Arousal Level within Positive Affect Influences the Attentional Blink

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Abstract

Positive affect has been associated with improved attentional performance, though studies have rarely controlled for arousal. This study examines the influence of arousal within positive affect on the attentional blink. In a rapid serial visual presentation dual task experiment, participants were exposed to pictures and music invoking positive affect that varied in arousal. Low arousal resulted in an attenuated attentional blink. That is, participants performed better in the low arousal condition in comparison to a high arousal, positive affect condition.

Introduction

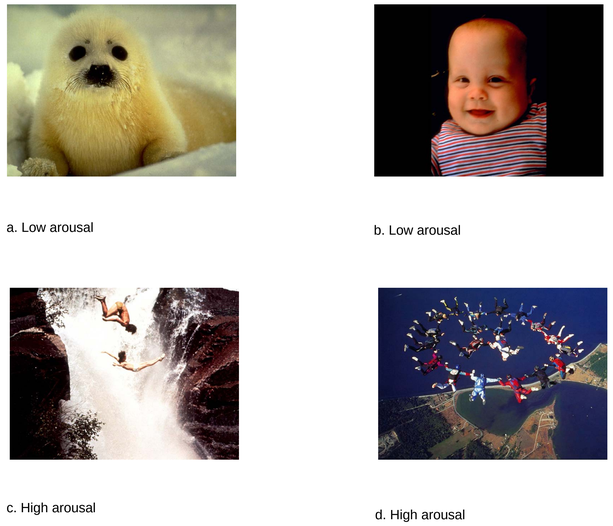
It has been shown that emotion influences attention over time (Arnell, Killman, & Fijavz, 2007; Olivers & Nieuwenhuis, 2006). The little research focused on positive emotions has found that positive emotion improves performance in attention on dual tasks (Olivers & Nieuwenhuis, 2006). However, this influence is difficult to explain as affect and arousal are often confounded. It has been proposed that affect and arousal may serve different functions in attention, though their unique roles have not been clearly identified (Jefferies, Smilek, Eich, & Enns, 2008).

The attentional blink (AB) is a phenomenon revealed in rapid serial visual presentation (RSVP) paradigms, where the detection of a second target (T2) is impaired when it appears in close succession to the first target (T1) (Raymond, Shapiro, & Arnell, 1992). The main purpose of this study was to examine the influence of arousal on attentional performance while controlling for positive affect.

In the present experiment, participants were asked to complete an RSVP dual attention task while in a pleasant mood. We hypothesized that performance would be better when participants were experiencing low arousal when compared to high arousal. We also varied the arousal level of the target stimuli in order to determine whether emotion-congruence between induced emotion and the emotion of the first target (T1) would influence the performance.

Method

Twenty-eight undergraduates participated in this study in exchange for class credit. A 2 (arousal of participant: low vs. high) x 2 (arousal of target: low vs high) x 6 (lag position) within subjects design was used. A dual task RSVP paradigm was used, with either a high or low arousal T1 and a neutral T2. Prior to the start of each RSVP stream emotions were induced in participants by showing a picture from the IAPS (Bradley & Lang, 1999). In addition, emotionally relevant music played throughout the experimental block of trials. Both pictures and target words were selected for their high mean ratings of pleasure, and varied (low or high) mean ratings of arousal. Participants completed the experiment during two days of testing with two conditions of the four being presented each day.



a. Low arousal

b. Low arousal

c. High arousal

d. High arousal

Figure 1: Examples of pictures used to induce relevant arousal levels.

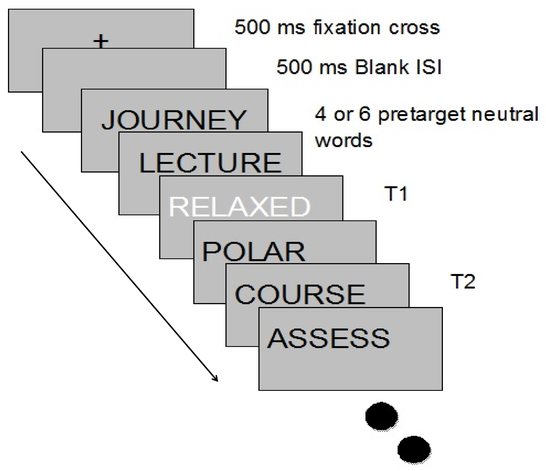


Figure 2. Schematic of one RSVP trial. Each trial started with a 3 sec presentation of a picture like the samples at the top. A single emotion was represented in each complete block of trials. Music played throughout included Brahm's Variations on a Theme by Joseph Haydn and Divertimento by Mozart.

Results

• Analyses of self report measures of affect yielded a main effect for arousal, $p > .05$, but no differences in pleasure, confirming the intended manipulation of emotion.

• Figure 3 illustrates the accuracy of T2 detection following the correct identification of T1. Results indicated a strong main effect for position, $p < .001$, as well as a main effect for arousal condition, $p < 0.05$.

•The interaction between arousal of the participant and arousal of the target was not significant.

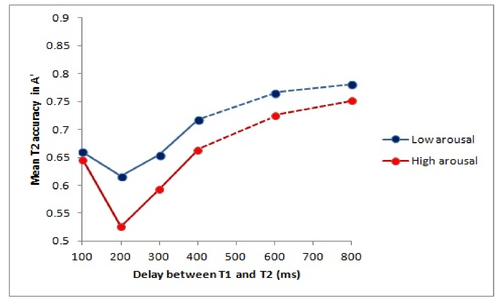


Figure 3. Mean performance across time during low and high arousal conditions.

Conclusions

•A typical AB was evident in that T2 detection was poorer in the first 300 ms than in the last 400 ms.

•We did not find an interaction between the valence of the target and the emotion of the participant. It is possible that the valence of the target is the critical feature for emotion-congruent detection and that small arousal differences inherent in the target stimuli do not matter.

•When experiencing pleasant emotion, low arousal enhances performance in a dual task in comparison to high arousal. This could be due to broadening the scope or window of attention. Another explanation could be that low arousal counteracts over-investment in processing all of the stimuli in the stream (Olivers & Nieuwenhuis, 2006).

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