Encoding spatial information in two sign languages: A Comparison of Ghanaian (GSL) and Adamorobe (AdaSL) Sign Languages

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Visual Spatial Language

• The visual encoding of spatial information in signed languages
  • Use of space, hands and body
  • High potential for iconic representation – visual-spatial expression of visual-spatial information

• Affordances of the modality bring about high degree of similarity between sign languages in the spatial domain (Aronoff et al. 2003; Meier 2002)
  • System of classifier predicates (depicting verbs, Liddell 2003)
  • Simultaneity of expression
Visual Spatial Language

• However, also differences between sign languages in the spatial domain
  • e.g. lack of entity classifier predicates in Adamorobe Sign Language (AdaSL) (Nyst 2007)

• Various factors may contribute to differences in spatial domain
  • Contact with surrounding spoken language (e.g. AdaSL contact with Akan, Nyst 2007)
  • Age of sign languages (Senghas et al. 2004)
  • Make-up of signing community (e.g. urban vs. rural) (De Vos & Pfau 2015)
  • Language-specific structures (Perniss et al. 2015)
Present Study

• Compare the encoding of information about location, motion and action in two sign languages used in Ghana
  • Ghanaian Sign Language (GSL)
  • Adamorobe Sign Language (AdaSL)
### Ghanaian Sign Language (GSL)
- Urban sign language
- Used by Deaf community in Ghana
- Developed after establishment of first schools for the deaf in 1957 (Kiyaga & Moores 2003)
- Estimated 110,625 Deaf people in Ghana (0.4% of population) (Ghana Nat. Assoc. of the Deaf, 2018)
- Language of instruction in Deaf schools

### Adamorobe Sign Language (AdaSL)
- Rural sign language
- Used by both deaf and hearing signers in Adamorobe village
- Emerged in the 18th century (Okyere & Addo 1994)
- 40 Deaf people in the village (1.3% of current population of 3000) (down from 2% of a population of 2400, Nyst 2007)
- Older AdaSL signers uneducated; younger AdaSL signers educated in GSL at Deaf schools
Why GSL and AdaSL?

• Very little research on GSL to date
  • Handful of BA/MA theses on phonology, morphology and numeral incorporation

• Typological exceptions in the spatial domain have been described for AdaSL (Nyst 2007)
  • Absence of entity classifier predicates
  • Restriction to real-size spatial projections
Why GSL and AdaSL?

• Since the earlier research on AdaSL, there has been a considerable amount of language contact between GSL and AdaSL
  • Younger Deaf Adamorobeans are being educated in GSL in urban Deaf schools
  • Church services in Adamorobe village used to be interpreted from GSL to AdaSL
    • Now only in GSL due to death of GSL-AdaSL interpreter
  • AdaSL signers exposed to GSL through increased community outreach programs
    • Social pressures to adopt a more widely used sign language (i.e. GSL)
Data Collection

• Signers of GSL and AdaSL watched the *Pear Story* video (Chafe 1980)
  • Full video divided into six parts (approx. 1 minute each) to facilitate retelling, minimising information loss due to memory limitations

• Signers retold the story in their sign language

• Participants
  • GSL signers (N=10)
  • AdaSL signers (N=10)
    • 8 AdaSL signers non-educated
    • 2 AdaSL signers educated and bilingual in AdaSL and GSL
Coding

• Scene by scene coding to allow direct comparison of event encoding between the two sign languages
  • Total of 112 scenes identified in *Pear Story* video and categorised as Location (14), Action (54) or Motion (44) scenes

• GSL and AdaSL signing coded for
  • Predicate type, e.g.
    • Classifier (handling, entity)
    • Directional (e.g. *go*, *come*)
    • Manner verb (e.g. *walk*, *run*)
    • Motion verb (e.g. *meet*, *descend*)
    • Action verb (e.g. *pick*, *give*)
  • Bimanual simultaneous constructions
  • Serial verbs constructions for event depiction (Nyst 2007)
Analysis

• Expression of location, action and motion events
  • **Location**: static location of referents
  • **Action**: agentive transitive action (e.g. picking pear, carrying basket, giving hat to boy)
  • **Motion**: intransitive path motion (e.g. walking, running, riding bicycle)

• Analysed only events/scenes that were encoded by at least 5 signers (half) in each language
  • 0 Location scenes (0/14=0%)
  • 22 Action scenes (22/54=41%)
  • 16 Motion scenes (16/44=36%)
Predicate types in ACTION events

Proportion predicate type

GSL
AdaSL
Predicate types in MOTION events

Proportion predicate type

GSL
AdaSL

MAN V+path
MAN V no path
DIR
ENT+path
HND+path
HND no path
HND+body/legs
LexMot V
Encoding Motion with Entity classifiers

RH: CL_E (boy)
LH: CL_E (girl)

GSL

RH: CL_E (boy)
LH: CL_E (girl)

AdaSL

RH: CL_E (boy)
LH: CL_E (girl)
Simultaneous constructions

- Preliminary analysis of the use of bimanual simultaneous constructions in the motion and action event analysed

- Bimanual simultaneous constructions occurred in

<table>
<thead>
<tr>
<th></th>
<th>Action events</th>
<th>Motion events</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSL</td>
<td>19%</td>
<td>11%</td>
</tr>
<tr>
<td>AdaSL</td>
<td>11%</td>
<td>6%</td>
</tr>
</tbody>
</table>
### Types of Simultaneous constructions (in data subset)

#### MOTION events

<table>
<thead>
<tr>
<th>Hand1</th>
<th>Hand2</th>
<th>GSL</th>
<th>AdaSL</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity CL</td>
<td>Entity CL</td>
<td>✓</td>
<td>✓</td>
<td>boy and girl riding toward each other</td>
</tr>
<tr>
<td>Entity CL</td>
<td>Handling CL</td>
<td>✔</td>
<td>✔ (1x)</td>
<td>man moving while dragging goat</td>
</tr>
<tr>
<td>Subject ref.</td>
<td>predicate</td>
<td>✓</td>
<td>✓</td>
<td>GIRL + ride bicycle</td>
</tr>
<tr>
<td>Directional</td>
<td>manner predicate</td>
<td>✓</td>
<td>✓</td>
<td>GO + ride bicycle</td>
</tr>
<tr>
<td>Directional</td>
<td>Handling CL</td>
<td>X</td>
<td>✔</td>
<td>man goes while dragging goat</td>
</tr>
<tr>
<td>Limb CL</td>
<td>Handling CL</td>
<td>X</td>
<td>✔ (1x)</td>
<td>limping while pushing bicycle</td>
</tr>
</tbody>
</table>

#### ACTION events

<table>
<thead>
<tr>
<th>Hand1</th>
<th>Hand2</th>
<th>GSL</th>
<th>AdaSL</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling CL</td>
<td>Ground obj.</td>
<td>✓</td>
<td>✓</td>
<td>put pear in basket</td>
</tr>
<tr>
<td>Handling CL</td>
<td>Handling CL</td>
<td>✔</td>
<td>✔</td>
<td>holding pear while taking bandana off neck</td>
</tr>
<tr>
<td>Handling CL</td>
<td>Lex. sign</td>
<td>✓</td>
<td>✓</td>
<td>pick pear + AGAIN</td>
</tr>
<tr>
<td>Handling CL</td>
<td>Index (to ref.)</td>
<td>✓</td>
<td>✓</td>
<td>give pear to boy (there)</td>
</tr>
<tr>
<td>Handling CL</td>
<td>numeral (number ref.)</td>
<td>✓</td>
<td>X</td>
<td>give three pears</td>
</tr>
<tr>
<td>Handling CL</td>
<td>Entity CL</td>
<td>✓</td>
<td>X</td>
<td>boy eating pear</td>
</tr>
</tbody>
</table>

Legend:
- ✓: Present
- ✗: Absent
- (1x): Occurs once
Examples of SC depicting Motion

1. RH: GO
   LH: CL\(_H\) (hold bicycle)

2. RH: \text{CL\(_L\)} (limb)
   LH: \text{CL\(_H\)} (hold bicycle)

3. RH: \text{CL\(_E\)} (man, two-legged CL)
   LH: \text{CL\(_H\)} (drags animal)

4. RH: \text{CL\(_E\)} (boy, two-legged CL)
   LH: \text{CL\(_H\)} (hold bicycle)
Examples of SC depicting Action

- RH: CL_E (play tennis)
  LH: CL_H (eat/hold fruit)

- RH: CL_H (hold fruit)
  LH: CL_H (play tennis)

- RH: MAN
  LH: CL_H (hold pear)

- RH: CL_H (eat)
  LH: CL_E (boy)
Serial verb constructions (SVCs) (in data subset)

Proportion events with SVC

- **Action**
  - GSL
  - AdaSL

- **Motion**
  - GSL
  - AdaSL
Types of SVCs encoding Motion events
(in data subset)
Summary and discussion

• GSL and AdaSL signers used similar strategies overall to express Motion and Action information
  • Action: Mostly handling handshapes (with or without path of object)
  • Motion: Manner verbs and directionals used substantially in both languages

• GSL signers used entity classifiers with path for encoding motion to considerable degree
  • Also occurred in AdaSL motion encoding!

• Higher preference for directional verbs for motion encoding in AdaSL signers compared to GSL signers

• Simultaneous constructions of various types used by signers of both languages
  • About twice as often by GSL signers – but also considerable use by AdaSL signers!

• Serial verb constructions used by signers of both languages to similar extent for action and motion encoding
  • Manner verb plus directional used by both but particularly common for AdaSL (Nyst 2007)
  • Manner verb OR directional plus entity classifiers used in GSL
Effects of GSL-AdaSL language contact?

Entity classifier use in AdaSL

- Nyst (2007) found no use of entity classifiers for motion encoding in AdaSL and no use of reduced-sized event space representation (observer perspective)
  - We found use of entity classifiers in AdaSL for depicting motion of referents
    - Especially for motion seen from a distance (e.g. walking and riding bicycle across field) – less of a reduced-sized event space representation
- 6 out of 10 AdaSL signers used entity classifiers
  - Interestingly, the two GSL-educated (bilingual GSL-AdaSL) signers did not use entity classifiers
  - The two educated signers also did not use any GSL signs (borrowings) in their narrations, in contrast to all other AdaSL signers
Effects of GSL-AdaSL language contact?

Use of simultaneous constructions in AdaSL

• Nyst (2007a,b) found very little use of simultaneous constructions in AdaSL, and of restricted type
  • We found considerable use of simultaneous constructions and of a wide variety of different types in our subset of data, similar to use of SCs in GSL
• Or due to different types of data analysed, and different nature of stimulus videos?
  • Nyst (2007) analysed spontaneous narrations and cartoon retellings (Tweety and Sylvester)
  • Pear Story has human characters in landscape, with actions familiar to both GSL and AdaSL signers
Conclusion

• The visual-spatial affordances of the visual modality give rise to a high degree of similarity in event representation
  • Cross-linguistic investigation is important and reveals differences in sign languages in this domain
• Language contact between GSL and AdaSL may be causing change in AdaSL
  • Emergence of entity classifier system in AdaSL
• Education of AdaSL signers may influence the change in progress
  • Bilingual signers with awareness of knowledge of two different sign languages
  • Avoidance of entity classifiers in AdaSL use as structure belonging to GSL
  • No borrowings from GSL
Thank you!

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