The influence of lexical priming versus event knowledge on the N400 and the P600

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Introduction

- **What is the functional interpretation of the N400 and the P600?**
  - **Integration-Reanalysis view**: N400 = semantic integration, P600 = structural reanalysis (e.g., Brown & Hagoort, 1993).
  - **Retrieval-Integration view:** N400 = lexical retrieval, P600 = semantic integration (Brouwer et al., 2012).
- The two approaches make different predictions about the effects of *lexical priming* vs. *event knowledge activation* on the N400 and the P600.
- We tested these predictions by comparing ERPs to event related (i.e., lexically primed) implausible target words in contexts activating vs. deactivating relevant event knowledge.
  - When event knowledge is deactivated, the event related target should be difficult to integrate into the unfolding representation —> N400 or P600 effect?

Design

Control
• Johann entered the restaurant. Before long he opened the **menu** and …
"Johann betrat das Restaurant. Wenig später öffnete er die Speisekarte und …"

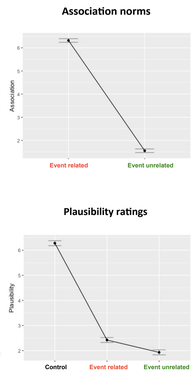
Event related target
• Johann left the restaurant. Before long he opened the **menu** and …
"Johann verließ das Restaurant. Wenig später öffnete er die Speisekarte und …"

Event unrelated target
• Johann entered the apartment. Before long he opened the **menu** and …
"Johann betrat die Wohnung. Wenig später öffnete er die Speisekarte und …"

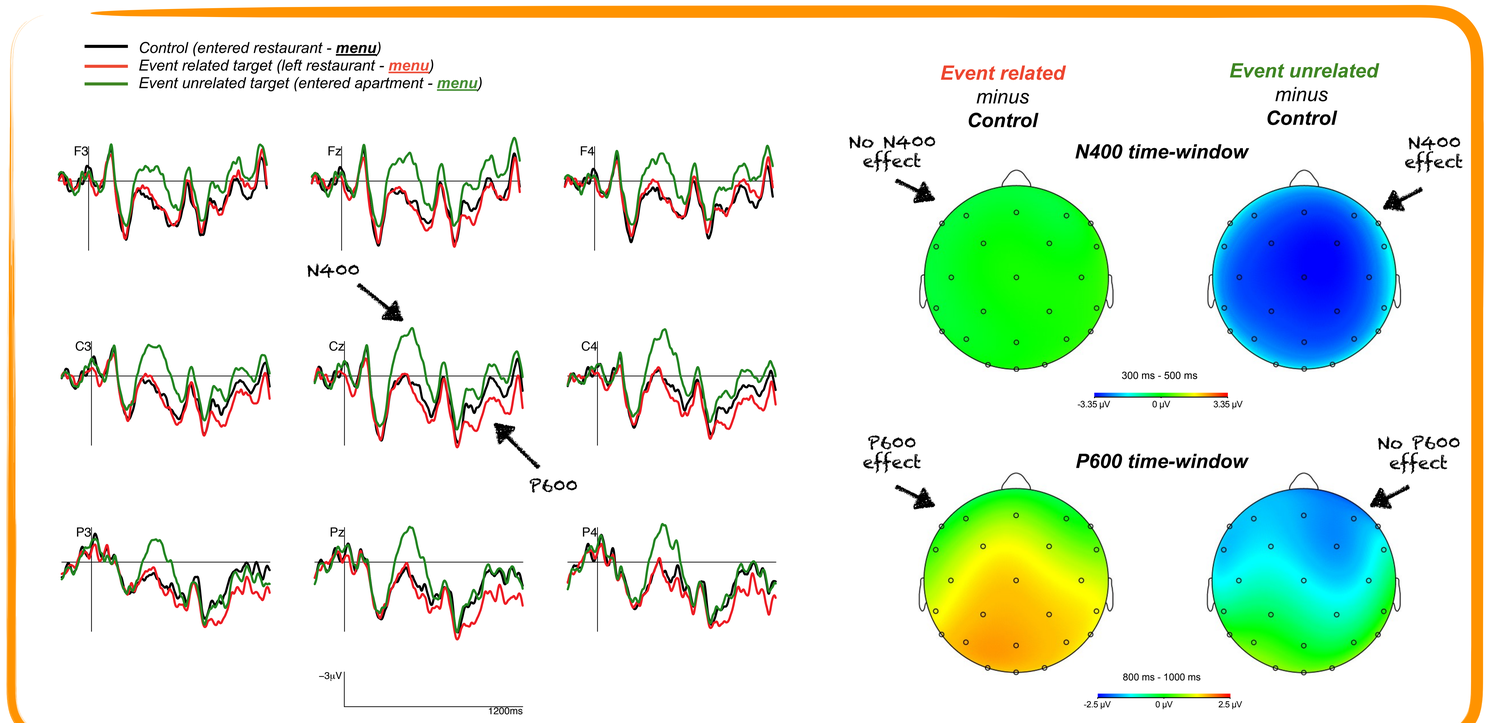
primed / Implausible

Method

- 21 right-handed German speakers.
- 90 items arranged in 3 counterbalanced lists (30 items x condition).
- Two pre-tests:
  - Association norms (on a 1-7 scale how strongly associated are "restaurant-menu" vs. "apartment-menu"?).
  - Plausibility judgments (on a 1-7 scale).
- 90 filler passages including 1/3 same structure, plausible, not primed; 1/3 different structure, plausible, primed; 1/3 different structure, implausible, not primed (more sever violation)
- Yes/No plausibility judgment task
- Target sentence presented word-by-word (350 ms word + 150 ms blank)



Results



Predictions

	Event related **vs. control**	*Event unrelated* **vs. control**
Integration - Reanalysis view	N400 effect No P600 effect	N400 effect No P600 effect
Retrieval - Integration view	No N400 effect P600 effect	N400 effect P600 effect* *if it survives component overlap (Brouwer & Crocker, 2017)

Summary

N400 time-window:
- N400 effect for event unrelated but *not* for event related targets indicates N400 modulations are driven by lexical priming rather than semantic integration difficulty **—>** inconsistent with the Integration view of the N400 (see also Lau et al., 2009).

P600 time-window:
- P600 sensitivity to event knowledge activation suggests the P600 - not the N400 - indexes semantic integration difficulty —> consistent with the Retrieval-Integration account
  - No P600 effect for event unrelated condition might depend on 1) stimuli not resulting in highly implausible scenarios (not uncommon to keep take-away menus at home) and/or component overlap issue (Brouwer & Crocker, 2017)
- Overall, our results are more consistent with the Retrieval-Integration view of the N400 and the P600

N400 = lexical retrieval
P600 = semantic integration

References: Brouwer et al. (2012). *Brain Res*; Brouwer & Crocker (2017). *Front Psychol*; Brown & Hagoort (1993). *JCN*; Lau et al. (2009). *Brain & Lang*