SLP 5116 PROJECT

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EFFECTIVENESS OF PHONOLOGICAL CUEING THERAPY FOR NAMING DEFICITS IN A MANDARIN-SPEAKING PATIENT

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SCOPE

• Anomia Therapies
• Mandarin and processing of the language
• Research Questions
• Methods
• Results
• Discussion
SPOKEN WORD PRODUCTION

Spoken word

Auditory phonological analysis

Phonological input lexicon

Visual picture/object recognition

Semantic system

Phonological output lexicon

Phonological output buffer

Speech

Written word

Visual orthographic analysis

Orthographic input lexicon

Phonological output lexicon

Sound to letter rules

Phonological output buffer

Print

PALPA (Kay, Lesser & Coltheart, 1996)
ANOMIA

Therapy for Anomia

Semantic (Meanings)
- Semantic feature analysis (SFA), Related judgment with feedback etc

Phonological (Sound)
- Phonological component analysis, Phonemic cueing, etc
WHY STUDY PHONOLOGICAL THERAPY?

- Limited research done on phonological therapy.

- Effective and more lasting and generalized effects than previously predicted (Hickin et al., 2002; Leonard et al., 2008; Wambaugh et al. 2004).

- No empirical data on its efficacy in Mandarin. Considering the demographic for Mandarin-speaking patients around the world, there is a need for research on aphasia therapy in Mandarin.
<table>
<thead>
<tr>
<th>ENGLISH</th>
<th>MANDARIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Alphabetical.</td>
<td>• Logographic system.</td>
</tr>
<tr>
<td>• Letter to sound mapping.</td>
<td>• No letter to sound mapping</td>
</tr>
<tr>
<td>• Basic unit: Phonemes</td>
<td>• Basic unit: Syllable</td>
</tr>
<tr>
<td>• Onset, rime.</td>
<td>• Tonal language: Onset, rime, tone</td>
</tr>
<tr>
<td></td>
<td>• Disyllabic/ Compound words</td>
</tr>
</tbody>
</table>

“舌 She2”

“枕头 Zhen3tou2”
### MANDARIN ‘华语’

<table>
<thead>
<tr>
<th>Monosyllabic</th>
<th>Onset</th>
<th>Rime</th>
<th>Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>马 ma3</td>
<td>m</td>
<td>a</td>
<td>3</td>
</tr>
<tr>
<td>妈 Ma1</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>摸 mo1</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The minimal unit selected for Mandarin phonological encoding are **syllables** (Chen et al. 2002).

Chen, Chen and Dell (2002) investigated whether sharing of onset only, tone only, **atonal syllables** (i.e. first syllables varied in tone), **tonal syllables** (i.e. first syllables with shared tone) led to implicit priming effects of disyllabic words.

<table>
<thead>
<tr>
<th>Disyllabic</th>
<th>Onset</th>
<th>Rime</th>
<th>Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target: pao3 bu4</td>
<td>p</td>
<td>ao</td>
<td>3</td>
</tr>
<tr>
<td><strong>Atonal syllable:</strong> pao4</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td><strong>Tonal syllable:</strong> pao3</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</tbody>
</table>
Proposed model for Chinese language processing. Adapted from the model proposed by Teh (2012)
RESEARCH QUESTIONS

1. Efficacy of phonological cueing therapy ("PCT") in Mandarin based on its phonological characteristics (rime, tone, onset, syllables)

<table>
<thead>
<tr>
<th>Cues</th>
<th>Onset</th>
<th>Rime</th>
<th>Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rime-tone related</td>
<td>✔✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Onset-tone related</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Rime-onset related/ Atonal syllabic</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Disyllables: tonal syllable</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</table>

2. Which phonological feature is the most salient feature useful for word retrieval?
• Most proficient in Mandarin in all modalities.

• Used Mandarin most of the time in all settings on a daily basis.

• Moderate-severe expressive > receptive aphasia, complicated by AOS.

• Predominantly semantic errors

Mr LLK: 65, male
10 years of education
Left MCA Infarct (7 months)
Mild Cognitive Impairment
• A multiple baseline single-case design

• Following the treatment phase, post-treatment testing conducted.

• If participant did not achieve 80% naming accuracy on trained items, a second treatment phase was planned

<table>
<thead>
<tr>
<th>Week</th>
<th>SCHEDULE</th>
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<tbody>
<tr>
<td>1 - 3</td>
<td>Baseline 1-3</td>
</tr>
<tr>
<td>4 - 8</td>
<td>Phonological Therapy</td>
</tr>
<tr>
<td>9</td>
<td>Post-Therapy Assessment 1</td>
</tr>
<tr>
<td>10 - 14</td>
<td>Phonological Therapy</td>
</tr>
<tr>
<td>15</td>
<td>Post-Therapy Assessment 2</td>
</tr>
<tr>
<td>16 - 20</td>
<td>No Therapy</td>
</tr>
<tr>
<td>21</td>
<td>Maintenance Assessment</td>
</tr>
</tbody>
</table>
**SCREEN:**
Language Background Questionnaire (Lincoln, Lim, Liow, & Onslow, 2008)

- **LANGUAGE TESTS**
  - **INVOLVE SEMANTICS**
    - Picture Naming (120 items)
    - Spoken Word-to-Picture Matching
    - Semantic Association Test
  - **NOT INVOLVING SEMANTICS**
    - Non-word Repetition
    - Oral Reading

- **TESTS OF COGNITION**
  - Forward and Backward Digit Recall (Wechsler, 2003)
  - Singapore Orientation Questionnaire
  - Raven’s Standard Progressive Matrices (Raven, Raven, & Court, 1998)

- **Communication Effectiveness Index (Lomas, 1989)**
Different onset, same rime, same tone: 底 di3

Different tone, same onset, same rime: 鼻 bi2

Different rime, same onset, same tone: 把 ba3

Monosyllable: 笔 bi3

“What is this?”

Repetition
Different onset, same rime, same tone: 放 fang4

Disyllabic word: 烫衣 tang4 yi1

Different rime, same onset, same tone: 退 tui4

“What is he doing?”

Different tone, same onset, same rime: 躺 tang3

Tonal syllabic cue > Repetition
Hypothesis: LLK would perform better on picture naming of trained words following phonological cueing therapy.

Baseline of treated items: $Mdn = 4$

Baselines of untreated items: $Mdn = 2$

Figure 1. LLK’s scores for picture naming.
RESEARCH QUESTION 2

Hypotheses: 2A. Monosyllabic words: Rime-onset related/Atonal syllabic cue most effective. 2B. Disyllabic words: Tonal syllabic cue most effective.

- Rime-tone related cues
- Onset-tone related cues
- Rime-Onset related cues
- Tonal syllabic cue

**Figure 2.** Cueing effectiveness of the phonological cues on naming of treated monosyllabic and disyllabic words.
RESULTS: CONTROL TASKS

Test Scores

Non-word repetition (24) Word Reading (10) Forward Digit Recall (10) Backward Digit Recall (12)

Figure 3. LLK’s scores on the language and cognitive control tasks
Discussion: Efficacy of PCT

• Effectiveness of PCT for a patient with more severe aphasia and concomitant mild cognitive impairment.

• The effectiveness of PCT could be related to the cognitive load and demands placed on the participant.

• Aspects of executive function and cognitive status might be important contributors to clinical decision-making about treatment type.

An example of features based approach
Discussion: Monosyllabic words

- Phonological cues should be minimally an atonal syllable (rime-onset related) cue for it to be effective.

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- Differences in phonological characteristics influence how phonological contents of a word are organized and stored in the phonological output lexicon.

- Economical to store whole syllable unit as phonological units.
Discussion: Disyllabic words

- Tonal syllabic cues constitute the penultimate representation of the initial syllable prior to the articulation.

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Tonal syllable: pao3

- Mandarin is a morpho-syllabic tonal language, the presentation of the first tonal syllable would convey a unique combination of semantic and phonological information.
Limitations and future research

• Limited basis for predictions on the outcome of the same therapy in other patients.

• Sentence construction tasks in therapy to aid the generalisation of therapy effects to sentences and discourse.

• Evaluation of word-finding performance in connected speech and in conversation to look at the functional benefits of the therapy.
Conclusion and future direction

• PCT can be effective for naming problems in Mandarin-speaking clients provided the cues are language appropriate.

• Positive gains despite limited resources
THANK YOU
References:


References:


Teh, Y. (2012). Semantic Assessment Battery for Mandarin-Dominant Adults with Aphasia (Master of Science, Speech and Language Pathology Unpublished thesis), National University of Singapore.
