

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, JP, Burstein, et al. 2010) and predicts psychopathology during adulthood (Pine, Cohen, Gurley & Brook, 1988). 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 fear-related disorders such as phobias (Waters, Bradley, & Mogg, 2014).
- Event-related potentials (ERPs) reflecting recruitment of cognitive control (N2, P3) can further provide neural signatures that underlie and distinguish distinct AB types.

AIMS

We explored:

- Whether moderately anxious youth showed both AB towards and away from threat
- 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

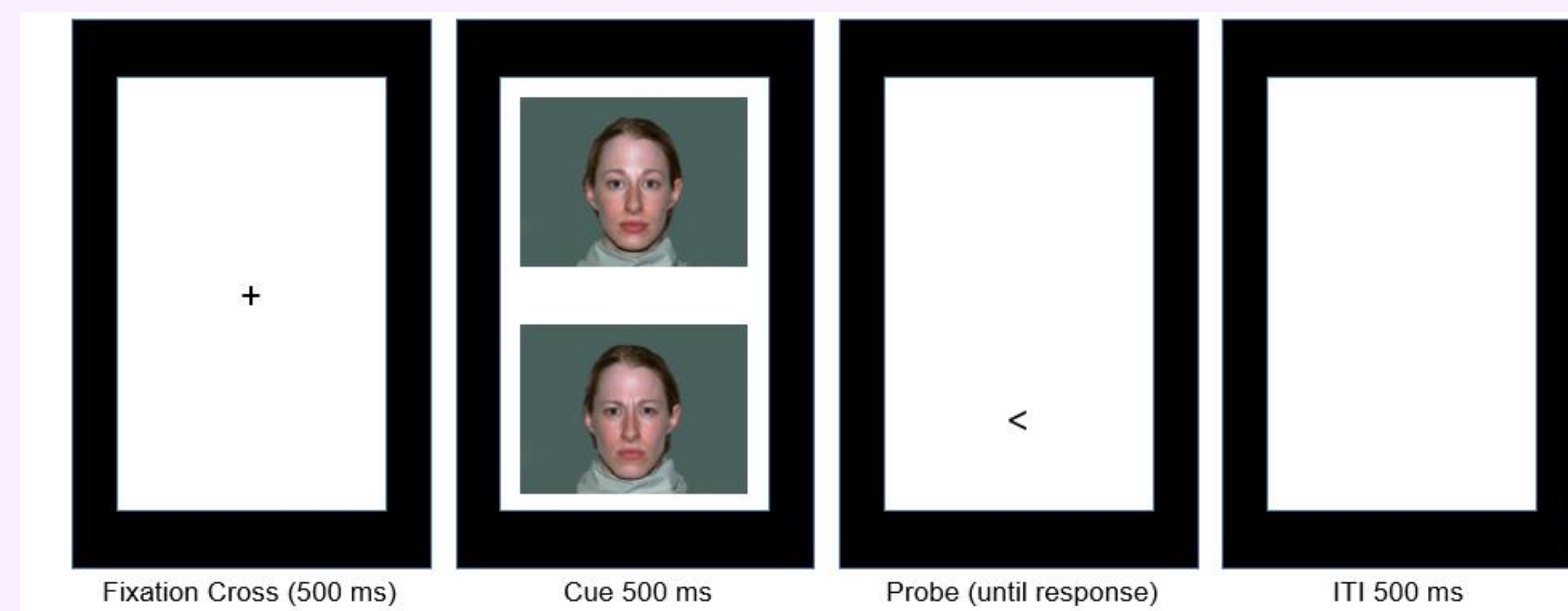
Screen for Child Anxiety Related Emotional Disorders

	Min	Max	M(SD)
Anxiety Disorder (Total Scores)	1	76	28.25 (17.99)
Panic Disorder/Somatic Symptoms	0	23	5.65 (5.67)
Generalized Anxiety	0	18	7.05 (5.38)
Separation Anxiety	0	16	5.75 (4.39)
Social Anxiety	1	14	8.1 (3.80)
Significant School Avoidance	0	5	1.7 (1.66)

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/non-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.

Attention Bias = RT neutral cues – RT threat cues



EEG Recording and Analysis

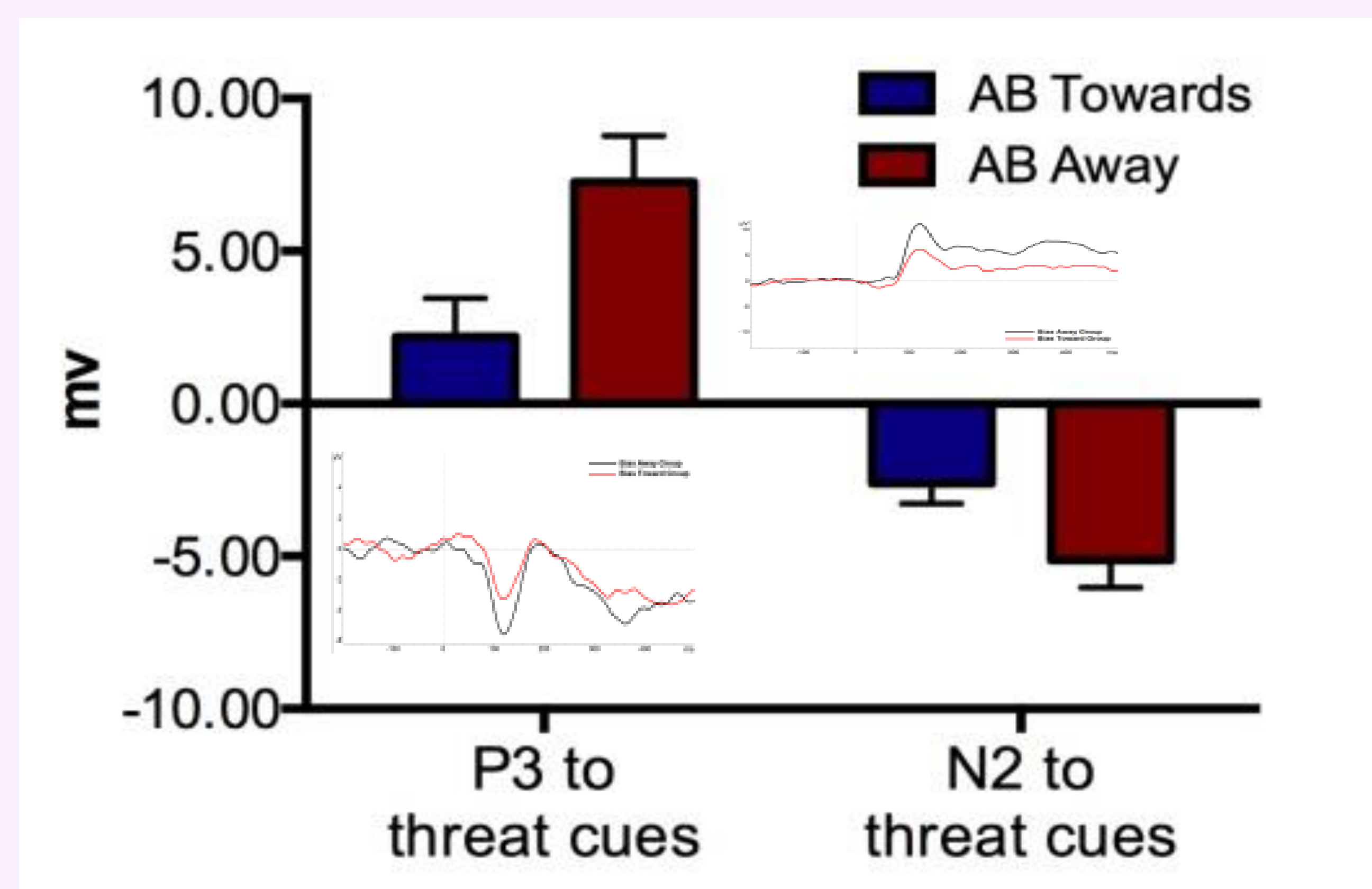
- EEG was recorded continuously while participants completed the Dot Probe task. N2 and P3 Scalp-recorded event-related potentials (ERPs) were generated to cues. N2 was computed as the mean amplitude between 290ms - 370 ms. P3 was computed as the mean amplitude between 240 ms - 340 ms.

Trier Social Stress Task (TSST)

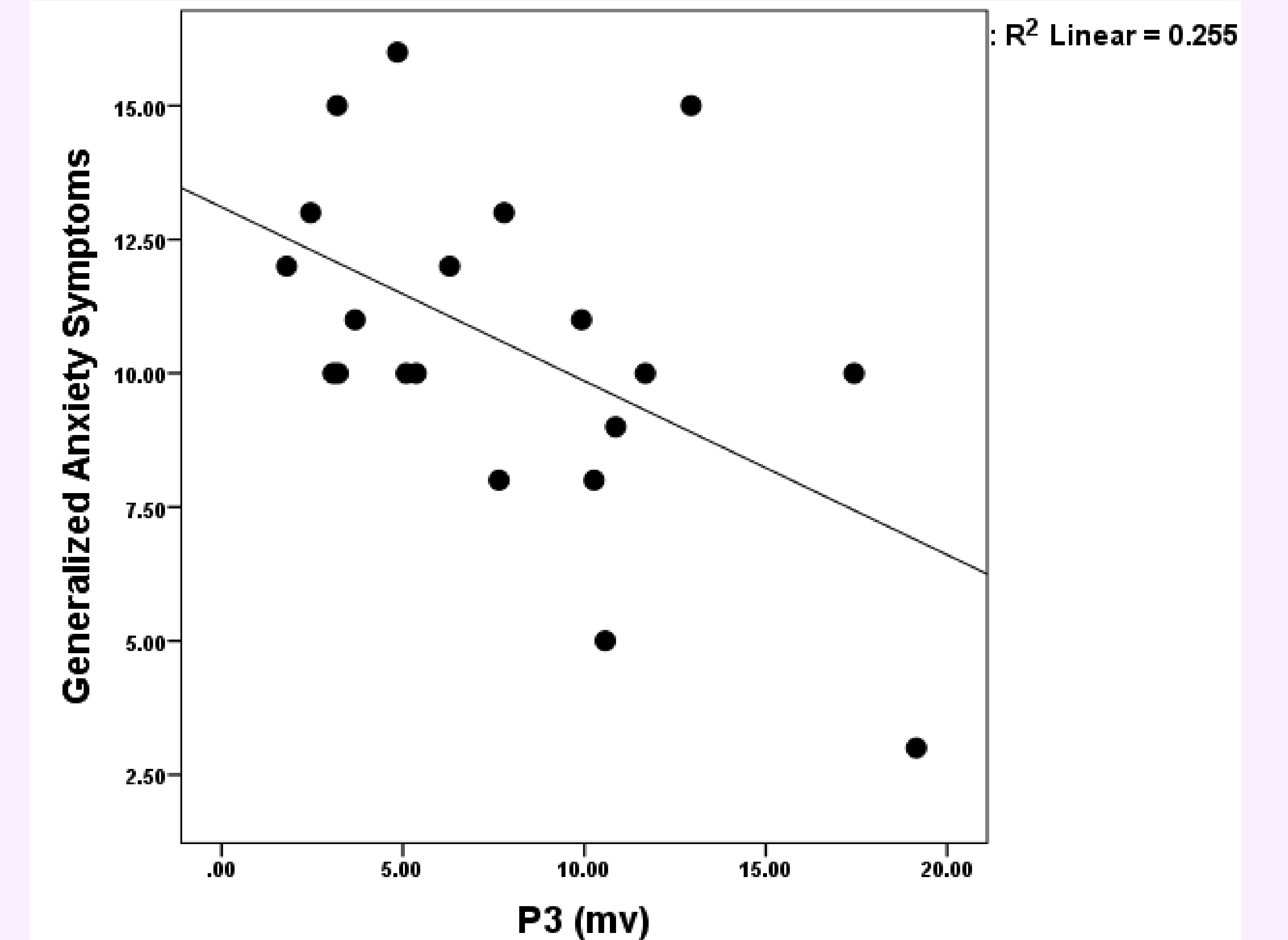
- The TSST is a standardized social stressor. Participants were observed and video recorded as they completed a speech and a computational assessment in front of researchers posing as judges (Kirschbaum, Pirke, & Hellhammer, 1993).

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 $t(18) = 2.18, p = .043$.



- Reduced P3 amplitudes, associated with AB towards threat, were associated with greater parent-reported distress-related symptoms (GAD; $r(20) = -.51, p = .023$).



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 recruitment 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.

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