Case disambiguation precedes number disambiguation at 4 years, but both are still developing until the age of 8 years and beyond: Evidence from word order variation in German

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The problem of who does what to whom

- O(bject)-V(erb)-S(ubject) sentences: German-speaking children need to interpret different morphosyntactic cues, such as **case and number agreement**
- Inconclusive evidence in studies so far regarding ability to comprehend **case marking** in isolation for OVS processing, pointing at five, six, and seven years (Dittmar et al., 2008; Lindner, 2003; Schipke et al., 2012).
- Development of **number processing** largely understudied (Schipke, Stegenwallner-Schütz, & Adani, 2024; Stegenwallner-Schütz & Adani, 2017)
- First time: Systematic and independent manipulation of case and number disambiguation in transitive sentences within the same experiment

Research questions

1) Do **case and number agreement** facilitate sentence processing and **OVS comprehension** in children and which of these cues is deployed more reliably?
2) How does the sensitivity to the case and number cue **develop** for online and offline OVS interpretation until adulthood?

Methods

Participants

Group	Mean age	N	Age range	Female/Male
4-yo	**4;05**	27	4;03-4;09	13/14
8-yo	**7;11**	27	7;02-8;07	9/18
adults	**24;06**	28	18;0-45;0	26/2

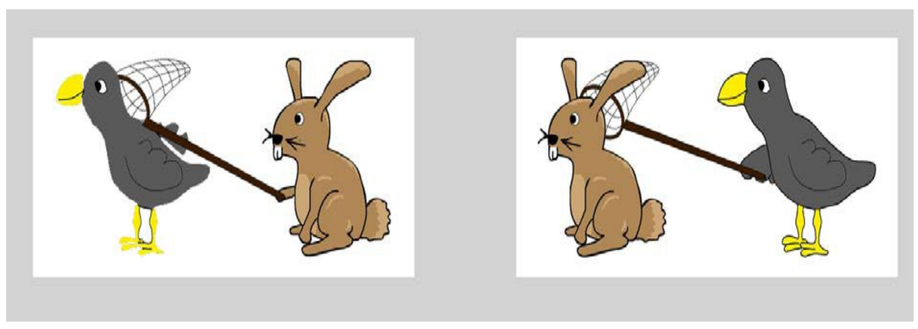
Procedure

- Sentence-picture matching task
- Embedded in an eye-tracking-while-listening experiment

Materials

- 48 semantically reversible transitive sentences
- 24 disambiguated by the case and 24 by the number cue

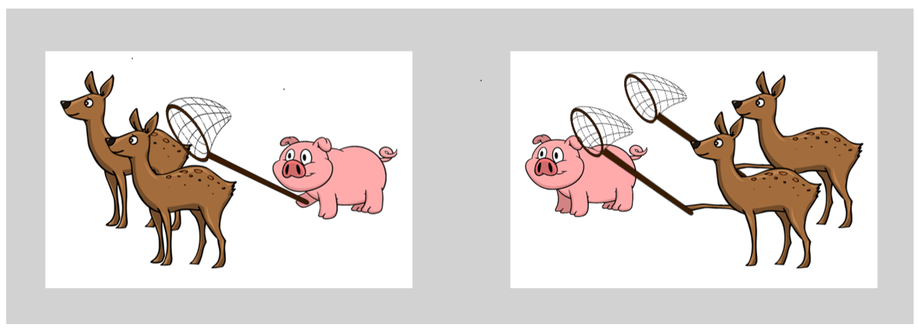
Case cue:



(SVO): Der Rabe fängt den Hasen.
'[The crow]**NOM** catches [the bunny]**ACC**'
(OVS): Den Raben fängt der Hase.
'[The crow]**ACC** catches [the bunny]**NOM**'

Underlining marks first possible point of disambiguation

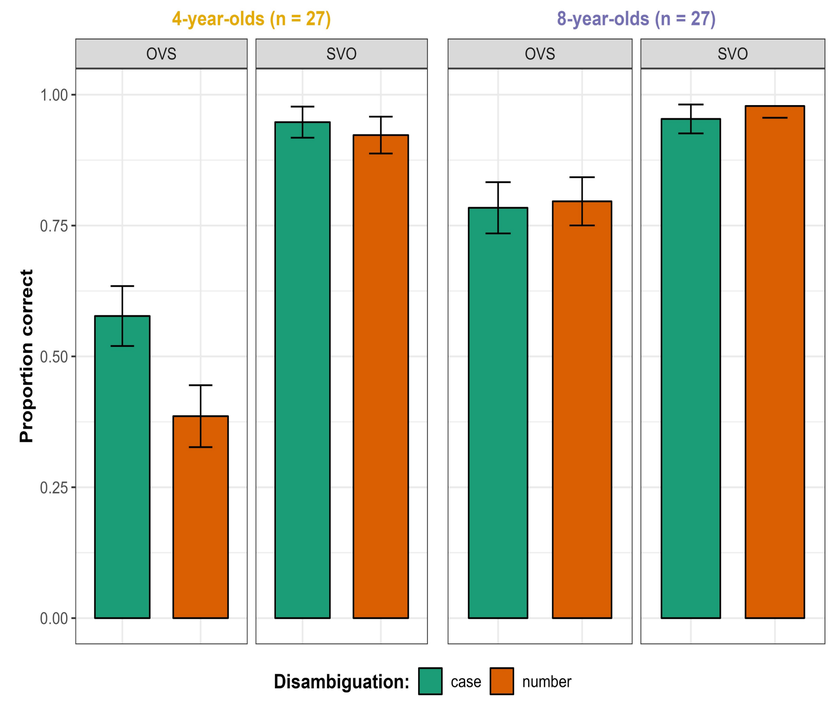
Number cue:



(SVO): Das Schwein fängt die Rehe / Die Schweine fangen das Reh.
'[The pig]**SG** [catches]**SG** [the deer]**PL**' / '[The pig]**PL** [catch]**PL** [the deer]**SG**'
(OVS): Das Schwein fangen die Rehe / Die Schweine fängt das Reh.
'[The pig]**SG** [catch]**PL** [the deer]**PL**' / '[The pig]**PL** [catches]**SG** [the deer]**SG**'

Results

Mean accuracy of 4-year-olds and 8-year-olds

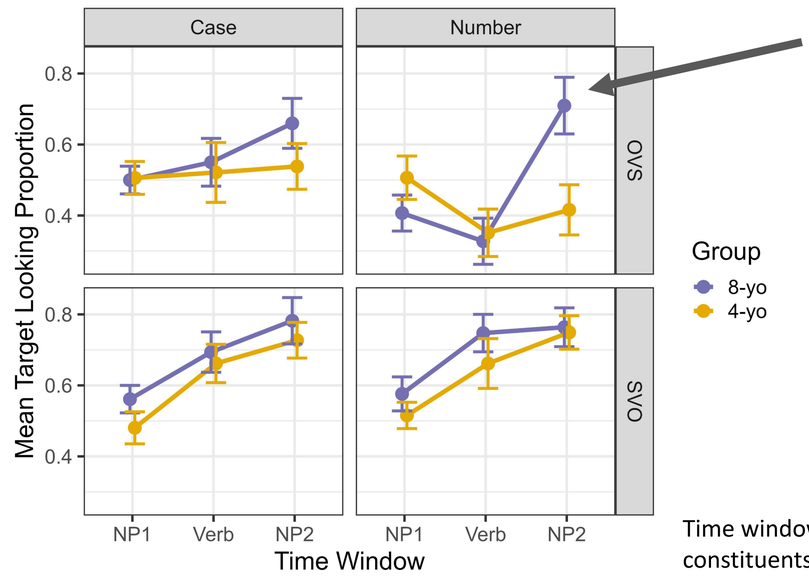


Adults (not included in the analysis*) are performing at ceiling:

SVO case: 99,7%
SVO number: 100%
OVS case: 99,7%
OVS number: 97,3%

- **OVS** in both conditions less accurate than SVO in both age groups
- Correct interpretation of **case and number marking** increases with age
- No more **difference between case and number marking** use at 8;0
- 8-year-olds do not reach adult-like comprehension yet

Mean target looking proportions in three time windows: NP1, Verb, NP2



8-year-olds integrate the number information for OVS interpretation right after the verb

Preliminary data:
- 4-year-olds: N = 27
- 8-year-olds: N = 24

Time windows according to sentence constituents: First noun phrase (NP1), verb, second noun phrase (NP2)

Discussion

1) Sensitivity to **number marking** for correct comprehension and processing of transitive sentences with word order variation emerges later than the one for **case marking** but develops between 4 and 8 years.
2) Results indicate an **incremental processing strategy** in 4-year-olds as dependencies between the verb and its arguments must be **processed at verb position** in the number condition in opposition to the case marking, which is available right at the **initial noun phrase**.
Further research is needed to **follow up the trajectory of OVS acquisition**, independently of case and number marking, in German-speaking children after the age of 8 until they reach adult-like processing abilities.

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***Poster & statistics:**

Acknowledgements

We thank all the children and their families who participated in our study in Potsdam and Berlin.
Financial support *(initiative grant ‚START')* of the Freie Universität Berlin and funding by the structural unit cognitive sciences of the University of Potsdam are gratefully acknowledged.

AMLaP 2024: September 5-7, Edinburgh