Production of the word “Two” in 18-39 Month Olds
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Background

This project studies the development of the word “two” in infants as a window into the process through which children develop an understanding of correct numeric language. Previous research indicates that acquisition of this number language is both late occurring and cumbersome. Early use of number words is often attributed to a broad understanding of plurality rather than an exact understanding of numbers. However, recent diary studies have documented the correct use of small number words such as “two” by children as soon as they begin speaking. As possibly the first mathematical symbol that children learn, the word “two” could very well be the jumping off point for children to reason about numbers, sets, and the property that numbers can represent sets. Accordingly, this project takes a detailed look into the acquisition of the word “two”.

Current Study

- To follow up previous diary studies and to begin taking a more quantitative look at the acquisition of the word “two”, the current study analyzes conversational excerpts of children between the ages of 18 and 39 months.
- Conversations were found on the CHILDES network, the child language component of the TalkBank system for sharing and studying conversation interactions.
- 205 utterances from 51 children have been included in the analysis.

Hypotheses

1.) If children’s earliest meaning for the word for two is an unspecified plural as previous research suggests, (e.g. Wynn 1992) then pair meanings of two should not predominate in early speech.
2.) If, on the other hand, children’s earliest meaning for the word two is a pair then pair meanings should predominate in early speech.

Methods

We used CLAN to search various databases on the CHILDES Network for examples of children using the word “two.” Excerpts were coded using context and any notes left by the transcriber. Each utterance was placed in one of nine categories.

Example:

```plaintext
*** File *katie.cha": line 1121. Keyword: Two
NOTa pair
NOTthere are two Jimmys!
NOTJimmys
NOTboth Jimmys are at home today.
NOTthey're not !/1, they can't come with us
NOTwhy Jimmy not here?
*Utterance containing "two"

Evidence supporting classification as a pair
```

Usage Distribution

<table>
<thead>
<tr>
<th>Age</th>
<th>Counting (without objects)</th>
<th>Definitely a pair</th>
<th>Maybe a pair</th>
<th>Definitely plural</th>
<th>Maybe plural</th>
<th>More than two</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24 months</td>
<td>40%</td>
<td>5%</td>
<td>35%</td>
<td>5%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>25-30 months</td>
<td>5%</td>
<td>30%</td>
<td>45%</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>31-36 months</td>
<td>10%</td>
<td>35%</td>
<td>50%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>37-39 months</td>
<td>15%</td>
<td>45%</td>
<td>30%</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Pair/Plural Time Series Comparison

A Pearson Chi-Square indicates a significant association between age group on pair vs. plural usage, \( X^2(3) = 27.011, p < .001 \)

Summary of Results

- Usage changes as a function of age.
  - There is evidence of early usage of “two” to mean exactly two.
  - After an initial burst of correct pair usage, we see a shift towards unspecified plural usage.
  - This suggests a U-shaped curve of “two” production: A U-shaped curve generally results from initial success, a period of errors, and a recovery of success.
  - A classic example of U-shaped development is overregularization errors (e.g. “I go”) suggesting early use of “two” may be rooted in morphological development.

Conclusions and Discussion

- Our data and analysis suggest children have a more complicated understanding of the word “two” than previous research suggests.
- Still, more research is necessary before making any strong conclusions.
- Our data may have been influenced by overrepresentation of some children.
- There were a number of samples rated as uncodable or low-confidence.

Future Research

Experiment 1: Manual Search Task

- Children will be told there are two balls in a box and allowed to search for them.
- Children will be allowed to find one and the second ball will be surreptitiously held from the child’s reach.
- Search time will be measured.
- If children understand that two is a plural, they will continue to search after finding the first ball.
- Children can search for the second ball.
- Search time will be measured again.
- If children understand that two is a pair, then they should stop searching after finding the second ball.

Experiment 2: Preferential Looking

- If the child understand the word “two” as a pair he/she should prefer to look at the screen with two objects rather than three.
- If the child understands two as a plural he/she should only prefer to look at the screen with two objects than one.

References


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Description of Coding Categories

<table>
<thead>
<tr>
<th>Usage Category</th>
<th>Definition</th>
<th>Context Keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely a pair</td>
<td>Child is labeling a set of exactly two objects</td>
<td>Look for indication that the child is correct (e.g. parent confirmation)</td>
</tr>
<tr>
<td>Maybe a pair</td>
<td>Child seems to be labeling a set of exactly two objects</td>
<td>Insufficient context, evidence indicating the child may have been given help from a parent, etc</td>
</tr>
<tr>
<td>Definitely plural</td>
<td>Child is labeling a set of more than two objects</td>
<td>Look for contextual indication that the child is incorrectly labeling a set larger than two objects as two</td>
</tr>
<tr>
<td>Maybe plural</td>
<td>Child seems to be labeling a set of more than two objects</td>
<td>Insufficient context</td>
</tr>
<tr>
<td>More than one</td>
<td>Child is labeling a set of objects greater than one as two</td>
<td>Look for plurals but unable to discern exact number of objects</td>
</tr>
<tr>
<td>Counting (objects)</td>
<td>Counting target objects</td>
<td>Look for counting in addition to the subject of that counting</td>
</tr>
<tr>
<td>Counting (without objects)</td>
<td>Counting without any objects</td>
<td>Look for counting for counting’s sake or rituals such as, “1, 2, 3, Go!”</td>
</tr>
<tr>
<td>Age</td>
<td>Child is referring to his age</td>
<td>“I’m two”</td>
</tr>
<tr>
<td>Uncodable</td>
<td>No clues from context to suggest type of usage</td>
<td>No helpful context; clear that the child is just repeating a parent</td>
</tr>
</tbody>
</table>