The impact of word frequency on grammatical error detection in Swedish-speaking school-age children with and without language impairment

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Background & Aim

Error detection tasks
- Have been widely used to measure metalinguistic awareness, language knowledge, and language processing
- Participants listen to a sentence with or without a morpho-syntactic error and decide if the sentence is correct or incorrect.
- Studies in English and French have shown that school-age children with language impairment (LI) have error detection difficulties that mirror patterns of vulnerability in the expressive language of younger children with LI.
- Few previous error detection studies include any information about the frequency of the words in the experimental sentences.
- To the current study aims to investigate the effect of error type and word frequency on speeded error detection in Swedish-speaking 4th graders with LI and typically developing (TD) peers.

Materials, procedures & analyses

Errors
- Grammatical error: regular past tense > infinitive
- Noun error: omission of the obligatory indefinite article in noun phrases with an adjective
- Plural (control) error: plural noun → singular noun

Frequency manipulation (modified corpus, September, 2003)

Target verb or noun either
- High frequency (HF): lemma > 100 million
- Low frequency (LF): lemma < 30 million (verbs) or < 10 million (nouns)

All targets rated as familiar to 4th graders by teachers

Dependent measures
- A’ = error sensitivity (E-prime/Button box:
  -Auditory presentation and response collection (accuracy/response time)

Results

1. Effect of error type and group on A’ (p values only high)

<table>
<thead>
<tr>
<th>TD</th>
<th>LI</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF Verb</td>
<td>0.84</td>
</tr>
<tr>
<td>HF Noun</td>
<td>0.88</td>
</tr>
<tr>
<td>LF Verb</td>
<td>0.79</td>
</tr>
<tr>
<td>LF Noun</td>
<td>0.78</td>
</tr>
</tbody>
</table>

2. Interaction of frequency and error type on A’ (p<0.05)

<table>
<thead>
<tr>
<th>TD</th>
<th>LI</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF Verb &amp; LF Noun</td>
<td>*</td>
</tr>
<tr>
<td>HF Noun &amp; LF Noun</td>
<td>*</td>
</tr>
<tr>
<td>HF Verb &amp; HF Noun</td>
<td>*</td>
</tr>
<tr>
<td>LF Verb &amp; LF Noun</td>
<td>*</td>
</tr>
</tbody>
</table>

3. Effect of error type and frequency on RT in children with > 50% accurate error detection

<table>
<thead>
<tr>
<th>TD</th>
<th>LI</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF Verb</td>
<td>160</td>
</tr>
<tr>
<td>HF Noun</td>
<td>165</td>
</tr>
<tr>
<td>LF Verb</td>
<td>170</td>
</tr>
<tr>
<td>LF Noun</td>
<td>180</td>
</tr>
</tbody>
</table>

Archival data
- The analysis includes participants from Mallart & Schelstraete (2005); Montgomery & Leonard, 1998; Wolfeck et al. 2004
- Effects of error type and frequency on speeded error detection in Swedes
- An analysis similar to the LI group

All significant results have values < 0.05 (two-tailed), with Bonferroni corrections when necessary

Discussion

Error sensitivity (A’) in children with LI
- Swedish-speaking 4th-grade LI children have the same sensitivity to errors on plural markers as their TD peers, but lower sensitivity to verb-finiteness errors and noun phrase errors, which mirrors expressive difficulties in preschool children with LI.
- The first error detection study showing this pattern of vulnerability in Swedish-speaking children.

Effect of word frequency on error detection
- All children were more sensitive to errors involving HF regular verbs compared to LF regular verbs, and there were no significant group interactions.
- The effect of frequency on verb-finiteness errors is in line with the emergentist view, and prompts a new look at previous error detection studies that did not control for target word frequency.
- Noun frequency did not affect A’ for noun phrase errors, perhaps because the task also involves detecting adjective congruence errors within the noun phrase.
- RT analyses for 19 TD children with good error detection skills showed that RTs for verb and common noun phrase errors were affected by word frequency.
- Neutral noun phrase errors seemed extra challenging, perhaps due to HF-plural marking for neutral nouns: "läg skulj ("low something) vs. läg skulj (low - stealthy).

Clinical implications and future directions
- Clinical implications for assessment and treatment of LI.
- The challenge of processing Swedish noun phrases
- Children with neutral nouns need to be further explored.
- Additional data (a total of 50 students with and without language learning disabilities) will be analyzed using a mixed-effect model approach.

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References: