Pointing In Bimodal Bilingual Language Development: Connections Between Distribution and Meaning

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Collaborators

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Research Questions

General
• How does pointing function (linguistically and para-linguistically) in sign languages?

Specific
• What referents do bibibi children point to?
• How do they use eye gaze while pointing?
• What does the pointing of bibi children say about the analysis of pointing in SLs?
BACKGROUND
Pointing

• “The prototypical pointing gesture is a communicative body movement that projects a vector from a body part. This vector indicates a certain direction, location or object” (Kita 2003: 1)

• “Pointing is a deictic gesture used to reorient the attention of another person so that an object becomes the shared focus for attention (Butterworth 2003:9)”
Pointing in Sign Languages

- Pointing carries pronominal and other linguistic functions in sign languages.

I/me (speaker)  
you (addressee)  
she (third person)

(Friedman 1975; Sandler and Lillo-Martin 2006; Meier & Lillo-Martin 2010, 2013)
Pointing in Sign Languages

[Mary and John are not present.]

Mary and John are not present.

"She loves him."

Mary and John are here.

"Mary is here and John is here."

She loves him.

"She loves him."
Theories of SL Pronouns

- Different proposals regarding person distinctions in sign language pronouns

<table>
<thead>
<tr>
<th>Full range of 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd}</th>
<th>Alibašić 2003; Alibašić and Wilbur 2006; Barberà 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} vs. non-1\textsuperscript{st}</td>
<td>Meier 1990; Lillo-Martin and Meier 2011</td>
</tr>
<tr>
<td>Single-form with referential index</td>
<td>Lillo-Martin and Klima 1990</td>
</tr>
</tbody>
</table>
Doubts about the analysis of pointing in SLs

• Typologically unusual not to have a full paradigm

• Form of pointing may not differ from that used in co-speech gesture (Johnston 2013)

• Pronominal signs have characteristics of both pronouns and gestures (Cormier et al. 2013)
Comparison: Pointing in sign and speech

- In both, pointing can be used with language and can be abstract
- In speech, pointing can complement spoken words
- In sign, pointing accomplishes the equivalent of speech + point

(Rathmann & Mathur 2002; Meier & Lillo-Martin 2013)

<table>
<thead>
<tr>
<th>Spoken language</th>
<th>Sign language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word (speech)</td>
<td>IX</td>
</tr>
<tr>
<td>Point (gesture)</td>
<td></td>
</tr>
</tbody>
</table>
Insights from SL Acquisition

- Petitto (1987) – two Deaf signing children acquiring ASL
  - Both avoided pointing to self and addressee between 12 and 18 months
  - One child resumed such points at 21 months; the other at 26 months
- Lexical learning of pronouns is required despite apparent iconicity
- Avoidance period represents mental reorganization from pre-linguistic gesture to linguistic pointing
Development of pointing in SL

Percent of Kate and Carla's total number of pointing forms directed to self and addressee.

![Graph showing the development of pointing in SL for Kate and Carla.](image)

Petitto 1987:19
Development of pointing in SL

Relationship between the children’s pointing to objects and non-objects and pointing to self and addressee (Top: Kate; Bottom: Carla); conventions in figure: △—△: object points; ⋄—⋄: non-object points; □—□: self/addressee points.
Development of pointing in SL

- Similar results for Greek Sign Language
  - Notable decrease in points to self/persons at 16-20 months (1% of all points)
  - Rate of points to persons increases to 10% at 20-27 months
Comparison: Development of co-speech pointing

- Pointing in non-signing hearing children starts as early as 9-12 months (e.g., Lock et al. 1994)
- Few studies have reported the use of pointing to self, addressee, or non-addressed persons
What about bimodal bilinguals?

- Children acquiring both a sign language and a spoken language
  - (presumably) must differentiate pointing in co-speech gesture from linguistic pointing
- Common use of code-blending
  - co-occurrence of sign with speech
Pointing in a bimodal bilingual child

- Morgenstern et al. (2010) – points to self 1;00-2;00:
  - one LSF/French bilingual child (I) – infrequent
  - one LSF signing child (C) – often
  - one French speaking child (M) - never
DATA

(Kökgöz et al. 2014, 2015, in prep)
Our Study: Participants

<table>
<thead>
<tr>
<th>Child</th>
<th>Age</th>
<th>Target language</th>
<th># Child IX</th>
<th># Adult IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben (US) 2;00-3;00</td>
<td>ASL</td>
<td>266</td>
<td>233</td>
<td></td>
</tr>
<tr>
<td>2;00-3;00</td>
<td>English</td>
<td>192</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>Tom (US) 1;11-2;06</td>
<td>ASL</td>
<td>47</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>2;00-2;06</td>
<td>English</td>
<td>31</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Edu (BR) 2;02-2;07</td>
<td>Libras</td>
<td>30</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>2;00-2;09</td>
<td>BP</td>
<td>26</td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>

- All child participants have at least one Deaf parent and relatively equal exposure to both sign and spoken languages.
- Adults in sign sessions are child’s Deaf parent or a Deaf RA.
- Adults in speech sessions are hearing signers.
- (Different analyses use different subsets of the data)
Ratio

- The ratio of pointing with respect to the number of individual signs/words stays constant over time in child sign sessions while it decreases over time in child speech sessions. The ratios are significantly different at each age interval ($\chi^2$s=7.69-245.57, all $p$s<.01).
DESIGNATUM
Questions

- What do points of bimodal bilingual children refer to?

- Are there differences in the distribution of points across sign and speech target sessions?

- Are there differences in the distribution of points when speaking and signing?
Methodology:
Coding for pointing

IX-speaker
IX-addressee
IX-3rd-person
(She is referring to BEN)

IX-object
(He wants the car)
IX-location
(He wants the bear to sit there/on the chair)
Findings: Pointing – US data

<table>
<thead>
<tr>
<th></th>
<th>Speech</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADULT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Loc**: Green
- **Object**: Brown
- **3-person**: Orange
- **Addressee**: Dark Red
- **Speaker**: Light Blue
Findings:
Pointing – BR data

<table>
<thead>
<tr>
<th></th>
<th>EDU</th>
<th>ADULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-person</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addressee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaker</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Findings:
Pointing with speech, sign

- BEN’s pattern differed according to modality
Discussion

• There are no points to self for any of the three children studied here
• For BEN, the few points to addressee are all produced while signing
• EDU’s points to addressee come from his latest observation (2;09)
• Points to persons are infrequent – extending previous findings to even older children
Discussion: Theoretical Implications

- Our results support 1\textsuperscript{st} vs. non-1\textsuperscript{st} view
  - There are no points to self for any of the three children studied here
  - There are a few points to addressee and 3\textsuperscript{rd}-person humans, and many to 3\textsuperscript{rd}-person objects and locations
EYE GAZE

Person Distinctions
Person Distinctions

$1^{st}$ vs. $2^{nd}$ vs. $3^{rd}$

- Perhaps alignment between gaze and hand is a marker of second person
  (Berenz 2002 – Brazilian Sign Language; Alibašić, Ciciliani and Wilbur 2006 – Croatian SL)
Eye-gaze – Predictions
Eye-gaze – Predictions

2\textsuperscript{nd} person
Eye-gaze – Predictions

3rd person

[Diagram showing a 3rd person perspective and a pointing hand]
Eye-gaze – Predictions

3rd person
Eye-gaze – Findings

Ben and Adults, 2:00-3:00

<table>
<thead>
<tr>
<th></th>
<th>Sign-Adult (167)</th>
<th>Sign-Child (114)</th>
<th>Speech-Adult (72)</th>
<th>Speech-Child (98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted</td>
<td>0.69</td>
<td>0.83</td>
<td>0.89</td>
<td>0.92</td>
</tr>
<tr>
<td>Not Predicted</td>
<td>0.31</td>
<td>0.17</td>
<td>0.11</td>
<td>0.08</td>
</tr>
</tbody>
</table>

For adults, the difference between sign and speech is highly significant ($z=-3.196, p<.005$ two-tailed).
For Ben, the difference between sign and speech is marginal ($z=-1.852, p=.064$ two-tailed, $p=.032$ one-tailed)
Eye gaze and Person distinctions

- Points to addressee usually occur with gaze to addressee – but …
- Alignment of point and gaze is not a marker of 2nd person.
- Alignment between point and gaze is also common in points to non-addressee (cf. Johnston 2013)
- The ‘predicted’ pattern is even stronger in speech!
Discussion: Why is 1st late?

- Two kinds of child behavior support the analysis that divides pointing between 1st person and non-1st.

- But why do we see late development with the 1st person form rather than the non-1st form?

- What the explanation CANNOT be:
  - Lack of the first person pronoun in adult input cannot be the reason.
  - In our study and others, adults do use points to themselves (Petitto 1987; Johnston 2013)
Discussion: 1\textsuperscript{st} in adult signing

- Johnston (2013) – Auslan corpus ($n=5797$)
Discussion: Person distinctions in speech?

**Question:**
- Maybe first person forms develop late altogether both in speech and sign?

**Answer:**
- First person forms are present in speech (alongside 2nd and 3rd persons)
Discussion: Person distinctions in speech

Examples of first person in speech (BEN):

I want get it (BEN, 2;00)
We're playing (BEN, 2;00)
more ball to me (BEN, 2;3)
I find this one (BEN, 2;3)
oh I don't know (BEN, 2;3)
me cut it (BEN, 2;3)
I'll cut (BEN, 2;3)
I cut first (BEN, 2;3)
me babies me baby (BEN, 2;3)
I stuck it no more (BEN, 2;3)
I dropped my cookie[?] (BEN, 2;3)
I see the cow (BEN, 2;6)
I see the big helicopter (BEN, 2;6)
I see doggie (BEN, 2;6)
I put it right in the trashcan (BEN, 2;6)
I did it (BEN, 2;6)
I hear it my[/] my mommy (BEN, 2;6)
I found this (BEN, 2;6)
I help this (BEN, 2;6)
Discussion: Person distinctions in speech

Examples of first person in speech (TOM):

I no[=?don't] want one (TOM, 1;11)
I sweeping[?] (TOM, 1;11)
I'm all# done done (TOM, 1;11)
I mo(re)[_] (TOM, 1;11)
I jump (TOM, 2;6)
I no reading (TOM, 2;6)
I looked around# the plate (TOM, 2;6)
me stir spoon (TOM, 2;06)
me Batman[?] (TOM, 2;06)
I need to stirring it (TOM, 2;6)
I want chicken (TOM, 2;6)
I make chicken (TOM, 2;6)
I baking[?] (TOM, 2;6)

I didn't this (TOM , 2;6)
I go on bicycle me (TOM, 2;6)
I build a house (TOM, 2;6)
I'm stuck (TOM, 2;6)
I put in there's pot (TOM, 2;6)
I fixed[?] it[_] (TOM, 2;6)
fish I xxx want (TOM, 2;6)
I love fish (TOM, 2;6)
and I stirred it up (TOM, 2;6)
look[?] at[?] me (TOM, 2;06)
Discussion: Null arguments

- ASL is a null-argument language (Lillo-Martin 1986 et seq.)
  - Dropping an argument requires recoverability; recovering 1st person may be generally easier
  - However, we don’t expect complete absence of 1st person
  - We are in the process of checking this
Discussion: What has to be learned

Petitto (1987) observed “U-shape” development of pointing

- Early start with an un-analyzed gestural period, where person forms are not analyzed.
- A transition period when children discover that pointing is integral in their sign linguistic system. They avoid pointing to persons during this period.
- Ultimately they display fully developed person distinctions.

Kodas must learn this … and how ‘pronouns’ in SL work
IX AS DEMONSTRATIVE

(Koulidobrova & Lillo-Martin in press)
The Issue

- For American Sign Language (ASL) - and possibly all sign languages - the form commonly considered to be a personal pronoun is a (deictic) point, IX.

- A similar (identical?) form is apparently used for many other functions (article, demonstrative, locative, predicate).

- Can IX be given a uniform analysis?
- PROPOSAL: IX is a *demonstrative*. 

IX as a ‘pronoun’ …

- does not behave as a bound variable
- relies on a demonstration/-um
- is vague with counterfactuals
- needs a non-empty denotation
IX with an NP…

• is not a definite article (weak or strong)

• evokes alternatives to the NP it precedes
  (similar suggestion in Winston 1995, McBurney 2002)

• does not co-vary where [the NP] does
A Unified Analysis

Pointing signs -- IX – with pronominal, locative, determining functions are *demonstratives*.

- uniquely referring -- *definite*
- familiar
- one out of a set of potential alternatives -- *contrast*
- demonstration -- *referential*
Others have suggested the same

- **Ahlgren (1990), (p. 167)**
  - “In Swedish Sign Language persons are deictically referred to by their location, not by their conversational roles. … It is perfectly reasonable to treat pointing to the location of referents as pronominal. This pointing can be compared to demonstrative pronouns in spoken languages.”

- **McBurney (2002), (p. 365)**
  - “the class of signs traditionally referred to as personal pronouns may, in fact, be demonstratives.”

- **Numerous spoken languages (Japanese, Korean, German *der*, etc.)**
Learnability

• How does the child developing a language determine whether apparent personal pronouns are really demonstratives?
• In general, demonstratives are acquired quite early
• Are there differences between sign and spoken language development in this area?
CONCLUSION

• Bibi children distinguish between pointing while signing and pointing with speech at an early age
• The distribution of pointing used by Bibi children is consistent with the analysis of pointing as marking 1\textsuperscript{st} vs. non-1\textsuperscript{st} person
• Eye gaze while pointing by children and adults does not support the proposal that alignment marks 2\textsuperscript{nd} person
• Children may go through a period of reorganization in which points to self are avoided
• Further research on child language may contribute further to understanding how the adult language works
THANK YOU