

Introduction

- Among other visual information, depicted events have been shown to influence online sentence comprehension
 - In Knoeferle et al. (2005)'s experiments, participants made use of depicted events even in the core linguistic process of syntactic disambiguation
 - In their experiments, participants might have relied more on visual information than they naturally would, because of
 - Highly non-stereotypical stimuli
 - Co-presence of scene and utterance
 - Static presentation of actions
- Therefore we address the question:

Do scene events influence syntactic disambiguation in plausible scenes, recently inspected scenes, and scenes containing animated events?

Method

- Participants were presented a picture and heard a German sentence with either subject-verb-object (SVO) or object-verb-subject (OVS) word order
- Sentences were ambiguous in structure up to the post verbal adverb

SVO	Das Kindergartenkind malt gerade den Onkel The small-child (ambiguous) paints currently the uncle (object) 'The small child is currently painting the uncle'
OVS	Das Kindergartenkind haut gerade der Knabe The small-child (ambiguous) hits currently the boy (subject) 'The boy is currently hitting the small child'

- The verb identified one action event in the picture which could enable participants to disambiguate before case marking information on the second noun phrase is available
- 16 items were used: each with a counter-balancing version with reversed action direction
- 32 fillers brought in visual and linguistic variety
- Eye-movements were tracked
- Anticipatory looks were used to monitor incremental disambiguation between the structures

Experiment 1: plausible stimuli

- Character constellations are plausible in a natural context
- Characters are likely to perform depicted action in that context
- No infrequent or fictional characters



Experiment 2: co-presence

- Same stimuli as in Experiment 1
- Picture was replaced by a blank screen before the utterance started



Experiment 3: animated actions

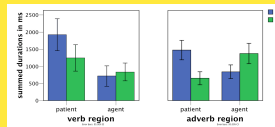
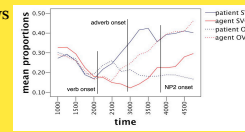
- Actions were animated in a sequence of 9 frames
- Utterance was presented afterwards with a picture containing characters in neutral position



Experiment 1: Plausibility

The time course of look proportions shows

- Early looks to patient in both conditions after verb onset
- Patient is anticipated in SVO from verb onset
- Agent is anticipated in OVS a bit later, but still before adverb onset

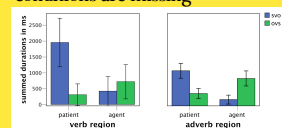
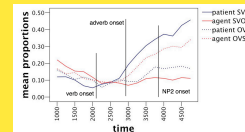


- In the inferential analysis of look durations, there is an interaction of character and structure for the verb region and the adverb region

=> Rapid use of depicted events from plausible scenes for syntactic disambiguation

Experiment 2: Co-presence

- Overall pattern similar to Experiment 1: Before the onset of the adverb looks to the patient in SVO and to the agent in OVS rise
- Early looks towards patient in both conditions are missing

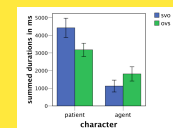
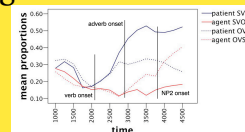


- Interactions for both regions in the analysis by items
- In the verb region, only looks to the patient in SVO are significantly longer than in the other conditions

=> Co-presence is not a pre-requisite for the use of depicted events in syntactic disambiguation

Experiment 3: Moving actions

- More looks to patient in both conditions during verb and adverb
- During the adverb looks to the agent in OVS rise slightly



- Interaction effect for the combined region of verb and adverb only

=> Animated and completed actions retain a diminished influence on syntactic disambiguation

Discussion

Comparison to Knoeferle et al. (2005):

- In Experiments 1 & 2, the effect is found for the verb and adverb region, whereas in Knoeferle et al. (2005) it was only present in the adverb region:

=> Disambiguation happens more rapidly in plausible scenes

Recently inspected events:

- When scenes were absent during utterance presentation, participants still directed looks to the regions where referents used to be (Spivey&Geng 2001) and results closely resembled the ones from Experiment 1
 - This supplements findings for event information in unambiguous contexts (Knoeferle&Crocker 2007)
- When actions were already completed, the effect was weakened and delayed

Why do completed events have less influence?

1. Orientation of characters:

- Early looks to the patient in both conditions (Experiment 1) could be due to the orientation of the ambiguous, first mentioned character towards the patient
- In the absence of the scene (Experiment 2), orientation does not seem to matter
- When event information is not immediately available (Experiment 3) orientation information may take priority over it

2. Accessibility:

- Completed events are less accessible from working memory (Kurby&Zacks 2008)

Depicted events can be used for syntactic disambiguation in the context of:

- Plausible scenes
- Recently inspected but not co-present scenes
- Animated scenes where actions are completed before the utterance starts

References

- Kurby, C. A., & Zacks, J. M. (2008). Segmentation in the perception and memory of events. *Trends in Cognitive Sciences*, 12 (2), 72-79.
- Knoeferle, P., Crocker, M. W., Scheepers, C., & Pickering, M. J. (2005). The influence of the immediate visual context on incremental thematic role assignment. *Cognition*, 95, 95-127.
- Knoeferle, P., & Crocker, M. W. (2007). The influence of recent events on spoken language comprehension: evidence from eye movements. *Journal of Memory and Language*, 57 (2), 519-543.
- Spivey, M., & Geng, J. (2001). Oculomotor mechanisms activated by imagery and memory: eye movements to absent objects. *Psychological Research*, 65, 235-241.