Nonword Repetition Errors in Children with Specific Language Impairment

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Abstract

Poor performance on nonword repetition tasks by children with Specific Language Impairment (SLI), to date, has been interpreted as deficits in phonological working memory. One question; however, is the extent to which errors in the repetition of nonwords by children with SLI is instead a reflection of poor fine motor coordination. Preliminary analyses examine the type of production errors of 77 children with SLI (ages 7 – 15) compared to 140 children with typically developing language (ages 5 – 15) on a Nonword Repetition Task (Dollaghan & Campbell, 1998). Results reveal statistically significant differences in percentage of consonants, percentage of vowels, and percentage of phonemes correct when comparing children with SLI to typically developing age-matched and younger children. In addition, phoneme analysis reveals that children with SLI are inconsistently producing developmentally appropriate phonemes (consonants and vowels) at the beginning, middle, and end of multisyllabic nonwords. Discussion will focus on findings in relation to current trends in the use of nonword repetition tasks to classify children with SLI.

Background

Poor performance on nonword repetition tasks by children with Specific Language Impairment (SLI) is viewed as deficits in phonological working memory. It has been argued however, that motor control may be part of the profile of impairments in SLI.

A critical question then, is whether errors in the repetition of nonwords by children with SLI are a reflection of poor fine motor coordination and/or reduced phonological working memory.

Purpose

The specific aim of this study is to examine in detail, at the phonetic and acoustic level, error patterns on the Nonword Repetition Task (NRT; Dollaghan & Campbell, 1998) of children with SLI to determine if error patterns reflect limited phonological memory and/or poor fine motor control.

Method

NRT tasks from 77 children with SLI (65 females and 75 males, ages 7 – 15) and 140 children with typically developing language (NL; 36 females and 41 males, ages 5 – 15) were analyzed. The following age groups were used in the current study:

Group	Age (in years)
NL1 and SLI1	5;0 – 6;0
NL2 and SLI2	7;0 – 9;0
NL3 and SLI3	10;0 – 12;0
NL4 and SLI4	13;0 – 15;0

The NRT was presented under headphones to children individually as part of a comprehensive protocol. Children's responses were recorded via digital recorder and stored on a G4 Mac for later transcription and analysis.

The same scoring procedures used by Dollaghan and Campbell (1998) were employed in this study. All audiotaped responses were independently transcribed by trained judges until 100% agreement was reached for each consonant, vowel, and phoneme for the 1-, 2-, 3-, and 4-syllable nonwords.

***Question 1:* Does the production of 1-, 2-, 3-, and 4-syllable nonwords on the NRT differ in children with SLI compared to NL age-matched and younger peers?**

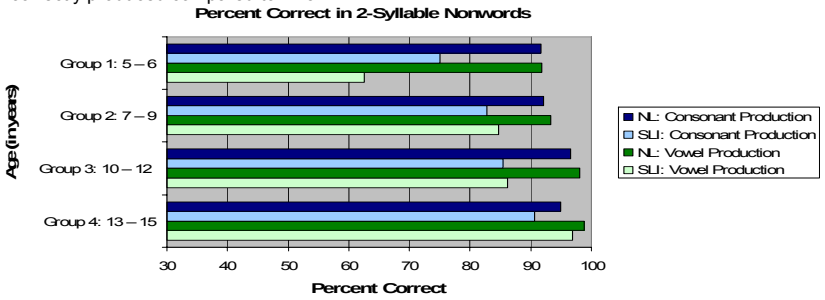
Post-hoc one-way ANOVA analysis (group × percent consonants correct, percent vowels correct, and percent phonemes correct at each syllable length).

1-Syllable Nonwords

- No statistically significant difference ($p \leq 0.05$) on 1-syllable nonword performance between children with SLI and NL age-matched children.

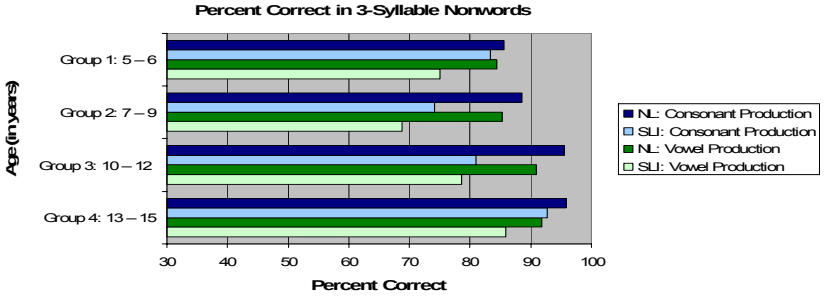
2-Syllable Nonwords

- Statistically significant differences between SLI2 and NL2 ($p < 0.05$) and SLI3 and NL3 ($p < 0.01$) on percentage of phonemes correct.
- SLI3 were significantly different on the percentage of consonants ($p < 0.05$) and vowels ($p < 0.01$) correctly produced compared to NL3.



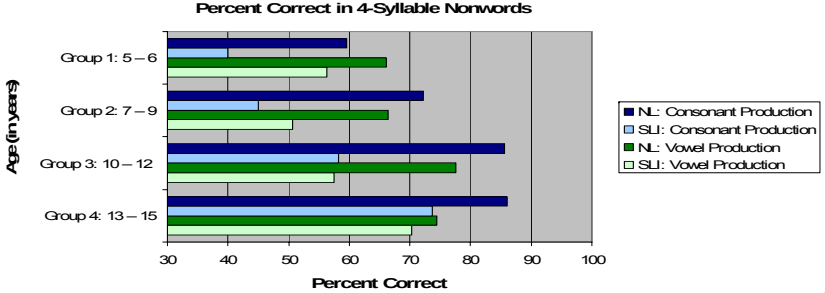
3-Syllable Nonwords

- Statistically significant differences between SLI2 and NL2 on percentage of consonants ($p < 0.001$), vowels ($p < 0.01$), and phonemes correct ($p < 0.001$).
- Statistically significant differences between SLI3 and NL3 on percentage of consonants ($p < 0.05$), vowels ($p < 0.01$), and phonemes correct ($p < 0.01$).
- SLI2 were significantly different on the percentage of consonants ($p < 0.01$) and phonemes ($p < 0.01$) correctly produced compared to NL1.



4-Syllable Nonwords

- Statistically significant differences between SLI2 and NL2 on percentage of consonants ($p < 0.001$), vowels (p = 0.001), and phonemes correct ($p < 0.001$).
- Statistically significant differences between SLI3 and NL3 on percentage of consonants ($p < 0.001$), vowels ($p < 0.001$), and phonemes correct ($p < 0.001$).
- The percentage of vowels and phonemes correct in SLI2 significantly differed from the percent correct of NL1 ($p < 0.05$).
- The percentage of consonants and phonemes correct in SLI3 significantly differed from the percent correct of NL2 ($p < 0.05$).



***Question 2:* What are the error patterns of the children with SLI compared to NL age-matched children on the NRT?**

- Phoneme-by-phoneme analysis reveals that children with SLI are inconsistently producing developmentally appropriate phonemes (both consonants and vowels) at the beginning, middle, and end of multisyllabic nonwords (unlike NL matched children).
- SLI2 inconsistently produced /g/ final in 4-syllable nonwords
  - Correctly in 'daevounoichig', but incorrectly in 'taevachinaig'
- SLI3 inconsistently produced 'oi' medial in 3-syllable nonwords
  - Correctly in 'teivoichaig', but incorrectly in 'chinoitaub'
- SLI3 inconsistently produced /b/ final in 3-syllable nonwords
  - Correctly in 'naichouveib', but incorrectly in 'chinoitaub'
- SLI 4 inconsistently produced /b/ final in 3-syllable nonwords
  - Correctly in 'doitauvaeb', but incorrectly in 'chinoitaub'
- SLI4 inconsistently produced 'ae' (1st CV syllable) in 4-syllable nonwords
  - Correctly in 'daevounoichig', but incorrectly in 'taevachinaig'

***Question 3:* Do these error patterns reflect limited phonological memory, poor fine motor control, or both?**

- Findings from the current study indicate that, children with SLI ages 7;0 – 12;0 are significantly different than their age matched and in some cases, younger peers on production of 2-, 3-, and 4-syllable nonwords on the NRT.
- As shown in the three figures, percent consonants and vowels correct on 2-, 3-, and 4-syllable nonwords overlap among SLI4 and NL4 children. The overlap in SLI and NL data could be, in part, due to the small number of children in each group (8 SLI and 10 NL children).
- The results of this analysis indicate variable sound errors of developmentally appropriate consonants and vowels. According to the *Childhood Apraxia of Speech: Technical Report*, one meaning of *variability* is "differential use of a certain phoneme or sound class in different word targets even in the same word position" (ASHA, 2007, pg. 7). Variable and multiple sound errors may in part reflect poor motor control.

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References:

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