

## 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 <sub>SG</sub>			beobachtetes <sub>SG</sub> ,
sg, ungram			die Frau <sub>SG</sub>			beobachteten <sub>PL</sub> ,
pl, gram	Pia erzählt, dass	der Mann <sub>SG</sub>	die Frauen <sub>PL</sub>	gestern	heimlich	beobachtetes <sub>SG</sub> ,
pl, ungram	Pia erzählt, dass	der Mann <sub>SG</sub>	die Frauen <sub>PL</sub>	gestern	heimlich	beobachteten <sub>PL</sub> ,
	<i>Pia says that</i>	<i>the man<sub>SG</sub></i>	<i>the woman/women</i>	<i>yesterday</i>	<i>secretly</i>	<i>watched<sub>SG/PL</sub></i>
	<i>'Pia says that, yesterday, the man secretly watched the woman/women ...'</i>					

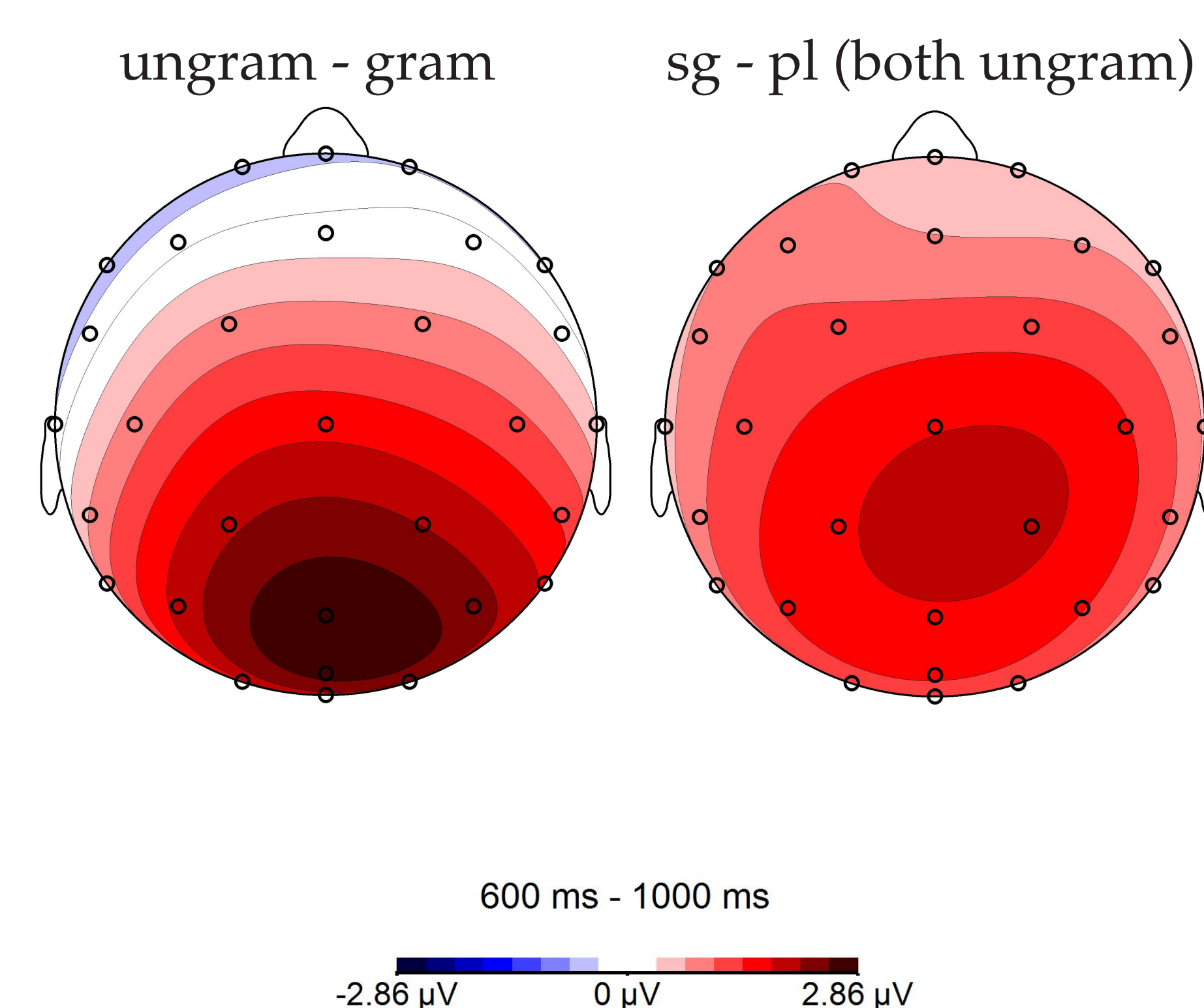
## 6. Results

Linear mixed model:

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

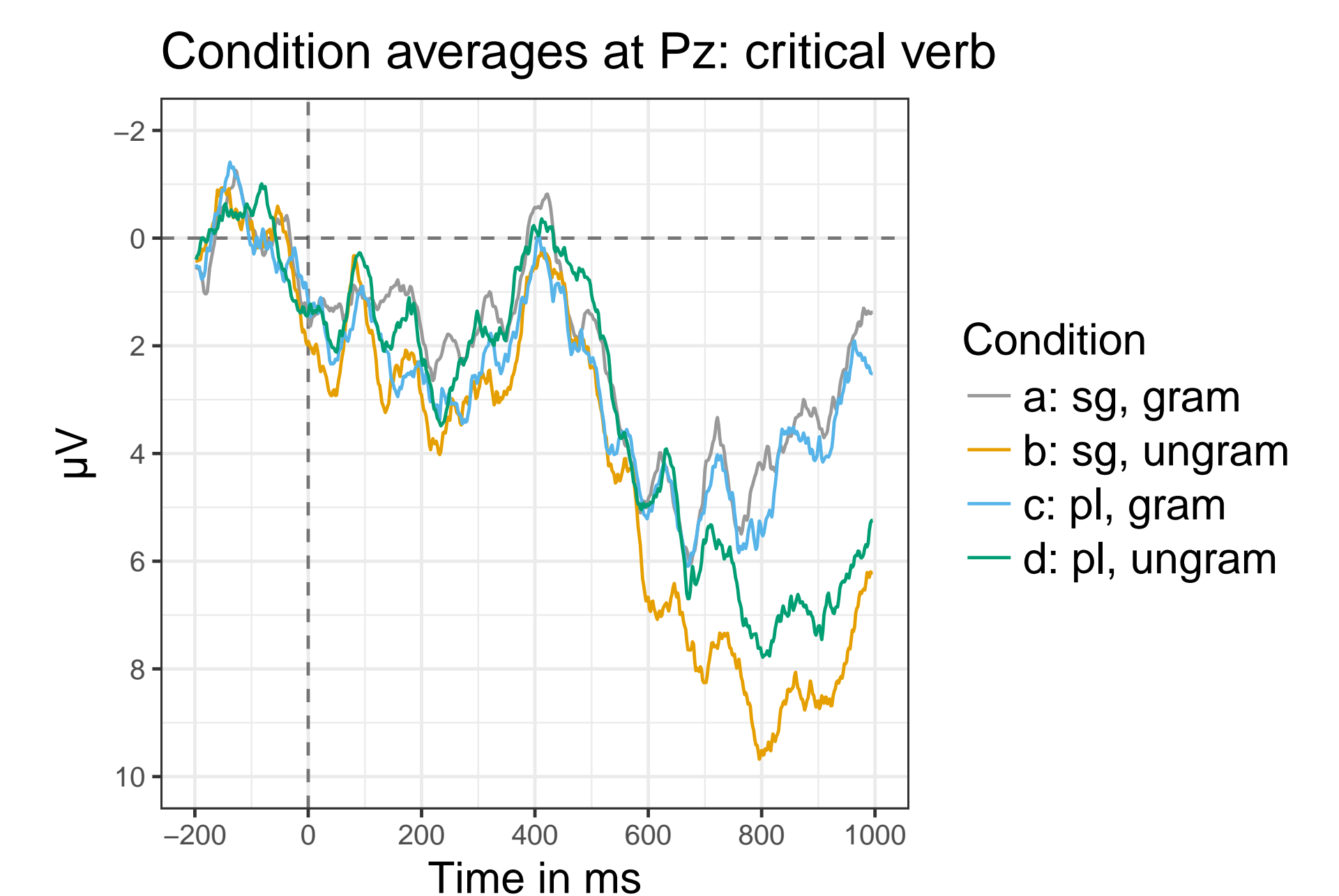
Time window: 600 - 1000ms

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*.