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Introduction

Background
- Differential diagnosis and treatment planning of speech sound disorders (SSD) is one of the major battlefields in the field of pediatric speech-language pathology.
- Intervention methods aim at specific parts of the speech production process, where diagnostic instruments consist of tests that measure knowledge and skills, and lack a direct relation with the underlying processes.

Research goal
- An individualistic, process-oriented approach for the diagnosis and treatment of pediatric SSD
- Advantages
  - Direct leads for treatment - tailored to the individual speaker
  - Evaluate and adapt treatment during the evolution of the disorder

Aim of the present study
- Development and evaluation of a learning task as an instrument to assess the acquisition of sensori-motor representations of novel speech sound units

Methodology

Participants
- 6 normally developing children: 3 male, 3 female; aged 4.6-7.8 yrs
- 5 children with SSD: 2 male, 3 female; aged 4.3-7.5 yrs (Table 1)

Table 1: Diagnostic classification of the children with speech sound disorders

<table>
<thead>
<tr>
<th>ID</th>
<th>Classification</th>
<th>Word discrimination (PPVT III)</th>
<th>Word comprehension (Dutch)</th>
<th>Word comprehension (German)</th>
<th>Word discrimination (Dutch)</th>
<th>Word discrimination (German)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PD</td>
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</tbody>
</table>

Procedure (Table 2)
- Learning paradigm: repetition task of nonsense words from a soundboard presented via headphones
- Stimuli: 3 non-native speech sound clusters in 4 context conditions, each item repeated twice

Table 2: Schematic overview of the learning task

<table>
<thead>
<tr>
<th>Stage</th>
<th>Goal</th>
<th>Conditions</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline measurement</td>
<td>Explain target paradigm</td>
<td>Auditory and visual input</td>
<td>&amp;/gpa/; /gpa/-/gpa/; /gpa/-/gpa/</td>
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<tr>
<td>Training 1</td>
<td>Practice target stimuli in different conditions</td>
<td>- Sequencing -Prosody</td>
<td>/gpa/-/gpa/; /gpa/-/gpa/; /gpa/-/gpa/</td>
</tr>
<tr>
<td>Break</td>
<td>- Practice target stimuli in different conditions</td>
<td>- Sequencing -Prosody</td>
<td>/gpa/-/gpa/; /gpa/-/gpa/; /gpa/-/gpa/</td>
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<tr>
<td>Training 2</td>
<td>Repeat training stage 1</td>
<td>- Sequencing -Prosody</td>
<td>/gpa/-/gpa/; /gpa/-/gpa/; /gpa/-/gpa/</td>
</tr>
<tr>
<td>Endpoint measurement</td>
<td>10 x attempt to produce target syllable in isolation</td>
<td>&amp;/gpa/; /gpa/-/gpa/; /gpa/-/gpa/</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Underlying profiles vary widely per child with SSD
- Results highlight important role of perceptual abilities
  - Strong correlation between non-word discrimination score and learning effect
- Results highlight important role of word-stress in SSD
  - Higher PCC in the prosody condition for ga and sja in SSD vs controls
  - Negative correlation between PCC and PWSC in the prosody condition
  - Detailed analysis of the individual data
  - No significant correlations for mla or sja
  - No significant differences for mla or sja

Future directions
- More data needed?
- Promising results for the profiling of SSD, suggesting that a detailed assessment of the acquisition of novel sensori-motor representations could provide direct starting points for therapy planning
- Focus assessment on Embedding, Sequencing & Prosody

References


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