Introduction

- Multiple studies in the 1970s (Bonvillian et al., 1981) focused on the ability of hearing children with autism to learn signs as an alternative to speech.
- Yet, very little research has investigated the linguistic abilities of deaf individuals on the autism spectrum – particularly native-signing children exposed to sign since birth.

Motivation

1. Sign requires learners to match their own body movements to those of others ("self-other mapping"); Rogers & Pannington, 1991.
2. Self-other mapping is believed to be impaired in autism (Williams et al., 2004).
3. We hypothesize that such a deficit will lead to articulatory/phonological errors in sign production.

Hypothesis and Predictions

- If signer and addressee are facing each other (as is typical), then each sees a different side of the hand.
- Impaired self-other mapping ability will lead to palm orientation reversals on signs specified for inward or outward orientations.
- Such "reversal errors" have been found in several studies on the imitation skills of hearing children with autism (Brown, 1996; Hobson & Lee, 1999). However, these kinds of errors are not found frequently in the typical development of signing children.

Examples

- The ASL sign WEDNESDAY is produced with an inward-facing palm.
- Addressee sees back of hands rather than palms.
- A self-other mapping failure by the signing-child – i.e., reproducing the sign as it appears from his/her perspective – could lead to production of the sign with an outward-facing palm.

The ASL sign TOILET is produced with an outward palm orientation.

- Addressee sees palm of hand rather than back of hand.
- A self-other mapping failure by the signing-child could lead to production of the sign with an inward-facing palm.

Subjects

- Ten native-signing children with autism (ages 4.7–16.3).
- Prior diagnosis of autism with validated instrument (CARS, GARS) verified.
- Control group: 13 typically-developing (TD) native-signing children (ages 3.7–5.4; M = 4.9).

<table>
<thead>
<tr>
<th>Subject</th>
<th>Age</th>
<th>Sex</th>
<th>Hearing Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruben</td>
<td>4.7</td>
<td>M</td>
<td>Deaf</td>
</tr>
<tr>
<td>Brook</td>
<td>5.1</td>
<td>M</td>
<td>CODA</td>
</tr>
<tr>
<td>Raymond</td>
<td>5.8</td>
<td>M</td>
<td>Deaf</td>
</tr>
<tr>
<td>Loga</td>
<td>7.2</td>
<td>M</td>
<td>Deaf</td>
</tr>
<tr>
<td>Cameron</td>
<td>7.5</td>
<td>M</td>
<td>Deaf</td>
</tr>
<tr>
<td>Dana</td>
<td>9.3</td>
<td>F</td>
<td>Deaf</td>
</tr>
<tr>
<td>Olga</td>
<td>11.9</td>
<td>F</td>
<td>Deaf</td>
</tr>
<tr>
<td>Mark</td>
<td>12.8</td>
<td>F</td>
<td>Deaf</td>
</tr>
<tr>
<td>Jonathan</td>
<td>14.1</td>
<td>M</td>
<td>Deaf</td>
</tr>
<tr>
<td>Justin</td>
<td>16.3</td>
<td>M</td>
<td>Deaf</td>
</tr>
</tbody>
</table>

Results

- Autistic subjects made palm orientation errors on all four tasks.
- Errors were primarily produced by autistic children under age 10.
- Both kinds of reversals (inward → outward and outward → inward) were observed. Thus, an articulatory explanation is implausible.

Error Examples - SPONTANEOUS ERRORS

- Inward palm orientation on the letter S (far left), produced by Ruben (age 4.7). Outward palm orientation on the letter L (left), produced by Brook (age 5.1).

- The English word “table” fingerspelled with inward palm orientation by Cameron (8.11, tip) and Raymond (5.8, bottom).

Discussion and Conclusions

- The difference in error rate between the autism group and TD group approached significance (p = .079).
- Fewer errors overall, probably because these signs are learned early in development.

ELICITED PALM ORIENTATION ERRORS

<table>
<thead>
<tr>
<th>Group</th>
<th>TEST</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism (N=10)</td>
<td>6/48</td>
<td>1/40</td>
</tr>
<tr>
<td>Typically-Developing (N=13)</td>
<td>1/52 (19%)</td>
<td>2/92 (3%)</td>
</tr>
</tbody>
</table>

FINGERSPELLING ERRORS

- Four of the five youngest autistic children showed a tendency to reverse their palm orientation while fingerspelling.
- None of the typically-developing control subjects reversed palm orientation while fingerspelling.
- This error type has not been reported in the literature on the typical acquisition of fingerspelling.

Future Studies

- Identification of cognitive mechanism(s) responsible:
  a. Is this related to impaired theory of mind?
  b. Which components of self-other mapping are impaired?
- Probing of other grammatical structures that may be impaired in the signing of deaf children with autism:
  a. Classifier constructions
  b. Directional verb agreement
  c. Pronominal reference
  d. Facial grammar

References


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