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Dorsolateral and orbitofrontal activation in prefrontal cortex during a n-back task applied for food addiction disorder: A near-infrared spectroscopy study

Tania Alexandra Couto
University of Macau, China

The present study investigated the neural correlates of prefrontal dysfunction in food addiction disorder activated by a n-back task in undergraduate and graduate students. We used a neuro-vascular coupling measure captured by near-infrared spectroscopy recordings with n-back paradigm in 2-back and 3-back conditions. We found that middle frontal gyrus (dorsolateral PFC – BA46) and frontopolar (orbitofrontal cortex BA 10) areas were activated, highlighting significant differences in three channels. Furthermore, to support the main hypothesis, in the behavioral performance students with low results in food addiction scale (less than three symptoms) were related with health conditions activated by n-back task, specifically the 2-back health condition. These results suggest that undergraduate and graduate students are sensitive to highly palatable food and the activation of BA 46 and BA 10 may correlate with unhealthy food pattern, which highlight the possibility of biomarker for food addiction disorder related to the dysfunction of working memory in PFC captured by nirs recordings. Even that the record of junk items has been presented higher activations during a 3-back task, junk conditions are not always related with inefficient emotional regulation underlying the binge eating events referred to in the YSAS and traditionally expected by the literature. This evidence could reflect that other patterns of eating behaviour and strategies of emotional regulation related should be more explored and redefined among students populations exposed to risky eating behaviors.

Biography

Tania Alexandra Couto is a Portuguese neuroscience researcher currently based in Macau, SAR, China. Her work is developed in the neuroimaging department in Faculty of Health Sciences at the University of Macau. The research aims are focused on neuroimaging fusion projects, integrating NIRS-ERP simultaneous measurements, applied to neuropsychiatric disorders. She has participated in different conferences, symposiums and Congress as speaker on a subject of Neurofeedback; haemodynamic approach with NIRS tool; NIRS-ERP studies: multimodal approach applied to neuropsychiatric disorders. She combines clinic experience in neurofeedback -EEG, cognitive rehabilitation and clinic psychology in several hospitals and Portuguese clinics between 2009-2016 and also, a valuable internship in Stroke Unit in King´s Hospital College (London), where she had the opportunity to develop her clinical practice with stroke acute patients, her major area of interest in cognitive rehabilitation. In parallel, the neurofeedback /EEG-Q clinic experience allowed to develop a deep interest in neuro creativity applied to the neuropsychiatric and healthy population. As PhD student, she has been worked on the neurofeedback application in a multimodal approach (NIRS-ERP studies), focused on working memory and visual creativity.

tpcouto@umac.mo

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