

# Can eye-movements trigger memory recall? $u^b$

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## Introduction

- A large body of research suggests that when we retrieve visual information from memory, we look back to the location where we encoded these objects.<sup>1</sup>
- It has been suggested that the oculomotor trace we act out during encoding is stored in long-term memory, along other contents of the episodic representation.<sup>2</sup>
- Further, it was proposed that the components of episodic memory representations can co-activate each other (e.g., visual information can trigger spatial information).<sup>3</sup>
- If memory recall moves the eyes to revisit the location where the stimulus was encoded, is there also an effect in the reverse direction?
- Can eye movements trigger memory recall?

## Method

### Participants

- 98 participants were recruited
- 5 subjects were excluded (guessed the hypothesis)
- 53 females, 40 males
- Age (range 18-70):  $M = 31.398$ ,  $SD = 14.931$

### Material

- 96 greyscale faces from the FERET database, in pairs
- The average morph of each pair ( $n = 48$ )
- Visual masks for each face built from face material
- Fixation crosses in 18pt black Courier font

### References

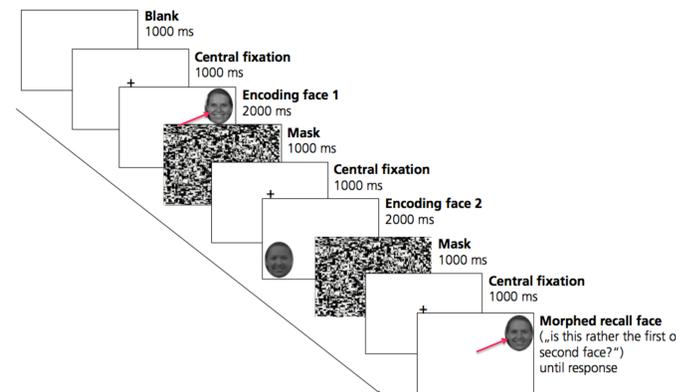
<sup>1</sup>Johansson & Johansson, 2014, Psychological Science; Laeng & Teodorescu, 2002, Cognitive Science; Martarelli & Mast, 2013, Psychological Research; Spivey & Geng, 2001; Psychological Research

<sup>2</sup>Martarelli & Mast, 2013, Psychological Research

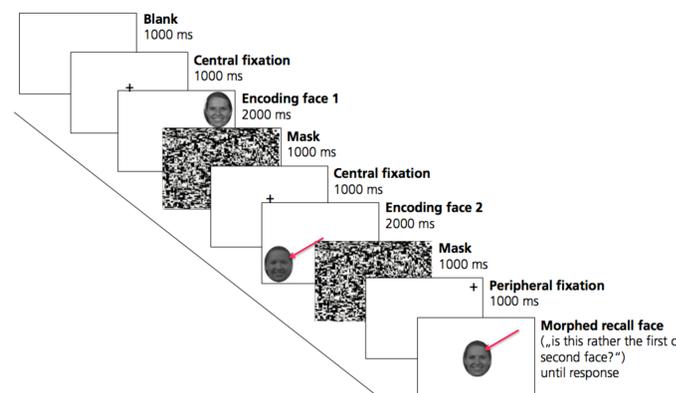
<sup>3</sup>Ferreira, Apel, & Henderson, 2008, Trends in Cognitive Sciences

### Procedure

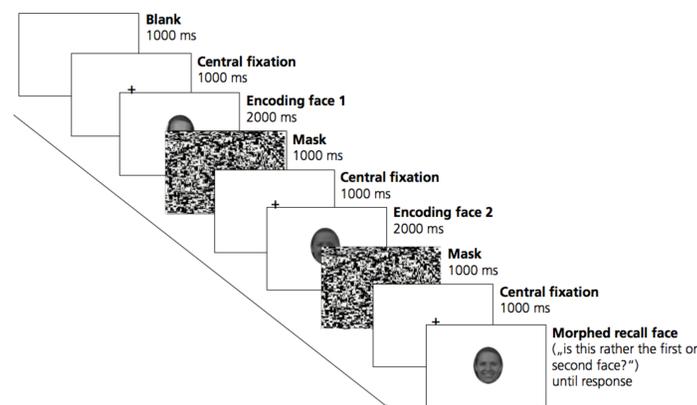
#### Group 1: eye-movement and location repetition



#### Group 2: eye-movement repetition



#### Group 3: no eye-movement repetition



- Hypothesis: If eye-movements can trigger memory recall, participants would perceive the morph as the face that was encoded with the same eye-movement above chance level.

## Results

- All proportions were significantly above/below chance level ( $p < .001$ ) except for face 1 repetitions in group 1 ( $p = .217$ ).
- One-way ANOVAs revealed a main effect of group both for face 1 responses ( $p < .001$ ) and for face 2 responses ( $p = .006$ ).
- Tukey comparisons revealed significant differences between group 1 and 2 ( $p < .001$ ) and between group 1 and 3 ( $p = .006$ ) in face 1 responses and between group 1 and 3 in face 2 responses ( $p = .008$ ).

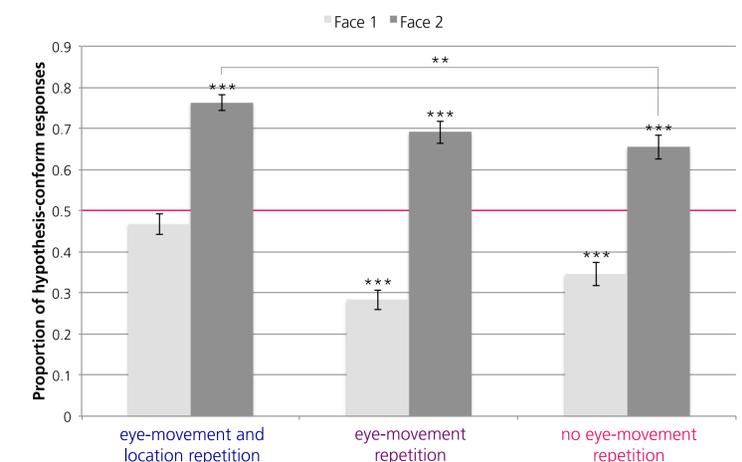


Figure: Means and standard errors of the proportion of hypothesis-conform responses in groups 1 & 2 and the proportion of face 1 or 2 responses in group 3

## Conclusion

- Participants' perception was only influenced by eye-movements when the saccade (+location) of the second face was repeated.
- When controlling for a recency effect, eye-movement only influenced memory recall in combination with location influences.
- One might interpret that eye-movements bias memory recall but only in a fragile and short-lasting way.
- More research is needed to find out what role location congruency plays in this regard.