

The role of prefrontal cortex in purchasing decision-making context

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The functional role of the prefrontal cortex has often been related to decision-making. Moreover, depending on the task that has to be carried out, it can be even more functionally specialized (Ernst & Paulus, 2005). The dorsolateral prefrontal cortex (DLPFC), for example, seems to be activated by complex tasks solving, working memory processing and recalling of long-lasting memories within long-term memory (Fuster, 2001; Hampson, 2018). Decision-making is applied every day in many different situations, among which stands out the purchasing one. In this context, a crucial and determinant role is played by feelings and emotions. Indeed, emotions are often linked with memories and choices. Previous experiences, in fact, have a key role in this process, since they can influence people's behavior and take decisions based on some psychological processes such as reward and motivation (Lucchiari & Pravettoni, 2012). However, this is also particularly important when people have to decide within unusual purchasing situations where pros and cons must be taken into account with regard to personal and others' advantages. In the present study, a modified version of a well-known social interaction paradigm (i.e., the Ultimatum Game; Güth et al., 1982) was used. The scenarios proposed described a store experience in which they should imagine using vouchers. Choices could be neutral, advantageous or disadvantageous from the participant's perspective. In order to explore the hemodynamic response, fNIRS was used by applying a 18-channels array of optodes covering prefrontal and frontal areas. The final sample included 32 university students of comparable age and educational level. Results showed that the specific offer type led to the engagement of dedicated neural networks, with increased activation of the right medial prefrontal cortex in the case of disadvantageous expenses. Findings are discussed taking into account the psychological factors involved in each purchase choice.

References

- Ernst, M., & Paulus, M. P. (2005). Neurobiology of decision making: a selective review from a neurocognitive and clinical perspective. *Biological psychiatry*, 58(8), 597-604.
- Fuster, J. M. (2001). The prefrontal cortex—an update: time is of the essence. *Neuron*, 30(2), 319-333.
- Güth, W., Schmittberger, R., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of economic behavior & organization*, 3(4), 367-388.
- Hampson, E. (2018). Relevance for cognition and decision-making. *Routledge International Handbook of Social Neuroendocrinology*.
- Lucchiari, C., & Pravettoni, G. (2012). The effect of brand on EEG modulation. *Swiss Journal of Psychology*.