

# ERP time-course of (pseudo-)word form activation and integration



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## Introduction

Comprehending the meaning behind a sentence requires a match between **lower level (feed-forward) lexical form processing** and **higher level (feedback) context expectations**

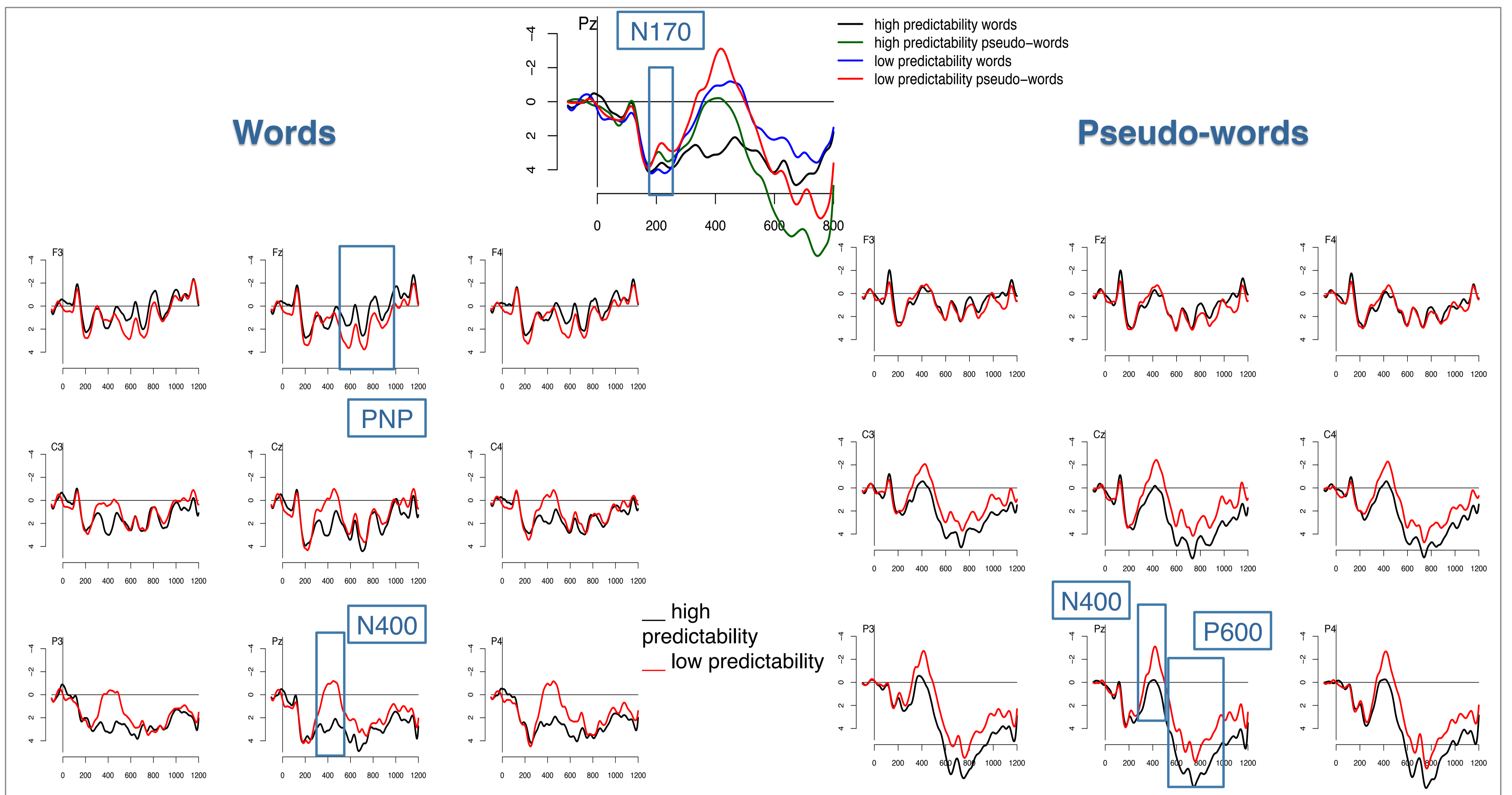
- Lexical processing (P1, N1): word form pre-activation (Kim & Lai, 2012)
- Context predictability:
  - N400 - semantic integration (e.g. Kutas & Federmeier, 2011) vs. word meaning retrieval (Brouwer et al., 2016)
  - P600 - structural revision/verification (e.g. Kuperberg & Jäger, 2016) vs. integration difficulties (Retrieval Integration RI account, Brouwer et al., 2016)
  - PNP (post N400-positivities) - costs of revision; prediction error detection (e.g. Van Petten & Luka, 2012, DeLong et al., 2014)

Does contextual support facilitate/override lexical processing of pseudo-words?  
Do failed attempts at pseudo-word integration suffer the same costs as word integration?

## Methods

- Modified Potsdam Sentence Corpus high frequency target words by replacing a medial letter of the original target words with a similarly shaped letter
- Context sentence **predictability**: high (mean cloze 0.84) vs. low (mean cloze 0.01)
- **Lexicality**: word vs. pseudo-word
- 144 pairs of sentences in German, read by 20 native speakers

## Results

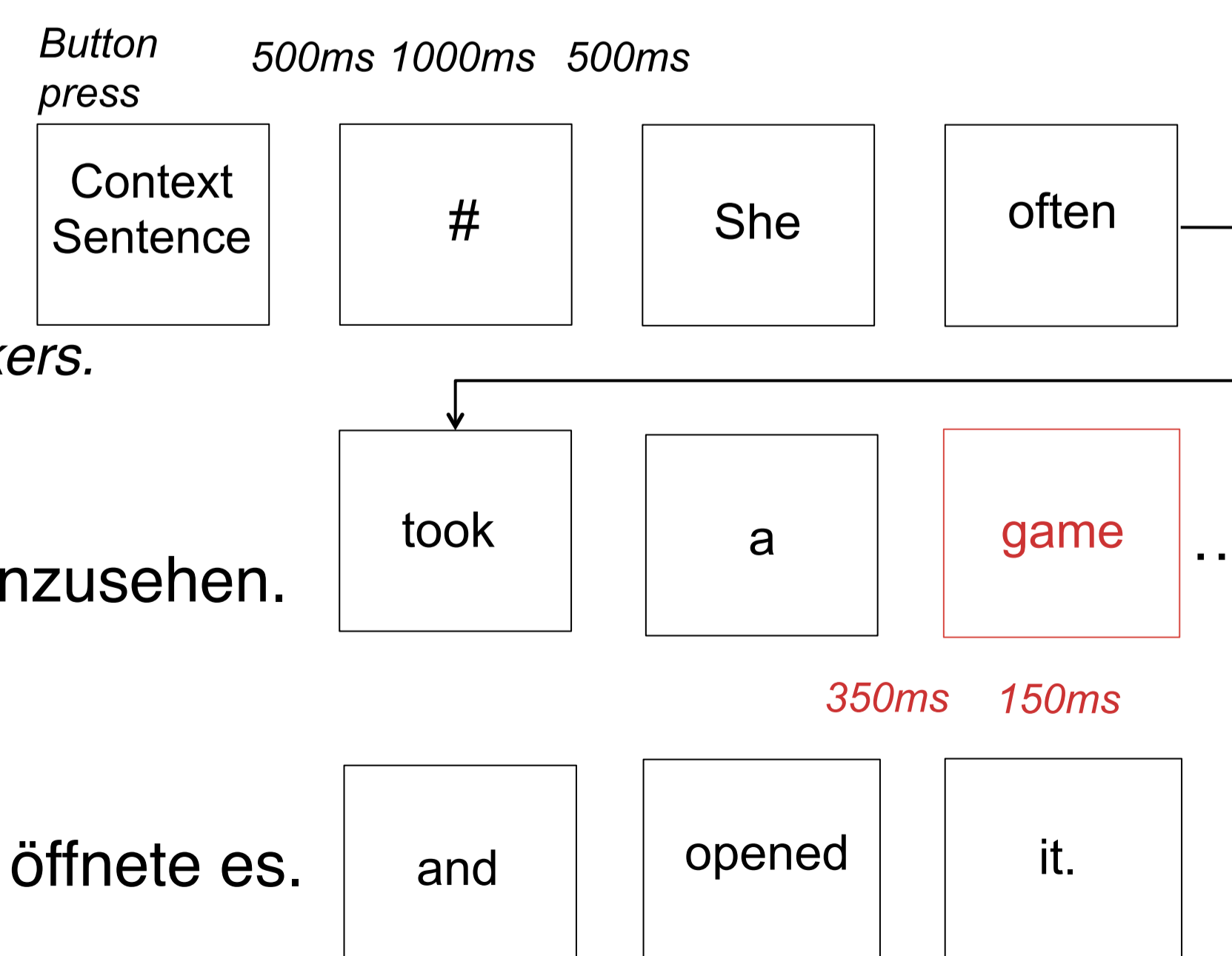


## Design and Procedure

### High predictability context sentence

Caroline liebte es, sich die Zeit mit Schach, Dame oder Mühle zu vertreiben.

*Caroline liked to spend her time playing chess or checkers.*



### Low predictability context sentence

Caroline liebte es, die Fotos aus ihrer Kindheit anzusehen.

*Caroline liked to look at pictures from her childhood.*

### Neutral target sentence

Oft holte sie aus dem Regal ein **Spiel/Spel** und öffnete es.

*She often took a game from the shelf and opened it.*

## Results

### N170 results

- Lexical access to the implausible pseudo-words was hindered compared to words

### N400 results

- Context support facilitated semantic processing for both words and pseudo-words (consistent with both RI and traditional accounts)

### Late positivities

#### • Posterior P600 - pseudo-words

- Compared to words overall, pseudo-word comprehension involved larger integration / revision efforts
- Unsupported pseudo-words' meanings were never accessed and thus never fully integrated in context (RI account), but compare non-pronounceable non-word data which shows a large P600 effect and no N400 effect (Kim & Lai, 2012)
- Supported pseudo-words may have been perceived as misspellings, thus requiring allocation of more resources to repair, compared to unsupported pseudo-words (traditional accounts)

#### • Frontal PNP - words

- Plausible, but unsupported words elicited frontally distributed PNPs, indicating costs of disconfirmed predictions (traditional accounts)

## Conclusions

Word and similar-looking pseudo-word forms are distinguished very early

At N400 time-windows, word and pseudo-word semantic processing is facilitated by supporting contexts

Later, words and pseudo-words elicit positivities with distinct topography

- Frontal PNPs to unexpected words reflect costs of failed predictions
- Posterior P600s reflect stronger attempts to re-integrate and re-process supported pseudo-words