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Is Memory for Emotional Words Enhanced or Biased?

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Introduction

The idea that emotional events are remembered more clearly than events without an emotional element dates to William James, who wrote that "An impression may be so exciting emotionally as almost to leave a scar upon the cerebral tissues". Recent research investigating the interaction between emotion and recognition memory has produced inconsistent findings. While some research suggests that memory for emotional words is better than for neutral words (Kensinger & Corkin, 2003; Hamann, 2001), other research indicates that the emotional content of the word makes one more likely to respond that they've encountered the word before even when they have not (Dougal & Rotello, in press; Windmann & Kutas 2001). To investigate these hypotheses, we used signal detection analyses to distinguish between the effects of emotional stimuli on bias versus accuracy in a memory recognition test. Examining ROC data allows us to choose measures of bias and accuracy that are most appropriate. Computing zROC curves allowed us to use d_a and d_e to measure accuracy and c_a and c_e to measure response bias. To provide additional evidence independent of the assumptions necessary to compute signal detection analyses, we used a two-alternative forced choice memory task to measure accuracy and response bias. Our results indicate that recognition for past events is enhanced when the events are negative, but not when they are positive. Rather, subjects are simply biased to endorse the prior occurrence of positive, past experiences.

Method

Participants studied negative, positive, and neutral words and then took a recognition memory test.

Experiment 1

In a recognition test, participants rated their confidence that words had or had not been presented. Confidence ratings ranged from 1-4. A confidence rating of "1" meant the participant was highly confident they had studied the word previously and a confidence rating of "4" meant they were highly confident they had not.

Signal detection analyses indicated that negative words are better recognized than neutral when using parameter d_a and d_e, however, positive words are better recognized than neutral words only when measured using d_a. Our measures of bias, c_a and c_e, both suggested a positive response bias for positive words.

Parameter	Negative	Neutral	Positive
d_a	1.97*	1.6	2.02*
d_e	2.21.*	1.7	2.2
c_a	-.06*	-.03*	-.27*
c_e	-.01*	-.04*	-.27*

Experiment 2

In contrast to the confidence rating task in experiment 1, participants completed a memory test in which a two-alternative forced choice task was administered. There were two types of word pairs presented, standard and null. Standard pairs allowed us to measure accuracy and were made up of one old word and one new word that were of the same valence. Null pairs allowed us to measure response bias and were made up of one emotional word and one neutral word that were either both old or new. Results showed that negative words were better recognized than neutral words and there was no evidence of response bias for positive words.

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