

# The relation of eye fixation patterns with emotional content and episodic memory

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## 1 Introduction

The focus of visual attention is closely related to eye movements and fixations, while episodic memory has been defined as the ability to be consciously aware of an earlier experience [Bond, 2005]. The role of emotional content plays a crucial role in the ability of recalling a previous event. Here we investigate eye fixation patterns and their spatial distribution using ordinary kriging, a geostatistical interpolation method [Canto-Pereira et al., 2005], in a task where emotion and episodic memory were assessed.

## 2 Methods

Graduate students (n=5) from the University of São Paulo participated in the experiment. Pictures with different emotion content - positive, neutral and negative - from IAPS [Lang et al. 1999] were used as stimuli. Stimuli were presented and responses were measured with the software E-Prime v 1.1 (PST Inc.) using a 19' Samsung 997 DF monitor powered by a PC Athlon XP 2400/512 driven by a 10-bit Matrox P650 graphics board with a refresh rate of 100 Hz and a resolution of 1024 x 768. Participants were positioned in front of the monitor in a fixed position maintained by a chin rest. The eye-gaze tracking system used in this study was based on the differencing followed by thresholding technique using bright and dark pupil images on a pupil detector [Morimoto et al. 2000].

The experiment was divided in 2 parts: in the first one 10 pictures were presented and eye movements were recorded; in the second part 40 pictures were presented and the task was to identify whether or not each of these 40 pictures had been previously presented, while eye movements were being recorded.

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## 3 Results

- The pattern of eye fixations during the first and second part of the experiment was similar when a picture was previously presented and correctly identified.
- The emotional content of the stimulus played a major role on eye movements and fixation.
- Pictures with positive and negative emotional contents have strong influence on episodic memory.

## 4 Conclusion

Our findings show a potential application of eye tracking devices on emotion and memory studies. The relation of eye fixations, emotional content and memory seems to have patterns that can be well defined and precisely allocated in space through geostatistical interpolation method.

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