Word Level Errors Across Aphasia Types: A Discourse Analysis

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Introduction

Production of word level errors is a characteristic of all types of aphasia. Currently, no large systematic studies of the frequency of different word level errors across aphasia types have been completed. The current study evaluated the frequency of phonemic, semantic, and neologistic errors produced by persons of different types of aphasia. Phonemic errors occur when a sound within a word is substituted, omitted, or added (e.g., das → gas, nana → banana, breakforast → breakfast). Semantic errors are real words related or unrelated to the target (e.g., knife → fork, he → she; "He fares me" → "He scared me"). Finally, neologistic errors are non-words for which the target is known or unknown (e.g., "She burnetted" instead of "She made a joke").

Previous research documents certain error types as being a primary characteristic of certain types of aphasia. Ardila and Rosselli (1993) conducted a frequency analysis of language deviations in aphasia with 30 subjects across five aphasia types. The subjects completed picture description, repetition, and naming tasks. Phonemic errors were associated with Broca's, Conduction, and Wernicke's aphasia. Semantic paraphasias appeared in Anomic aphasia and to a lesser degree in Wernicke's aphasia. Finally, neologistic errors were associated with Wernicke's aphasia. Williams and Canter (1982) examined errors in confrontation naming and discourse tasks (40 subjects across four aphasia types). The results showed that delayed responses, semantic paraphasias, and grammatical errors were associated with Broca's aphasia. In addition, Wernicke's aphasia was associated with extended circumlocutions and neologisms, whereas perseverations and phonemic attempts were found in Conduction aphasia.

Studies with larger sample sizes and subjects with various aphasia types are needed to better understand the patterns of error types across different types of aphasia.

Research Questions and Hypothesis

Research Question:
1) Will persons with different aphasia types display distinct and clinically significant patterns of word level errors?

Hypotheses:
1) Subjects with Wernicke's aphasia will produce more neologistic paraphasias than subjects with other types of aphasia.
2) Subjects with Anomic aphasia will produce fewer phonemic paraphasias than subjects with other types of aphasia.
3) Subjects with Conduction aphasia will produce more phonemic paraphasias than subjects with other types of aphasia.

Subjects

Participants (n = 77; 44 males and 33 females) were selected from the AphasiaBank web-based database (MacWhinney et al., 2011) containing test results from 290 unique persons with aphasia (PWA) when the database was accessed on July 18, 2013.

Aphasia types (based on WAB-R scores) included: Anomic (n=27), Broca's (n=22), Conduction (n=19), and Wernicke's (n=9).

Their mean age was 62.9 years (SD = 10.6), and their mean number of years of education was 15.3 (SD = 2.68). Subjects were primarily Caucasian (n = 69) and right-handed (n = 72). Mean time post-onset of stroke was 6 years and 3 months (SD = 5 years, 5 months).

Inclusion criteria were:
- diagnosis of aphasia
- adequate vision and hearing
- English-speaking monolingual
- left hemisphere brain damage due to a stroke
- aphasia duration of at least six months
- no history of other neurologic conditions

Exclusion criteria were:
- Transcription file had not been coded or double checked by an SLP (completed by AphasiaBank personnel)
- Due to the low number of participants with Global, Transcortical Motor, and Transcortical Sensory aphasia, participants in these groups were excluded (n = 7)

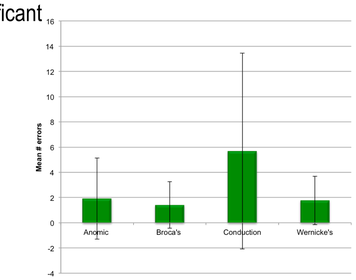
Procedure

Individuals who participate in the AphasiaBank project are administered a variety of standardized tests; they also participate in various discourse tasks, including telling the story of Cinderella. Cinderella story narratives were analyzed for word level errors. Word level error types included in the analyses were phonemic, semantic, and neologistic paraphasias. The CHAT system and CLAN program (MacWhinney et al., 2011) were used to extract and code transcripts as well as analyze number and type of errors within tasks. SPSS was used to perform statistical analyses (descriptive statistics, one-way ANOVAs, post-hoc comparisons).

Results: Neologistic Paraphasias

Anomic = 1.93 (SD = 3.22); Broca's = 1.41 (SD = 1.84); Conduction = 5.68 (SD = 7.76); Wernicke's = 1.78 (SD = 1.92)

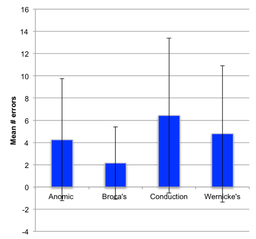
Results of one-way ANOVA: F = 3.84, p = .013
However, none of the post-hoc comparisons were significant



Results: Phonemic Paraphasias

Anomic = 4.26 (SD = 5.50); Broca's = 2.14 (SD = 3.26); Conduction = 6.42 (SD =6.96); Wernicke's = 4.78 (SD = 6.14)

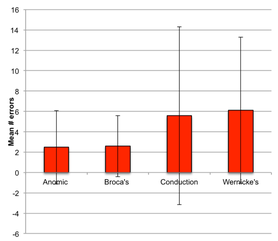
Results of one-way ANOVA: F = 2.121, p = .105



Results: Semantic Paraphasias

Anomic = 2.48 (SD = 3.61); Broca's = 2.59 (SD = 3.00); Conduction = 5.58 (SD = 8.73); Wernicke's = 6.11 (SD = 7.17)

Results of one-way ANOVA: F = 1.96, p = .127



Discussion

There was no significant difference among the four aphasia types in terms of number of phonemic or semantic paraphasias. There was a significant difference among the aphasia types in terms of number of neologistic paraphasias; however, none of the post-hoc comparisons were statistically significant.

The results of this study did not support the first hypothesis that subjects with Wernicke's aphasia will produce more neologistic paraphasias than subjects with other types of aphasia.

The second hypothesis that subjects with Anomic aphasia will produce fewer phonemic paraphasias than subjects with other types of aphasia was not supported.

Finally, the results of this study did not support the hypothesis that subjects with Conduction aphasia will produce more phonemic paraphasias than subjects with other types of aphasia.

The number of phonemic, semantic, and neologistic paraphasias differed considerably within a type of aphasia; the standard deviations often were larger than the mean number of errors. Possible sources of variability for number of errors within a type of aphasia may include severity of aphasia, severity of specific language behaviors, and total number of words spoken.

In addition to exploring reasons for within-group variability, future studies might explore word level errors across different types of aphasia in other discourse tasks (e.g., picture description, procedural discourse).

References

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Disclosure

We have no relevant financial or nonfinancial relationships within the products or services described, reviewed, evaluated or compared in this presentation.