Arousal Effects Temporal Attention in Specific Phobia

Kade B. Thornton, Brandon T. Saxton, and Paul D. Rokke
North Dakota State University

Abstract
Research examining the impact of anxiety on temporal attention has been divided between two schools of thought. The first posits that anxiety caused by the detection of threatening stimuli is adaptive and increases attention related performance (Cisler et al., 2007). The second suggests that highly anxious individuals show difficulty disengaging from threatening stimuli, thus, showing deficient attentional efficiency (Olatunji et al., 2013). The extant literature has focused primarily on trait (personally relevant information), rather than state anxiety (heightened arousal). The main purpose of this study was to examine how the interaction between state and trait anxiety affects attentional performance.

Introduction
Recent research focused on the effects of anxiety on attention across time has reached what at first appear to be discrepant results. One fairly consistent finding is that when attending to a threat relevant T1 presented among neutral distractors in an RSVP task, anxiety improves T2 detection (Arndt and Botella, 2002; Cisler et al., 2007; Amir et al., 2009; Lystad et al., 2009). A second line of research has found that when presented with a threat relevant T1 anxiety decreases T2 performance (Olatunji et al., 2011, 2013), however, within this line of research several studies have found no evidence of an increased attentional blink following threat-relevant T1 (Schönenberg and Abderahman, 2013; Weierich and Treat, 2015). Two possibilities for these discrepancies are of particular importance. First, the existing literature has focused on trait rather than state anxiety, meaning that higher levels of arousal at the time of participation may have influenced performance. Secondly, evidence of delayed temporal disengagement has only been found in samples where participants endorsed clinical levels of anxiety or were diagnosed with an anxiety disorder.

Thus, we conducted an emotional RSVP task to test two hypotheses. First, we expected that non-phobic individuals in a high state of anxiety would display greater accuracy in T2 detection following threat-relevant T1 stimuli than any other group. Second, we also predicted that phobic individuals would show difficulty disengaging from threat-relevant T1 stimuli and therefore show a decrease in T2 accuracy relative to other conditions.

Methods
Participants
- 64 undergraduate students (34 Non-Phobic & 30 Phobic)
- SPQ Scores: Phobic (M = 29.18, SD = 0.39) Non-Phobic (M = 18.68, SD = 1.87)
- 14 males, 50 females
- Age ranged from 18 - 24 (M = 18.98, SD = 1.195)
- Participated in exchanged for course credit

Procedure
A 2 (phobic vs. non-phobic) x 2 (emotion vs. neutral) x 2 (T1 valence) x 4 (lag position: 200, 300, 400, 500) mixed methods design was used. A dual-task version of the RSVP paradigm with the participants experiencing anxiety or a neutral state was used. The first target (T1) was either a spider (anxious) or frog (neutral) image. The second target (T2) was a landscape or architecture image that had been rotated either 90 degrees to the left or the right. Each trial consisted of first presenting an emotion-provoking slide (anxious or neutral) for 3000 ms. Immediately following, a black fixation cross was displayed for 500 ms in the center of the screen. Following that was a 500 ms blank interval before the start of the RSVP stream. Seven or ten distractor digits were presented prior to T1, which was always an animal. T2 was always a landscape or architecture image presented at one of four positions following T1. On all trials, following the RSVP stream, participants were asked if a rotated image was present, and if so, which direction it was rotated. The participant then pressed the spacebar when they were ready for the next trial.

Results
The primary dependent measure in this experiment was the percent correct detection of T2. The results indicated two significant 3-way interactions. A target x position x group interaction, F (3,60) = 4.02, p = 0.011, as well as an emotion x target x group interaction, F (1,62) = 3.99, p = 0.05 were observed. Post hoc analyses revealed that non-phobics displayed better T2 detection following a spider image in the high arousal condition compared to the low arousal condition and compared to phobics in both conditions. Conversely, phobic participants showed poorer T2 detection following a spider image in the second and fourth lag positions.

Conclusions
- We found that spider phobics showed poor T2 performance following a threat relevant T1 image AND when in a high state of arousal.
- Conversely, non-phobics displayed the best performance following a threat relevant image AND when in a high state of arousal.
- These results are analogous to Olatunji et al. (2013) who found that Veterans with PTSD had difficulty disengaging from a threat relevant T1.
- Moreover, these results parallel those of Lystad et al. (2009) who found that high arousal resulted in better performance following an anxious T1.
- Under normal conditions, anxiety serves to focus and promote efficient processing of threatening information.
- However, when experience renders some stimuli personally relevant and of high concern it is difficult for individuals to disengage attention from those stimuli.

References