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Scientific Study "EEG-Measurement"

How dynamic sitting on **swopper** influences the ability to concentrate.

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Summary

The present document is a study of how dynamic sitting on swopper influences the ability to concentrate in the short and long term and the corresponding brain activity.

Here EEG measurements are made to draw conclusions about the psychophysiological level of alertness and ability to concentrate.

The advantage of this method of examination is that it can be coupled with external stimuli like concentration tests. These serve to stimulate the afferent nerve pathways of the central nervous system under the relevant test conditions. Until now, only a few studies have examined the effect of fine motor control on the cognitive performance and the corresponding brain activity. The present experimental laboratory study tested 45 test persons aged 22 to 27 in a group configuration. There were three sitting conditions: sitting on a swopper, which moves, sitting on a static test chair of the same appearance constructed purposely for the examination and sitting on a conventional office chair with backrest. The test persons did tests to determine the short term ability to concentrate (d2-R test) and the long term ability to concentrate (Mackworth clock test). The electroencephalographic spontaneous activity was recorded in resting states before and after the concentration tests and during the concentration tests.

The behavioural data shows better performance with regard to the short-term and long-term ability to concentrate when sitting on the swopper. This is demonstrated by the greater number of items processed when determining the short-term ability to concentrate with the d2-R test and in the short reaction times in the Mackworth clock test. The EEG data points to underlying neuronal mechanisms of the observable increase in performance during the concentration tests when sitting on the swopper.

Overall, when working on the swopper, there is greater frontal theta activity, greater frontal and occipital alpha and alpha-1 activity as well as greater beta activity, in particular when working on tasks to determine the short-term ability to concentrate. Greater beta-1 activity, which occurs during the d2-R test and the Mackworth clock test, puts the case for an alert and attentive psychophysiological state of the cognitive system achieved when sitting on the swopper, in contrast to working on a conventional office chair with backrest or on a static stool.

Summing up, it can be established that working on the swopper has a positive effect on the ability to concentrate in the observed behaviour and also on the underlying brain activity. The results of this study show the potential of dynamic posture control when sitting and its implementation in daily school and work situations and have important implications for the design of learning and working environments.