



AN EARLY ERP REPETITION EFFECT FOR REMEMBERED COMPARED TO FORGOTTEN FACES

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INTRODUCTION

Prior ERP studies of face repetition have three limitations that we address in the current studies.

A. Prior studies compare the initial presentation of a face with its own repetition (Schweinberger *et al.*, 2004; Schweinberger *et al.*, 1995), and thus confound differences in stimulus repetition with the passage of time. Here, the current studies compare a repeated face with a novel face that occurs close together in time. This comparison eliminates the effects of time, leaving a measure of the repetition effect.

Second, studies which have compared repeated and novel faces often use tasks where the faces are the focus of attention (e.g., Guillem *et al.*, 2001). The current study investigates face repetition effects when faces are task-irrelevant. Finally, face repetition effects have not been investigated separately for subsequently remembered and forgotten faces. We included a surprise recognition memory test after the initial task so that we could directly compare the repetition effect for faces that were remembered with the effect for faces that were forgotten.

Consistent with Guillem *et al.* (2001), we predicted a difference between repeated and novel faces at frontal and central electrode sites between 350-400 msec post stimulus.

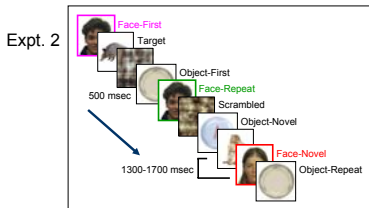
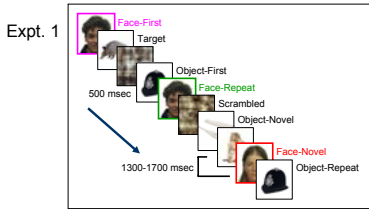
METHOD

Participants

- Experiment 1 – 27 healthy young adults (M 23.62 years old +/- SD 4.16; 9 males)
- Experiment 2 – 21 healthy young adults (M 18.67 years old +/- SD 0.97; 8 males)

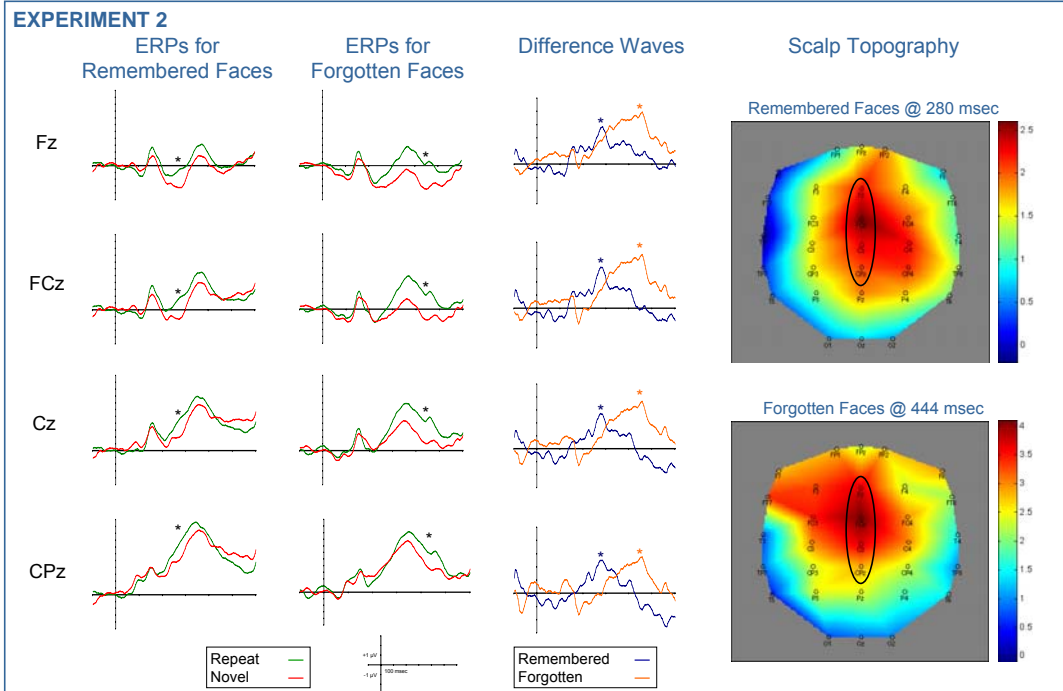
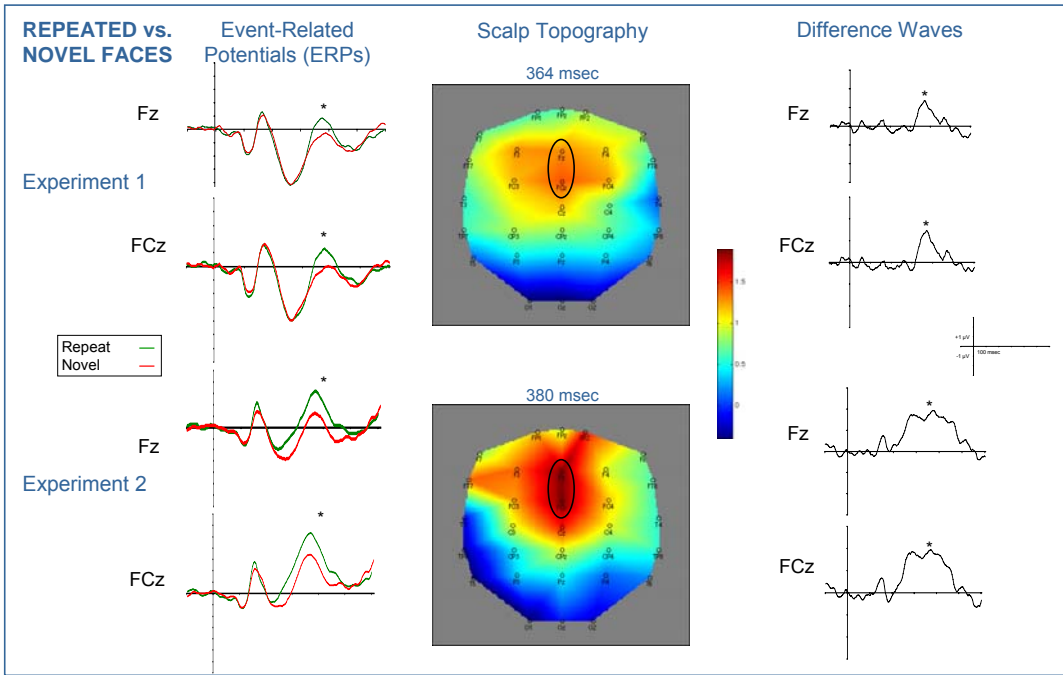
Task Design

- Modified Visual Oddball Paradigm (6 runs)
 - Faces (30%, 1st Presentations, Repetitions, & Novels)
 - Objects (30%, 1st Presentations, Repetitions, & Novels)
 - Unique Objects (Expt. 1) or Plates (Expt. 2)
 - Scrambled Faces (30%)
 - Animals (10%, Targets)
 - Subjects responded to the presence of an animal target
- Recognition Memory Test after in Experiment 2

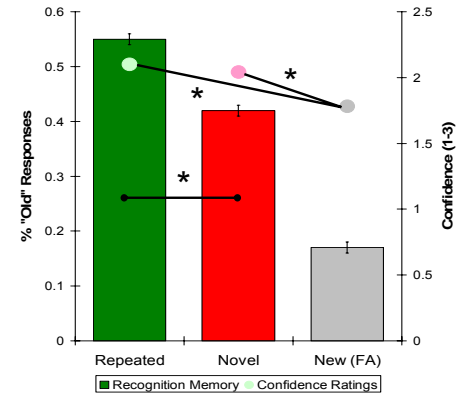


Data Recording and Analysis

- ERP recordings: 32 electrodes, modified 10-20 system, bandpass filtered (0.1 - 100 Hz), sampling rate = 250 Hz.
- ERP averages were calculated for each stimulus type.
 - e.g., Face-First, Face-Repetitions, Face-Novels



Recognition Memory Performance



SUMMARY

- Behavior
 - Recognition: REPEATED > NOVEL
 - Confidence: REPEATED = NOVEL > NEW (FA)
- ERP Repetition Effects
 - Experiment 1:
 - REPEATED > NOVEL @ 348-380 msec
 - Experiment 2:
 - REPEATED > NOVEL @ 276-452 msec
 - Hits: REPEATED > NOVEL @ 276-296 msec
 - Misses: REPEATED > NOVEL @ 404-464 msec

DISCUSSION

- Consistent with previous studies of face repetition (Guillem *et al.*, 2001), both experiments demonstrated a difference between repeated and novel faces between 350-400 msec post stimulus.
- The effect of repetition on face processing and recognition memory performance suggests that the additional information being extracted from the face during the second presentation is beneficial to face recognition at a later time.
- The latency shift seen between the repetition effects for remembered and forgotten faces suggests that a repeated face is processed more efficiently during the second presentation.
- A limitation of the current study is the absence of a measure of participants' awareness of repetitions. An explicit measure of a participant's awareness of repetition may be related to the ease with which a repeated face is processed.

REFERENCES

- Guillem F, Bicu M, & Debruille J (2001). *Cognitive Brain Research*, 11, 113-125.
 Schweinberger S, Huddy V, & Burton AM (2004). *NeuroReport*, 15, 1501-1505.
 Schweinberger S, Pfütze E-M, & Sommer W (1995). *Journal of Experimental Psychology: Learning, Memory and Cognition*, 3, 722-726.

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