

68/04 - "The emotional Stroop effect: Cognitive, emotional, and physiological aspects"

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Abstract:

Objectives: This project explores the interaction between emotion and cognition. In high anxious participants, emotional stimuli capture attention and cause interference. This is the emotional Stroop effect. In four experiments, we examine the correlates of emotional Stroop interference using supraliminal and subliminal presentations. We compare explicit (affective ratings, explicit memory) and implicit (EDA, facial EMG) measures of emotional processing.

Methodology: Using the Stroop paradigm, we examined reaction times (RT) to emotional and neutral stimuli, comparing high anxious and low anxious participants. We manipulated the emotional value of the stimuli using classical conditioning. Initially neutral non-words were repeatedly paired with either negative or neutral images. We presented the stimuli in the Stroop task either supraliminally or subliminally (using a sandwich masking procedure). We recorded changes in facial expressions (corrugator muscle) using electromyography (EMG), and electrodermal activity (EDA). Participants also rated the emotional value of the stimuli and we tested their memory for the type of images used in conditioning the stimuli.

Results: Higher levels of anxiety were related to increased interference from emotional stimuli (slower RTs to negatively- relative to neutrally conditioned stimuli). This was the case when stimuli were presented supraliminally but not when they were presented subliminally, with the exception of participants who were aware of the stimuli despite the masking in the subliminal task. Despite the emotion manipulation showing consistent effects on the Stroop task, the explicit affective ratings were not always sensitive to this manipulation. Facial EMG activity however was consistently affected by the emotional value of the stimuli, both in high and low anxious participants, and both when stimuli were presented supraliminally and subliminally. Similarly, emotional stimuli also led to increased EDA under subliminal presentations, especially for high anxious participants.

Conclusions: Overall, our results provide insight into the interaction between implicit and explicit processing of emotion. These different subsystems of emotion may operate independently. Specifically, we found instances where emotion was evidently processed through implicit channels (facial expressions, EDA) despite not showing an effect on explicit systems (affective ratings, emotional Stroop interference). Importantly, these interactions can be modulated by individual differences in anxiety.

Publications: Richards, A., Blanchette, I., Hamilton, V., & Lavda, A. (2007). Cognitive, emotional and physiological components of emotional Stroop using associative conditioning. In: S. Vosniadou, D. Kayser and A. Protopapas (Eds), *Proceedings of the 2nd European Cognitive Science Conference*, pp. XX-XX. Taylor & Francis, UK.; Lavda, A., Blanchette, I., Richards, A., & Hamilton, V. (2006). Facial expressions are better predictors of the emotional Stroop effect than explicit emotional ratings. Poster presented at the *13th Annual Conference of the Cognitive Section of the British Psychological Association*, Lancaster, UK, September, 2006.; Richards, A., Blanchette, I., Hamilton, V., & Lavda, A. (under revision). Conscious and nonconscious components of anxiety using psychophysiological and behavioural measures. *Neuropsychologia*.; Blanchette, I., Richards, A., Lavda, A., & Hamilton, V. (in preparation). What is the best predictor of interference by emotional stimuli? Comparing facial expressions and subjective evaluations.

Keywords: Emotion, psychophysiology, Stroop, EDA, EMG