Neurobehavioral Patterns of Attention Bias in Anxious Youth
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BACKGROUND
• Anxiety is among the most prevalent mental disorders, affecting up to 29% of individuals during their lifetime (Kessler et al., 2012). The onset of anxiety disorders (AD) peaks during adolescence. (Merikangas, J.P., Burstein, et al. 2010) and predicts psychopathology during adulthood (Pine, Cohen, Gurley & Brook, 1998). Therefore examining factors that influence the emergence, maintenance, and treatment of anxiety during adolescence is a crucial research goal.
• Attention bias (AB), selective and exaggerated attention towards threat, has been examined as a core cognitive mechanism in anxiety (Bar-Haim, Lamy, Pergamin, et al., 2007).
• Recent research highlights heterogeneity in AB, with many anxious individuals showing a bias away from rather than towards threat (Roy, Dennis, & Warner, 2015).
• The direction of AB may predict unique symptom profiles. AB towards threat has been associated with distress-related disorders such as generalized anxiety disorder (GAD), whereas AB away from threat relates to anxiety disorders such as phobias (Waters, Bradley, & Mogg, 2014).
• Event-related potentials (ERPs) reflecting recruitment of cognitive control (N2, P3) can further provide neuroplastic signals that underlie and distinguish distinct AB types.

AIMS
We explored:
1. Whether moderately anxious youth showed both AB towards and away from threat
2. Whether AB groups showed unique neurocognitive responses to threat and distinct anxiety symptom profiles

METHOD
Participants:
• 20 children (13 females) between the ages of 9 and 17 (M = 12.96, SD = 2.85) participated in the study.

Measures
• Screen for Child Anxiety Related Emotional Disorders (SCARED) and Screen for Child Anxiety Related Emotional Disorders – Parent (SCARED-P) (Birmaher et al., 1997). Both scales consist of 41 with subscales measuring
  • Panic Disorder/Significant Somatic Disorder, Generalized Anxiety Disorder, Separation Anxiety Disorder, Social Anxiety Disorder, Significant School Avoidance

Screen for Child Anxiety Related Emotional Disorders

<table>
<thead>
<tr>
<th>Screen for Child Anxiety Related Emotional Disorders</th>
<th>Min</th>
<th>Max</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety Disorder (Total Scores)</td>
<td>1</td>
<td>76</td>
<td>28.25 (17.99)</td>
</tr>
<tr>
<td>Panic Disorder/Somatic Symptoms</td>
<td>0</td>
<td>23</td>
<td>5.65 (5.67)</td>
</tr>
<tr>
<td>Generalized Anxiety</td>
<td>0</td>
<td>18</td>
<td>7.05 (5.38)</td>
</tr>
<tr>
<td>Separation Anxiety</td>
<td>0</td>
<td>16</td>
<td>5.75 (4.39)</td>
</tr>
<tr>
<td>Social Anxiety</td>
<td>1</td>
<td>14</td>
<td>8.1 (3.80)</td>
</tr>
<tr>
<td>Significant School Avoidance</td>
<td>0</td>
<td>5</td>
<td>1.7 (1.66)</td>
</tr>
</tbody>
</table>

Dot Probe Task
• Stimuli were images of angry (threat) and neutral (non-threat) faces from the NimStim Set (Tottenham et al., 2009). Pairs of faces were presented for 500 ms. Faces were either paired threat/non-threat or non-threat/threat.
• On each trial, one of the face cues was randomly replaced by an arrow (probe). Participants were asked to identify the direction of the arrow and reaction times were collected.

EEG Recording and Analysis
• EEG was recorded continuously while participants completed the Dot Probe task. N2 and P3 Scalp-recorded event-related potentials (ERPs) were generated to cues. N2 was computed as the mean amplitude between 200ms - 300ms. P3 was computed as the mean amplitude between 240 ms - 340 ms.

Trier Social Stress Task (TSST)
• The TSST is a standardized social stressor. Participants were observed and video recorded as they completed a speech and a computational assessment in front of researchers posing as judges (Kirschbaum, Pirke, & Hellhammer, 1993).

RESULTS
Those showing AB away (n = 11) versus towards threat (n = 9), based on AB scores > or < zero, showed heightened P3 and N2 in response to threat cues, t(18) = 2.47, p = .024 and t(18) = 2.18, p = .043.

DISCUSSION
• This study was among the first to demonstrate that bias towards and away from threat is related to distinct anxiety symptoms, demonstrating the heterogeneity of AB (Roy, Dennis, & Warner, 2015).
• Those showing a bias away from threat also showed heightened P3 and N2 amplitudes suggesting enhanced recognition of cognitive control. This in turn may support maladaptive or rigid behavioral avoidance, characteristic of fear-related stimuli. Although successfully avoiding threat, an unbalanced use of cognitive resources is used to do so.
• Future studies should examine AB heterogeneity in clinically anxious youth, and test its impact on efficacy of targeted treatment approaches such as Attention Bias Modification.

REFERENCES