

Reward modulation of tactile stimulus processing

ABSTRACT:

Background

Sensory processing is influenced by reward contingency.

Aims

Describe the effects of reward in active and passive tactile processing in humans. I) Describe the neurophysiological (EEG activity) correlates of passive and active tactile discrimination in a width discrimination task. II) Describe the effects of monetary reward in active tactile width discrimination. III) Describe the effects of monetary reward in passive thermotactile stimulation.

Method

Multiple techniques were combined to describe the effects of monetary reward in active and passive tactile stimulation, namely: behavioral performance, self-reports, electroencephalography (EEG), functional near infrared spectroscopy (fNIRS), cortisol and Substance P (in saliva).

Results

Aim 1) EEG recordings demonstrated that fundamentally different networks were involved in active and passive versions of the task. Aim 2) Monetary rewards introduced changes in the individual behavior of subgroups of subjects and revealed a new set of behavioral attitudes, neuronal and other physiological responses to the task. Some subjects became extremely frustrated when they failed, while others became highly motivated. These results suggested that monetary rewards had different effects for subjects with different characteristics. Aim 3) Monetary rewards influenced passive tactile discrimination in parieto-occipital areas mainly through the delta band.

Conclusions

Monetary rewards differentially influence active and passive tactile stimulation processing through a complex prefrontal-temporo-parieto-occipital network.

Keywords

Tactile discrimination, Monetary reward, Electroencephalography

Published Work:

Pais-Vieira, C., Allahdad, M., Neves-Amado, J., Perrotta, A., Morya, E., Muioli, R., Shapkova, E., & Pais-Vieira, M. (2020). Method for positioning and rehabilitation training with the ExoAtlet ® powered exoskeleton. *MethodsX*, 7, 100849. doi: 10.1016/j.mex.2020.100849

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Pais-Vieira, C., Gaspar, P., Matos, D., Alves, L., Cruz, B., Azevedo, M., Gago, M., Poleri, T., Perrotta, A. & Pais-Vieira, M. (2022). Embodiment comfort levels during motor imagery training combined with immersive virtual reality spinal cord injury patient. *Frontiers in Human Neuroscience*, 16. doi: 10.3389/fnhum.2022.909112

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