Electrophysiological investigation of masked repetition priming effects with objects rotated in depth

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INTRODUCTION

One ongoing debate in the object recognition literature questions whether object recognition relies on view-point dependent or view-point invariant representations of objects. Behavioral results have suggested a more view-point dependent mechanism (e.g., Tarr, 1995) as have several fMRI studies (e.g., Vuilleumier et al. 2002; Gauthier et al., 2002). While fMRI studies allow us to understand the brain areas involved in object recognition, the timing of these events is obscured by the sluggish BOLD signal. ERPs provide a way to examine the timing of these processes in the brain.

This study aimed to examine how rotations in depth affect ERP repetition priming effects when the prime duration has been increased in masked repetition priming. Three effects in particular have been observed for masked pictures: 1). An early N190/P190 component indexing perceptual processing of object features and shape, 2.) A middle level component, the N300, a picture specific effect thought to reflect object representation activation, and finally 3.) a later component, the N400, which is an a-modal component reflecting semantic integration processes.

METHODS

Masked Repetition Priming: 29 Channel Event-Related Potentials (ERPs)

- 21 participants (ages 18-26)
- Three-dimensional computer rendered models of everyday objects
- Objects were rotated in depth at 30°, 60°, and 150° in depth from the conventional view of the object (48 items per condition, see Figure 1a for repeated trials, Figure 1b for unrepeated).
- The most conventional view (e.g., 0° of rotation) was determined by a behavioral rating study completed by a separate group of participants
- Participants performed a go-no-go semantic categorization task where they pressed a button to probe food items in the target position.

REFERENCES


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