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The Emotional Valence of Lexical Stimuli Affects Low-Level Visual Processing: Evidence From Backward Masking

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Introduction

Recent studies have demonstrated that emotion can influence relatively automatic cognitive and perceptual processes in several ways. Pratto & John (1991) showed that undesirable trait words captured processing capacity away from a primary task more effectively than did desirable trait words using a dual task design. Niedenthal & Setterlund (1994) demonstrated an emotion/perception congruity effect. Words that were consistent with an induced emotion were perceived more quickly than words inconsistent with the induced state. In a similar study, Halberstadt, Niedenthal, & Kushner (1995) demonstrated a consistency effect when the task was to disambiguate auditorially presented homographs (die-dye). These studies address a question about the relationship between emotion and perceptual/cognitive processes that is at least as old as the James-Lange theory of emotion: "Which comes first, emotional or cognitive evaluation?"

We address this question through a novel application of the backward masking procedure. Ohnesorge & Theios (1996) showed that the backward masking task could be used to infer the processing demands of words by examining their relative effectiveness as masks. In those studies characteristics of masking words such as printed word frequency (familiarity) and repetition (recency) were manipulated and shown to alter the effectiveness of the mask. In brief, increasing the processing demand of a mask increases its effectiveness.

Analogously, word recognition under backward masking can be used to probe for effects of emotion on perception. By manipulating the emotional valence (e.g. Positive vs. Negative) of words used as masks and looking for differential target recognition performance we can ask the question: "Do negative and positive emotion words make equal demands for attentional/processing resources?" Further, any difference that occurs is also support for the notion that emotional meaning is evaluated very early in perceptual processing. Finally, the consideration of survival fitness or evolutionary pressure suggests that words referring to negative or threatening events might well be more effective at capturing attentional resources than stimuli that refer to positive or non-threatening events, thus leading to more effective masking.

Method

27 subjects participated. The Positive and Negative masking stimuli were selected through a rating study and were matched on printed frequency and spatial extent (number of letters). On each trial a target and mask were selected at random and presented at an SOA of 53 ms. Recognition performance was indexed with a two alternative forced choice to the target and a similar distractor. Subjects practiced, and then completed 160 experimental trials: 40 each with Positive and Negative masking words, with 80 filler trials (Neutral mask).

Result

The average percent correct under masking by Negative words was 62% versus 67% for the Positive masks. A paired samples T-test revealed that the Negative emotion words were more effective masks than the Positive emotion words, $T(26) = 2.7$, $p < .05$. Conversion of the T statistic to r_{pb} reveals that Emotional Valence accounts for 21% of the variance.

Discussion

Our results extend those previously discussed to show that emotion can influence the very low level perceptual task of word recognition. Our design and tight stimulus control motivate the conclusion that emotion can affect recognition performance via perceptual sensitivity and not simply by altering the subject's response bias.

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