**Phonological Encoding of Verbs & Nouns: An Investigation of Neurotypical Adults and Aphasia**

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**BACKGROUND**

- Verb retrieval is more severely impaired than noun retrieval in the majority of persons with aphasia

N=289 PWA

- The reason for the vulnerability of verbs in persons with aphasia (PWA) is unclear

- Evidence of relatively preserved semantic representations of verbs, but likely rapid decay of semantic activation

- Not known if phonological representations are activated in a timely manner

- Evidence of facilitation of verb (but not noun) naming following phonemic cues in verb-impaired PWA

- Phonological encoding in verb-impaired PWA needs further investigation

**PURPOSE**

To examine the time course of phonological encoding for verbs (relative to nouns) in:

- Neurotypically healthy adults
- People with aphasia

**PARTICIPANTS**

- Neurotypical: college volunteers (N=20, seven males, mean age: 19.7 years)
- People with aphasia: (N=3, all at least one year left stroke post-onset, all had near ceiling scores on semantic decision task for verbs as determined by Kissing and Dancing test)

<table>
<thead>
<tr>
<th>Age/Sex</th>
<th>Aphasia Quotient (WAB-R)</th>
<th>Verb OANB score</th>
<th>Noun OANB score</th>
<th>Verb deficit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWA 1</td>
<td>75/M</td>
<td>59.7</td>
<td>10/50</td>
<td>Yes</td>
</tr>
<tr>
<td>PWA 2</td>
<td>56/F</td>
<td>57.7</td>
<td>21/50</td>
<td>Yes</td>
</tr>
<tr>
<td>PWA 3</td>
<td>61/M</td>
<td>95.2</td>
<td>41/50</td>
<td>No</td>
</tr>
</tbody>
</table>

**PROCEDURES**

**Stimuli:** 15 transitive verb and 15 noun pictures taken from the International Picture Naming Project, matched for name agreement, word frequency and number of phonemes

- Task: Detect presence of pre-specified phoneme in noun and verb picture name (phoneme monitoring, adapted from Sasisekaran et al., 2006)

**CONDITION**

- Initial phoneme
- Non-initial phoneme
- Does not occur

**DEPENDENT MEASURE**

- Reaction time from time of picture presentation to keyboard response (correct responses only)

**RESULTS**

**Neurotypical group - Mean RT**

- Verbs slower than nouns p<.01
- Non-initial slower than initial p<.001
- That is, main effects of word type and phoneme position

**People with aphasia**

- Significantly slower than controls

- PWA1 verb deficit: Verb-noun difference pattern significantly different from controls p=0.00
- Noun non-initial slower than other conditions

- PWA2 verb deficit: Verb-noun difference pattern is not significantly different from controls

- Verb non-initial slower than other conditions

- PWA3 no verb-noun difference

- Verb-noun difference pattern significantly different from controls p=0.049

- Noun initial slower than verb initial

**DISCUSSION**

This is the first study investigating phonological encoding of verbs with this task (to our knowledge)

**Neurotypical Adults**

- **Phoneme position:** Slower RTs for non-initial phonemes is consistent with prior research.
- **Supports incremental phonological encoding**

**Word class:** Slower RTs for verbs compared to nouns is consistent with slower picture naming of verbs vs. nouns

- Possible reasons for slower verb RTs:
  - Greater conceptual complexity
  - Lower imageability
  - Complexity of the picture
  - Greater syntactic information

**This study contributes to understanding of normal word production**

- Verbs are encoded incrementally, just like nouns
- Lack of interaction between word class and position indicates that, once initiated, phonological encoding of verbs is not any slower than nouns

**People with Aphasia**

- Accuracy was similar across nouns and verbs for all PWA
- Slower RTs and higher individual variability compared to controls are consistent with prior findings for aphasia

**Phoneme position:** All PWA showed neurotypical pattern

- **Word class:** Two PWA showed an atypical pattern with slower RTs for nouns
- One of the verb-impaired PWA showed impaired/slower phonological encoding for verbs while the other, surprisingly, did not

**Verb-noun retrieval differences in PWA do not directly map onto their phonological encoding of these word classes**

Locus of verb impairment in aphasia needs further research

**REFERENCES**

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2. Faroqi-Shah, Y., et al., 2015, Aphasiology
4. Bak, T. & Hodges, J., 2003, Kissing and Dancing Test, Frontier
7. Szewczyk, J. et al., 2004, PPH, Cortex

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