

POPULARSCIENTIFIC PROJECT SUMMARY

People commit errors. It happens very often that our hand reacts faster before being guided by our mind, and we, for example, by accident touch a hot pan. In situations like this, we immediately ‘know’ that our action was erroneous. In case of simple stimulus – wrong action mappings, the functioning of our internal monitoring system is fast and automatic. When the situation/task is more complicated, however, usually we can not simply rely on our internal states or feelings. While looking for the appropriate clerk for example, we need to enter several offices, ask for help, and wait for the information provided. In the other words, to ‘know’, we need to receive external feedback information. Human external monitoring system also works fast and efficiently, categorizing feedback into positive (‘yes, you are in a right office, please come in’), or negative one (‘it’s a wrong office, please check elsewhere’).

In this research project, 64 electrodes will always precisely record Event-Related bioelectrical brain Potentials (ERPs), while participants will perform in a computer task in the psychophysiological laboratory. Thanks to that, evoked brain activity can be later analyzed and correlated in time with performing a specific action by participants. When a participant in the EEG experiment commits an error, his/her brain immediately reflects this event in the Error-Related Negativity (ERN component), which is usually larger in response to erroneous than correct reactions. After each action participant also receives a feedback on his/her performance. Importantly, as the experimental task is challenging, therefore it is hard to perform without errors, activation of the feedback monitoring system is vital to adjust future actions, with an aim of avoiding errors (and negative feedback s/punishments).

And what if participants would have been cued that the feedback information following their actions is completely not related to their task performance, and it is delivered to them randomly? This aspect is the clue of this research project, and it is hypothesized that no Feedback-Related Negativity (FRN) modulation will be observed if the feedback information will be fictional (therefore, it will be perceived by participants as goal-irrelevant). In contrast to that, typical FRN effect (larger amplitudes when elicited by negative when compared to positive feedbacks) is expected if participants will be confronted with feedback mapping their performance in real (goal-relevant) condition.

One of the very strong needs among humans is the need for closure. People simply ‘want/need to know’. They would prefer, of course, to know that they behave/perform accurately, but even if they are informed about their errors/mistakes, they can activate both internal and external monitoring systems to adjust future actions accordingly. This can, however, only happen if the (external) feedback information is deemed reliable (goal-relevant in this project). Knowing this, a confirmation of the main hypothesis from this project would be novel and significant contribution to the existing knowledge. So far, no one has shown that it is possible to suppress the brain in feedback information processing, which has so far been thought to be highly automatic, as guiding us to perform accurately in a strive to be rewarded.