
Independence of valence and reward in emotional word processing

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Abstract

Previous electrophysiological work on word processing shows that emotional word content can enhance word processing at all stages from pre-lexical encoding and semantic access, up to contextual integration, evaluation, and memory encoding (for review see Kissler, Assadollahi, & Herbert, 2006). Similarly, reward expectancy has been shown to enhance cognitive processing from the perceptual up to the executive control level (for review see Pessoa & Engelmann, 2010). Here, we investigated how these primary regulators of cognition interact. We studied whether and how the anticipation of reward or loss modulates ERP components related to the processing of emotion and semantic meaning in words. Participants ($n = 24$) performed a semantic categorization task (concreteness decision) on positive, negative and neutral words, which were preceded by a cue indicating that performance could lead to monetary loss or gain. Reward expectancy modulated ERPs in response to the cue and the P2 in response to the word but did neither interact with valence nor with concreteness. In accordance with previous studies emotional words elicited a LPC and concreteness modulated the N400. Furthermore valence and concreteness interacted in the LPC time window. Emotion-related and reward-related effects occurred in different time windows, did not interact, and showed different topographies (map dissimilarity analysis). This speaks for an independence of reward expectancy and the processing of emotional content of a word. Emotional valence connected to a word leads to a privileged processing that is not affected by short term motivational cues like monetary gain or loss.

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