Introduction

Cognitive models of anxiety suggest that the development and maintenance of this affective disorder is associated with enhanced processing of threat-related information (e.g., Eysenck, Derakshan, Santos, & Calvo, 2007). Supporting this notion is a growing body of research indicating that highly anxious participants exhibit attentional biases favouring threatening interpretations of negative stimuli, such as threat-related words or images of angry faces (Hughes & Kendall, 2008; for a meta-analysis see Bar-Haim et al., 2007).

Many of the studies in this area involve utilising rapid serial visual presentation (RSVP), which assesses the attentional blink (AB) effect, to measure temporal components of visual processing. Studies using this paradigm have found that highly anxious individuals are able to process emotionally salient stimuli more accurately than non-anxious individuals (e.g., Fox, Russo and Georgiou, 2005). However, much of the past research in this area has focused on adolescents and adults, and the few studies that have been conducted in child populations are inconsistent. This suggests that there is a need to further investigate the AB in child populations.

Objectives of the present study were to:

i) determine whether processes of temporal attention in children are subject to the same attentional processing constraints as in adults (i.e. the attentional blink)

ii) investigate the effects of high and low levels of anxiety on temporal biases of attention in a child population.

Methods

The Effects of Anxiety on the Attentional Blink in Children
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Participants

• 103 local primary school children (52 male), aged 8 to 11 years.
• Levels of anxiety were measured using the State-Trait Anxiety Inventory for Children (STAI, Spielberger, 1973).

Stimuli

• The experiment involved an RSVP task (see Maratos, Mogg & Bradley, 2008), where participants had to determine whether threat, positive or neutral faces (see Figure 1) were embedded in a stream of distractor stimuli (i.e., pictures of scrambled faces – see Figure 2 for examples).
• All stimuli were presented consecutively at a speed of one stimulus every 133.6 ms.
• Stimulus presentation was controlled using Inquisit software (www.millisecond.com).

Procedure

• There were 120 trials in total, each containing 20 stimuli: 18 distracter stimuli and two target stimuli.
• During each trial, the first target stimulus (T1) was always a neutral face and the second target stimulus (T2) was a threat, positive, or neutral face.
• This resulted in three types of trial:
  i. neutral T1 – threat T2 (threat trials)
  ii. neutral T1 – positive T2 (positive trials)
  iii. neutral T1 – neutral T2 (neutral trials)
• Neutral trials were counterbalanced so that when T1 was N1, T2 was N2 (and vice versa).
• Lags investigated were 2 (267.2 ms), 3 (400.8 ms), 4 (534.4 ms), and 7 (935.2 ms).
• See Figure 2 for an example of a trial.
• After each trial, participants were required to report which face(s) they had seen using buttons on a response pad that corresponded to the different faces.
• Response accuracy was recorded automatically using Inquisit software.

Results

Of the 81 children who successfully completed the task, a repeated measures ANOVA of percent correct responses was carried out with Lag (2, 3, 4, 7) and Face Type (threat, positive, neutral) as the IVs. This revealed significant main effects for lag [F(3,78) = 9.89, p < .001, η2 = .28] and face type [F(2,79) = 54.41, p < .001, η2 = .58].

For the main effect of lag, pair-wise Bonferroni corrected comparisons revealed that participants performed better on trials at lag 7 compared with lags 2 and 3 (p < .001; p ≤ .005, respectively). Participants further performed better on trials at lag 4 compared with lag 2 (p < .01) (see Figure 3). For the main effect of face type, pair-wise Bonferroni corrected comparisons revealed better performance on trials with threat and positive faces compared with neutral faces (p < .001 for both comparisons).

To investigate state anxiety, a mixed ANOVA was carried out with Lag and Face Type as the within-subjects IVs and State Anxiety (high and low, defined using upper and lower tertiles) as the between-groups IV. This revealed a significant interaction between state anxiety and lag only [F(3,48) = 3.30, p < .05, η2 = .17] (see Figure 4). To clarify the interaction, Bonferroni corrected independent t-tests of percent correct responses were undertaken separately for each lag. Results indicated that high state anxious participants performed significantly worse at lag 7 than low state anxious participants (p < .005).

To investigate Trait Anxiety, a similar analysis was conducted with Trait Anxiety as the between-subjects IV. The interaction effects did not reach statistical significance.

Discussion

• Findings demonstrate that overall, children display a typical blink profile. This suggests that children are subject to the same attentional processing constraints as in adults.

• Also in line with adult data, results indicate that there is an effect of valence on RSVP task performance. However, in relation to anxiety, analyses show no biased attention to threat.

• Furthermore, results demonstrate that high state anxious children do not display a typical blink profile. This finding might indicate that those with anxiety disorders are more easily distracted by task-irrelevant stimuli than non-anxious individuals (see also Benoit et al, 2007). However, this finding requires further investigation.

References


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http://psychology.derby.ac.uk/centre/cognitive_psychology.html