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

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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).

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

Table 1. Demographic and clinical characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>SFA (M, SD)</th>
<th>PM (M, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender: Male/Female</td>
<td>5M/6F</td>
<td>5M/6F</td>
</tr>
<tr>
<td>Education, Years</td>
<td>15.6 (2.9)</td>
<td>14.7 (2.1)</td>
</tr>
<tr>
<td>Age, Years</td>
<td>63 (14.9)</td>
<td>62.7 (9.5)</td>
</tr>
<tr>
<td>Months Post-Onset</td>
<td>39.7 (34.7)</td>
<td>46.5 (29.2)</td>
</tr>
<tr>
<td>CAT</td>
<td>16.3 (4.3)</td>
<td>17.2 (2.9)</td>
</tr>
<tr>
<td>BNT</td>
<td>28.8 (20.8)</td>
<td>20.4 (15.9)</td>
</tr>
</tbody>
</table>

Table 2. Mean CIUs scores produced at time points

<table>
<thead>
<tr>
<th>Time Points</th>
<th>SFA (M, SD)</th>
<th>PM (M, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Tx (Time 1)</td>
<td>.432 (.080)</td>
<td>.433 (.080)</td>
</tr>
<tr>
<td>Post-Tx (Time 2)</td>
<td>.476 (.083)</td>
<td>.468 (.083)</td>
</tr>
<tr>
<td>3 months post-Tx</td>
<td>.439 (.076)</td>
<td>.481 (.076)</td>
</tr>
</tbody>
</table>

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 CIUs 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.

References