Phenomic Errors and Phonetic Distortions after Left Hemisphere Stroke

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PURPOSE

The purpose of this study was to compare the frequency of phonetic distortions and phonemic errors in speech samples collected from 26 people, 16 of whom were left hemisphere stroke survivors and 10 of whom did not have brain injury. This study also aimed to find the correlation between phonetic and phonemic errors among the speakers who had suffered a stroke.

BACKGROUND

Left hemisphere stroke often results in aphasia, which can co-occur with both apraxia of speech (AOS) and phonemic paraphasia (APP). AOS and APP have similar presentations, so it is important to increase understanding of the clinical differentiation between the disorders. AOS is a motor speech disorder characterized by a slow speaking rate and the presence of distortions and distorted substitutions, while APP is characterized by phonemic errors such as the deletion, addition, and/or substitution of phonemes. Thus, phonetic distortions are linked theoretically only to AOS and one of two primary criteria for differential diagnosis between AOS and APP when studying speech (Haley et al., 2012).

PARTICIPANTS

Stroke group:

- 6 females, 10 males
- mean age: 58 years
- 6 with borderline fluent aphasia, 4 with conduction aphasia, 4 with Broca's aphasia, 2 with anomic aphasia

Control group:

- 8 females, 2 males
- mean age: 63 years

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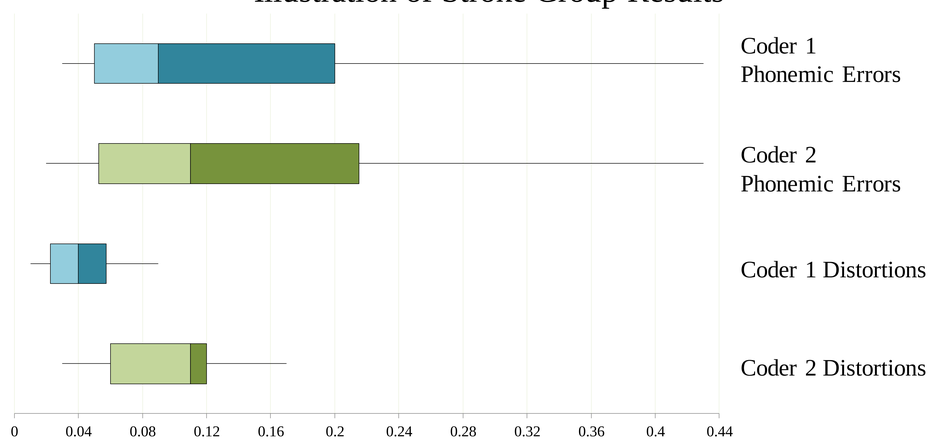
RESULTS

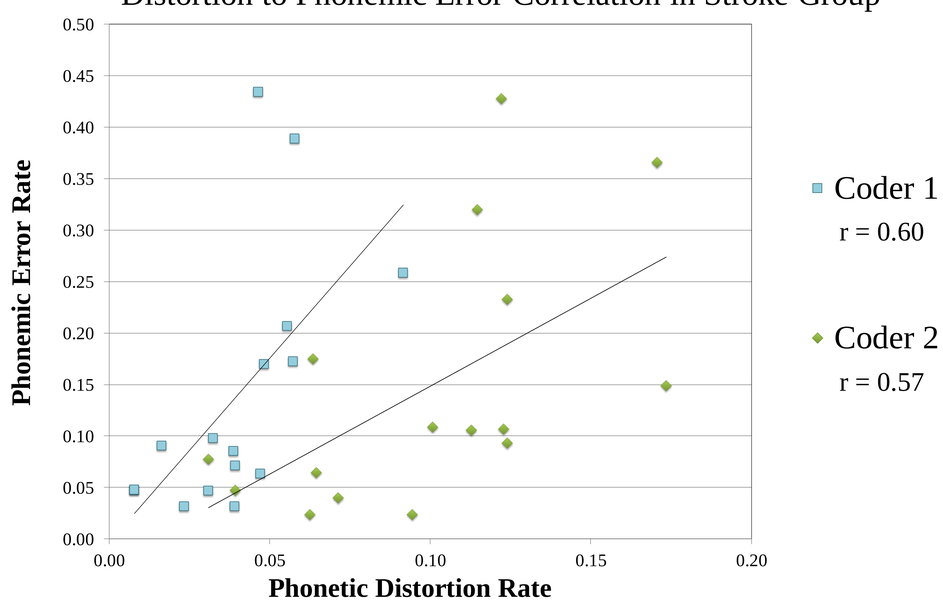
Frequency of Phonemic Errors and Phonetic Distortions

Coder 1	Stroke Group Averages	Control Group Averages
% of segments with Phonetic distortions	4% (range: 1% - 9%)	1% (range: 0% - 5%)
% of segments with Phonemic errors	14% (range: 3% - 43%)	1% (range: 0% - 2%)
Coder 2	**Stroke Group Average**	**Control Group Averages**
% of segments with Phonetic distortions	10% (range: 3% - 17%)	3% (range: 0% - 9%)
% of segments with Phonemic errors	15% (range: 2% - 43%)	2% (range: 0% - 5%)

Illustration of Stroke Group Results



Distortion to Phonemic Error Correlation in Stroke Group



METHODS

After completing an introductory phonetics course, the authors were further trained in narrow phonetic transcription. Transcription was completed using Klattese, a computer readable variation of phonetic transcription, and the computer interface Praat. A numeric code was used to identify 12 distortion types. A new distortion type was introduced each week, allowing time for transcribers to properly train their ears to hear each distortion. Practice samples from various speakers with aphasia were first given. Discussion of the practice samples was allowed to establish reliability in the authors' perception of sub-phonemic variation. Once an appropriate level of confidence was established, the authors were assigned speech samples from 26 speakers, some of whom had suffered a left hemisphere stroke. These were transcribed independently without collaboration. Coders were unaware that some speakers did not have aphasia.

CONCLUSIONS

- For the stroke group, there was a positive, moderately strong correlation between transcribers for the frequency of phonetic distortion errors and phonemic errors.
- Distortion frequency was significantly higher for the stroke group than the control group.
- Coder 2 coded more distortions than Coder 1. One reason may be a lack of clear criteria for how to code dialectical differences in vowels.

REFERENCES

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