

Different Mechanism of Covert and Overt Attention in Anxious and Non-anxious Population

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Abstract

A modified Posner cue-target paradigm in which neutral, positive and negative (threat) words were presented in peripheral location for cue was used to investigate the difference of engagement component of attention across emotional valence and anxiety level of participants. Results showed an interaction effect between anxiety level of participants and emotional valence of cue in valid trial. This indicates that the engage component of attention is not encapsulated and influenced by anxiety level of participant.

Introduction

Until recently, many researches have focused on the initial orienting of attention toward threat stimuli, that is, simple direction model of attention. But recently, an alternative account of attentional biases is proposed by several researches (e.g., Fox, Russo, Bowles, & Dutton, 2001; Fox, Russo, & Dutton, 2002) using a multi component model of attention proposed by Posner & Peterson (1990) in which the attentional system comprised measurable cognitive components: shifting, engagement, and, disengagement and finally, inhibition of return.

Fox et al.(2001, 2002) have reported preliminary findings which suggest threat material may modulate the disengage component of attention but not the engagement component in sub-clinically anxious participants. Using a modified Posner's cue-target paradigm, they showed that participants with high state anxiety scores showed slower RT with threat cue in invalid trials but not faster RT with threat cue in valid trials which would have indicated that threat material modulated the engagement component of attention. They proposed that the engage component of attention may be encapsulated, and not influenced by higher-level variables (e.g., meaning or valence of a cue) whereas the disengage component of attention is not encapsulated and could influenced by semantic material (Stolz, 1996).

But there are other empirical results that was not reviewed by Fox and her colleagues (Fox et al., 2001, 2002) and that seem to contradict their conclusions (Rinck, Reinecke, Ellwart, Heuer, & Becker, 2005). Ohman, Flykt, and Esteves(2001) used a kind of searching task that was named by odd-one-out search task. They presented a fear-relevant stimulus (e.g., a picture of snake) among a number of fear-irrelevant distractors (e.g., pictures of flowers) or vice versa in 2 x 2 and 3 x 3 matrices and participants are asked to indicate whether one of the stimuli is different from others. Generally, as Fox

et al.,(2001, 2002) have discussed, it is ambiguous whether the results that threatening targets among neural distractor were detected more quickly than neutral target among threatening distractors (Ohman, et al., 2001) is caused by speeded detection of threatening targets (engagement), by slowed disengagement from threatening targets, or both (Rinck, et al., 2005). But other results are relatively clear to explain, for example, Byrne and Eysenck(1995) found that high trait-anxious participants were faster to find angry than happy faces among same neutral faces for distracters or crowd stimuli, whereas no difference was found for non-anxious control participants. Similar results were reported by Gilboa-Schechtman, Foa and Amir (1999) for participants with social phobia and by Rinck et al.,(2005) with spider phobia patients. The effects observed in these studies is not easily explained by differences between anxious and controls in the ability to disengage attention. It implicates certainly the existence of speeded engagement of attention for threatening stimuli.

The aim of this study is to determine whether threat-related words are more potent than neutral or positive words in inducing an attentional shift to their own location. On the basis of the literature reviewed earlier, we predicted that threat words will be more effective (shorter reaction time) than neutral or positive words in attracting visual attention just for anxious participants.

Method

Subjects

Twenty four students were selected by Spielberger State-Anxiety scale tested just before the experiment: those scoring at or above a score of 47 (n = 12) for low state-anxious participants and those scoring at or below a score of 40 (n = 12) for high state-anxious participants.

Procedure

They were asked to indicate whether the target appear on the left or right by pressing one of two response buttons ('z' for left and '/' for right) as quickly as possible.

The sequence of events within each trial was as follows: A fixation point (+) was presented at the center of screen and disappeared after 700ms. Immediately after offset of the fixation point, a cue of schematic face was presented either in the right or the left side of fixation point for 100ms.

Immediately after offset of the face, the target was presented in the location in which the word appeared (valid trials) or in another location in which the word did not appear (invalid trials) until the participant responded. This gave a cue-target interval (CTI) of 100ms.

Results and discussion

The groups differed significantly, in the expected directions, on trait anxiety, $t(24) = 12.7$, $p < .001$, and state anxiety, $t(22) = 8.7$, $p < .001$.

In order to understand engagement and disengagement of attention, we examined the data for valid and invalid conditions separately. In the valid condition, as expected, there was a Anxiety X Emotion interaction, $F(2, 44) = 7.36$, $MSE = 89.58$, $p < .01$. In the invalid condition, there was no interaction between Anxiety group X Emotion.

Further analysis revealed that anxious participants responded more rapidly with negative and positive face cues than with neutral face cue in valid trials, $F(2, 24) = 5.10$, $MSE = 88.27$, $p < .05$ (see Figure 1).

The experiment confirms the finding that the speed of engagement to threat cue could be affected by anxious level of participants. Anxious participants detected targets more rapidly when negative (threatening) and positive face was presented for cue than when neutral face was done. This indicate that threatening stimulus is more effective (shorter reaction time) than neutral or positive words in attracting visual attention just for anxious participants.

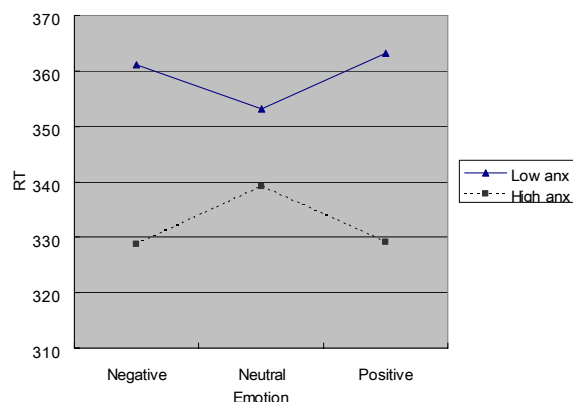


Figure 1: Mean correct response times for the three type of emotional cue for high and low State-anxious participants in valid trials.

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