How do monolingual and bilingual children differ in their processing of ambiguous utterances?

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Ambiguity in Sentence Processing

- Natural language is often ambiguous in multiple ways:
  - Phonological ambiguity between minimal pairs
  - Lexical ambiguity between homophones
  - Referential ambiguity between pronouns/nouns
  - Syntactic ambiguity between valid parse trees

- Adults are adept at resolving any initial interpretations which turn out to be wrong, as in “garden path” sentences – “The horse raced past the barn fell”
- Children lack experience with language and therefore are less able to take advantage of top-down constraints

Monolingual and Bilingual Differences

- Monolingual children have more experience in their native language compared to bilinguals with their second language
- Bilingual children have been shown to have an advantage in Executive Function performance
- The current study compares these to groups in order to assess the role played by language experience and Executive Function in sentence processing.

Research Questions

- What is responsible for the development of children’s ability to take advantage of top-down constraints?

Hypotheses

Hypothesis 1
Children lack the Executive Function required to resolve conflict across the competing representations that arise due to ambiguity

Hypothesis 2
Children lack experience with language and therefore are less efficient at processing input – a lack of “processing fluency”

Methods

- Executive Function tasks:
  - Simon Tasks (arrows, pictures), Flanker Task, Stroop Task, Digit Span test
- Language experience assessments:
  - PPVT, TROG
- Non-verbal intelligence assessment:
  - K-BIT Matrices
- Ambiguity tasks:
  - Syntactic Garden Path
  - Lexical, Pronominal reference (in progress)

Participants

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Min Age</th>
<th>Max Age</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monolingual</td>
<td>20</td>
<td>5.24</td>
<td>6.63</td>
<td>6.18 (0.47)</td>
</tr>
<tr>
<td>Bilingual</td>
<td>20</td>
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</tr>
</tbody>
</table>

Bilingualism assessed by Language Use Questionnaire, with more than 4 hours of exposure to non-English per day or have a parent who speaks another language more than 75% of the time.

Results

- All participants show sensitivity to Executive Functioning demand, with similar reaction times for on the basis of an Executive Functioning advantage, since there was no significant between-group difference in demand, with similar reaction times

- Both groups perform equally as poor in the incongruent condition.
- No overall effect of language group or a language group by congruency interaction
- No bilingual Executive Functioning advantage in any test

Conclusions

- Eye tracking shows that bilinguals are more sensitive to referential context, similar to adults
- Monolinguals are not
- There are no significant behavioural differences. Despite better online use of context, both the monolinguals and bilinguals fail to revise garden-path errors
- Bilinguals’ use of referential context cannot be accounted for on the basis of an Executive Functioning advantage, since there was no significant between-group difference in the EF tests
- Similarly, nor can it be attributed to a language experience advantage since bilinguals performed worse than monolinguals on measures of both vocabulary and grammar knowledge.
- Alternative hypothesis: growing up in a bilingual context may cue children into relevant contextual information in the environment
- Follow-up work will look at whether the advantage that we see in the syntactic ambiguity resolution generalizes to other use of contextual cues.

Literature cited


Syntactic Garden Path Data

- The critical trial had ambiguous instructions (“put the the frog on the napkin in the box”) and two referents
- Monolinguals looked at each referent equally
- Bilinguals used referential context and spent more time looking at the target object (i.e. the frog on the napkin)
- Both groups performed similarly in terms of behaviour and how they actually executed the instructions