Antecedent ambiguity and ellipsis: Testing the reactivation account

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Previous work

- In a self-paced reading study, Paape (2015) investigated sluicing with temporarily ambiguous antecedents to compare the predictions of copy-/pointer- and reconstruction-based accounts of ellipsis processing

Copying/Pointer

The syntactic structure of the antecedent can be accessed in memory and 'shared' by the ellipsis (Frazier & Clifton, 2001/5; Martin & McElree 2008).

Reconstruction

The antecedent is retrieved without structure and parsed from scratch (most compatible with the account of Kim et al. 2011).

- The experiment manipulated Word order (SVO vs. OVS, a/c vs. b/d) and Case marking of the first NP (ambiguous vs. unambiguous, a/b vs. c/d)

a./b. Eine Sprecherin des Pharmakonzerns$_{NP1}$ » hatte|n$_{AUX}$ »
A.nom/acc spokeswoman of the pharmaceutical company had.sg|had-pl

c./d. Ein|en Sprecher des Pharmakonzerns$_{NP1}$ » hatte|n$_{AUX}$ »
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)$_{WH}$, » 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

- Paape found a garden-path effect for the antecedent in the OVS/ambiguous condition, along with a significant Word order × Case marking interaction three regions after the sluicing site
- Unexpectedly, at the ellipsis site the garden-path condition with non-canonical OVS word order was read faster than its counterpart with SVO word order while the OVS control condition was read more slowly than its SVO counterpart
- The results are incompatible with a reconstruction approach, but cannot be explained straightforwardly by the copying/pointer approach either

The reactivation (+ mismatch) hypothesis

- Paape (2015) explained the finding in terms of reactivation of the antecedent's memory trace through reanalysis, coupled with a mismatch penalty for OVS antecedents
- German subordinate clauses are verb-final:

aber die Quelle konnte nicht mitteilen, . . .
but the source could not tell
wo ein Sprecher die Sportler getroffen hatte. SVO → SOV
where a spokesman.nom the athletes met had.sg
?? wo einen Sprecher die Sportler getroffen hatten. OVS → OSV
where a spokesman.acc the athletes met had.pl
wo die Sportler einen Sprecher getroffen hatten. OVS → SOV
where the athletes a spokesman.acc met had.pl

- Mismatch between antecedent and ellipsis site's structure is stronger for the OVS conditions – the penalty is in line with Arregui et al.'s (2006) recycling hypothesis or with imperfect cue matching in a retrieval-based parsing architecture (Lewis & Vasishth, 2005)
- Cue-based retrieval parsing also predicts that syntactic chunks in memory are reactivated when they are retrieved for reanalysis, which explains why OVS/ambiguous is processed faster
- Activation decay never cancels the reactivation effect completely: $\ln\left(\sum_{j=1}^{n} t_j^{-d}\right)$

The current study

- Since the reactivation hypothesis of Paape (2015) was conceived post-hoc, further investigations are in order
- We used a different variety of ellipsis – bare argument ellipsis, or 'stripping' – as well as a different ambiguity (dative/genitive instead of nominative/accusative)
- No antecedent-ellipsis mismatch was present in this experiment, but the reactivation advantage should still be visible

Experimental design and procedure

- Non-cumulative self-paced reading, '»' indicates presentation regions
- 2 × 2 design: Case ambiguity × Structure

A-AA Der Makler » wollte » [die Sommerhäuser] » [der ehemaligen
the realtor wanted the summer houses the.gen/dat former
Bürgermeisterin » und » dem reichen Apotheker] » verkaufen,
mayor and the.dat wealthy pharmacist sell

A-AM Der Makler » wollte » [die Sommerhäuser » [der ehemaligen
the realtor wanted the summer houses the.gen/dat former
Bürgermeisterin » und » des reichen Apothekers]] » verkaufen,
mayor and the.gen wealthy pharmacist sell

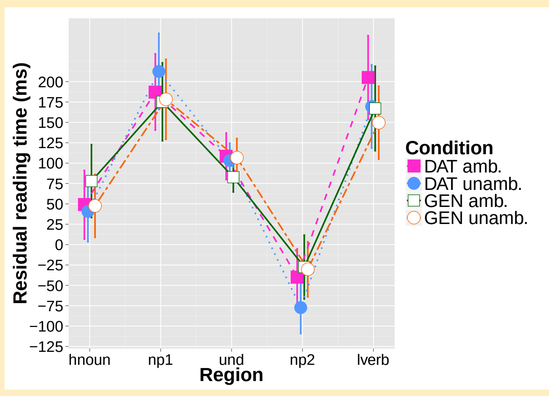
U-AA Der Makler » wollte » [die Sommerhäuser] » [dem ehemaligen
the realtor wanted the summer houses the.dat former
Bürgermeister » und » dem reichen Apotheker] » verkaufen,
mayor and the.dat wealthy pharmacist sell

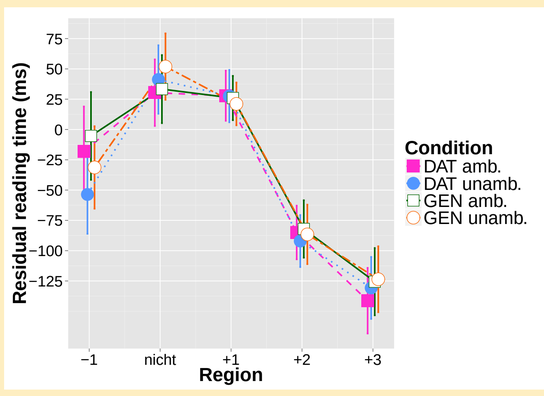
U-AM Der Makler » wollte » [die Sommerhäuser » [des ehemaligen
the realtor wanted the summer houses the.gen former
Bürgermeisters » und » des reichen Apothekers]] » verkaufen,
mayor and the.gen wealthy pharmacist sell
aber der Vorgesetzte mit der lächerlichen Frisur (nicht)$_{NOT}$, da der Preis
but the superior with the silly haircut not, since the price
erst noch weiter steigen sollte.
first still further rise should

- Antecedent ends at *verkaufen*, 'sell'; *nicht*, 'not' marks the ellipsis site
- Structure (ARG-MOD vs. ARG-ARG) is disambiguated by overt case marking on the *pharmacist* NP
- 60 participants, 32 items, 96 fillers
- Comprehension test with its own design:

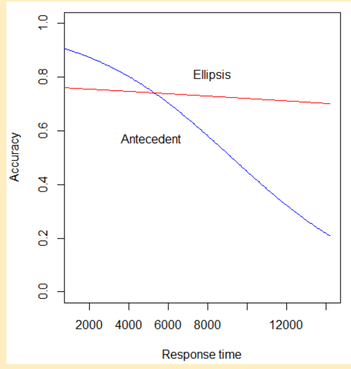
a. The realtor wanted to sell summer residences. Antecedent target, TRUE
b. The realtor did not want to sell summer residences. Antecedent target, FALSE
c. The superior wanted to sell summer residences. Ellipsis target, FALSE
d. The superior did not want to sell summer residences. Ellipsis target, TRUE

Results





- **Antecedent**: Main effect of Structure (t = -2.78), Case ambiguity × Structure interaction (t = 1.99) at **NP2**
- **Ellipsis**: No significant effects
- **Comprehension accuracy**: Main effects of Case ambiguity (z = -2.4), log(RT) (z = -3.19); Case ambiguity × Structure interaction (z = -2.69); Target × log(RT) interaction (z = 2.88); Case ambiguity × Structure × Target interaction (z = 2.11)



Target	Case	Ambiguity	Accuracy
Antecedent	DAT	Ambiguous	0.67
Antecedent	DAT	Unambiguous	0.89
Antecedent	GEN	Ambiguous	0.84
Antecedent	GEN	Unambiguous	0.83
Ellipsis	DAT	Ambiguous	0.71
Ellipsis	DAT	Unambiguous	0.76
Ellipsis	GEN	Ambiguous	0.76
Ellipsis	GEN	Unambiguous	0.77

Discussion

- No additional evidence in favor of the reactivation hypothesis; however

→ Null result for ellipsis in RTs may not be informative since the garden-path effect was smaller than in the sluicing study (30 ms vs. 100 ms)

→ Comprehension results may indicate that participants did not always create a detailed parse of the ellipsis, but used a "good-enough" heuristic instead

References. Arregui et al. (2006). *J Mem Lang*, 55(2), 232–246. Frazier & Clifton (2001). *Syntax*, 4(1), 1–22. — 2005. *Syntax*, 8(2), 121–174. Kim et al. (2011). *Syntax*, 14(4), 318–354. Lewis & Vasishth (2005). *Cognitive Sci*, 29, 375–419. Martin & McElree (2008). *J Mem Lang*, 58(3), 879–906. Paape (2015). Poster presented at CUNY 2015.