# Errors in Nonwords vs. Real Words after Left-Hemisphere Stroke

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Disclosures: I have no financial or intellectual conflicts of interest.

## Background

The clinical implications of prompting people with aphasia and apraxia of speech to repeat nonwords has not yet been studied in much detail. Maas and colleagues (2002) suggested that the use of nonwords may limit treatment outcomes because they do not allow for the incorporation of lexical and semantic levels of processing.

Saito and colleagues (2003) studied the effect of wordlikeness on nonword repetition by incorporating sets of both phonotactically common and phonotactically uncommon nonwords. They found that high-wordlike nonwords evoked more correct productions than low-wordlike nonwords. They concluded that this was due to stronger phonological activation when repeating nonwords that resemble real words.

Independently of whether a repeated syllable sequence is a word or nonword, complexity of target phonemes is also likely to affect production accuracy.

## Objectives

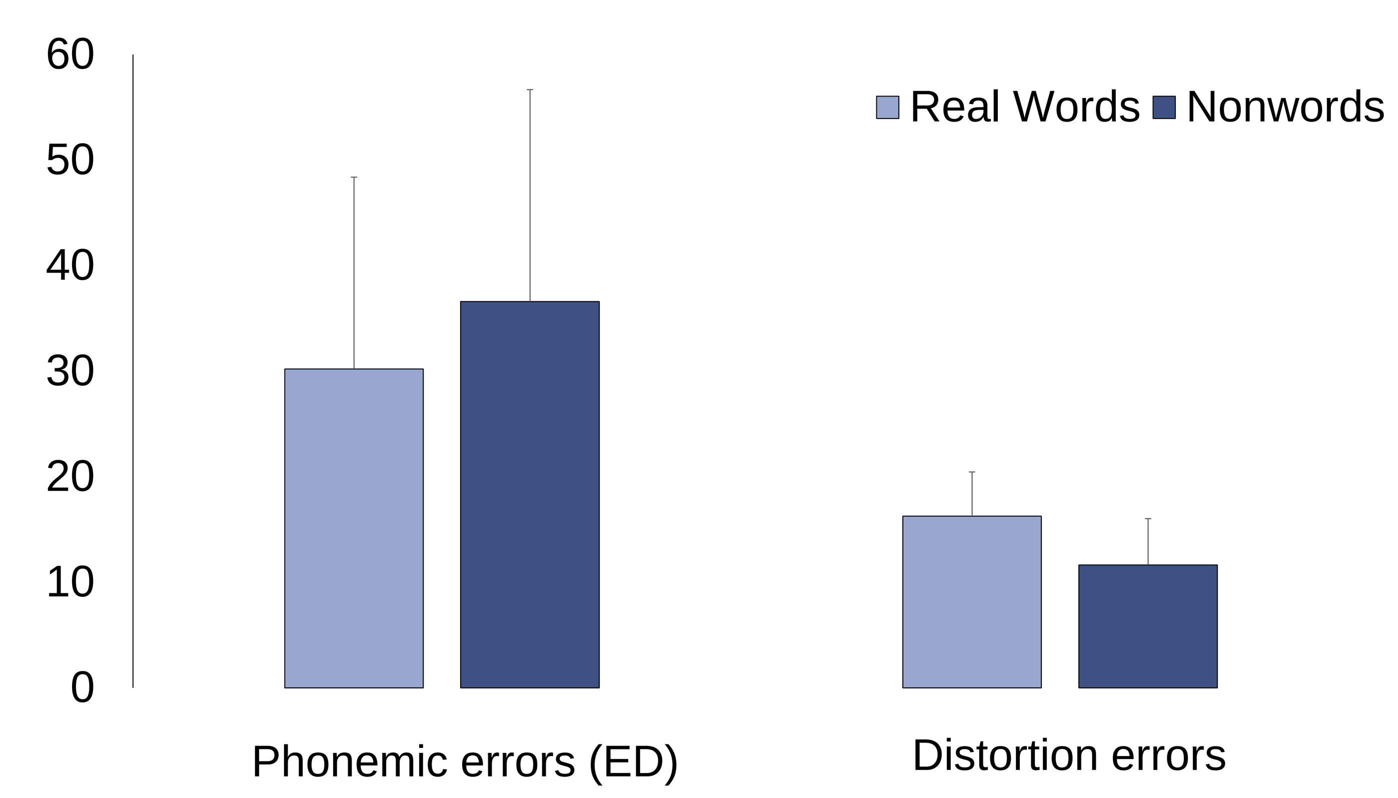
1. To determine whether real words or nonwords evoke more frequent errors among speakers who have sustained a left hemisphere stroke.
2. To analyze the potentially confounding factors of word complexity.

## Methods

Audio-recorded motor speech evaluations from 73 speakers were narrowly transcribed and analyzed. Each speaker was tasked with single repetition of a subset of words and a subset of nonwords. Phonemic errors and word complexity were calculated using edit distance and complexity algorithms in Microsoft Excel. Phonetic errors were coded in one of eleven distortion categories.

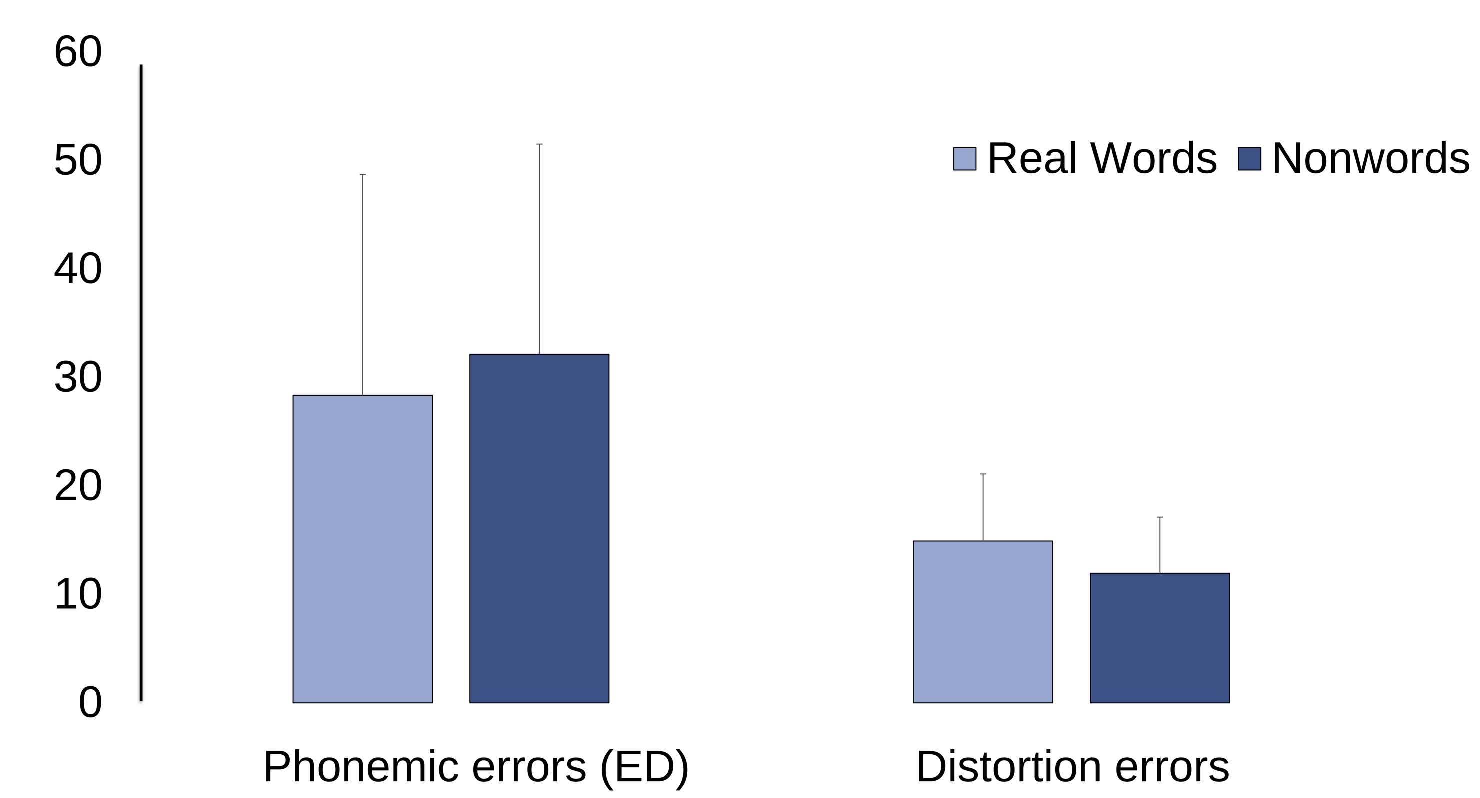
## Results

**Error Percentages: All Targets**




There were more phonemic errors produced among the nonwords, and more distortion errors produced among the real words. The differences between subsets were significant ($p = .001$ for phonemic errors and $p < .0001$ for phonetic errors). However, the nonword subset had a higher word complexity average than the real word subset.

**Error Percentages: Targets with Similar Complexity**




When samples of the words and nonwords were controlled for complexity, real words had significantly more distortion errors ($p = .0001$) but the word type difference was no longer significant for phonemic errors ($p = .15$).

## THE WORD COMPLEXITY MEASURE: (Stoel-Gammon, 2010)

**WORD PATTERNS**

1. Productions with more than 2 syllables: 1 point
2. Productions with stress on any syllable but the first: 1 point

**SYLLABLE STRUCTURES**

1. Productions with a word-final consonant: 1 point
2. Productions with a consonant cluster: 1 point per cluster

**SOUND CLASSES**

1. Productions with a velar consonant:1 point for each velar
2. Productions with liquids/syllabic liquids/rhotic vowels: 1 point for each liquid/syllabic liquid/rhotic vowel
3. Productions with a fricative or affricate: 1 point for each
4. Productions with voiced fricatives or affricates: 1 point for each (in addition to the point earned in #3)

## Discussion

The greater rate of phonemic errors in nonwords aligns with what was hypothesized. The greater rate of distortion errors in real words was unexpected. The difference likely reflects the more familiar phonological sequences that are present in real words.

The elimination of the phonemic error effect when the subsets were matched for complexity implies that word complexity contributed to the initial significant difference in phonemic error frequency for words and nonwords.

Future studies should include larger subsets of nonwords and real words that are matched for complexity and a greater variety of elicitation tasks.

## Key References

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