

1. Introduction

Agreement attraction in comprehension: the number mismatch at the verb elicits reduced processing difficulty when an interfering noun, the so-called attractor (*test tubes*), bears the same number marking as the ungrammatical verb [1,2,3].

**The chemist with the test tubes are conducting an experiment.*

Most agreement attraction research has focused on non-obligatory PP-modifier attractors [2,3]. Obligatory Direct Object (DO) attractors have mainly been investigated in production studies [4].

Research question: Can DOs elicit agreement attraction in comprehension?

In previous ERP research, attraction has been found to reduce the P600 amplitude in ungrammatical sentences compared to non-attraction stimuli [2]. This finding has not been reported for DO configurations (however, see [5] for first ERP study on DO constructions in context of attraction).

Predictions:

- (i) Increased P600 for ungrammatical items
- (ii) If DO configurations are susceptible to attraction:
 - Reduced P600 in case of agreement attraction (Ungram, DO plural vs Ungram, DO singular)

2. Design

2 × 2 fully-crossed factorial design

- Factor 1: Number of attractor NP (sg vs pl)
- Factor 2: Grammaticality of verb (gram vs ungram)
- Bayesian LMM with predictors: attraction (-0.5 vs 0.5), grammaticality (-0.5 vs 0.5), their interaction
- 26 participants
- 120 experimental items (German SOV structures) + 140 filler items
- Items presented in RSVP mode (SOA = 450ms)
- ERP recordings with acceptability judgments

3. Materials

Item structure: matrix clause + subordinate clause I (SOV) + subordinate clause II (...)

ERPs were recorded at the verb (underlined) of subordinate clause I.

Grammatical sentences (singular DO/ plural DO)

Pia erzählt, [CP dass der Mann_{NOM.SG} die Frau_{ACC.SG} gestern heimlich beobachtete_{SG}], ...

[CP dass der Mann_{NOM.SG} die Frauen_{ACC.PL} gestern heimlich beobachtete_{SG}], ...

Pia says [CP that the man_{SG} the woman_{DO}/ the women_{DO} yesterday secretly watched_{SG}], ...

Ungrammatical sentences (singular DO/ plural DO)

Pia erzählt, [CP dass der Mann_{NOM.SG} die Frau_{ACC.SG} gestern heimlich *beobachteten_{PL}], ...

[CP dass der Mann_{NOM.SG} die Frauen_{ACC.PL} gestern heimlich *beobachteten_{PL}], ...

Pia says [CP that the man_{SG} the woman_{DO}/ the women_{DO} yesterday secretly *watched_{PL}], ...

'Pia says that the man secretly watched_{SG/PL} the woman/women ...'

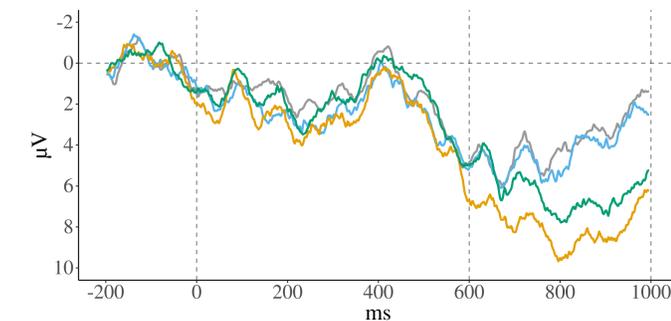
References

- [1] Wagers, Lau & Phillips (2009). *Journal of Memory and Language*. [2] Tanner, Nicol & Brehm (2014). *Journal of Memory and Language*. [3] Lago, Shalom, Sigman, Lau & Phillips (2015). *Journal of Memory and Language*. [4] Hartsuiker, Antón-Méndez & Van Zee (2001). *Journal of Memory and Language*. [5] Kaan (2002). *Journal of Psycholinguistic Research*.

4. Results & Conclusion

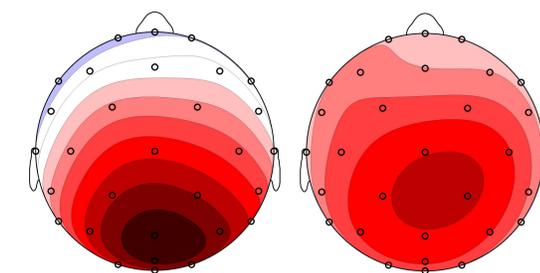
Analysis: mean amplitude at Pz from 600-1000ms

1. Reliable effect of grammaticality (Est. = 3.03 μV, 95% CrI = [1.64, 4.43])
 - Increased positivity for ungrammatical sentences (Ungram, DO singular; Ungram, DO plural) → P600 effect
2. Reliable interaction of grammaticality and attractor number (Est. = -2.07 μV, 95% CrI = [-3.59, -0.55])
 - Decreased positivity for ungrammatical sentences with plural attractors (Ungram, DO plural) → agreement attraction
 - No comparable effect for grammatical sentences



—Gram, DO sg—Gram, DO pl—Ungram, DO sg—Ungram, DO pl

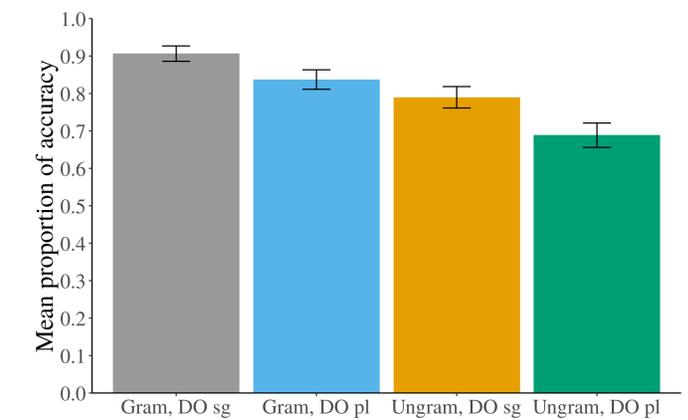
ungrammatical - grammatical singular - plural (both ungram)



600 ms - 1000 ms
-2.86 μV 0 μV 2.86 μV

Behavioral Results

1. Reliable effect of grammaticality (Est. = -0.97 log odds, 95% CrI = [-1.64, -0.28] log odds)
 - Decreased judgment accuracy for ungrammatical conditions (Ungram, DO singular; Ungram, DO plural)
2. Reliable effect of attractor number (Est. = -0.75 log odds, 95% CrI = [-1.03, -0.46] log odds)
 - Decreased judgment accuracy for plural attractor conditions (Gram, DO plural; Ungram, DO plural) → agreement attraction



Conclusion

1. Evidence for attraction in DO configurations
 - Reduced P600 if attractor number matches with the ungrammatical verb → asymmetrical attraction.
 - Attraction can be elicited by obligatory constituents.
 - Results are consistent with [2].
2. Evidence for long lasting effect of agreement attraction
 - Plural attractor reduced accuracy in both grammatical and ungrammatical sentences → symmetrical attraction.
3. First ERP evidence for agreement attraction in German