

Methods

Participants

48 people aged 18 to 35 who are right-handed Native English speakers with no neurological or psychiatric disorders.

Material & Design

The experiment is a 2 x 3 x 2 design with two visual field locations (Fovea vs. Parafovea), 3 sentence conditions (Anomalous, Unexpected, and Expected), and 2 masking effects (masked vs. unmasked).

Procedure

The sentence stimuli will be presented using the RSVP with flankers design (Figure 1). The stimuli onset asynchrony will be 100 ms with an interstimulus interval of 350 ms. Each trial will end with a letter probe task (Figure 3c). On 25% of trials, participants will be asked a yes or no comprehension question.

Hypothesis

- Figure 4 shows a breakdown of the major hypothesis for the study.
- If the target words are masked in the fovea and parafovea or masked only in the fovea and not the parafovea, there will be no LPC effect because the reader does not obtain foveal input.
- If foveal information is accessed so if the parafovea and fovea are unmasked and if the parafovea is masked and the fovea is unmasked, there will be an LPC effect because the reader has access to foveal input which might be necessary for semantic integration purposes.

References

Kuperberg, G. R., Brothers, T., & Wlotko, E. W. (2020). A Tale of Two Positives and the N400: Distinct neural signatures are evoked by confirmed and violated predictions at different levels of representation. *Journal of Cognitive Neuroscience*, 1-72.
 Rayner, K., Schotter, E.R., Masson, M.E.J., Potter, M.C., & Treiman, R., (2016). So much to read, so little time: How Do We Read, and Can speed reading help? *Psychological Science in the Public Interest*, 17(1), 4-34.
 Schotter, E.R., (2018). Reading ahead by hedging our bets on seeing the future: Eye tracking and electrophysiology evidence for parafoveal lexical processing and saccadic control by partial word recognition. *Psychology of Learning and Motivation*, 68, 263-298.

Is Parafoveal Vision Sufficient for Semantic Integration?: Evidence from Event-Related Potentials

Victoria Estevez, Sara Milligan, & Elizabeth R. Schotter, Ph.D.

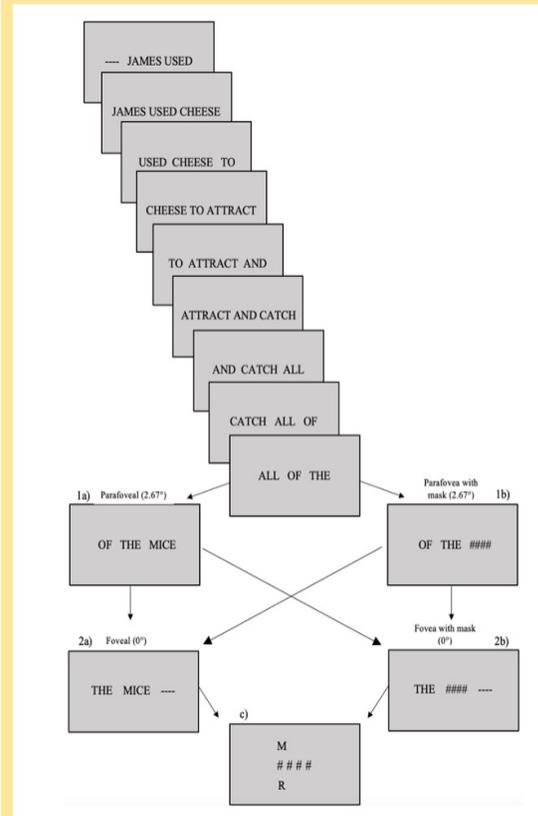


Figure 3: Rapid Serial Visual Presentation (RSVP) with flankers paradigm that will be used to present sentence stimuli.

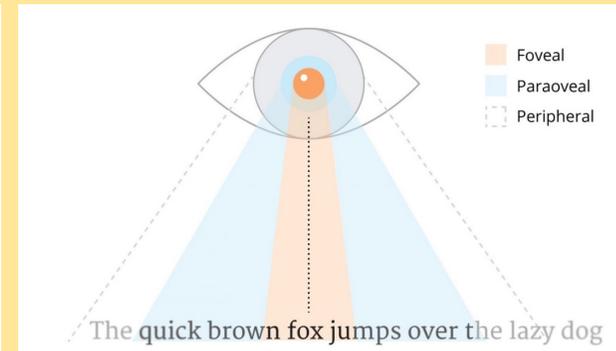


Figure 1: Difference between the Parafoveal and Foveal visual fields.

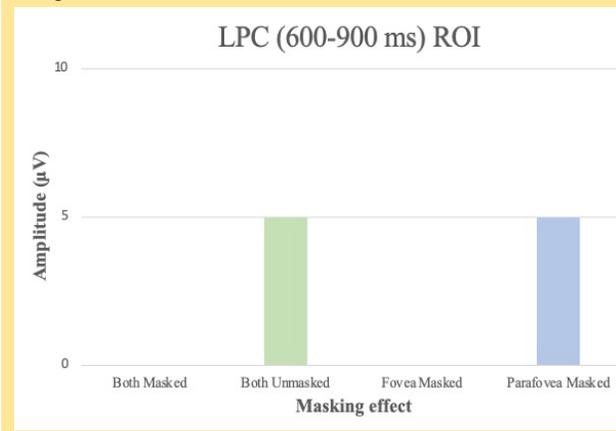


Figure 4: Expected amplitude differences for the LPC effect in the parafoveal time window when the words are masked or unmasked.

Research Questions

- 1) What stages of word processing are engaged during parafoveal processing?
- 2) How can readers use parafoveal information and does it affect neural processing?
- 3) Can the parafovea elicit a *Late-Positive Component (LPC) effect*.

Background

Schotter (2018):

- Readers extract information from a word prior to looking at them in the parafoveal visual field.

Rayner, Schotter, Masson, Potter, & Treiman (2016):

- Parafoveal presentation has lower visual clarity but can still provide lexical information to be utilized while reading.

Kuperberg et. al., 2020:

- The LPC is a positive-going deflection that peaks around 800 ms after a word is perceived.
- The LPC effect is often generated following errors in semantic integration and has a larger amplitude as the word is increasingly anomalous in the sentence context.

Proposal

- This study will use an RSVP with flankers paradigm with masking effects to avoid attention distribution and isolate specific ERP effects.
- This study will use masks to investigate whether or not the parafoveal visual field is sufficient to elicit an LPC effect.

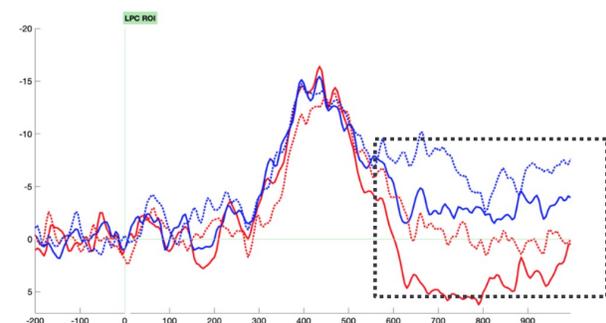


Figure 2: The LPC effect (indicated by the dotted box) in response to a sentence anomaly.

Sentence Condition	Sentence Example
Expected	James used some cheese to attract and catch all the <u>mice</u>
Unexpected	James realized there wasn't enough water for all the <u>mice</u>
Anomalous	Chinese food dishes come with white or brown <u>mice</u>

Table 1: Example stimuli, which differ based on the expectancy of the last word in the sentence.