Annotation and coding of spatial expressions across sign languages

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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)

HOUSE location$_{(x)}$ BICYCLE location$_{(y_next\text{-}to\text{-}house)}$

"A bicycle is next to a house."

Spatial expressions in SLs

(1) Mention of **Ground before Figure**

(2) Use of **classifier predicates** (CPs) to localize referents in sign space

(3) CP components:

- the CP **handshapes** encode specific semantic features of the entities (e.g. shape, manipulation, animacy)
- the CP locations in sign space encode the location of the entities

(4) Expression of the relation between Figure and Ground entities by:

- the **relative positioning** of CPs in sign space
- the **simultaneous** representation of CPs in sign space

Canonical Spatial expressions in SLs

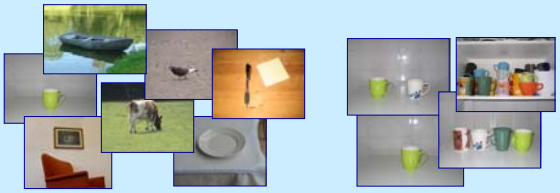
- Spatial expressions in signed languages have been claimed to be shaped by affordances of the visual-spatial modality (e.g. Emmorey 2002; Talmy 2003)
  - The use of the body and space
  - The potential for visual **analogue** representation
- The potential for analogue mapping is assumed to create similarities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

(Preliminary) results: overview

- Similarities to “canonical structure” in both TİD 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 TİD 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 (TİD), data collected in Izmir (out of 15)
- 5 native signers from German Sign Language (DGS): data collected in Aachen and Essen (out of 15)

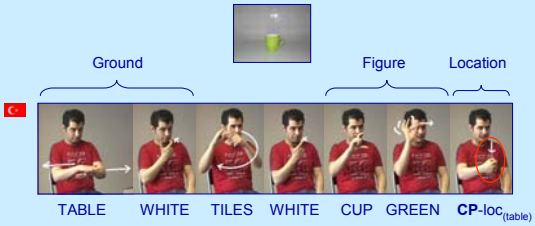
Research method: procedure

- 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 TİD *and* DGS)

(1) Ground is usually expressed before Figure

(2) Typically, CPs are used to encode the location of Figure objects

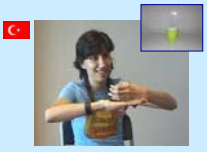


“There is a white table, and white tiles, and there is a green cup on the table.”

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 TİD 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).

Hold of "table" sign

WHITE TABLE WHITE WALL CUP **CP**$_{cup}$-loc$_{(table)}$

"There is a white table, and a white wall behind it, and there is a cup on the table."

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

Simultaneity of CPs

WHITE HORIZ.SURF. FOUR CUP

LH: **CP**-loc$_{(table)}$ ----------

RH: **CP**-loc$_{(table)}$ **CP**-loc$_{(table)}$ **CP**-loc$_{(table)}$ **CP**-loc$_{(table)}$

"There is a white surface, there are four cups on it, next to each other"

Simultaneity of CPs

LH: TABLE CLOTH TABLE CLOTH PLATE TWO CP-loc$_{(table)}$

RH: TABLE TABLE CLOTH PLATE CP-loc$_{(table)}$

"There is a table, with a table cloth, and there are two plates on it."

Simultaneity of CPs

(…) (…)

TABLE SQUARE FOUR CUP

(…)

FOUR **CP**-loc$_{(table)}$ **CP**-loc$_{(table)}$ **CP**-loc$_{(table)}$ **CP**-loc$_{(table)}$

"There is a square table, and 4 cups (…). There are 4 cups on the table, next to each other. (…)"

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

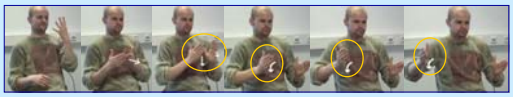
WOOD TABLE PAPER POST-IT YELLOW

PAPER TWO BALLPOINT **LIE**-loc$_{(table)}$ **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."

TABLE CUP FOUR **4-next-loc**$_{(table)}$

"There is a table, and there are four cups on it, next to each other."

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

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

Why do we find these differences?

? Result of the research method (procedure, coding)

? Result of the stimuli used in this study

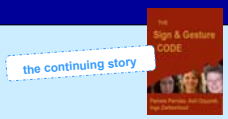
? Result of different focus from previous studies

? TİD 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

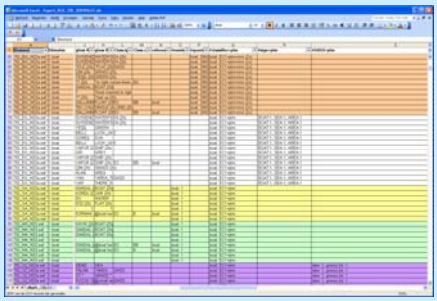
Research method: coding & analysis

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

Research method: coding & analysis

- Export of annotations to Excel for overview and counting



Conclusion (preliminary)

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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