

1. Agreement Attraction and Processing Accounts

Agreement attraction errors are characterized by the verb's faulty number mismatch with the subject (*chemist*) and its simultaneous match with the attractor (*test tubes*).

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

They occur during the comprehension of subject-verb dependencies [1,2,3] and are **asymmetrical**:

- They occur more often with sg subject heads and pl attractors
- They mostly affect ungrammatical sentences, where the subject head and verb mismatch in number

Two alternative accounts based on content-based memory retrieval have been proposed [1,3]:

- Memory retrieval account
 - Cue-based retrieval always occurs during agreement processing
 - Verb number is used as a cue to retrieve subject
- Error-driven account
 - Reanalysis specifically caused by subject-verb number mismatch
 - Cue-based retrieval to find matching noun to resolve mismatch

2. Link to the P600

The P600 has been interpreted in terms of reanalysis (e.g. [4]).

Consequences for processing accounts:

- Memory retrieval account → no P600 modulations due to lack of reanalysis
- Error-driven account → P600 modulations due to reanalysis

3. Predictions

- P600 for ungrammatical items
- Memory retrieval account
 - No reduced P600 in case of agreement attraction (**pl, ungram** vs **sg, ungram**)
- Error-driven account
 - Reduced P600 in case of agreement attraction (**pl, ungram** vs **sg, ungram**)

4. Design

2 × 2 fully-crossed factorial design

- Factor 1: Number of attractor NP (sg vs pl)
- Factor 2: Grammaticality of verb (gram vs ungram)

- 33 participants (26 included into analysis)
- Items presented in RSVP mode (SOA = 450ms)
- Method: ERP technique
- Task: acceptability judgments

5. Materials

120 experimental items (German SOV structures) + 140 filler items

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

Condition	Matrix Clause	Subject	Attractor	Adverb I	Adverb II	Verb (critical region)	
sg, gram			die Frau _{SG}			beobachtete _{SG} ,	
sg, ungram			die Frau _{SG}			beobachteten _{PL} ,	
pl, gram	Pia erzählt, dass	der Mann _{SG}	die Frauen _{PL}	gestern	heimlich	beobachtete _{SG} ,	...
pl, ungram			die Frauen _{PL}			beobachteten _{PL} ,	
	Pia says that	the man _{SG}	the woman/women	yesterday	secretly	watched _{SG/PL}	
	'Pia says that, yesterday, the man secretly watched the woman/women ...'						

6. Results

Linear mixed model:

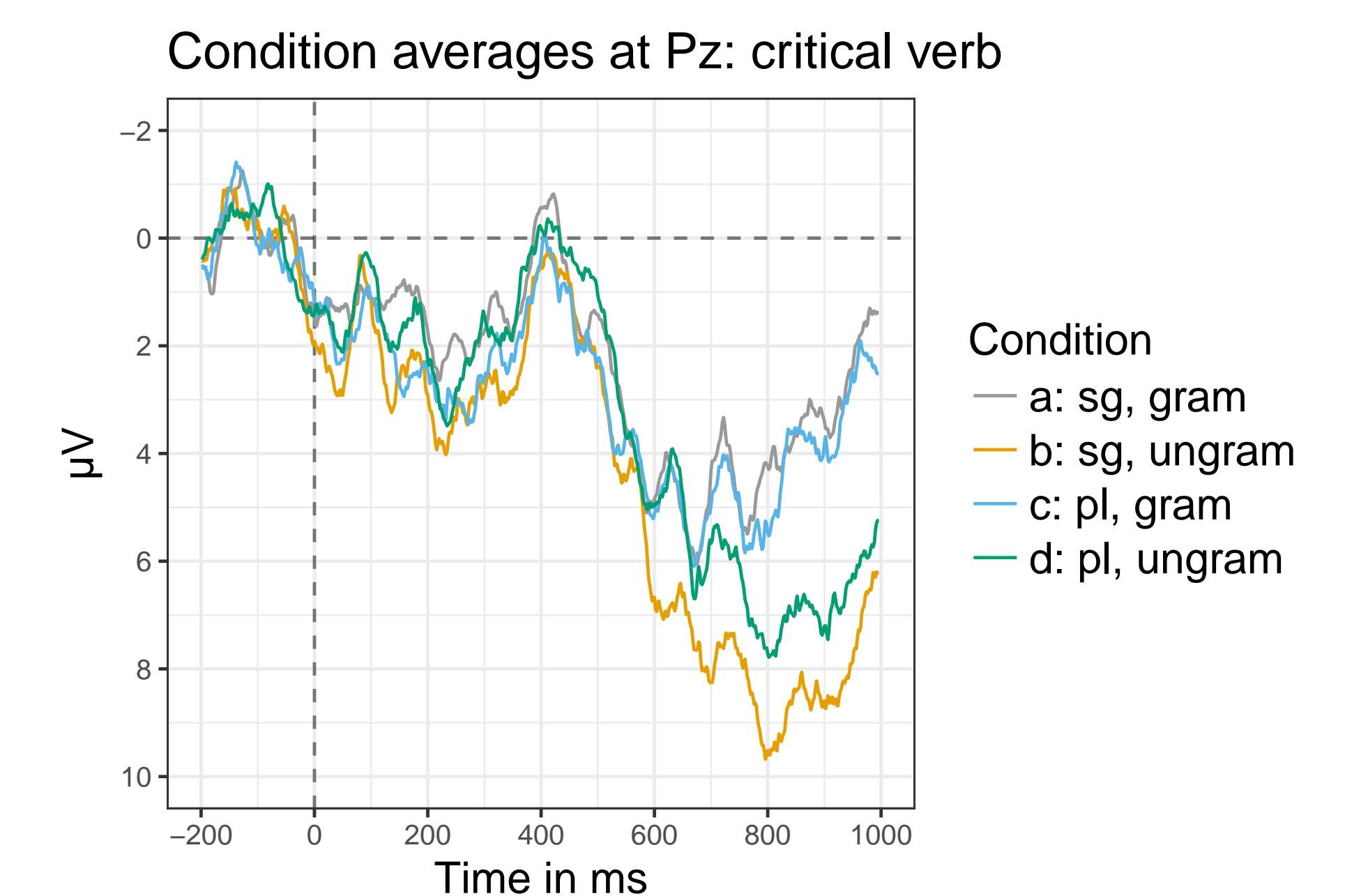
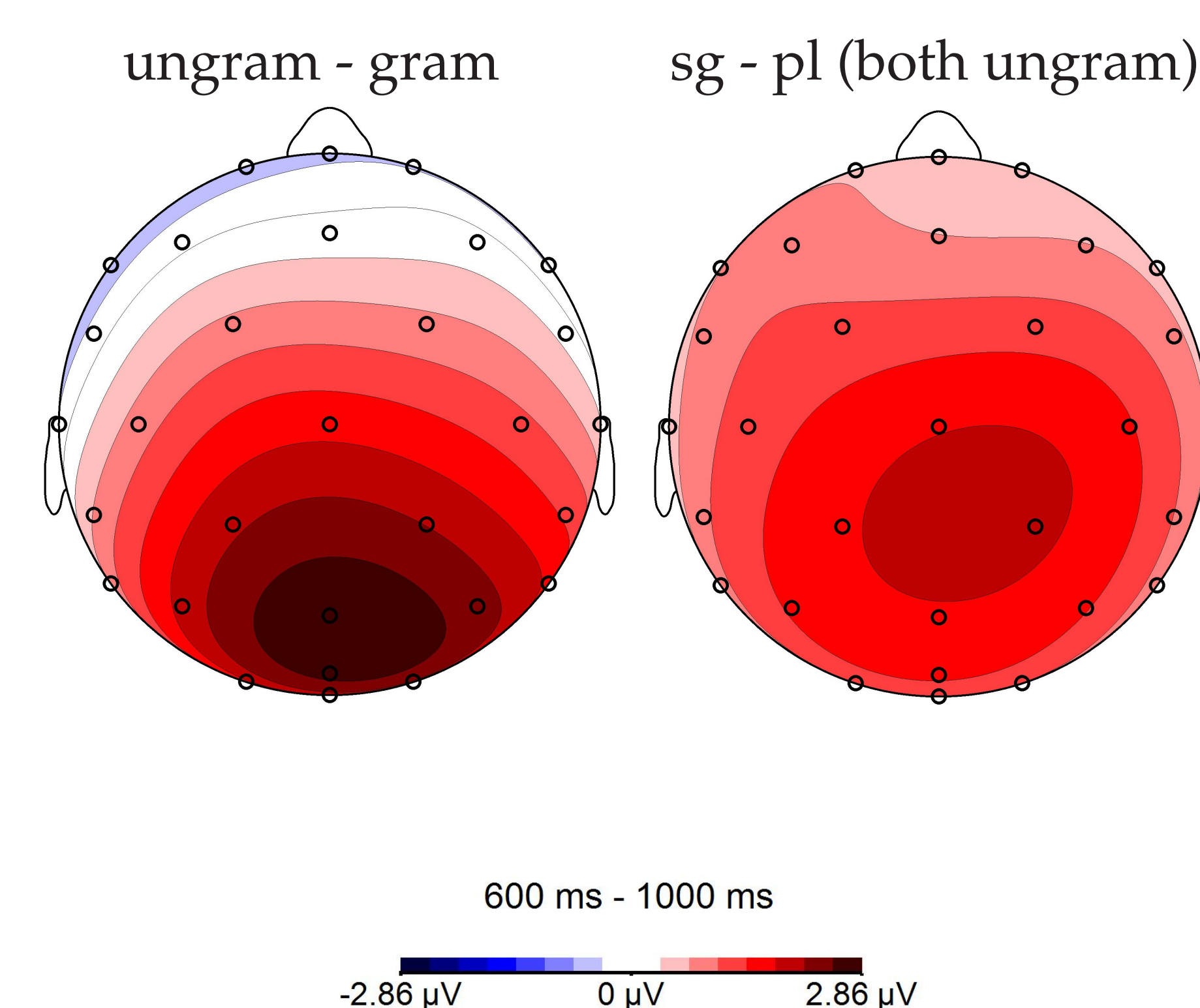
- Predictors: attraction (-0.5 vs 0.5), grammaticality (-0.5 vs 0.5), their interaction
- Maximal random effects structure

Time window: 600 - 1000ms

Electrode: Pz

Effects:

- Reliable effect of grammaticality ($b=3.00$, $t=8.82$)
 - Increased positivity for ungrammatical sentences (**sg, ungram**, **pl, ungram**) → **P600 effect**
- Reliable interaction of grammaticality and attractor number ($b=-2.06$, $t=-2.73$)
 - Decreased positivity for ungrammatical sentences with plural attractors (**pl, ungram**) → **agreement attraction effect**



7. Conclusion

Reduced P600 if attractor number matches with the ungrammatical verb.

1. Support for error-driven account

- Reduction of P600 as indicator of reduced reanalysis

2. Evidence against memory retrieval account

- Would have predicted no modulation of P600

3. Evidence for error-driven account in a syntactic configuration (SOV structures) different from PP-modifiers (see [5] for comparison)

4. First ERP evidence for agreement attraction in German

8. 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] Metzner, von der Malsburg, Vasishth & Rösler (2016). *Cognitive Science*. [5] Kaan (2002). *Journal of Psycholinguistic Research*.