

A reactivation advantage for sluicing antecedents in German



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Background

- ▶ Sluicing is a kind of clausal ellipsis that leaves behind a *wh*-pronoun:

I saw Peter but I don't remember where_i ____.
____ = I saw Peter t_i

- ▶ The antecedent (I saw Peter (t_i)) needs to be interpreted at the ellipsis site (= gap) to yield the meaning of the second clause
- ▶ How is this achieved during on-line processing?

Copy α (Frazier & Clifton, 2001)

There is a special, 'cost-free' mechanism for copying syntactic structure from antecedent to gap.

'Pointer'/'structure sharing' approach (Martin & McElree, 2008; Frazier & Clifton, 2005)

The gap acts a kind of hyperlink to the antecedent structure in memory.

- ▶ An alternative view without additional assumptions:

The 'reconstruction' approach

Syntax is constructed at the gap in the 'normal' way, even though there is no phonological content.

- ▶ A 'reconstruction' account is compatible with a number of proposals from theoretical linguistics (e.g. Merchant, 2001)

Previous work

Hypothesis

If reconstruction takes place at the ellipsis site, and if building syntax is costly, increasing the antecedent's syntactic complexity should increase processing time. (Frazier & Clifton, 2001)

- ▶ Murphy (1985) found that increasing antecedent complexity led to increased reading times for sentences containing a VP ellipsis
- ▶ Martin & McElree (2008) and Frazier & Clifton (2000) found no such effect
- Missing antecedent complexity effects suggest that no structure needs to be built at the ellipsis site, contra the reconstruction account
- However, the effect may have been absent due to insufficient statistical power and/or superficial processing on part of the participants (cf. Phillips & Parker, 2014)

Some notes on German

- ▶ German allows both SVO and OVS word order in main clauses:

A. Der Bulle sah den Bauern. B. Den Bullen sah der Bauer.
the bull.nom saw the farmer.acc the bull.acc saw the farmer.nom
'The bull saw the farmer.' 'The farmer saw the bull.'

- ▶ When case marking on the initial NP is ambiguous, a garden-path effect appears upon disambiguation if the clause has OVS order (Meng & Bader, 2000)

- ▶ This suggests that SVO is the canonical order and that OVS requires reanalysis
- ▶ Disambiguation can be achieved through number marking on the finite verb:

C. Welche Kühe sah die Bäuerin?
which cows.nom/acc saw.sg the farmer.fem.nom/acc
'Which cows did the farmer see?'

D. Welche Kühe sahen die Bäuerin?
which cows.nom/acc saw.pl the farmer.fem.nom/acc
'Which cows saw the farmer?'

Research question

If the antecedent of an ellipsis is a garden-path structure, does the garden-path reappear at the ellipsis site?

- ▶ Copy α and the pointer approach say NO: The antecedent can be copied/accessed 'as-is', no matter if reanalyzed or not
- ▶ The reconstruction approach says YES, POSSIBLY: If the parser does not remember its mistake, reanalysis should happen again

Experimental design and procedure

- ▶ Non-cumulative self-paced reading, '»' indicates presentation regions
- ▶ 2 × 2 design: Case ambiguity (a./b. vs. c./d.) × Word order (a./c. vs. b./d.)

a./b. Eine Sprecherin des Pharmakonzerns_{NP1} » hatte_nAUX »
A.nom/acc spokeswoman of the pharmaceutical company had.sg|had-pl

c./d. Einjen Sprecher des Pharmakonzerns_{NP1} » hatte_nAUX »
A.nom|A.acc spokesman of the pharmaceutical company had.sg|had-pl

die Sportler_{NP2} » nach Angaben der Presse » persönlich getroffen,
the athletes.nom/acc after indications of the press personally met

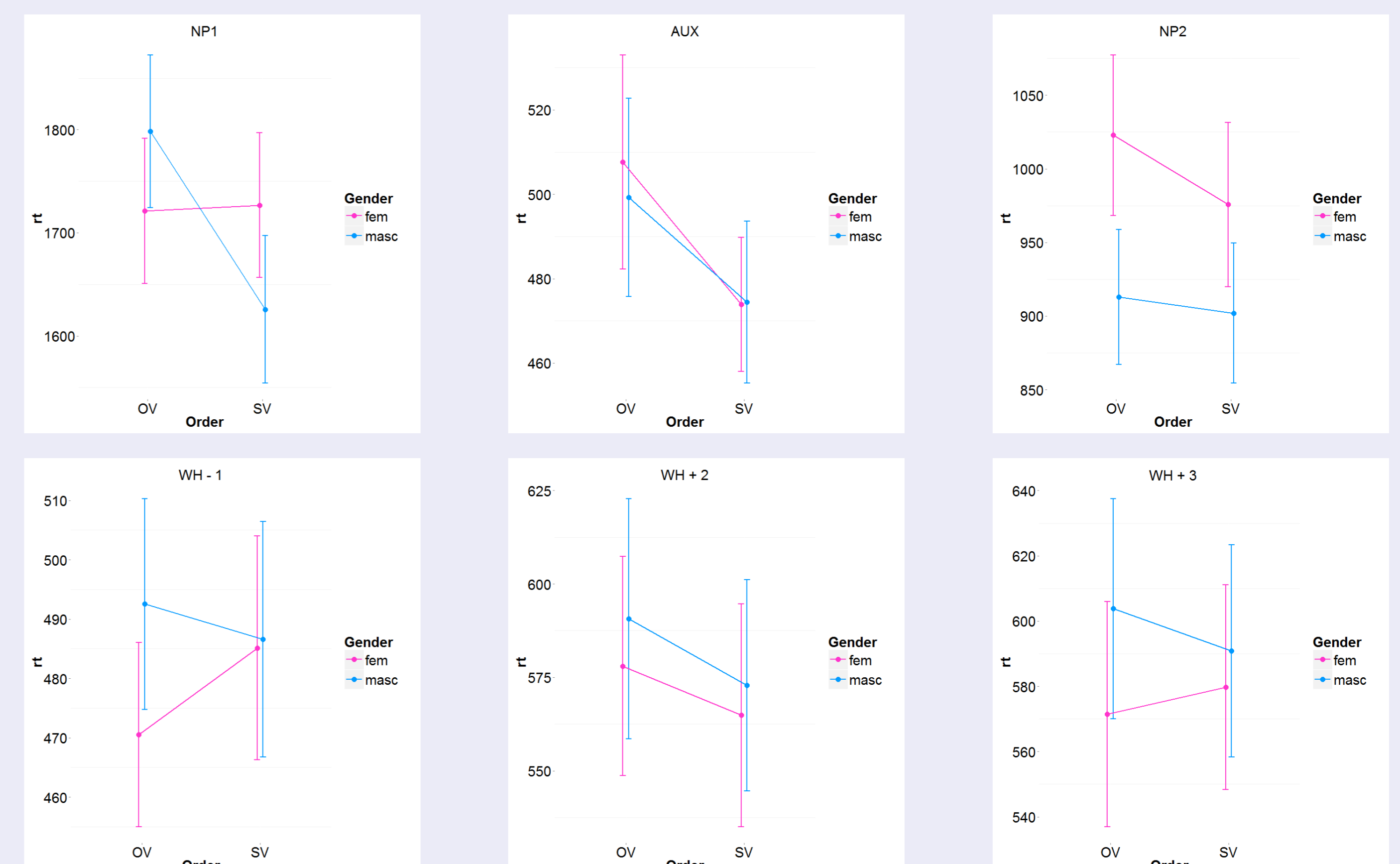
» aber » die Quelle » konnte » nicht » mitteilen, » wo_{WH1} » sodass » die
but the source could not tell where so that the

Geschichte » den meisten Lesern » wahrscheinlich » nicht sehr
story the most readers probably not very

glaubwürdig erschien.
believable seemed

- ▶ Antecedent ends at *getroffen*, 'met'; *wo*, 'where' marks the ellipsis site
- ▶ Word order (SVO vs. OVS) is disambiguated by agreement on the auxiliary *hatte(-n)*, 'had'(-pl), which agrees either with *spokes(wo)man* or with *athletes*
- ▶ 60 participants, 32 items, 96 fillers
- ▶ Most comprehension questions targeted either the *wh*-pronoun, the ellipsis or the antecedent

Results



- ▶ **NP1:** Main effect of Order ($t = 3.8$), Gender × Order interaction ($t = -3.96$); **AUX:** Main effect of Order ($t = 2.03$); **NP2:** Main effect of Order ($t = 3.43$), main effect of Gender ($t = 3.36$), Gender × Order interaction ($t = 2.03$); **WH-1*:** Gender × Order interaction ($t = -2.34$); **WH+2:** Main effect of Order ($t = 2.06$); **WH+3:** Gender × Order interaction ($t = -2.06$)

* This finding is entirely post-hoc. There was no hypothesis regarding this region.

Discussion

- ▶ Region NP2 showed the expected garden-path (= reanalysis) effect for the antecedent: The region is read more slowly with ambiguous case marking and OVS disambiguation
- ▶ Overall, reading time patterns at the ellipsis site weigh against a reconstruction approach but are principally in line with pointer- or copy-based accounts:
 - ▶ Reanalyzed OVS antecedents were processed fastest at WH+3 – the opposite of what reconstruction would predict
 - ▶ The advantage may be explained if reanalysis leads to reactivation of the antecedent's memory trace, aiding retrieval (Lewis & Vasishth, 2005)
- ▶ Results at WH-1 suggest that readers may have engaged in predictive processing (e.g. Levy, 2008)
- ▶ The observed disadvantage for non-reanalyzed OVS antecedents may be explained by the Recycling Hypothesis (Arregui et al., 2006), which claims that 'marked' antecedents are more difficult to recover

References. Arregui et al. (2006). *J Mem Lang*, 55(2), 232–246. Frazier & Clifton (2000). *J Psycholinguist Res*, 29(2), 125–140. — (2001). *Syntax*, 4(1), 1–22. — 2005. *Syntax*, 8(2), 121–174. Levy (2008). *Cognition*, 106, 1126–1177. Martin & McElree (2008). *J Mem Lang*, 58(3), 879–906. Meng & Bader (2000). *Lang Speech*, 43(1), 43–74. Merchant (2001). Oxford University Press. Murphy (1985). *J Mem Lang*, 24(3), 290–303. Phillips & Parker (2014). *Lingua*, 151, 78–95. Lewis & Vasishth (2005). *Cognitive Sci*, 29, 375–419.