Hemispheric sensitivity to frequency and prediction: evidence from early and late ERPs

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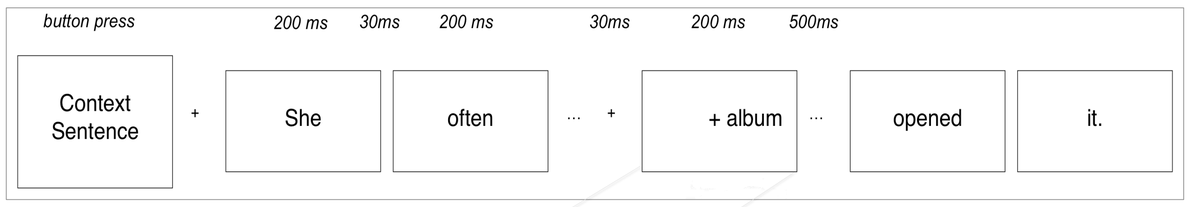
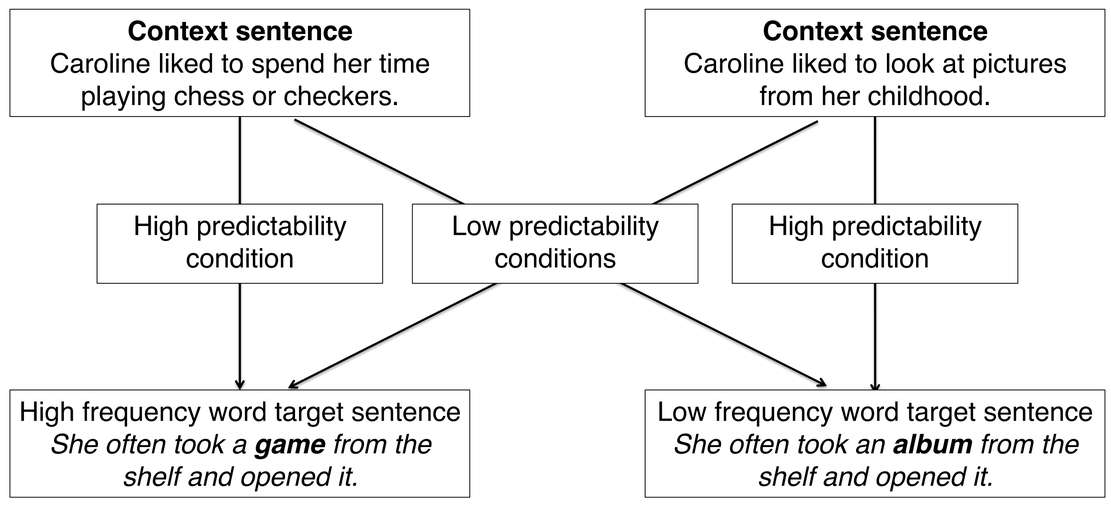
Introduction

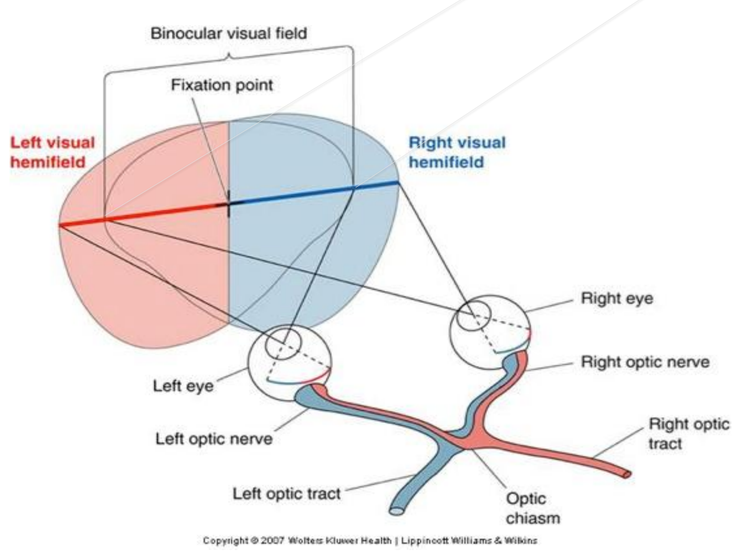
- What is the between-hemisphere interplay for factors such as **word frequency** and **predictability**?
- Extremely early effects of **predictability** in the first 90ms (Dambacher et al., 2009)
- No **hemispheric differences** have been explored in early timeframes (0-100ms) with such stimuli.
- **Hemispheric difference** studies in the later N400 timeframe suggest:
  - LH: employs **top-down predictive** processing
  - RH: **bottom-up, integrative** processing (Wlotko & Federmeier, 2007; 2013)

Methods

- Modified Dambacher et al. (2009) procedure using the divided visual field paradigm
- **Predictability** of target word (provided by context sentence) – high vs. low
- **Frequency** of target word – high vs. low
- **Visual field of presentation** (target word only) – LVF vs. RVF
- 144 pairs of sentences in German, read by 19 native speakers

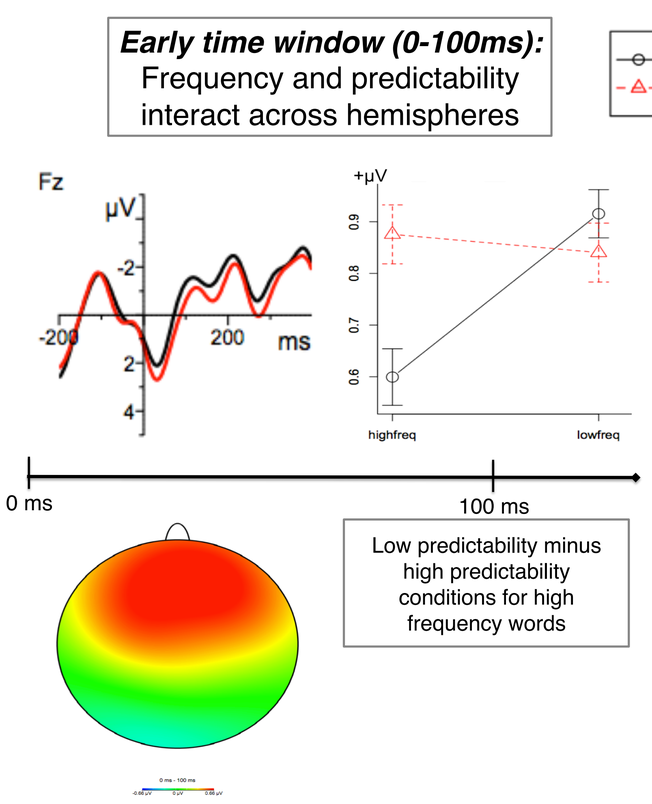




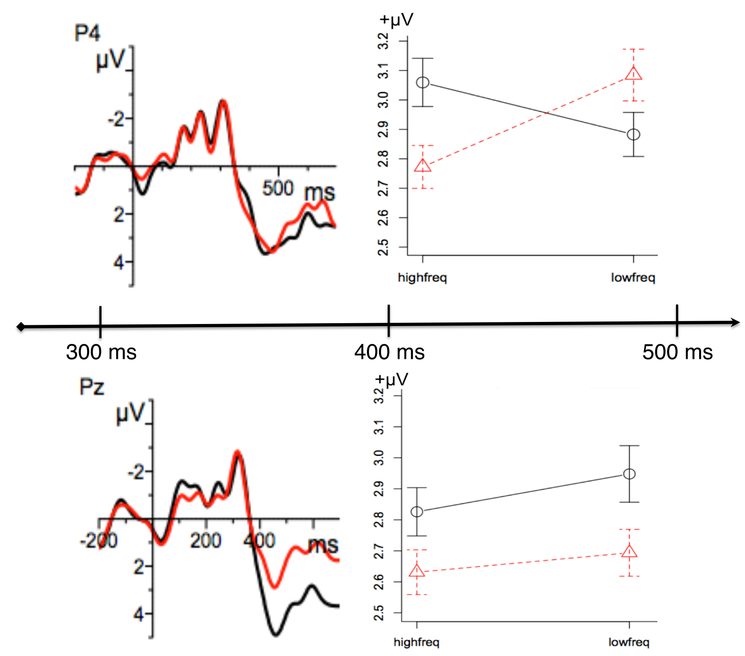


Results and conclusions

Early time window (0-100ms): Frequency and predictability interact across hemispheres



N400 time window: **RH** Negative modulation of predictability only for high frequency words



N400 time window: LH Negative modulation of predictability across frequency conditions

- 0-100ms: **frequency** and **predictability** both influenced early ERPs (differently to Dambacher et al, 2009):
- High frequency words were subject to rapid predictability effects
- The **early predictability** effects were **not hemisphere-specific**: early lexical access did not differ between hemispheres
- **Hemispheric differences** occurred later, at the N400 time window
- **N400 window**: modulations of **low predictability** conditions in both hemispheres (as in Wlotko and Federmeier, 2007; 2013) such that:
- **LH**: sensitive mostly to predictability (top-down)
- **RH**: influenced by predictability and frequency (top-down & bottom-up)

References

Dambacher et al (2009) Frequency and predictability effects on event-related potentials during reading. *PloS one*, *4*(3), e5047.

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