

Emotion influences almost all the aspects of human functioning, especially those related to interpersonal communication. Also, they significantly influence various mind processes such as memory and attention. It is a common knowledge that information evoking our strong emotions has a privileged position in our memory. In astounding details are we able to retrieve the face of someone who menaced us, or someone's confession that was very impressive to us. However, we might not remember at all the background of these events.

The aim of the project is an investigating what exactly makes us remember context in the process of communication. These mechanisms will be examined at three levels – attentional (gaze direction), behavioural (correctness and time of retrieval) as well as neuronal (spatial and temporal characteristics of brain activations). Specifically, we would like to examine if these mechanisms depend on particular emotions (for instance, disgust or fear), and what is the influence of emotional congruence characterizing memorized information and its context. The study will be conducted in collaboration with a group of scientists from the Swiss NCCR Affective Sciences, specialised in research of human emotions.

In order to accomplish the described goal, we will conduct a study with the use of two methods. First, 25 healthy volunteers will be subjects of an *eye-tracking* (ET) study in which their gaze direction during the task will be monitored. Another group of 25 volunteers will be scanned with the method of *functional magnetic resonance* (fMRI) measuring indirectly brain activation related to the task. This task in both studies will be to memorize and retrieve pairs of emotional words and faces (as communicates and their senders). Both words and faces will differ with respect to represented emotion (disgust, fear, neutral), and the created word – face pairs will be either emotionally congruent or incongruent. For instance, a word “decayed” can be accompanied by a face expressing disgust, whereas a word “mould” can be accompanied by a face expressing fear. Also neutral words and faces will occur. As a control of other factors that might potentially influence memory and emotion processing, after the task the participants will complete one of the personality tests.

The method of fMRI is one of the most important techniques of human brain imaging. Apart from traditional investigation at the level of task - related activations of brain structures (i.e. *functional connectivity*), examination of temporal dependencies of activations has been recently developed. Studying brain mechanisms of memory at all the three levels will let us better understand the process of forming memories in the complex network of communicating brain regions.

Existing studies on memory and emotions with the use of the mentioned methods have pointed separate mechanisms of retrieval of visual material and its context. However, it is not known if these mechanisms are similar in the case of language, specifically in communicative context. We still do not know what is the role played by particular emotions and what is the significance of emotional congruency in the memorized material. A response to these questions will contribute to deeper understanding of the mechanisms of human memory. This, in turn, in the future might be used in the therapy of persons having problems with memory as a consequence of brain damage or aging.