



Student project in Visual Perception

Improvement of Working Memory by cross-modal (or bi-modal) processing of audiovisual stimuli

Background. An enhancement of participant's working memory (WM) performance in terms of correct recall has been repeatedly found, when bi-modal formats of presentation (e.g., audio together with visual stimuli) were compared to uni-modal formats (e.g., audio or visual alone). Several theoretical frameworks are on the market in order to account for the bimodal advantage, ranging from those emphasizing early stages of processing (such as automatic altering effects or multisensory integration processes) or those centred on late stages of processing (as postulated by the dual coding theory). In everyday situations an event is frequently defined in (synchronized) stimulation and processing of more than one single cue (e.g., an approaching car can be processed visual and auditory). Thus, our learning brain should be adapted for such cross- or multi-modal stimuli.

In this project we ask, (a) if the WM processing performance benefits from bi-modal stimulation and (b) in what kind of circumstances and temporal constraints (e.g., temporal coincidence or predictability of two stimuli from different modalities) this improvement happens.

Project(s).

- Develop an experimental setup (psychophysically) by using MatLab technology and the PsychToolbox 3.
- Learn to use psychophysics and signal detection theory by using an n-back task.
- Learn to create and to run a psychophysical experiment and data processing by the use of MatLab.
- Analyze behavioural data empirically and graphically and perform statistical tests to extract meaningful effects.

Methods. Visual psychophysics, d' - statistics, and MatLab programming of the experiments and the scripts for analysis.

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References.

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Date posted: July 2012