Event knowledge and word associations jointly influence predictive processing during discourse comprehension

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Introduction

- Readers and listeners often anticipate information, an open question concerns the mechanisms underlying predictive language processing.
- Some previous work suggests that predictions involve (at least) partly simple word associations (Kukona et al., 2011; Kuperberg, 2007).
- Other work suggests that readers use event knowledge rather than associations to predict words during discourse comprehension (Metusalem et al., 2012; these authors based on a post-hoc analysis, rejected the possibility that their results could be explained by word associations).
- In the present study we tested the contribution of event knowledge and word associations to prediction during discourse reading: Target words were preceded by associatively related words appearing in coherent discourse context (Exp. 1, Metusalem et al., 2012) or in sentences which did not build up a coherent discourse context (Exp. 2).

Research Question & Hypothesis

- What is the contribution of associative priming to prediction in discourse comprehension (i.e. the graded N400 pattern found by Metusalem et al.)?
- If associative priming contributes to prediction during discourse comprehension, part of the prediction effect should remain in Experiment 2.

Experiment 1: Context manipulation (N = 30)

- Replication of Metusalem et al. (2012) in Dutch.
- Rating studies were conducted to control the materials (e.g. cloze probability, event associations, etc.).

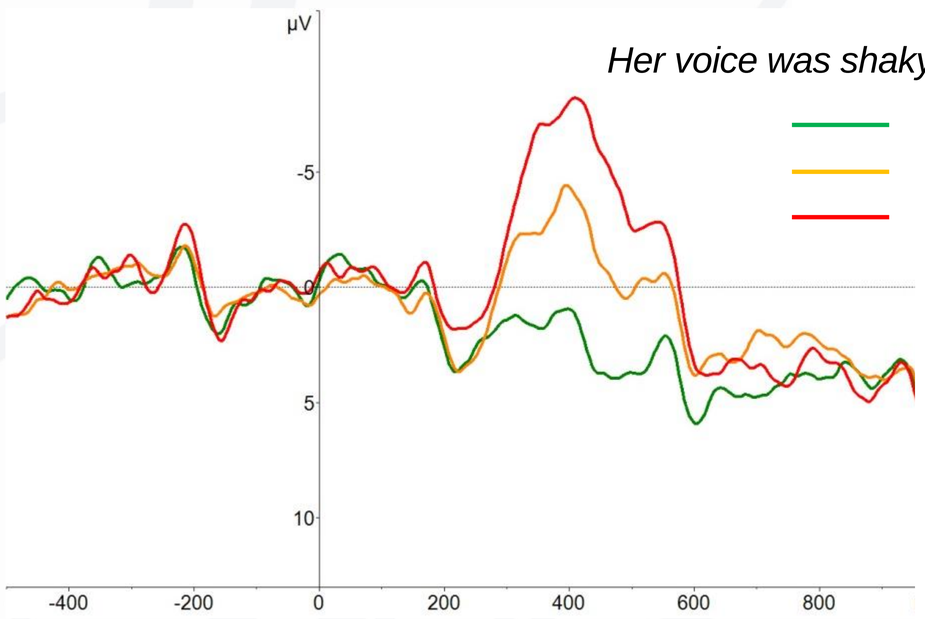
Context sentences:

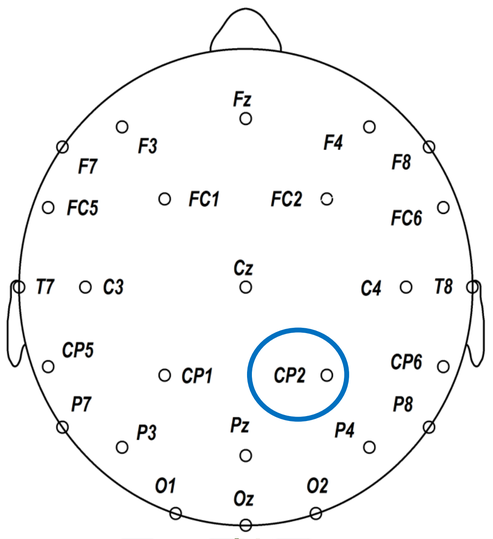
My sister was only twenty when she won a Grammy for her first album. She seemed so nervous as she gave her acceptance speech.

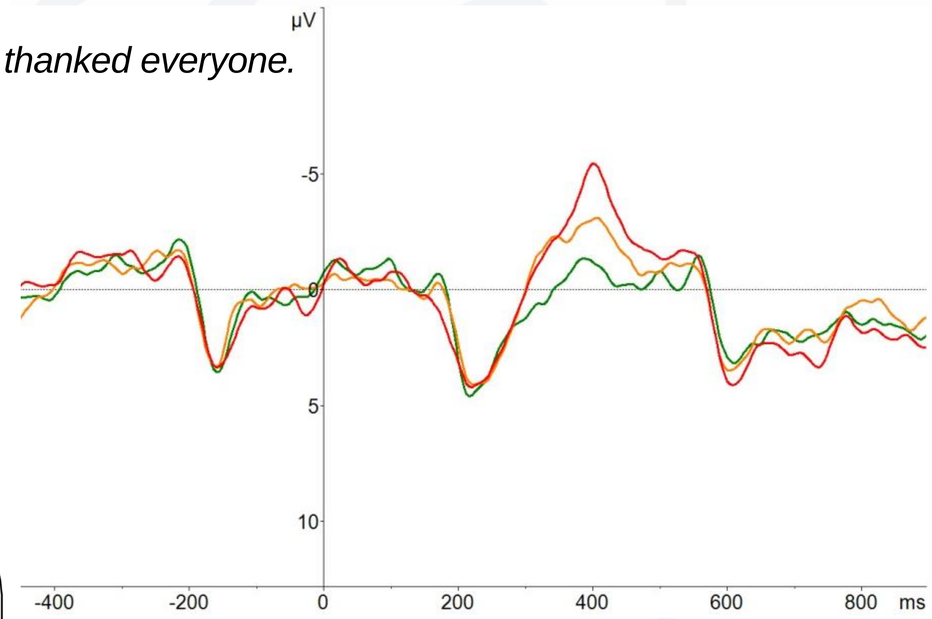
Target sentence:

Her voice was shaky as she spoke into the __ and thanked everyone.

microphone (Expected)
dress (Event-related)
painting (Event-unrelated)







- Three-way split in N400 amplitude was replicated:
  - Expected targets elicited the smallest N400, unexpected and event-unrelated targets elicited the largest N400.
  - Amplitude of the N400 elicited by unexpected but event-related targets was attenuated relative to the amplitude of the N400 elicited by the unexpected and event-unrelated targets.
- Event knowledge modulates anticipatory language processing.

Experiment 2: Priming manipulation (N = 30)

- Two words from the event-establishing sentences (strongly associated with the unexpected but event-related targets) were selected.
- Each was placed in a neutral isolated carrier sentence.

Carrier sentences:

When Susie looked inside she saw a Grammy standing on the table. In one of the boxes Tom found an album he could use.

- N400 amplitudes elicited by the unexpected targets were larger than the N400 amplitude elicited by the expected target.
- The critical difference between event-related and event-unrelated unexpected targets reached statistical significance at parietal electrodes over the right hemisphere.
- Part of the effect observed in Experiment 1remained, most likely due to associative facilitation.

Conclusions

- The presence of a coherent discourse context *and* associative relationships between words affect the N400 amplitude.
- Event knowledge and simple word associations jointly contribute to prediction.
- Multiple mechanisms underlie predictive language processing.

References

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