Annotation and coding of spatial expressions across sign languages

Asli Özyürek, Inge Zwitserlood, & Pamela Perniss

Radboud University Nijmegen
Max Planck Institute for Psycholinguistics
Nijmegen Gesture Center

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Signed languages: Modality-specific features

- Signed languages use the visual-spatial modality (in contrast to the vocal-auditory modality of spoken languages)
- Signed languages share linguistic properties with spoken languages on phonological, morphological, and syntactic levels in spite of the difference in modality
- In certain domains, signed language structure is shaped by the visual-spatial modality
  - spatial expressions (i.e. of location and motion) in signed languages exhibit a visual similarity (or iconicity) with real-world scenes in contrast to those in spoken languages

Linguistic expression of space

In spatial relations the location of one entity is encoded in relation to another entity

Figure-Ground relation (Talmy 1985, 2003):
- Ground: the bigger, backgrounded entity (house)
- Figure: the smaller entity, focus of attention (bicycle)
- Relation: the spatial configuration of Figure and Ground ("next to")

Spatial expressions in SLs

American Sign Language (ASL) (Emmorey 2002:87)

“A bicycle is next to a house.”

Spatial expressions in SLs

- Spatial expressions in signed languages have been claimed to be shaped by affordances of the visual-spatial modality (e.g. Emmorey 2002; Talmy 2003)
  - The use of the body and space
  - The potential for visual analogue representation
- The potential for analogue mapping is assumed to create similarities across different signed languages (e.g. Aronoff et al. 2003)
(Preliminary) results: overview

- Similarities to “canonical structure” in both TÍD and DGS
  - Order: Ground before Figure
  - Use of CPs to localize referents
- Difference from “canonical structure”
  - Non-simultaneous use of CPs
  - Frequent use of non-CP devices to express the spatial relations (in addition to CPs)
- Similarities as well as differences between TÍD and DGS in the spatial expressions

Current (sub)study: photo descriptions

- 28 photographs with objects in Figure-Ground relationships
- 7 Figure object types (cups, boats, cows, birds, plates, pens, pictures)
- Different number of tokens (1, 2, 3 or 4, and many) for each object type

Research: data

Photo descriptions of:
- 6 native signers from Turkish Sign Language (TÍD), data collected in Izmir (out of 15)
- 5 native signers from German Sign Language (DGS): data collected in Aachen and Essen (out of 15)

Research method: procedure

- Signers look at stimulus pictures one at a time on laptop screen
- Signers describe each stimulus picture to addressee seated opposite
- Addressee identifies described picture on a sheet containing photographs in the stimulus set

Similarities to canonical structure (in TÍD and DGS)

1. Ground is usually expressed before Figure
2. Typically, CPs are used to encode the location of Figure objects

<table>
<thead>
<tr>
<th>Ground</th>
<th>Figure</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE</td>
<td>WHITE</td>
<td>TILES</td>
</tr>
<tr>
<td>WHITE</td>
<td>CUP</td>
<td>GREEN</td>
</tr>
<tr>
<td>CP-loc</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

"There is a white table, and white tiles, and there is a green cup on the table."

Difference from canonical structures: Simultaneity of CPs?

Representation of Figure and Ground relationship (e.g. cup/plate/pencil on table, boat on water) with simultaneous CP constructions:
- Never in the DGS data
- Once in the TÍD data
However… (?)

In the DGS data, relationships between Figure (e.g. cup) and Ground (e.g. table) are sometimes represented simultaneously through perseverance of the sign for the Ground (instead of a CP).

Simultaneity of CPs

Representation of two objects (e.g. cup next to cup, pens next to paper, picture next to picture) with simultaneous CP constructions:
- Commonly occurred in the DGS data
- Sporadically occurred in the TİD data

Non-CP devices for localization of referents

In the data from both sign languages:
- spatial relations are not necessarily expressed (only) by CPs
- different types of non-CP devices are used frequently for expression of spatial relations:
  - Positional and general locative verb (DGS)
  - Locative verb + number (TİD)
  - Localization of noun (DGS and TİD)
  - Prepositions (?) (DGS)
Non-CP devices:
Positional locative predicate

Wood table paper post-it yellow

Paper two ballpoint lie-loc\_(table)

“There is a wooden table, a yellow post-it notepad, and there are two pens lying next to each other on the table.”

Non-CP devices:
Locative predicate used for NEXT-TO

Lake surface also meadow have

Four boat loc loc\_(next-to) loc\_(next-to) loc\_(next-to)

“There is a lake, and also a meadow, and there are four boats on it, next to each other.”

Non-CP devices:
Locative predicate used for NEXT-TO

Table plate-locs\_(table) three 3-next-loc\_(table)

“There is a table, and there are three plates on it, next to each other.”

Non-analogue devices

Each sign language has devised language-specific, and less analogue, ways of expressing spatial relations

• Abstraction from analogue encoding of referent information
  ▶ DGS locative predicates

• Abstraction from analogue encoding of referent and (exact) location information
  ▶ TID locative predicate

Results: Summary (1)

The DGS and TID data show similarities and differences to the canonical analogue structure of spatial expressions.

• Similarities to canonical structures
  – Ground before Figure
  – use of CPs to localize referents and to express spatial relations

• Difference from canonical structures
  Signers did not always use (only) simultaneous CPs to encode the relative location of referents to each other
  – some in DGS but almost none in TID
  – in DGS: only for NEXT-TO, not for ON relationships

Why do we find these differences?

• Result of the research method (procedure, coding)
• Result of the stimuli used in this study
• Result of different focus from previous studies
• TID and DGS differ from “canonical structure” languages

• ...
Research method: coding & analysis

Coding: Sign Level
- Segmentation of signs (strokes, holds)
- Each sign was glossed for both hands, in Turkish/German and English
- Each sign referring to one or multiple objects was coded for presence of mouthing and localization, as well as for CP-like and SASS-like characteristics:
  - CP-like: hand represents whole object, sign has no fixed movement/location
  - SASS-like: movement indicates shape of object, sign has no fixed location
- If the response held more than one sign referring to an object, first mentions were distinguished from subsequent mentions for that object.

Coding: Figure-Ground level
- Full responses to the stimuli were analysed (viz. no segmentation into clauses or utterances)
- Every description was categorized into whether it contained a Figure-Ground relation (Figure localized in relation to a previously located Ground object). Descriptions with no Figure-Ground relation were not further analyzed in this study
- Perseverance from signs that introduce the Ground through the introduction and localization of the Figure were not considered simultaneous CP constructions.

In spite of the affordances of the visual-spatial modality in expressing spatial relations, SLs:
- do not necessarily maximally exploit the possibilities of analogue representation
- can use devices that are less analogue and more abstract
- differ from each other (as spoken languages do)

FUTURE DIRECTIONS
- Investigate other types of spatial relations (e.g. UNDER, IN, BEHIND); in contrastive and non-contrastive uses
- Include motion events
- Use data elicited by various types of materials as well as (semi-)spontaneous conversations
- Extend comparison to different SLs (e.g. ASL, BSL)
- Examine Turkish and German spoken language patterns for the same relationships
- Investigate non-linguistic visual-spatial representations of the same scenes
  - co-speech gestures
  - pantomimes

Research: Materials
- (Semi-)spontaneous:
  - Spontaneous personal narratives
  - Family and living space descriptions
  - Free conversation between signer/speaker and addressee
- Elicited:
  - Narratives
    - Cartoon events (Sendung mit der Maus, Canary Row)
    - Filmed vignettes (Give-Take, Charlie Chaplin)
  - Picture descriptions
    - Events (Volterra’s materials, Zwitserlood’s materials, Balloon story)
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