

Nonword repetition skills in young children who do and do not stutter

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Abstract

The purpose of this study was to assess the nonword repetition skills of 24 children who do (CWS; $n = 12$) and do not stutter (CWNS; $n = 12$) between the ages of 3;0 and 5;2. Findings revealed that CWS produced significantly fewer correct two- and three-syllable nonword repetitions and made significantly more phoneme errors on three-syllable nonwords relative to CWNS. In addition, there was a significant relationship between performance on a test of expressive phonology and nonword repetition for CWS, but not CWNS. Findings further revealed no significant fluctuation in fluency as nonwords increased in length. Taken together, findings lend support to previous work, suggesting that nonword repetition skills differ for CWS compared with CWNS, and that these findings cannot be attributed to (a) weak language performance on the part of CWS, or (b) the occurrence of stuttering in the course of nonword production.

Educational objectives: After reading this article, the learner will be able to: (a) describe one common means of assessing phonological working memory in children; (b) summarize the performance differences of children who stutter compared to peers on a nonword repetition task; (c) compare the results of the present study with previous work in this area.

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1. Nonword repetition in young children who do and do not stutter

As a group, children who stutter (CWS) tend to differ from their peers in a range of areas, including language (e.g., see Hall, 2004; Weiss, 2004, for recent reviews). Perhaps because differ-

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ences in the language performance of CWS tend to be subclinical (i.e., not constituting a language disorder), the literature has not focused on the many language-related areas that have been associated with language performance in other populations. In particular, one language-related area that has received considerable attention is the role of phonological working memory in the language performance of children with specific language impairment (SLI; e.g., Baddeley & Wilson, 1993; Botting & Conti-Ramsden, 2001; Conti-Ramsden, 2003; Ellis Weismer et al., 2000; Gathercole & Baddeley, 1990; Gray, 2003; Marton & Schwartz, 2003; Montgomery, 1995a; Munson, Kurtz, & Windsor, 2005). As a group, these studies generally reveal that nonword repetition represents an area of weakness for children with SLI.

For example, Montgomery (1995b) examined working memory and sentence comprehension in school-age children with SLI and language-matched peers with typically developing language using nonword repetition and sentence comprehension tasks. On the nonword repetition task, the typically developing children performed significantly better than the SLI children on three- and four-syllable nonwords. On the sentence comprehension task, the two groups differed only in comprehension of redundant sentences, with the SLI group performing more poorly on these. Findings further revealed a significant, positive relationship between children's nonword repetition and sentence comprehension scores. These findings were interpreted as evidence that limited phonological working memory capacity in children with SLI contributed to their poor auditory comprehension of sentences.

More recently, Sahlen, Reuterskiold-Wagner, Nettelbladt, and Radeborg (1999) studied nonword repetition in 27 young children with language impairments, focusing on the relationship between nonword repetition and grammatical skills, and nonword repetition and phonological skills. They found significant relationships between nonword repetition performance and children's phonological stage and expressive grammar. However, when a subgroup of participants with the same phonological level was divided into two groups according to grammatical skills, the two groups did not differ in nonword repetition performance. This suggests that phonological skills, more so than expressive syntax, are related to nonword repetition performance. Munson et al. (2005) examined nonword repetition with items varying in phonotactic probability. Children with SLI were less accurate in nonword repetition than age-matched peers, with phonotactic probability impacting the SLI group's performance more than it impacted the performance of peers. These and other recent studies have focused not only on phonological working memory skills in children with language difficulties, but also on what nonword repetition, as a construct, measures in these children.

Baddeley's model (Baddeley, 1986; Gathercole & Baddeley, 1993) is widely cited as the basis for research in phonological working memory (cf. Cowan, 1996; Just & Carpenter, 1992). The model accounts for ways in which information is held in memory until it is needed for recall. The phonological loop, one of three components of the model, processes phonological information. It consists of a storage component and a rehearsal mechanism. Phonological information can be held in storage for only a short period of time (seconds) unless the information is rehearsed. By rehearsing, the information can be "refreshed" within the storage component, enabling it to remain within memory for a longer period of time (see Baddeley, 2003, for a more detailed summary of the model).

1.1. Nonword repetition as a measure of phonological working memory

Nonword repetition tasks have been widely used to estimate phonological working memory skills in children (e.g., Dollaghan, Biber, & Campbell, 1993, 1995; Dollaghan & Campbell, 1998;

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