

Anxiety and Sadness: Differences in Dual-Attention RSVP Performance

Brandon T. Saxton, Tharaki Siyaguna, Samantha K. Myhre, & Paul D. Rokke
North Dakota State University

Abstract

Specific emotional states have been shown to differentially influence attention. In an RSVP experiment that varied emotional states, and the nature of the target stimuli, it was determined that anxiety produced better performance (a smaller attentional blink) than sadness, regardless of whether the initial targets were digits, neutral words, or negatively valenced words. This finding helps to clarify previous anomalies in the literature and has implications for our understanding of the influence of emotion on attention across time.

Introduction

It has been shown that specific emotional states influence attention in different ways (Anderson, 2005; Arnell, Killman, & Fijavz, 2007). Previous research has shown that attending to emotionally relevant targets present among neutral distractors during an RSVP, dysphoria impairs probe detection (Koster, De Raedt, Verschuere, Tibboel, & De Jong, 2009) whereas anxiety improve probe detection (Lystad, Rokke, & Stout, 2009). A study by Jefferies and colleagues (2008) found the opposite. Participants performed better when sad than when fearful. Their task involved attention to a digit among letter distractors. The primary difference in these studies was whether the attended to stimuli were emotion congruent or not.

Thus, we conducted a study in which attention to neutral stimuli (digits and words) were compared to emotion congruent stimuli (words) under different emotion conditions. It is possible that emotion congruent stimuli reset attention priorities in a way that reverses that fundamental influence of emotion on attention to emotionally irrelevant information.

Methods

Participants

- 35 NDSU undergraduates
- 16 women, 19 men
- Age ranged from 18 to 23 ($M = 19.02$, $SD = 0.98$)
- Participated in exchange for course credit

References

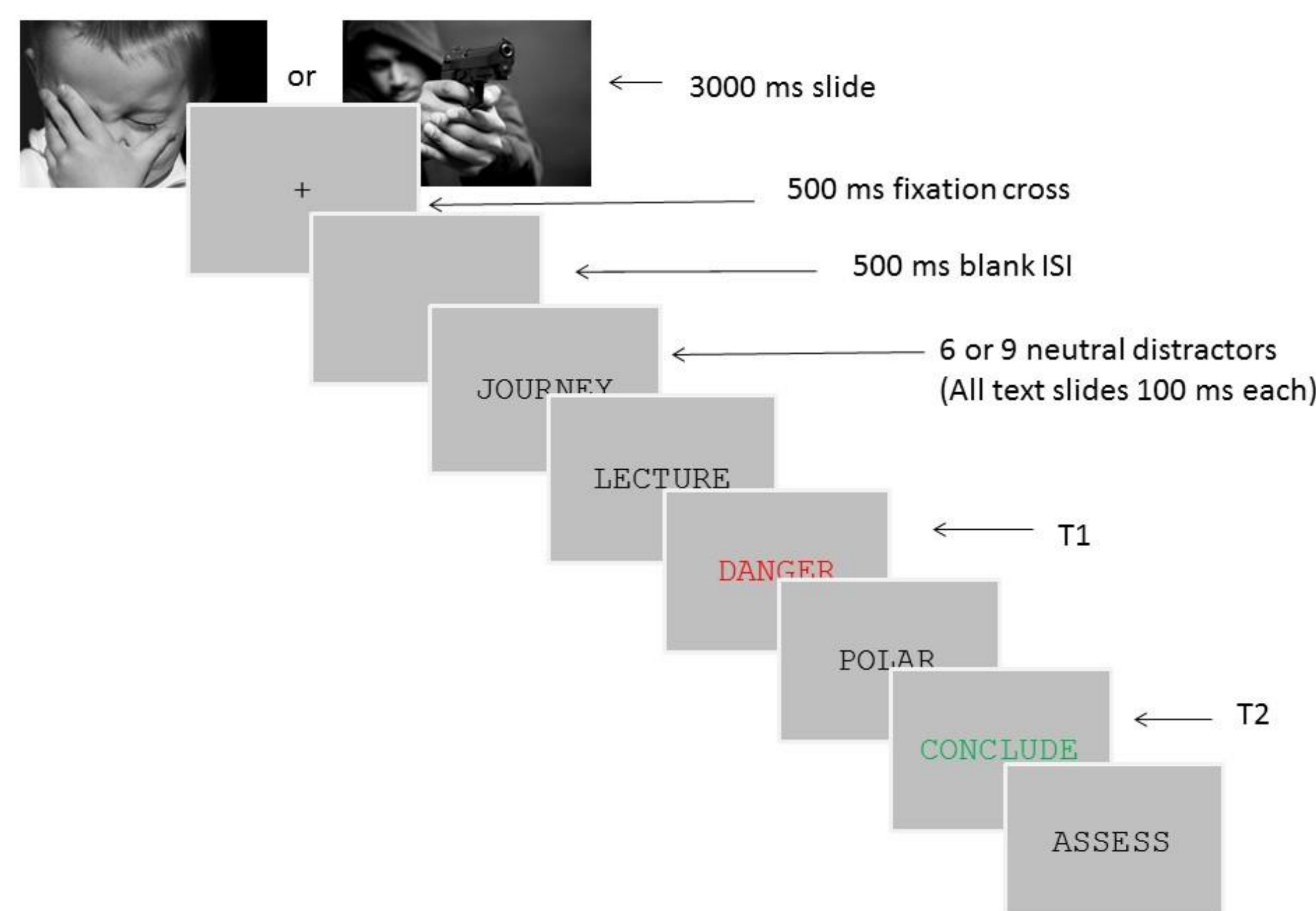
- Anderson, A. K. (2005). Affective Influences on the Attentional Dynamics Supporting Awareness. *Journal of Experimental Psychology: General*, 134(2), 258–281.
Arnell, K. M., Killman, K. V., & Fijavz, D. (2007). Blinded by emotion: Target misses follow attention capture by arousing distractors in RSVP. *Emotion*, 7(3), 465–477.
http://doi.org/10.1037/1528-3542.7.3.465
Jefferies, L. N., Smilek, D., Eich, E., & Enns, J. T. (2008). Emotional Valence and Arousal Interact in Attentional Control. *Psychological Science*, 19(3), 290–295. http://doi.org/10.1111/j.1467-9280.2008.02082.x
Koster, E. H. W., De Raedt, R., Verschuere, B., Tibboel, H., & De Jong, P. J. (2009). Negative information enhances the attentional blink in dysphoria. *Depression & Anxiety* (1091-4269), 26(1), E16–E22. http://doi.org/Article
Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). International affective picture system (IAPS): Instruction manual and affective ratings. *The Center for Research in Psychophysiology, University of Florida*.
Lystad, C. M., Rokke, P. D., & Stout, D. M. (2009). Emotion congruent facilitation of attention when processing anxious stimuli. *Cognitive Therapy and Research*, 33(5), 499–510.
http://doi.org/10.1007/s10608-008-9210-1

Procedure

A 2 (emotion: sadness vs. anxiety) x 3 (target: (T1): emotion congruent words vs neutral words vs digits) x 3 (lag position: 200, 400, or 800 ms) within subjects design was used. A dual-task version of the RSVP paradigm with the participant experiencing sadness or anxiety was used. The first target (T1) was always presented in red colored font. The second target (T2) was always neutral and presented in green colored font. Trial by trial emotions were induced in participants by showing a picture from the IAPS (Bradley & Lang, 1999) immediately prior to the start of each RSVP stream and by playing emotionally relevant music throughout each block of trials. Both pictures and target words were selected for their mean ratings of pleasure and arousal.

Each trial consisted of first presenting a black fixation cross for 500 ms in the center of the screen. Following that was a 500 ms blank interval before the start of the RSVP stream. Five or seven neutral distractor words or letters were presented prior to T1, which was always an emotionally congruent word, a neutral word, or a digit and presented in red font. T2 was always neutral (digit or word) presented in green font at 200, 400, or 800 ms following T1. For trials using digit targets, following the RSVP stream, participants were asked to press the button on the keyboard corresponding the digit they saw for T1 and then T2. For trials using word targets, participants were asked to type the first two letters of the word they saw for T1 and then T2. The participant then pressed the spacebar when they were ready for the next trial.

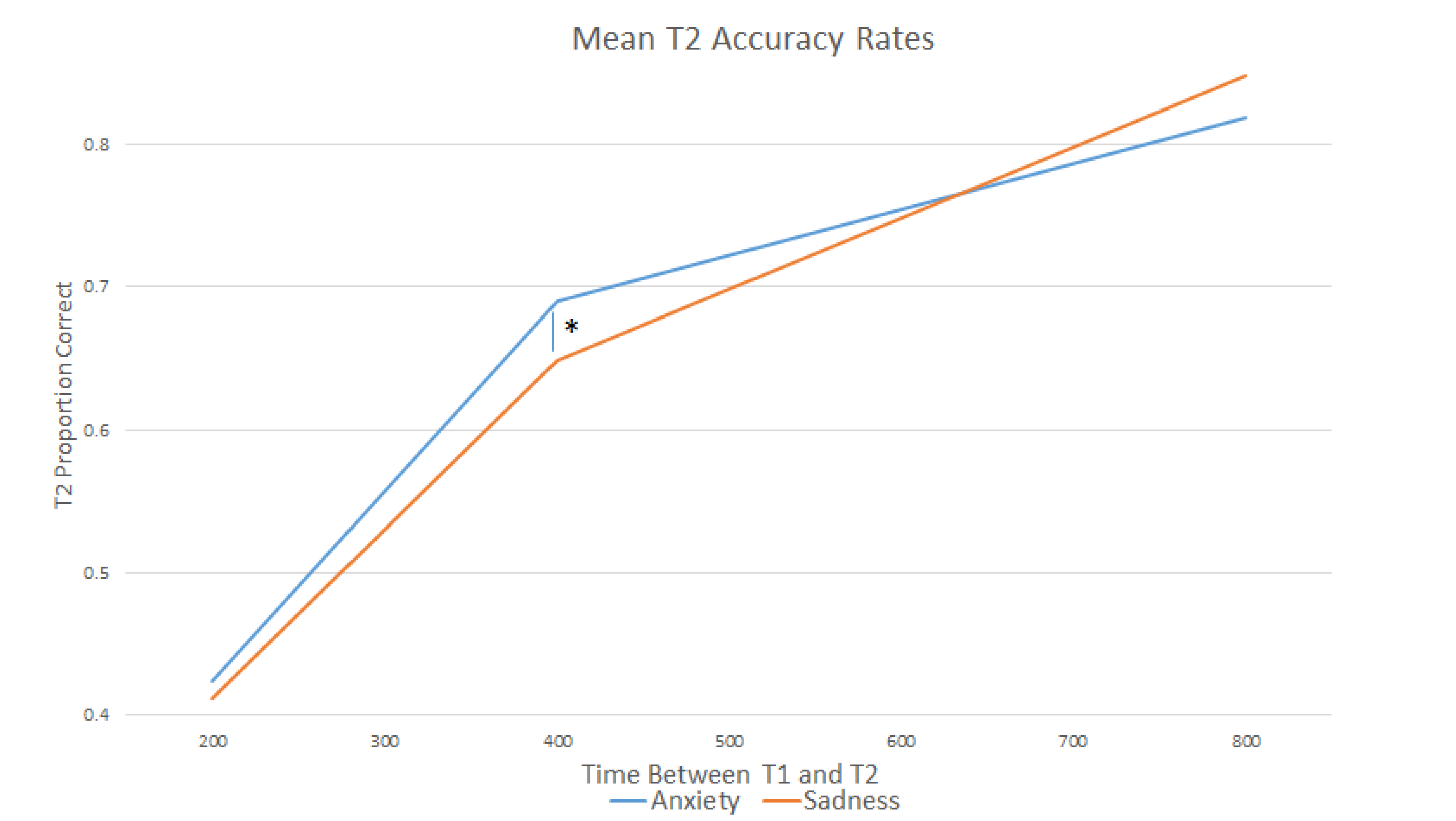
An example of a typical trial experienced by a participant:



Results

The primary dependent measure was the accuracy of T2 detection contingent on accurate identification of T1. A repeated measures ANOVA revealed a significant main effect for T2 position, $F(2, 68) = 204.79$, $p < 0.001$ indicating the presence of the typical attentional blink. There was also a main effect for target, $F(2, 68) = 195.11$, $p < 0.001$. A target x position interaction $F(2, 68) = 56.78$, $p < 0.001$ revealed that in all positions, the digit targets were detected significantly better than the word targets (all $ps < 0.001$). There was also a significant emotion by position interaction, $F(2, 68) = 3.80$, $p < 0.034$, revealing that at position two, performance was better when participants were anxious than when sad.

The graph below demonstrates T2 performance collapsed across anxious and sad mood states.



Conclusions

- The smaller attentional blink associated with anxiety, in comparison to sadness, is consistent with previous findings (Koster et al., 2009; Lystad et al., 2009).
- Differences in the size of the attentional blink reflect differences in the efficiency of processing T1.
- This calls into question the previous findings in which performance was better with sad emotions and points to the beneficial role of arousal in attentional functioning regardless of the stimuli being attended to.