An ERP Study of Masked Word and Pseudoword Repetition Priming
Alexandra Geyer¹, Lauren Dennis¹, Jonathan Grainger² & Phillip J. Holcomb¹
Tufts University, Medford, MA¹; CNRS, Aix/Marseille²

Introduction

- Previous behavioral research has demonstrated masked repetition priming can provide sensitive measures of the processes involved in word recognition.
- Recently, our laboratory has reported that the N400 is also sensitive to masked repetition priming (i.e., the N400 is larger when the target differs from the prime than when it is the same as the prime).
- One aim of the current study was to examine whether this finding could be extended to conditions where the prime and target are not identical but overlap by all but one letter (pseudoword prime condition).
- A second aim of this study was to examine masked repetition priming under conditions of increased power to determine if smaller effects could be found on components earlier than the N400.

Figure 1 – Electrode Montage

![Figure 1 – Electrode Montage](image)

Figure 3 word-WORD

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Method

• 48 participants (32 female, mean age = 20.8 years)
• 400 trials of a repetition priming Semantic Categorization Task (press a button to occasional animal names) including:
  • 80 with the same word in the prime and target position (e.g., table– TABLE = Repeated Words)
  • 80 with different prime and target words (e.g., mouth–TABLE = Unrelated Words)
  • 80 with pseudoword primes one letter different from the target word (e.g., table–TABLE = Repeated Pseudowords)
  • 80 with pseudoword primes with no orthographic overlap to the target (e.g., mooth–TABLE = Unrelated Pseudowords)
• 160 animal name probe trials
  • 80 with animal names in the target position (e.g., table–MOUSE)
  • 80 with animal names in the prime position (e.g., mouse–TABLE)
• see Figure 2 for the timing of a typical trial

Findings

• Consistent with our earlier report (Misra & Holcomb, 2003) ERPs to target words following masked prime words produced a robust N400 repetition effect with repeated words producing an attenuation of the N400.
• However, unlike our earlier study, the current experiment also produced an earlier N250 repetition priming effect (repeated smaller than unrepeated). This effect started as early as 175 ms post target onset and had a somewhat more anterior scalp distribution than the N400 (see Figure 3). The N250 (but not the N400) was also slightly, but significantly, later for repeated than unrepeated items (14 ms).
• The N250 effects in this experiment seem most likely to be due to the shorter Prime-Target SOA used here compared to our earlier study (70 vs 500 ms) and suggests that the N250 may directly reflect lexical level processes that are largely complete by 500 ms.
• We also found evidence for an even earlier priming effect with a right posterior focus. This effect took the form of slight, but significant, enhancement of the occipital N1, which peaked at about 150 ms post-target onset.
• Finally, we found similar, but smaller, N400 and N250 (but not N1) repetition effects when pseudowords were used as primes (i.e., when the prime overlapped targets in four of their five letter positions relative to no letter overlap). And as with word primes, the N250 was delayed (16 ms) in the repeated condition relative to the unrepeated.
• Together these results suggest that the ERP masked priming technique can be a valuable tool for tracking the time course of early word recognition processes.

This research was supported by HD25889 and HD064361.