage.

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