Enabling tool: Estonian-English code-mixing of a 2-year-old with even input
Usage-based theory

Lexically fixed combinations
↓
slot and frame patterns
↓
abstract patterns

*I want candy*
↓
*I want X*
↓
noun-verb-object
Usage-based theory

- Entrenchment

How to bilingual children’s languages interplay as the children produce speech?
- Quick et al (2018, 2020) and Gaskins (2019) have found:
  - MLU follows input patterns
  - MLU is higher for code-mixed utterances
  - Code-mixed utterances are syntactically more complex
Participant and data

- Case study
- 2;4-2;10
- Estonian-English simultaneous bilingual
- Language separated by time and on an average week fairly balanced
- 35h of data

<table>
<thead>
<tr>
<th>Day</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>EST</td>
</tr>
<tr>
<td>Tuesday</td>
<td>ENG</td>
</tr>
<tr>
<td>Wednesday</td>
<td>EST</td>
</tr>
<tr>
<td>Thursday</td>
<td>ENG</td>
</tr>
<tr>
<td>Friday</td>
<td>EST</td>
</tr>
<tr>
<td>Saturday</td>
<td>ENG</td>
</tr>
<tr>
<td>Sunday</td>
<td>ENG</td>
</tr>
</tbody>
</table>
Methodology

- 6853 utterances coded:
  - Monolingual Estonian
  - Monolingual English
  - Code-mixed

- 3 analyses:
  - Language proportions
  - MLU for monolingual and code-mixed utterances for 3 periods
  - Complexity analysis (sentences, phrases, fragments)
## Results: language proportions

<table>
<thead>
<tr>
<th></th>
<th>Estonian days</th>
<th>English days</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM utterances</td>
<td>42%</td>
<td>40%</td>
</tr>
<tr>
<td>EST utterances</td>
<td>44%</td>
<td>15%</td>
</tr>
<tr>
<td>ENG utterances</td>
<td>14%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Other studies with similar aged children:
- Quick et al. (2018): 7%, 9%, 10%
- Gaskins et al (20xx): 9%, 11%, 40%*

*(2h of data)*
Results: MLU scores

<table>
<thead>
<tr>
<th></th>
<th>Oct-Dec</th>
<th>Jan-Feb</th>
<th>March-Apr</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLU</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Legend:
- CM
- EST
- ENG
Results: Complexity analysis

- Sentences:
  - CM: 78%
  - EST: 39%
  - ENG: 35%

- Phrases:
  - CM: 18%
  - EST/ENG: 39%/38%

- Fragments:
  - CM: 8%
  - EST: 22%
  - ENG: 27%
Discussion

Language proportions and MLU reflected the input pattern
Why so many code-mixed utterances?
Why did the code-mixed utterances have the highest MLU?
Code-mixing as an enabling tool
Thank you for listening!