

Forum: Georgia State Undergraduate Research Conference (GSURC)

Title: Differences in neural responses to positively and negatively primed words: A cross-modal study of affective priming using environmental sounds

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Keywords: *electroencephalography, priming, emotion, semantics, N400, valence, nonlinguistic*

Introduction: In this study we used event related potentials (ERPs) to compare neurophysiological responses during emotion priming versus semantic priming. Semantic priming happens when a stimulus facilitates or speeds recognition of a subsequent stimulus because the two stimuli have related meanings (e.g., "applause"—"success" vs. "music"—"success"). Previous ERP studies have shown robust N400 effect to words that are semantically primed. Emotion priming occurs when two stimuli have the same emotional valence (i.e., both positive or both negative). There have been inconsistent findings with respect to ERP markers of emotion priming in previous studies.

Methods: In the present study, we compared semantic and emotion priming in the same subjects. While under the 256-Channel Geodesic Sensor Net (EEG), participants heard nonlinguistic (environmental) sounds followed by visually presented words. Each participant performed two tasks (blocked): the semantic task focused their attention on the meaning (linguistic significance) of the stimuli, whereas the emotion task required them to attend to stimulus valence (i.e., emotional significance).

Results: We found robust N400s to stimuli that were semantically primed, regardless of task. By contrast, N400 effects in emotion priming were observed only for positively valenced words (e.g., [coughing] sound followed by the word "success" vs. [music] excerpt followed by "success"), and only when subjects focused attention on stimulus valence. We discuss the role of item-level differences in degree of relatedness for different sound-word pairs, as well as individual differences in task performance.

Conclusion: These findings have significance for understanding how the mind and brain process both linguistic and nonlinguistic stimuli that are emotionally charged.