May 10th, 11:00 AM - 1:00 PM

Comparing the Effects of Phonomotor Treatment and Semantic Feature Analysis on Discourse Production for Individuals with Aphasia

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Introduction

- Anomia is the cardinal deficit of aphasia, an acquired neurogenic language disorder that approximately 1 million people in the United States suffer from [8]. Currently, there is a lack of effective treatments that can improve discourse production.
- Phonomotor treatment is a rigorous, multi-modal program designed to increase language production of persons with aphasia (PWA) [6]. Specifically, it has been shown to:
  - increase accuracy of trained words [6],
  - improve overall aphasia severity scores,
  - generalize to both non-word and real word reading [2], and
  - generalize to improved discourse production in structured tasks [5].
- Limited research is currently available on how phonomotor treatment generalizes to less structured discourse tasks, more typical of daily life.
- Discourse abilities, analyzed by Correct Information Units (CIUs) [9], reflect a speaker's overall communication accuracy and efficiency.

Research Questions

- Do people with aphasia (PWA) exhibit improved discourse informativeness immediately post-treatment and 3 months post-treatment?
- Is either treatment associated with greater gains post- and 3 months post-treatment?

Method

Participants

- Criteria:
  - Inclusionary: chronic aphasia, anomia, and impaired phonology due to stroke with left hemisphere damage.
  - Exclusionary: severe AOS, major depressive/psychiatric illnesses, degenerative diseases, chronic illnesses, or severe/uncorrected vision/hearing impairments.
- Presence and severity of aphasia determined through criteria from the Comprehensive Aphasia Test (CAT).

Table 1. *Demographic and clinical characteristics*

	SFA	PM
Gender	5M:6F	5M:6F
Education, Years		
Mean (*SD*)	15.6 (2.9)	14.7 (2.1)
Age, Years		
Mean (*SD*)	63 (14.9)	62.7 (9.5)
Months Post-Onset		
Mean (*SD*)	39.7 (34.7)	46.5 (29.2)
CAT		
Mean (*SD*)	16.3 (4.3)	17.2 (2.9)
BNT		
Mean (*SD*)	28.8 (20.8)	20.4 (15.9)

Procedure

- Participants randomly assigned to either phonomotor (PM) or semantic feature analysis (SFA) [1] treatment groups.
- Language samples elicited at pre-, post-, and three-months post-treatment.
- All participants received 60 hours of treatment total over 6 weeks.

Treatment

- **First stage:** Isolated sound training
- **Second stage:** Sound combination training, progressing from simple combinations to increasingly complex sound combinations, single words.
- Both stages trained multi-modally through perception and production tasks.
  - Example tasks include: Mouth pictures, colored blocks, motor descriptions, verbal responses, and letters tasks.

Materials

- Samples were elicited using the story retell procedure [4].
- Six of twelve pre-recorded stories at each time point (A-B-A) were used.
- All stories were accompanied by six-plate black & white illustrations during the elicitation of the language sample.

CIU Scoring

- CIUs [9] scored at pre-, post-, and three-months post-treatment:
  - Defined as words which are "intelligible in context, accurate in relation to the picture(s) or topic, and relevant to and informative about the content of the picture(s) or topic" [9].
- Scoring completed by two students from PSU who had been trained on CIU protocol.
- Two scores estimated per transcript related to CIU production: CIUs per number of words and CIUs per minute.

CIU Reliability

- The Pearson Product Moment Correlation was greater than .92 across all three time points.

Results

Figure 1. Average % CIUs as Function of Time and Treatment Group

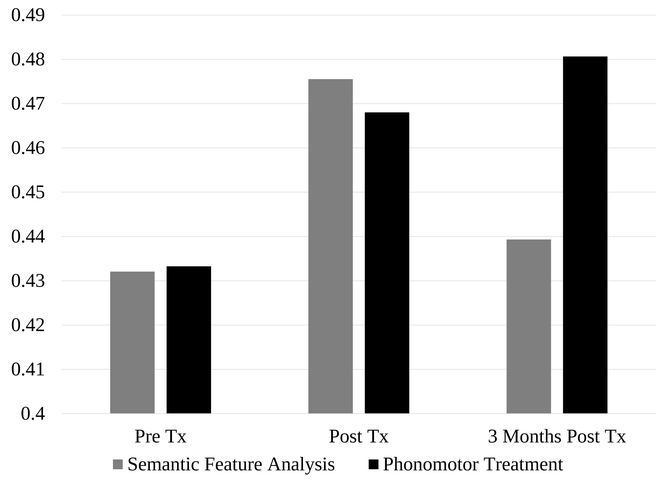

Table 2. *Mean CIUs scores produced at time points*

	Measures	
	SFA	PM
Time points	*CIUs per number of words (SE)*	
Pre-Tx (Time 1)	.432 (.080)	.433 (.080)
Post-Tx (Time 2)	.476 (.083)	.468 (.083)
3 months post-Tx (Time 3)	.439 (.076)	.481 (.076)

CIUs per number of words

- A preliminary mixed 2x3 ANOVA was conducted to compare the effects of Treatment Group (phonomotor treatment, semantic feature analysis) on the percent of CIUs produced by participants as a function of Time (pre-, post-, and 3 months post treatment). None of the main effects or the interaction term were statistically significant. The observed power for the interaction term was .252.

Discussion

Main Findings

- Descriptively, both treatments appear to be associated on average with improved outcomes immediately after treatment.
- However, only participants who received the phonomotor treatment appear to have additional improvement three months-post treatment.
- The 5% increase in CIU's associated with the phonomotor treatment 3 months post-treatment is consistent with the findings of Horton et al. [3].
- Improvement after the end of the treatment is consistent with the theoretical framework of the phonomotor treatment.

Limitations

- Sample size is low as there was only complete data for statistical analysis for 23 participants; CIU scoring of the remaining participants is ongoing.
- Even though relative agreement between CIU scorers was high, absolute agreement was problematic.

Future directions

- Currently, data from 56 PWA have been collected but language sample analysis is ongoing. Once all samples are analyzed (expect ~60), a more powerful 2x3 mixed ANOVA followed up with pairwise comparisons will be computed.

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