New Paradigms for Analysis of Emotional Behavior. Co-Registration of Hemodynamic (fNIRS), EEG and Autonomic Emotional Correlates

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Emotions are configured as pattern of complex and multicomponential responses resulting from the interaction of the organism with an internal or external stimulus. The multidimension of emotional states allows to measure the different physiological, cognitive, expressive, behavioral and motivational components of emotions (Balconi, Grippa, & Vanutelli, 2015). Previous researches have shown the existence of different paradigms for the elicitation of emotional responses in individuals. The aim of the present study was to define an innovative protocol for emotional elicitation using novel engaging paradigms composed by self-inducing emotional stimuli. Electrophysiological (EEG), hemodynamic (functional Near-Infrared Spectroscopy, fNIRS), and autonomic correlates of emotional responses were recorded and evaluated in a sample of healthy participants during three different tasks. Tasks were devised to elicit different emotional states in agreement with the dimensional model of emotions, which stresses the role of two primary dimensions: valence and arousal.

Specifically, two tasks required subjects to observe emotional pictures selected from the International Affective Picture System (IAPS); and pictures representing human interactions (Balconi & Vanutelli, 2017). A third task tapping on autobiographical memories was created to elicit emotional responses related to participants' positive, negative and neutral autobiographical life events. Specific algorithms finalized to find clusters of biomarkers for the elicited emotions were applied. This study hints at the potential of a novel paradigm for eliciting emotions, as well as of the multimethod approach for investigating electrophysiological, hemodynamic and autonomic correlates of emotional responses.