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ORIGINAL ARTICLE

Attention Shifting Moderates the Association Between Threat Interpretation Bias and Anxiety in Youth

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Abstract

Purpose Theory and data implicate attention control and its components, shifting and focusing, as moderators of vulnerability to anxiety. The current study provides the first empirical examination of attention control and its components as moderators of the relation between threat interpretation bias and anxiety severity in clinically referred youth.

Methods $N=64$ clinically referred youths ages 7 to 17 years ($M=11.7$ years, SD = 2.5; 46.9% female; 85.9% Hispanic) who met criteria for a primary anxiety disorder completed a threat interpretation bias task and self-ratings of attention control, attention shifting, attention focusing, and anxiety severity.

Results Attention shifting, but not focusing, significantly moderated the association between threat interpretation bias and anxiety severity such that threat interpretation bias was positively associated with anxiety severity at high levels of shifting. A similar trend-level moderation effect was found for total attention control.

Conclusions This is the first study to identify attention shifting as a moderator of the association between threat interpretation bias and anxiety severity in youth. Findings hold implications for revisions to theoretical models and interventions that target attention processes and interpretation biases in youth with anxiety disorders.

Keywords Threat interpretation bias · Attention control · Anxiety · Youth

Anxiety disorders are among the most prevalent and impairing mental health disorders in children and adolescents (hereon "youth"), highlighting the critical need to advance understanding of their development and maintenance. Cognitive models implicate threat interpretation bias in vulnerability to anxiety disorders in youth (Field & Lester, 2010; Muris et al., 2000). Threat interpretation bias is the tendency to interpret ambiguous situations as threatening (Mogg & Bradley, 1998). The approach most widely used to assess threat interpretation bias presents ambiguous scenarios to youth and asks them to provide interpretations to resolve the ambiguity. The youths' interpretations are coded categorically by independent raters as either benign or threatening. Findings from this approach show that youth with high anxiety severity provide more threatening interpretations than youth with low anxiety severity (e.g., Creswell et al., 2005; Miers et al., 2008; Sherman & Ehrenreich-May, 2018).

Despite this evidence supporting an association between youth threat interpretation bias and anxiety severity, there is a paucity of research and thus a gap in understanding of variables that might moderate the association. Efforts to close this gap are important to identify for which youth and in what contexts threat interpretation bias enhances anxiety, and then inform the selection and tailoring of treatment approaches to reduce anxiety. Theory and research implicate attention control and its components as key variables that could help close the gap (Cox et al., 2018; Melendez et al., 2019; Shi et al., 2019; Son et al., 2021). Attention control is a top-down cognitive process that allows youths to flexibly deploy attention according to the youth's goals. It includes the ability to maintain focus on goal-relevant stimuli by inhibiting attention to goal-irrelevant distractors

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(i.e., focusing) and shift attention away from goal-irrelevant stimuli (i.e., shifting; Derryberry & Reed, 2002; Eysenck, 2007; Mills et al., 2016). In the presence of a goal-irrelevant threat such as an inaccurate interpretation of an ambiguous scenario as threatening or dangerous (e.g., a child trying to complete homework while experiencing the thought, "my parent is late from work and therefore must have been in a bad car accident"), high attention control enables youth to sustain focus on goal-relevant stimuli (i.e., homework) and/or shift attention away from the threat (i.e., interpretation). By contrast, low attention control may result in youth's attention being captured by and stuck on the threat, triggering downstream cognitive and affective processes that maintain anxiety (Lonigan & Vasey, 2009; Lonigan et al., 2004; Susa et al., 2012).

Given attention control's role in promoting flexibility, researchers have proposed that attention control and its components may attenuate vulnerability to anxiety (Cisler & Koster, 2010; Lonigan et al., 2004). Support for this proposal comes, for example, from a sample of 1,806 non-referred youths with an average age of 13 years, in which Sportel and colleagues (2011) found that high attention control attenuated anxiety severity in the context of high behavioral inhibition. In contrast, in a sample of 20 clinically referred youths with anxiety disorders and 17 youths without anxiety disorders, aged 8 to 16 years, Ramos and colleagues (2022) found high attention control– specifically high shifting– amplified (not attenuated) anxiety severity in the context of high error monitoring. These examples support attention control and its components as moderators of anxiety vulnerability in youth yet raise intriguing questions about the contexts in which attention control attenuates or amplifies vulnerability. We build on this work in the current study by examining attention control and its components (i.e. shifting and focusing) as moderators of anxiety severity in yet another important but understudied context, high threat interpretation bias in youth.

Attention Control and Its Components as Moderators of the Association Between Threat Interpretation Bias and Anxiety in Youth

We know of only one study that examined attention control as a moderator of the association between threat interpretation bias and social anxiety severity. In a nonreferred sample of 71 youths with social anxiety disorder and 42 youths with no anxiety disorder, aged 6 to 18 years, Pergamin-Hight and colleagues (2016) found that attention control did not moderate the association between threat interpretation bias and social anxiety severity. We do not know of any study that examined the components of attention control, focusing and shifting, as moderators, or examined the associations among threat interpretation bias, attention control, and anxiety severity in a sample of clinically referred youth with anxiety disorders. These are important gaps in the literature because data support the theoretical and empirical distinction between focusing and shifting in youth, with more consistent and larger associations found between focusing and anxiety severity than between shifting and anxiety severity (Patriarca et al., 2023; Pettit et al., 2023). As noted, prior research also supports shifting, but not focusing, as a moderator of anxiety severity in the context of high error monitoring (Ramos et al., 2022). Moreover, emerging research demonstrates that distinct forms of control can have opposing influences on anxiety outcomes, emphasizing the importance of investigating the components of attention control (Fox et al., 2023; Fox et al., 2021). In the context of high threat interpretation bias, high attention focusing and shifting may attenuate anxiety severity through distinct theorized mechanisms: focusing by enabling youth to inhibit goal-irrelevant distracting thoughts related to threatening interpretations; shifting by enabling youth to disengage from threatening interpretations and redirect their thoughts to non-threatening aspects of their environment.

Investigating these components can advance understanding of how attention processes may attenuate– or even amplify (cf. Ramos et al., 2022)– anxiety severity in the context of threat interpretation bias, advancing theory and informing precise translational treatment approaches for anxiety in youth. Further, evaluating attention control and its components as moderators among clinically referred youth with anxiety disorders enhances the generalizability of findings to clinical populations.

Current Study

The current study moves to close the aforementioned gaps in the literature. We envision two scenarios in which attention control and its components could moderate the association between threat interpretation bias and anxiety severity. In one scenario, high levels of attention control could attenuate the influence of threatening interpretations on anxiety severity by enabling youth to shift their attention away from threat-related thoughts and stimuli and maintain focus on more adaptive ones (Hadwin & Field, 2010). In this scenario, youth who demonstrate flexible attention control may redirect their thoughts to other, non-threatening interpretations and/or maintain focus on other activities to direct their attention away from threat. In an alternative scenario, high levels of attention control could amplify the influence of threatening interpretations on anxiety severity if youth

strategically maintain their focus on or shift their attention towards threat-related thoughts and stimuli. In this alternative scenario, threatening interpretations become the goal-relevant stimuli, and youth who demonstrate an ability to sustain focus and shift attention may deploy these skills to maintain their thoughts on threatening interpretations.

Based on theory and research, we hypothesized that high threat interpretation bias will be associated with high anxiety severity. Further, based on theory we hypothesized that this association will be moderated by attention control and its components: focusing and shifting. We tentatively expected attention control and its components to attenuate the association between threat interpretation bias and anxiety severity. That is, we expected the association to be present when attention control and its components are low, based on the notion that youths' attention will be captured by threatening interpretations, and they will be unable to shift their attention to other, nonthreatening thoughts or aspects of their environment.

Methods

Participants

Participants were 64 youths ages 7 to 17 years (M=11.7 years, SD=2.43; 46.9% female) who met for a primary anxiety disorder. Participants were recruited from a clinical trial (ClinicalTrials.gov identifier NCT01819311; Pettit et al., 2020). Data were collected at a pretreatment evaluation, and parents granted written informed consent and youths granted written assent to use their data for research purposes. Annual income was reported as follows: 20.3%<$21,000; 29.7% between $21,000 and $61,000; 21.9% between $61,000 and $100,000; 20.3>$100,000; and 7.8% did not report income. The majority of the participants (85.9%) identified as White and Hispanic/Latino. Participants' primary anxiety diagnoses were as follows: 39.1% social anxiety disorder, 31.3% generalized anxiety disorder, 14.1% specific phobia, and 9.4% separation anxiety disorder. A minority of participants met for a comorbid diagnosis: 10.94% for Attention Deficit-Hyperactivity Disorder, and 3.13% for a Depressive Disorder. Exclusion criteria for this study included developmental disabilities, psychosis, or involvement in other mental health related treatment.

Measures

Anxiety Disorder Interview Schedule for Children– IV: Child and Parent Versions (ADIS-IV-C/P; Silverman & Albano, 1996*)*

We used the ADIS-IV-C/P to determine primary anxiety diagnoses, operationalized as the disorder which was the most interfering or impairing. The ADIS-IV-C/P has high retest reliability in youth ages 7 to 17 years, with k values ranging from 0.80 to 0.92 for diagnoses (Silverman et al., 2001; Wood et al., 2002). In this sample, interrater reliability on diagnoses in a subset of 25% of participants was k = 1.0 for both social anxiety disorder and generalized anxiety disorder, k = 0.63 for specific phobia, and k = 0.86 for separation anxiety disorder, indicating good to excellent reliability.

Screen for Child Anxiety Related Emotional Disorders (SCARED-C; Birmaher et al., 1997*)*

We measured anxiety severity using the SCARED-C, a 41-item youth self-rating scale with statements inquiring about symptoms related to anxiety disorders (e.g., "I worry about other people liking me"). Each item has a rating scale that assess anxiety symptom severity on a 3-point Likert scale ranging from "Not true or hardly ever true" to "Very true or often true." The SCARED-C has demonstrated adequate internal consistency, test–retest reliability, and convergent validity through expected correlations with other measures of anxiety in youth ages 7 to 17 years (Behrens et al., 2019; Birmaher et al., 1997). The total score from the SCARED-C was used to assess anxiety severity, and in this sample the omega coefficient was 0.92.

Attentional Control Scale-Child (ACS-C; Melendez et al., 2017; Muris et al., 2004; Son et al., 2021*)*

We measured attention control and its components using the ACS-C, 15-item version. The ACS-C is a youth self-rating scale that consists of two subscales, Attentional Focusing, assessing ability to sustain attention, and Attentional Shifting, assessing ability to switch/redirect attention from one task to another. Items on the Attentional Focusing subscale include "I find it difficult to concentrate myself when I'm excited about something." Items on the Attentional Shifting subscale include "It is easy for me to switch back and forth between two different tasks." Items are rated on a 4-point Likert scale from "Almost never" to "Always" and some items are reverse coded so that higher scores indicate higher levels of attention control, focusing, and shifting, respectively. The 15-item ACS-C total and subscale scores have

demonstrated adequate internal consistency and convergent validity in youth ages 6 to 17 years (Melendez et al., 2017; Son et al., 2021). In this sample, the omega coefficient was 0.72 for total attention control, 0.77 for Attention Focusing, and 0.74 for Attention Shifting.

Children's Opinions of Everyday Life Events (COELE; Suarez & Bell-Dolan, 2001*)*

We used the COELE to assess youths' threat interpretation bias. The COELE presents six hypothetical ambiguous scenarios relevant to children's experiences and concerns (Silverman et al., 1995). The six scenarios reflect common situations involving school, family, interpersonal relationships, personal appearance, health, and safety. Examples include: "One day before starting the lesson, your teacher asks you to stay after class", "At the school dance, you noticed other kids were looking at you while you were dancing", and "One night, you wake up suddenly thinking that you heard a noise in the living room, but all is quiet." Each situation was read aloud to youth participants and then they were asked, "What do you think happened in this situation?". Youths' responses were recorded, transcribed, and coded as threatening if the explanation focused on a negative interpretation (score of 1) and non-threatening if the explanation provided a neutral or positive interpretation (score of 0). Scores on the six items were summed to calculate a total threat interpretation score ranging from 0 to 6. The COELE has demonstrated adequate retest reliability and concurrent validity with measures of worry and trait anxiety (Suarez & Bell-Dolan, 2001). In this sample, interrater reliability was k = 0.62 on COELE items, indicating good reliability. The omega coefficient was 0.75.

Data Analysis

Missing data occurred at low rates: 0% on the SCARED-C and COELE; 3.1% on the ACS-C. Missing data bias was assessed by creating a dummy variable to indicate presence or absence of missing data. The dummy variable was then correlated with all other measured variables. No significant correlations were observed (all $p > 0.05$), indicating no evidence of bias and data were assumed to be missing at random. Missing data were estimated using an expectation maximization algorithm.

We used Pearson's correlations to examine the associations among measured variables. Additionally, we used multiple regression analyses to examine attention control and its components as moderators of the association between threat interpretation bias and anxiety severity. We used a PROCESS macro for IBM SPSS version 28 (Preacher & Hayes, 2008), where the main effects were entered into the model first, followed by the interaction terms to evaluate the moderation effects. Age and primary anxiety diagnosis were examined as potential covariates in these models. A robust nonparametric resampling procedure (n = 5000 bootstrap resamples) was used to derive 95% confidence intervals (CIs) and point estimates. Statistically significant moderation effects were determined by a 95% confidence interval that did not include zero. Prior to running analyses, we mean centered variables to reduce the potential for multicollinearity and to facilitate interpretation of parameter estimates. We further assessed multicollinearity using Variance Inflation Factors (VIFs); all VIF values were equal to or below one. For each of three separate regression models, we generated product terms to examine moderation by separately multiplying COELE scores (threat interpretation bias) by total attention control, attention focusing, and attention shifting, respectively (Jaccard & Turrisi, 2003). Significant product terms were probed for regions of significance via the Johnson-Neyman technique (Darlington & Hayes, 2016).

Results

Means, standard deviations, and pairwise correlations between variables of interest are presented in Table 1. Threat interpretation bias was significantly negatively correlated with total attention control and attention shifting, but not attention focusing or anxiety severity (although the correlations were in the expected direction). Total attention control and attention focusing, but not attention shifting, were significantly negatively correlated with anxiety severity. Age and primary anxiety diagnosis were not significantly associated with other measured variables (all $p > 0.05$). Therefore, we did not retain them as covariates in regression models.

Attention shifting significantly moderated the association between threat interpretation bias and anxiety severity, B = 0.72 (95% CI [0.26, 1.19], $p = 0.003$), as shown in Table 2. The Johnson-Neyman regions of significance test indicated that threat interpretation bias was significantly positively associated with anxiety severity only when attention shifting scores were above 13, values that included 53.23% of our sample (see Fig. 1). No other moderation effects were statistically significant (Tables 3 and 4), although a trend level effect was found for total attention control, such that threat interpretation bias was positively associated with anxiety severity when total attention control scores were high.

Table 1 Means, Standard Deviations, and Correlations between Variables

	1	2	3	4	5	6
1. COELE	–					
2. SCARED-C	.19	–				
3. ACS-C Total	−.35*	−.45**	–			
4. ACS-C Focusing	−.21	−.56**	.80**	–		
5. ACS-C Shifting	−.28*	−.02	.56**	.17	–	
6. Age	−.07	.20	−.01	−.15	.19	–
Mean	2.06	22.96	39.35	13.58	11.73	11.73
Standard deviation	1.49	14.14	6.54	5.45	3.96	2.47
Range	0–6	0–52	26–59	14–36	6–23	7–17

N=64; COELE=Children's opinions of everyday life events; SCARED-C=Screen for child anxiety related disorders– child; ACS-C Total=Total scores on attentional control scale for children; ACS-C Focusing=Attentional control scale for children focusing subscale; ACS-C Shifting=Attentional control scale for children shifting subscale; **p<.001, *p<.05

Table 2 Attention Shifting as a Moderator of the Association between Threat Interpretation Bias and Anxiety Severity

Model: R^2=.43, p<.01	Est	LCI	UCI	S.E	T	p
Constant	37.85	17.04	58.65	10.39	3.64	.0006
COELE	−7.34	−13.84	−0.83	3.25	−2.26*	.03
ACS-C Shifting	−1.37	−2.76	0.02	0.69	−1.98	.05
COELE X ACS-C Shifting	0.72	0.26	1.19	0.23	3.14*	.003

Est.=Estimate, *LCI/UCI*=Lower/upper confidence interval, *S.E.*=Standard error; COELE=Children's opinions of everyday life events; ACS-C Shifting=Attentional control scale for children shifting subscale. *denotes statistically significant t-value

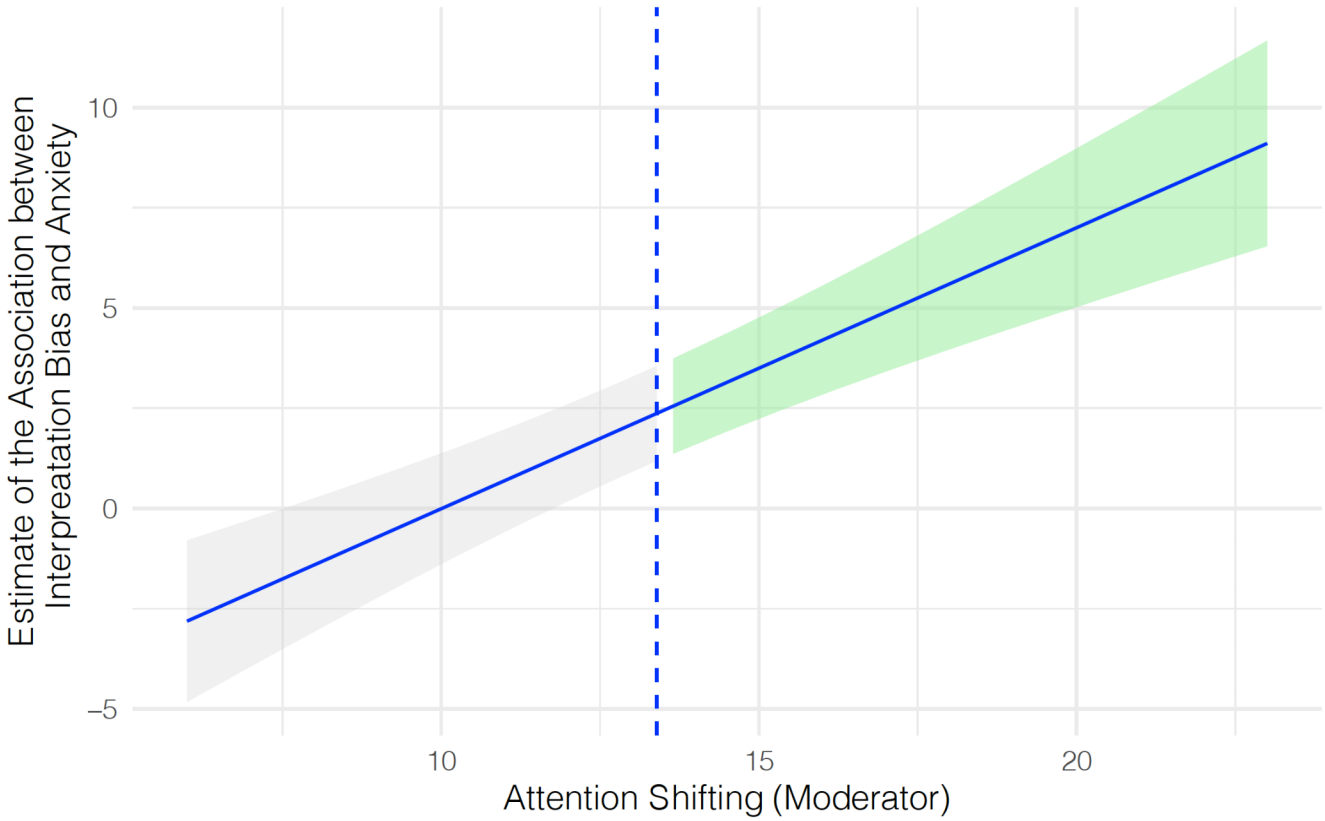

Fig. 1 Johnson-Neyman Plot of the Moderating Effect of Attention Shifting on the Association Between Threat Interpretation Bias and Youth Anxiety Severity. This figure illustrates the association between threat interpretation bias and anxiety severity across levels of attention shifting. The regression line represents the estimated association, with shaded areas indicating the 95% confidence intervals. The vertical dashed line marks the Johnson-Neyman boundary, where the effect transitions from non-significant to significant (p<.05). The region to the right of this boundary, shaded in green, corresponds to the range where the association between threat interpretation bias and anxiety severity is statistically significant, beginning at an attention shifiting value of 13.39 (53.23% of the sample).

Table 3 Total Attention Control as a Moderator of the Association between Threat Interpretation Bias and Anxiety Severity

Model: R^2=.49, p<.01	Est	LCI	UCI	S.E	T	*p*
Constant	82.42	46.86	117.98	17.76	4.64	.0001
COELE	−13.36	−29.76	3.04	8.19	−1.63	.11
ACS-C	−1.53	−2.39	−0.67	0.43	−3.55	.0008
COELE X ACS-C	0.36	−0.06	0.79	0.21	1.71	0.09

Est.=Estimate, *LCI/UCI*=Lower/upper confidence interval, *S.E.*=Standard error; COELE=Children's opinions of everyday life events; ACS-C=Total attentional control scale for children. *denotes statistically significant t-value

Table 4 Attention Focusing as a Moderator of the Association between Threat Interpretation Bias and Anxiety Severity

Model: R^2=.56, p<.01	Est	LCI	UCI	S.E	T	*p*
Constant	60.45	30.83	90.07	14.89	4.08	.0001
COELE	−0.36	−11.50	10.78	5.56	−0.06	.95
ACS-C focusing	−1.51	−2.59	−0.43	0.54	−2.79	.007
COELE X ACS-C focusing	0.05	−0.37	0.47	0.21	0.22	.83

Est.=Estimate, *LCI/UCI*=Lower/upper confidence interval, *S.E.*=Standard error; COELE=Children's opinions of everyday life events; ACS-C=Attentional control scale for children focusing subscale. *denotes statistically significant t-value

Discussion

In this clinically referred sample of youth with anxiety disorders, we found that attention shifting, but not focusing, moderated the association between threat interpretation bias and anxiety severity. Intriguingly, threat interpretation bias was positively associated with anxiety severity at high attention shifting. The direction of this effect was consistent with a recent finding on attention shifting as a moderator of the association between error monitoring and anxiety severity (Ramos et al., 2022) but differed from prior theory as we elaborate below.

Consistent with prior theory and research, low total attention control and focusing were correlated with high anxiety severity (Melendez et al., 2019; Pergamin-Hight et al., 2016; Shi et al., 2019; Son et al., 2021). In contrast, attention shifting and threat interpretation bias were not significantly correlated with anxiety severity, although correlations were in the expected direction. The nonsignificant correlation between threat interpretation bias and anxiety severity in the current study diverges from prior research. It is possible that sample characteristics contributed to this divergence. Unlike prior studies that compared interpretation bias scores between high anxious and low anxious groups, all participants in the current sample had a primary anxiety diagnosis, which may have restricted the range of anxiety scores and limited the ability to detect a significant correlation.

Of most relevance to the current study, the association between threat interpretation bias and anxiety severity varied as a function of youth's ability to flexibly shift attention. At high levels of attention shifting, high threat interpretation bias was associated with high anxiety severity. This finding is intriguing; whereas theory and prior research implicate low attention control overall in anxiety (e.g., Shi et al., 2019; Son et al., 2021), our finding indicates that high attention shifting amplified– not attenuated– the association between threat interpretation bias and anxiety severity. Although these findings run counter to prior theory, they are consistent with other research findings which suggest specific subdomains of cognitive control (i.e. shifting) differentially relate to anxiety vulnerability (Fox et al., 2021; Troller-Renfree et al., 2019; White et al., 2011). Additionally, these findings align with recent data indicating that high attention control and shifting may amplify vulnerability to anxiety. For example, Ramos and colleagues (2022) found at high levels of shifting, high error monitoring was associated with high anxiety severity in youth. Saulnier and colleagues (2021) also found that high attention control amplified the relationship between intolerance of uncertainty and anxiety in adults. Overall, these results suggest that both the components and levels of attention control are relevant to understanding anxiety in the context of threat interpretation bias.

Findings from the current study also suggest a need for further consideration of the conceptualization of attention control as a protective factor against anxiety (Ramos et al., 2022; Sportel et al., 2011; Zetsche et al., 2018). The current findings are consistent with the notion that youth who possess a high ability to shift attention might use that ability to redirect their attention to threatening interpretations, triggering downstream cognitive and affective processes that promote anxiety. That is, in the context of high threat interpretation bias, high shifting might amplify anxiety severity in youth. An optimal, moderate level of attention shifting may allow youth to flexibly focus their attention on situationally relevant, more benign interpretations. Further research is needed to test this notion directly, as we were unable to do so in the present study given the cross-sectional design.

These findings have both theoretical and applied implications. As noted, theoretical models posit that low attention control and its components contribute to the development and maintenance of anxiety in youth (Lonigan et al., 2004; Lonigan & Vasey, 2009; Shackman et al., 2016). On one hand, our findings from correlation analyses largely support such models because low total attention control was associated with high youth anxiety severity. On the other hand, our findings from moderation analyses highlight a context (high threat interpretation bias) in which high, not low, attention shifting relates to high anxiety severity (cf. Ramos et al., 2022). If replicated, these findings may lead to theoretical refinements concerning the levels, components, and circumstances under which attention control relates to anxiety severity in youth.

Regarding applied implications, the findings raise an interesting question about the optimal use of cognitive bias modification (CBM) programs for anxiety. CBM-interpretation programs aim to reduce anxiety using repetitive training tasks designed to increase endorsement of benign or positive interpretations of ambiguous scenarios (Martinelli, et al., 2022). CBM-interpretation programs have demonstrated moderate effects on interpretations and small effects on anxiety severity in youth (Krebs et al., 2018), supporting their promise for targeting threat interpretation bias. CBM-attention programs, also referred to as attention training, aim to reduce anxiety using repetitive training tasks designed to increase attention control by shifting attention away from threat-related stimuli and toward neutral stimuli (Martinelli, et al., 2022; Pettit et al., 2020). CBM-attention programs have been demonstrated to increase youth's attention control (Pettit et al., 2020; Pettit et al., 2023) and increases in attention control during CBM-attention have been associated with reductions in youth anxiety severity (Linetzky et al., 2020; Pettit et al., 2023). Although such demonstrations support the use of CBM-attention overall (Falcone et al., 2024), the current findings raise the question of whether increasing attention control, especially shifting, might have unintended negative consequences among youth who show threat interpretation biases. Further intervention development research among youth with anxiety disorders is needed to answer this question.

Findings should be interpreted in view of the study's strengths and limitations. Strengths include the well-characterized sample of clinically referred youth and multi-method assessment approach. Our predominately Hispanic/Latino sample is a strength of this study, as it helps to address the historical underrepresentation of Hispanic/Latino youth in anxiety research (Patriarca et al., 2023). Further research is needed to examine the generalizability of these findings to other populations of youth. Limitations include the relatively small sample size and the cross-sectional study design which prevents conclusions about directionality of effects. The original clinical trial from which this sample was drawn was not designed to test moderation; statistical power to detect interaction effects was therefore low. The wide age range together with relatively small sample size precluded an examination of potential developmental effects, although we note that age was not associated with other variables. Further research is needed to consider potential developmental influences and expand upon the measurement approach to include attention control specifically in anxiety-provoking situations (i.e., "hot" measures of attention control; Zelazo et al., 2024) and eye-tracking methods to directly measure attention control and its components (Pettit & Silverman, 2020), such as the anti-saccade task with eye-tracking (e.g., Cardinale et al., 2019). Such research, together with collection of youth self-ratings, may also advance understanding of the validity of youth self-ratings on attention control and its components.

In conclusion, this study presents the first data on components of attention control as moderators of the association between threat interpretation bias and anxiety severity. Our findings support attention shifting as a moderator, while suggesting the ability to flexibly shift attention might amplify anxiety severity in the context of threat interpretation bias among youth. Future research is encouraged to replicate and extend the current findings to further elucidate the complex interplay between threat interpretation bias, attention control and its components, and anxiety severity across diverse populations and settings to inform precise translational interventions.

Author Contribution M.M., J.W.P. and W.K.S. conceptualized the study and wrote the manuscript. V.C. and S.J. assisted with data collection and coded behavioral data. M.M. and Y.R. curated and analyzed data. W.K.S. and G.B. contributed to reviewing and editing the manuscript. All authors reviewed and approved the final manuscript.

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Data Availability Data is available upon reasonable request to the corresponding author.

Declarations

Conflict of interest Jeremy Pettit receives royalties from New Harbinger and American Psychological Association. No other authors have competing financial or personal interests to disclose.

Ethical Approval All procedures were approved by the Institutional Review Board. All procedures were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent to Participate All participants provided informed consent.

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