Universität Basel

Research Project

Eye tracking and episodic memory

Third-party funded project

Project title Eye tracking and episodic memory
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Background: There is evidence that differences in attentional and emotional processes during encoding can influence memory performance substantially. Importantly, such differences affect eye movements and pupil dynamics, which can be measured by eye tracking. Whereas characteristics of ocular behaviour have been related to recognition memory, it is currently unknown if the same characteristics are also linked to free recall - an important form of memory in daily life. Moreover, it remains unclear if pupil dynamics, which are influenced by emotional arousal, are related to differences in emotional memory. Specific aims: 1) to extract the eye-tracking parameters at encoding and to specify their relevance for subsequent episodic memory performance. 2) to investigate the relations of eye movement measures with different retrieval forms of memory (i.e. recall vs. recognition). 3) to investigate to what extent the found relations depend on the emotional content of the stimulus material. 4) to investigate if pupil dynamics are related to the memory enhancing effects of emotional arousal. 5) to investigate the neural correlates of those eye movements and pupil dynamics that are related to memory measures by means of functional magnetic resonance imaging (fMRI).Material/Methods: Data are available from a paradigm, which combines eye-tracking measures at encoding with a free recall and a recognition task consisting of emotional stimuli of variable valence and arousal potential (taken from the international affective picture system, IAPS). Measures were collected during an ongoing large-scale imaging genetics study in Basel, Switzerland, providing a unique dataset for analysis. Besides behavioural and eye-tracking measurements, it comprises functional magnetic resonance imaging data of over 1500 healthy human subjects. Before the core analysis, pre-processing as well as exploratory work on the data will be conducted. Expected value of the proposed project: This project will explore the way of which movements and pupil dynamics during memory encoding are related to episodic memory functions and will examine the underlying neural correlates. The findings might have important implications for using eye measures as physiological phenotypes for memory and for testing novel therapeutic interventions.

Keywords attention; pupillometry; encoding; eye tracking; emotion; memory
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Published results

3608524, Mohler, Lukas; Deininger, Sebastian; Müller, Daniel, Energy Elasticities and the Rebound Effect: A Comprehensive Empirical Analysis, Publication: Other Publications (Forschungsberichte o. ä.)

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