



# The possible role of post - movement cortical motor processing in self - disturbances

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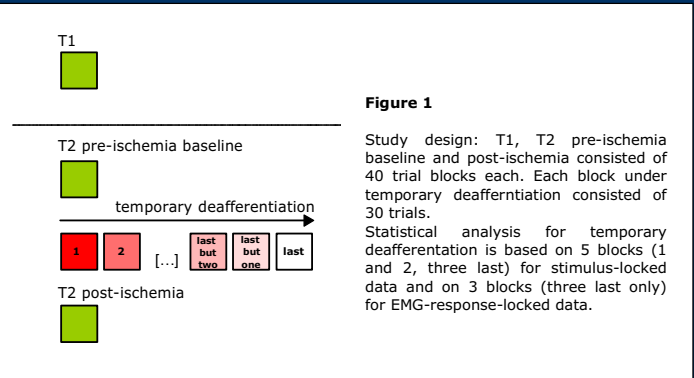
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## Objective:

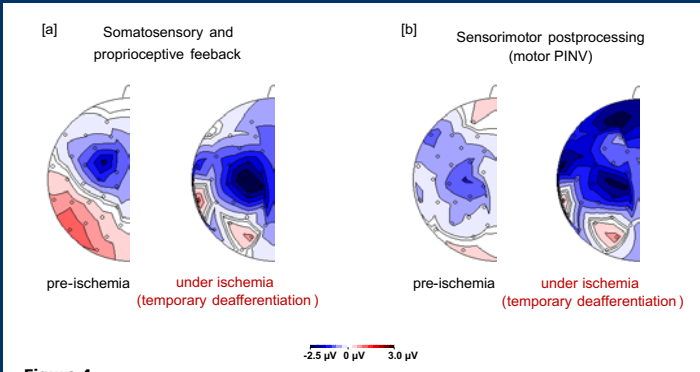
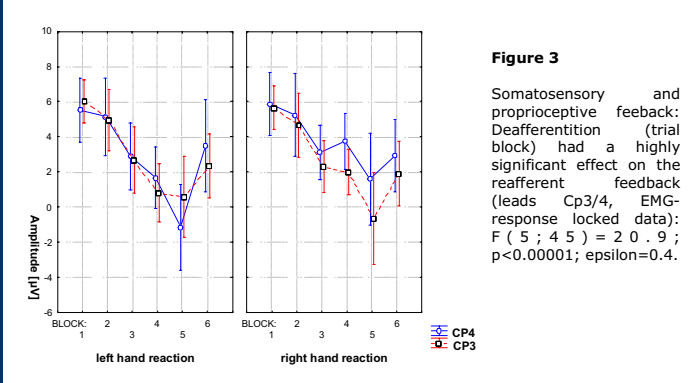
Cortical activation of the motor system is possibly one of the basic principles of the acting self. During the execution of voluntary movements, reafferent sensory feedback from the effector muscle is compared with a hypothetical estimation of the path of movement, the so-called efference copy. Literature indicates that this process could be impaired in schizophrenic patients. This could partly explain the underlying pathology of self-disturbances (depersonalization, egodystonic perception of movement). Motor postimpulsive negative variation (motor PINV) is a component of cortical motor activation that outlasts movement execution and can therefore serve for comparison with sensory reafferent feedback as in the efference copy model.

## Methods:

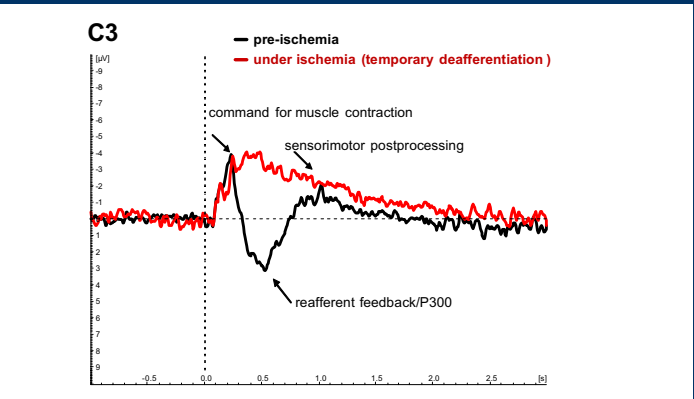
In order to differentiate cortical movement evaluation from reafferent feedback we analyzed movement related potentials of 10 healthy, right-handed adults aged 21 to 25 years using a simple reaction time task. Sensory reafferent feedback was abolished and experimental deafferentiation was achieved by means of temporary tourniquet ischemia that was in place an average of 28 minutes.



Under conditions of temporary deafferentiation, activity in the motor PINV interval increased over the primary motor cortex. A repeated measures analysis of variance (ANOVA) for motor PINV with the factors "recording block", "hemisphere" and "reaction hand side" revealed a highly significant interaction between all three factors ( $F(7;63)=5.2$ ;  $p=0.003$ ;  $\epsilon=0.5$ ). In contrast, a potential component with a topography that pointed towards a tangential dipole in the postcentral gyrus was concurrently decreased along with discontinuation of the reafferent feedback.



## Results:



## Conclusions:

Motor PINV appears to be part of a motor memory trace that is independent from reafferent feedback and could allow a comparison of motor programming and sensory feedback. Future research in this field could help understand the underlying pathology self-disturbances.

## Literature:

Bender, S., Becker, D., Oelkers-Ax, R., Weisbrod, M.. Cortical motor areas are activated early in a characteristic sequence during post-movement processing. *Neuroimage* 2006 (32); 330-351.

Kristeva, R., Charkarov, V., Wagner, M., Schulte-Mönting, J., Hepp-Reymond, M.-C.. Is the movement-evoked potential mandatory for movement execution? A high-resolution EEG study in a deafferented patient. *Neuroimage* 2006 (31); 677-685.