How Preschool Children’s Animacy Knowledge Affects Their Comprehension of Simple Sentences

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Introduction
- Children use both linguistic cues (e.g., word order) and non-linguistic cues (e.g., animacy knowledge) to comprehend sentences.
- Young children may rely more on non-linguistic cues to comprehend sentences (Chapman & Miller, 1975; Chan, Lieven & Tomasello, 2009) and use their predisposed notions about animacy relations between entities in events to support emerging syntactic learning (Childrens & Echols, 2004).
- The prototypical Animate Subject – Verb – Inanimate Object (AVI) sentences are the most common sentences that children hear (Chan et al., 2009).
- Research shows that toddlers comprehend sentences in which word order and animacy (e.g., agent) cues converge (IV A) > AVA (only word order is relevant) > IVA (cues in conflict).

Current Study
- Unlike previous studies in which children manipulated objects to demonstrate their comprehension of SVO sentences under different animacy conditions, this study aimed to examine comprehension using children’s eye-gaze patterns.
- The role inhibitory control played in children’s abilities to interpret animacy cues was also investigated.

Research Questions
- Do children show this well-documented pattern in an eye-tracking paradigm?
- Are children’s animacy knowledge and inhibitory control skills related to sentence comprehension?

Tasks
- **Eye-Tracking Experiment**
  Tobii Pro Spectrum device was used to track eye gaze patterns using 24 animations.
  A trial is determined valid and useful when:
  1) The child’s eye gaze was centered during the pre-test attention-getting video;
  2) The child spent a sufficient amount of time looking at either or both animations.

  ![Eye-Tracking Data](image)

- **Color-Object Sorting Task**
  Stage 1: Sorting by color (red flower \(\rightarrow\) red rabbit box; blue rabbit \(\rightarrow\) blue flower box).
  Stage 2: Sorting by shape (red flower \(\rightarrow\) blue flower box; blue rabbit \(\rightarrow\) red rabbit box).
- **Day-Night Stroop Task**
  Stage 1: Sorting cards by matching suns to the day scene and moons to the night scene.
  Stage 2: Sorting cards by matching moons to the day scene and suns to the night scene.
- **Animacy Card-Sorting Task**
  Children were asked to sort cards based on if the object is “living” (blue box) or “non-living” (red box).

![Card Sorting Tasks](image)

Results

<table>
<thead>
<tr>
<th>Eye-Tracking Data</th>
<th>Child 1: Average Percent Target Looking</th>
<th>Child 2: Average Percent Target Looking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video + attractive sounds (for fixation)</td>
<td>65%</td>
<td>60%</td>
</tr>
<tr>
<td>Baseline phase (8s)</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Video + attractive sounds (for fixation)</td>
<td>70%</td>
<td>65%</td>
</tr>
<tr>
<td>Testing phase (8s)</td>
<td>45%</td>
<td>40%</td>
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</table>

Card Sorting Tasks

<table>
<thead>
<tr>
<th>Sorting Tasks</th>
<th>Child 1</th>
<th>Child 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color-Object Sorting Task</td>
<td>10/10</td>
<td>9/10</td>
</tr>
<tr>
<td>Day-Night Stroop Task</td>
<td>9/10</td>
<td>9/10</td>
</tr>
<tr>
<td>Animacy Knowledge Task</td>
<td>13/16</td>
<td>8/16</td>
</tr>
</tbody>
</table>

Discussion

Research Question 1
- Neither child showed the predicted pattern.
  - Child 1 had only 4 valid and useful trials from the eye-gaze task, preventing observation of any reliable patterns.
  - Child 2 had 9 useful trials from the eye-gaze task, demonstrating a pattern on IVA>AVA>AVI.
  - Child 2 may have found the IVA animations out of the ordinary or silly and these unusual animations caught his attention.

Research Question 2
- More data are needed to answer this research question.

Participants

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Child 1</th>
<th>Child 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years, months)</td>
<td>4,5</td>
<td>3,3</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>Male</td>
</tr>
<tr>
<td>Maternal Education</td>
<td>18 years-Master’s Degree</td>
<td>21 years-Doctorate Degree</td>
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<td>Languages</td>
<td>Monolingual-English</td>
<td>Monolingual-English</td>
</tr>
<tr>
<td>Sessions to Complete Tasks</td>
<td>1</td>
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</tr>
</tbody>
</table>

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- Samantha Bell, Department of Communication Sciences and Disorders, University of Delaware
- Isabel Ryan, Department of Linguistics and Cognitive Science, University of Delaware

References