

## What happens after a wrong choice? An ERP analysis

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When subjects commit errors in choice response tasks, the P300 component of the event related potential (ERP) is assumed to be delayed as compared to correct trials. We examined whether it is in fact the P300 which is delayed in error trials. As RT slowing is often observed in post error trials, we also examined these.

In two experiments with identical stimulus conditions in the visual and auditory modality, eight subjects each performed a two-choice RT task. Choice responses with the index fingers were required as a function of either stimulus location (Exp.1) or stimulus identity (Exp.2). Discriminability of these two stimulus dimensions was varied factorially. EEG from Fpz, Fz, Cz, C3', C4', Pz, Oz, and EOG were recorded at a rate of 100 Hz for 1270 ms (bandpass .03 to 40 Hz) starting 270 ms prior to stimulus onset. RTs, N200 and P300 latencies, and P300 amplitudes were measured in correct, error, and post error trials and ana-

lyzed by means of Huynh-Feldt corrected repeated measures ANOVAs.

RTs confirmed earlier results of faster error and slower post error responses as compared to correct responses. In both experiments, ERPs in post error trials were not different from ERPs elicited in correct trials. In error trials, N200 latencies were delayed for about 40 ms and "P300" appeared about 120 ms later than in correct trials. Importantly, the amplitude of the delayed P300 component showed the same topography and was affected by the same experimental variables as the P300 elicited in correct trials.

This study clearly demonstrates that both the N200 and P300 are delayed in error trials indicating an increase of stimulus evaluation time. As the P300 in post error trials is not different from that in correct trials, the slowing of RTs may relate to a shift towards a more conservative response criterion, whereas perceptual processing is not affected.

## Psychophysiological effects of a short-term reduction of energy supply

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Effects of food deprivation on somatic and psychic processes have been reported in animals and humans. In humans, food deprivation from 12 to 24 hours already induces changes in psychophysiological variables (e.g., heart rate or feelings of hunger and appetite), but these effects cannot be attributed solely to a reduced energy supply.

Therefore, an experiment was conducted to investigate the effects of a short-term reduction of energy supply on psychophysiological variables (indicators of autonomic nervous system, subjective emotional and somatic state) without depriving subjects of eating behavior. Subjects were not informed about the variation of energy supply. Healthy normal weight male students received breakfast and lunch in the

laboratory. For one-half of the subjects ( $n = 28$ ), the energy content of the two meals was reduced (approx. 260 kcal), whereas subjects of the other group received approx. 1700 kcal ( $n = 28$ ). Psychophysiological variables were recorded every hour from morning to afternoon and during periods of experimentally induced stress in the afternoon.

Self-ratings showed, for example, increased feelings of hunger and appetite by the reduction of energy supply. Furthermore, reductions of systolic blood pressure, skin temperature, and sublingual temperature were found. These results indicate that the psychophysiological state is altered by a short-term reduction of energy in food. Implications for the psychophysiology of emotions are discussed.