



Attentional Control and Threat-Related Attention Bias Partially Explain the Association Between Maternal Psychological Control and Youth Anxiety Severity

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Published online: 26 November 2018

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Abstract

Etiological models of youth anxiety disorders have generally treated maternal psychological control (PC) and youth attentional processes as separate lines of inquiry. As a consequence, little is known about the interplay of PC and youth attentional processes as it relates to youth anxiety. The current study bridges these two lines of inquiry, and evaluates a conceptual model wherein youth threat-related attention bias and youth attentional control account for the relation between maternal PC and youth anxiety. Participants were 202 clinic-referred youths ($M = 10.09$ years; 54% male) and their mothers. The indirect association between maternal PC and youth anxiety via youth attentional control was statistically significant using youth ratings. The indirect association between maternal PC and youth anxiety via youth threat-related attention bias was statistically significant using mother ratings. Findings from this study advance etiological models of youth anxiety, provide insight into threat-related attention bias and attentional control as potential mediators of the association between high maternal PC and youth anxiety, and suggest that targeting attentional processes could offer an additional treatment option for anxious youths whose parents are high in PC.

Keywords Anxiety · Youth · Mothers · Attention bias · Attentional control · Psychological control

Anxiety disorders are prevalent, chronic, and associated with substantial impairment in children and adolescents (hereon referred to as youth) (Copeland et al. 2014; Wood et al. 2012). Theoretical models of the development and maintenance of youth anxiety highlight the influence of high parental psychological control (e.g., Chorpita and Barlow 1998; Vasey and Dadds 2001). Parental psychological control (PC) refers to behaviors that inhibit youths' psychological and emotional development (e.g., guilt induction, intrusiveness, overprotection, shame; Barber 1996). Parents who exert excessive control over their children's psychological and emotional well-being and do not grant autonomy in developmentally salient tasks foster a diminished sense of control in their children, which is theorized to lead to higher levels

of anxiety (Wood 2006). In contrast, parents who encourage youth autonomy foster a sense of control and mastery over the environment in their children, which is theorized to lead to lower levels of anxiety (Zalta and Chambless 2011).

Consistent with these theoretical models, extensive evidence documents an association between high parental PC and youth anxiety severity (e.g., McLeod et al. 2007; Becker et al. 2010). Most of this research has focused on maternal PC, primarily because mothers are the primary caregivers in most families and spend more time with youth than fathers. Although the association between maternal PC and youth anxiety is well-established, less is known about variables that may explain the association. We are aware of four studies that have examined variables that may account for this association using school-based or high risk samples. We are unaware of any prior research examining these variables in a clinic-referred sample of youth. In a school-based sample of 107 youths ages 8–11 years, youth perceived lack of control mediated the association between youth-rated parental PC and youth anxiety severity (Nanda et al. 2012). In a separate school-based sample of 116 youths ages 10–14 years, youth

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hopelessness mediated the association between youth-rated maternal PC and youth anxiety severity (Schleider et al. 2014). In a sample of 89 youths ages 6–13 years who were involved in an anxiety prevention program, youth interpretation biases of ambiguous situations partially accounted for the association between youth-rated maternal overcontrol and youth anxiety severity (Affrunti and Ginsburg 2012a). Finally, in a sample with 74 youths ages 7–13 years who were involved in an anxiety prevention program, youth perceived competence partially accounted for the relationship between youth-rated parental overcontrol and youth anxiety severity (Affrunti and Ginsburg 2012b). Findings from these studies indicate that youth who perceive overcontrolling behaviors or high PC from their parents hold maladaptive beliefs about control, self-competence, the future, and ambiguous situations, which partially account for their heightened levels of anxiety. Notably, the aforementioned studies assessed parent behaviors from the perspective of the youth only. The relation between these variables and maternal ratings of PC and youth anxiety is therefore unknown.

In addition to perceived maternal PC and youths' beliefs about control and competence, researchers have focused on attentional processes in theoretical models of youth anxiety (Fox 2010; Lonigan and Vasey 2009; Mathews and MacLeod 2005; Waters and Craske 2016). According to these models, youth who exhibit heightened attention to threat (i.e., threat-related attention bias) and difficulty adaptively regulating attention (i.e., poor attentional control) are at risk for developing anxiety. Threat-related attention bias is the tendency to preferentially allocate attentional resources to threatening stimuli relative to non-threatening stimuli, and is typically measured using reaction times on performance-based tasks (Mathews and MacLeod 2005). Recent data indicate that attention bias in anxious youth can manifest as towards threat in some instances (e.g., Dudeney et al. 2015) and away from threat in other instances (e.g., Waters et al. 2014). These recent data have led researchers to focus increasingly on poor attentional control in theoretical models of anxiety (e.g., Waters and Craske 2016; Zvielli et al. 2014). Whereas threat-related attention bias is an automatic, bottom-up process, poor attentional control is a distinct and strategic, top-down process that represents a deficiency in the ability to adaptively focus, sustain, and shift attention, and is typically measured using rating scales (Cisler and Koster 2010). Youth with poor attentional control may respond to the presence of threat with avoidance and/or difficulty disengaging from threat, and attentional control is typically not correlated with threat-related attention bias (e.g., In-Albon et al. 2010). In support of these theoretical models, extensive evidence documents that threat-related attention bias and poor attentional control are associated

with youth anxiety severity (Dudeney et al. 2015; Melen-dez et al. 2017; Meesters et al. 2007).

The theoretical and empirical literatures on maternal PC and youth attentional processes have developed largely as separate lines of inquiry, and have not been integrated into a single model. As a consequence, it is unknown whether, and how, maternal PC may be associated with youth attentional processes. There are reasons to expect high maternal PC to be related to youth threat-related attention bias and attentional control. From a social learning perspective, high maternal PC conveys information to youth that the world is a dangerous place (Rapee 1997), and suggests that youth are not capable of meeting the challenges the world presents. This perspective can be complemented with a genetics perspective: heritable differences in reactivity to threat may account for high levels of PC, perturbed attentional processing of threat, and anxiety (e.g., Gibb et al. 2009; Perez-Edgar et al. 2010). Taken together, in response to high maternal PC, youth may become hypervigilant to cues of threat or danger in their environments (i.e., display heightened threat-related attention bias) and struggle to adaptively shift or regulate their attention (i.e., display poor attentional control). Further, intrusive and controlling maternal behaviors, aspects of PC, have been shown to diminish young children's motivation to independently practice sustaining and regulating attention (Graziano et al. 2011). Over time and across multiple stages of youth development, lower levels of practice regulating attention are expected to inhibit the development of attentional control.

Heightened threat-related attention bias and difficulty regulating attention may explain in part the higher anxiety severity seen in children of parents who are high in PC. Indirect evidence consistent with this expectation comes from a study of 129 school-based youths ages 6–14 and their mothers: youth threat-related attention bias mediated the association between observer-rated maternal overinvolvement and youth-rated separation anxiety symptoms (Perez-Olivas et al. 2008). We know of no other research that has examined threat-related attention bias and/or attentional control as explanatory variables of the association between maternal PC and youth anxiety severity. To integrate and advance theory on parenting and attentional processes in youth anxiety, there is need to develop and test conceptual models of the associations between these variables. The current study represents the first effort to address that need.

Current Study

The purpose of the current study is to bridge theoretical models of youth anxiety by testing a conceptual model of the associations between maternal PC, youth threat-related attention bias and attentional control, and youth anxiety

severity in a sample of clinic-referred anxious youths and their mothers. We tested a model wherein the association between maternal PC and youth anxiety severity is accounted for by youth threat-related attention bias and youth attentional control. Based on the theory and research reviewed above, we hypothesized: (a) maternal PC would be significantly and positively associated with youth anxiety severity and youth threat-related attention bias; (b) maternal PC would be significantly and negatively associated with youth attentional control; and (c) the relationship between maternal PC and youth anxiety severity would be partially accounted for by youth threat-related attention bias and youth attentional control. In light of potential changes in levels of maternal PC and youth attentional control across development (i.e., as youths grow older PC may decrease whereas attentional control tends to increase), we explored age as a moderator of the hypothesized indirect paths. During childhood and adolescence, youth experience normative increases in autonomy from parents and regulation of attention. High maternal PC may interfere with normative increases in autonomy and regulatory abilities throughout these developmental periods, or it may have differential effects depending on youths' age. Additionally, given discrepancies found in caregiver- and youth-report data on parenting behaviors (Bogels and van Melick 2004; Korelitz and Garber 2016) and symptoms of anxiety (Klein 1991; De Los Reyes et al. 2010), we tested these models using both mother- and youth-report. As noted, this is the first study we know of to examine multiple attentional processes as explanatory variables in the relation between maternal PC and youth anxiety severity in a clinic referred sample of youth, and to assess the relations using youth and mother perspectives, respectively.

Methods

Participants and Procedures

All study procedures were approved by the appropriate institutional review board. Participants were 202 youths (54.5% male) and their mothers who completed an intake assessment at an anxiety disorders specialty clinic in an urban area of the southeastern United States. Prior to completing the intake, all parents provided written informed consent and all youths provided written assent to study participation. All measures were collected at the intake assessment. Referral sources were primarily pediatricians, school personnel, social workers, and other professionals. Youths ranged in age from 6 to 18 years ($M = 10.10$; $SD = 2.74$); 78.2% were Hispanic/Latino, 8.4% were European American, 0.5% were African American, 4.5% reported "other race/ethnicity," and 7.9% declined to report race/ethnicity. Annual family income

was as follows: 15.8% < \$21,000; 37.7% between \$21,000 and \$61,000; 21.8% between \$61,000 and \$100,000; and 23.8% > \$100,000. Two participants (1%) declined to report income.

All participants who completed an intake assessment were included in the present study, regardless of their diagnosis. Common primary diagnoses were generalized anxiety disorder (25.2%), social anxiety disorder (21.3%), separation anxiety disorder (16.8%), and specific phobia (10.9%). Other primary diagnoses included attention-deficit/hyperactivity disorder (6%), panic disorder (2%), selective mutism (2%), major depressive disorder (1.5%), obsessive-compulsive disorder (1%), and oppositional defiant disorder (1%). Seven participants (3.5%) displayed subthreshold anxiety symptom levels and did not meet criteria for a diagnosis, and 12 participants (6%) did not complete the diagnostic interview but completed all other study measures. Approximately 72% of the sample met criteria for more than one disorder, including another anxiety disorder (59%), attention-deficit/hyperactivity disorder (9%), major depressive disorder (3%), and oppositional defiant disorder (1.5%).

Measures

Maternal Psychological Control (PC)

Maternal PC was assessed using the 10-item PC subscale of the Child/Parent Report of Parental Behavior Inventory-30 (CRPBI/PRPBI-30; Schludermann and Schludermann 1970). On the CRPBI/PRPBI-30, youths and parents separately provide ratings on 30 items on a 3-point Likert scale, indicating whether a statement is "Not like", "Somewhat like", or "A lot like" the parent's behavior toward the child. Sample items from the PC scale include "My mother is a person who tells me all the things she has done for me"/"I tell my child all the things I have done for him/her" and "My mother is a person who is always telling me how I should behave"/"I am always telling my child how he/she should behave." The PC scale measures the extent to which a mother's behaviors control or influence her child's thoughts and emotions through overprotection, manipulation, guilt-induction, or intrusiveness. The CRPBI PC scale has demonstrated internal consistency ($\alpha = .87$) and convergent validity ($r = .56$), significantly correlating with another measure of parental overprotection (Safford et al. 2007). In the current sample, the alpha coefficients for the PC scale were .87 for the CRPBI-30 and .77 for the PRPBI-30.

Youth Anxiety Severity

Youth anxiety severity was assessed using the Screen for Child Anxiety Related Emotional Disorders—Child/Parent Versions (SCARED-C/P; Birmaher et al. 1997), 41-item

self- and parent-report measures related to disorders such as separation anxiety disorder, general anxiety disorder, panic disorder, social phobia, and school phobia. Items are rated on a 3-point Likert scale ranging from “Not true or hardly ever true” to “Very true or often true”. Test–retest reliability is satisfactory to excellent (ranging from .70 to .90). The SCARED-C/P has demonstrated good convergent and divergent validity compared with other widely used screening scales (Birmaher et al. 1999; Monga et al. 2000). In this sample, the alpha coefficients were .93 for the SCARED-C and .91 for the SCARED-P.

Youth Attentional Control

The child version of the Attentional Control Scale (ACS-C; Muris et al. 2004) is a youth self-report measure of attentional control. Sample items include “My concentration is good, even when someone turns the music on”, and “It is easy for me to switch back and forth between two different tasks.” Youths provide ratings on 20 items on a 4-point Likert scale, indicating whether a statement applies to them “Almost never”, “Sometimes”, “Often”, or “Always”. Higher scores indicate higher levels of attentional control. The ACS-C has demonstrated good psychometric properties and lower scores have been associated with poorer performance on tests of selective attention, attentional switching, and sustained attention (Muris et al. 2008), as well as higher levels of anxiety severity (Melendez et al. 2017). In the current sample, the alpha coefficient was .74.

Youth Threat-Related Attention Bias

The emotional faces dot-probe task (TAU-NIMH ABMT initiative; <http://people.socsci.tau.ac.il/mu/anxietytrauma/tau-nimh-abmt-initiative-participating/>) developed by MacLeod et al. (1986) was used to assess youths’ threat-related attention bias. The task consists of 240 trials: 160 presenting one neutral face and one angry face (neutral–threat trials) and 80 presenting a pair of neutral faces (neutral–neutral trials). Each trial presents a white fixation cross in the center of a black screen for 500 milliseconds (ms), followed by a pair of faces of the same actor for 500 ms, arranged vertically (one above the other). This is immediately followed by a visual probe (“<” or “>”) replacing either the top or bottom face. Participants were told to respond as fast and as accurately as possible, and indicate the orientation of the probe by clicking the left or right mouse button (left for “<” and right for “>”) using their dominant hand. The probe remains on the screen until participants respond, and the next trial starts immediately. Angry-face location, probe location, probe type, and actor were fully counterbalanced in presentation.

Responses on the dot-probe task were used to calculate threat-related attention bias scores. Threat-related attention

bias scores were calculated by subtracting reaction times of incongruent trials (i.e., trials where the probe replaced a neutral face) from reaction times of congruent trials (i.e., trials where the probe replaced an angry face). Higher and more positive scores indicate a bias toward threat (i.e., angry faces) and lower and more negative scores indicate a bias away from threat (i.e., towards neutral faces). Before calculations, we excluded inaccurate responses, trials with response latencies < 150 ms and > 1200 ms, and trials with response latencies ± 2.5 SDs from the participant’s mean (e.g., Eldar et al. 2010).

Youth Diagnosis

The Anxiety Disorders Interview Schedule for DSM-IV, Child and Parent Versions (ADIS-IV-C/P; Silverman and Albano 1996) is a semi-structured diagnostic interview administered to children parents. Evidence supports the concurrent validity (Wood et al. 2002), inter-rater reliability ($k = 0.92$; Lyneham et al. 2007), and test–retest reliability for anxiety disorder diagnoses ($k = .80-.92$; Silverman et al. 2001).

Data Analyses

Missing data occurred for the threat-related attention bias index (19.3%), ACS-C (7.9%), CRPBI PC-scale (10%), PRPBI PC-scale (11.8%), SCARED-C (5.4%), and SCARED-P (5.9%). Missing data on the threat-related attention bias index resulted primarily from technical malfunctions or user error on this computer-based performance task. Little’s Missing Completely at Random (MCAR) test was not statistically significant, $\chi^2(21) = 21.47, p = .431$, indicating no evidence of bias due to missing data. Missing data were estimated using an expectation maximization algorithm. Data were then evaluated for the presence of outliers with respect to leverage, influence, and discrepancy, resulting in the identification of 25 possible outliers (17 of the outliers were due to scores on the threat-related attention bias index). Analyses were conducted both with and without the possible outliers included and conclusions remained the same. The results presented here include the outliers to better represent the population of interest. Data from all 202 youths were included in analyses.

Youth age, gender, and family income were significantly correlated with other measured variables (see Results), and were therefore included as covariates in the indirect effects models. Youth diagnosis and ethnicity were not significantly correlated with any measured variables, and were therefore excluded from statistical analyses. Hypotheses were tested using Pearson’s correlations and the PROCESS macro for IBM SPSS version 21 (Preacher and Hayes 2008). PROCESS uses a robust nonparametric resampling procedure

with $n = 5000$ bootstrap resamples to derive a 95% confidence interval (CI) and a point estimate for an indirect path. A statistically significant indirect path is indicated by 95% confidence intervals that do not include zero. All variables in the conceptual model approximated a normal distribution.

Results

Means of, standard deviations of, and correlations between variables are presented in Table 1. Age was significantly and negatively correlated with youth threat-related attention bias and youth-report of maternal PC. Boys reported significantly higher levels of attentional control than girls; girls reported significantly higher levels of anxiety severity than boys. Income was negatively correlated with youth- and parent-reported PC and parent-report of youth anxiety severity. In the following sections, we present results separately for youth-rated and mother-rated measures.

Youth Ratings

Using youth ratings, the association between maternal PC and youth anxiety severity was statistically significant and positive, the association between maternal PC and youth attentional control was statistically significant and negative (i.e., higher levels of maternal PC were associated with lower levels of youth attentional control), and the association between youth attentional control and youth anxiety severity was statistically significant and negative. Youth threat-related attention bias was not significantly associated with any other variable.

The indirect path models included youth age, gender, and family income as covariates. The model examining youth threat-related attention bias indicated a significant direct effect of maternal PC on youth anxiety severity, but no other associations were significant (see Table 2; Fig. 1 for path coefficients). The indirect path model examining youth attentional control indicated that the paths between maternal PC and youth attentional control (path a2) and

Table 1 Means of, standard deviations of, and correlations between variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Youth threat-related attention bias	–								
(2) ACS-C	-.01	–							
(3) CRPBI-PC	.11	-.26**	–						
(4) SCARED-C	.04	-.52**	.25**	–					
(5) PRPBI-PC	.07	-.02	.16*	.04	–				
(6) SCARED-P	.20**	-.15*	.26**	.33**	.21*	–			
(7) Youth age	-.15*	.09	-.20**	-.04	.02	-.01	–		
(8) Youth gender	-.11	-.15*	-.07	.16*	.02	.06	-.17*	–	
(9) Family income	.07	.06	-.23**	-.04	-.35**	-.21**	-.11	-.12	–
Mean	2.95	50.15	17.87	30.56	15.02	32.60	10.10		
(SD)	(59.33)	(8.37)	(3.91)	(15.85)	(3.27)	(15.09)	(2.74)		
Observed range	–203.05 to 233.97	27–73	10–30	0–74	10–29	3–80	6–18		

ACS-C Attention Control Scale for Children, CRPBI-PC Child Report of Parental Behavior Inventory—Psychological Control scale, SCARED-C Screen for Child Anxiety Related Emotional Disorders—Child version, PRPBI-PC Parent Report of Parental Behavior Inventory—Psychological Control scale, SCARED-P Screen for Child Anxiety Related Emotional Disorders—Parent version

* $p < .05$; ** $p < .01$

Table 2 Indirect path model of attention bias using youth self-ratings

Path	Estimate	SE	95% CI
Path between maternal PC and youth AB (path a1)	1.97	1.15	–0.30, 4.24
Path between youth AB and youth anxiety severity (path b1)	0.01	0.02	–0.04, 0.04
Direct path between maternal PC and youth anxiety severity (path c1')	0.96*	0.31	0.34, 1.57
Indirect path between maternal PC and youth anxiety severity (path a1 × path b1)	0.01	0.05	–.06, .13

PC psychological control, AB attention bias

* $p < .05$

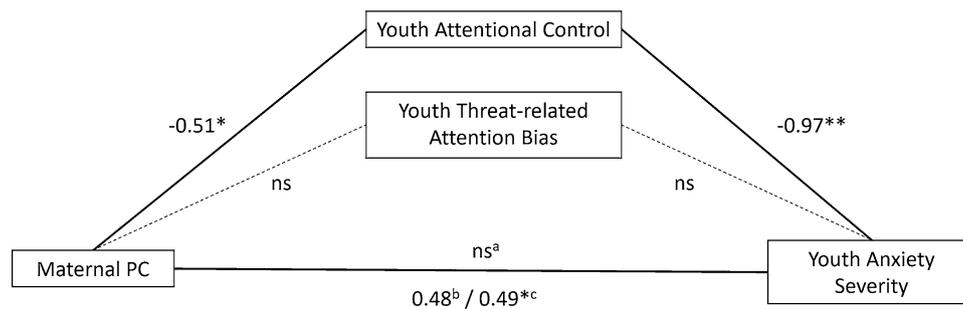


Fig. 1 Indirect path model using youth ratings. *ns* non-significant path estimate. * $p < .05$. ** $p < .001$. ^anon-significant indirect path from maternal PC to youth anxiety severity via youth threat-related atten-

tion bias. ^bestimate of direct path between maternal PC and youth anxiety severity. ^cestimate of indirect path between maternal PC and youth anxiety severity via youth attentional control

youth attentional control and youth anxiety severity (path b2) were statistically significant and negative (see Table 3 for path coefficients). The direct path between maternal PC and youth anxiety severity (path c2') was not statistically significant. As shown in the final row of Table 2, the indirect path between maternal PC and youth anxiety severity via youth attentional control was statistically significant. Examination of age as a moderator revealed no statistically significant moderation of the indirect effect for either threat-related attention bias (estimate = -0.002 , SE = 0.01 , 95% CI -0.04 , 0.01) or attentional control (estimate = 0.08 , SE = 0.05 , 95% CI -0.02 , 0.19).

Mother Ratings

Using mother ratings of maternal PC and youth anxiety severity, maternal PC was not significantly associated with youth threat-related attention bias or youth attentional control. Maternal PC was significantly and positively associated with youth anxiety severity. Youth anxiety severity was significantly and positively associated with youth threat-related attention bias, and significantly and negatively associated with youth attentional control.

The indirect path model examining youth threat-related attention bias, controlling for age, gender, and income,

indicated that the path between maternal PC and youth threat-related attention bias (path a3) was not statistically significant, and the path between youth threat-related attention bias and youth anxiety severity (path b3) was statistically significant and positive (see Table 4; Fig. 2 for path coefficients). The direct path between maternal PC and youth anxiety severity was not statistically significant, and the indirect path between maternal PC and youth anxiety severity via youth threat-related attention bias was statistically significant. The indirect path model examining youth attentional control indicated that the path between maternal PC and youth attentional control (path a4) was not statistically significant, and the path between youth attentional control and youth anxiety severity (path b4) was statistically significant and negative (see Table 5 for path coefficients). The direct path between maternal PC and youth anxiety severity (path c4') was statistically significant and positive. As shown in the final row of Table 5, the indirect path between maternal PC and youth anxiety severity via youth attentional control was not statistically significant. Examination of age as a moderator revealed no statistically significant moderation of the indirect effect for either threat-related attention bias (estimate = 0.05 , SE = 0.03 , 95% CI -0.01 , 0.15) or attentional control (estimate = 0.02 , SE = 0.03 , 95% CI -0.01 , 0.10).

Table 3 Indirect path model of attentional control using youth self-ratings

Path	Estimate	SE	95% CI
Path between maternal PC and youth AC (path a2)	-0.51^*	0.16	$-0.81, -0.20$
Path between youth AC and youth anxiety severity (path b2)	-0.97^{**}	0.13	$-1.22, -0.71$
Direct path between maternal PC and youth anxiety severity (path c2')	0.48	0.28	$-0.07, 1.02$
Indirect path between maternal PC and youth anxiety severity (path a2 × path b2)	0.49 ^a	0.18	0.18, 0.86

PC psychological control, AC attentional control

* $p < .01$; ** $p < .001$

^aIndirect path statistically significant at $p < .05$

Table 4 Indirect path model of attention bias using mother ratings

Path	Estimate	SE	95% CI
Path between maternal PC and youth AB (path a3)	2.02	1.36	−0.65, 4.70
Path between youth AB and youth anxiety severity (path b3)	0.06**	0.02	0.02, 0.09
Direct path between maternal PC and youth anxiety severity (path c3')	0.61	0.03	−0.06, 1.29
Indirect path between maternal PC and youth anxiety severity (path a3×path b3)	0.11 ^a	0.07	0.01, 0.30

PC psychological control, AB attention bias

**p < .01

^aIndirect path statistically significant at p < .05

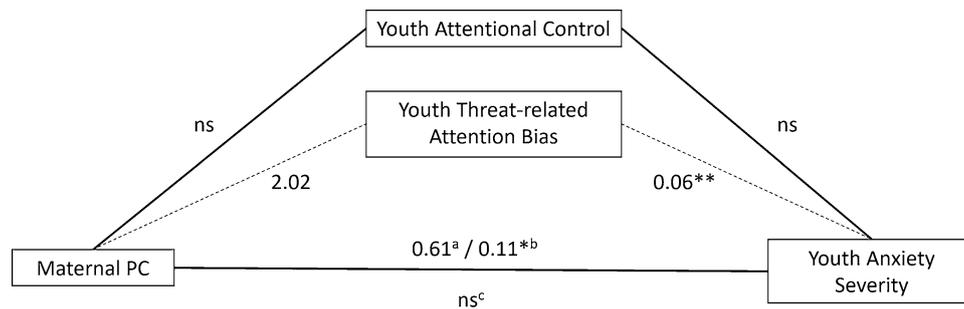


Fig. 2 Indirect path model using maternal ratings. *ns* non-significant path estimate. *p < .05. **p < .001. ^aestimate of direct path between maternal PC and youth anxiety severity. ^bestimate of indirect path

between maternal PC and youth anxiety severity via youth threat-related attention bias. ^cnon-significant indirect path between maternal PC and youth anxiety severity via youth attentional control

Table 5 Indirect path model of attentional control using mother ratings

Path	Estimate	SE	95% CI
Path between maternal PC and youth AC (path a4)	0.02	0.18	−0.35, 0.39
Path between youth AC and youth anxiety severity (path b4)	−0.26	0.14	−0.53, 0.01
Direct path between maternal PC and youth anxiety severity (path c4')	0.73*	0.34	.05, 1.41
Indirect path between maternal PC and youth anxiety severity (path a4×path b4)	−0.01	0.05	−0.14, 0.09

PC psychological control, AC attentional control

*p < .05

Discussion

Consistent with prior theory and research, we found partial evidence in support of the hypothesized associations between maternal PC and youth anxiety severity, youth attentional control and youth anxiety severity, and youth threat-related attention bias and youth anxiety severity. The significance of these associations varied by informant. We also identified a negative association between youth-reported maternal PC and youth attentional control. Youth who rated their mothers as high on overprotection, intrusive behaviors, guilt induction, and similar parenting behaviors also rated themselves as having difficulty strategically focusing, sustaining, and shifting their attention to

regulate their emotional experiences. Parenting behaviors high in PC convey to youth that the world is a dangerous place and stifle youths’ independent practice of sustaining and regulating attention (Chorpita and Barlow 1998; Graziano et al. 2011; Rapee 1997). Such practice may be critical in the development of attentional control, which allows youth to modulate anxiety levels in response to ambiguous or threatening situations.

Youth attentional control partially accounted for the relationship between maternal PC and youth anxiety severity according to youth ratings, but not maternal ratings. Additionally, youth threat-related attention bias partially accounted for the relationship between maternal PC and youth anxiety severity according to maternal ratings, but not youth ratings. These findings represent a step toward

integrating theory and research on parenting and attentional processes in youth anxiety. Theoretical accounts of the roles of parenting and attentional processes in youth anxiety have largely developed in isolation. The current findings provide preliminary support for a relationship between specific parenting behaviors and youth attentional processes, and are consistent with a conceptual model wherein high levels of maternal PC foster difficulties in youths' attention to threat and strategic regulation of attention, which in turn explains higher levels of youth anxiety. The current study was not able to test the directionality of these associations; it will be important for future research to do so using prospective designs.

The absence of a significant indirect path of attentional control using mother ratings appears to result from a weak correlation ($r = -.02$) between mother ratings on PC and youth self-ratings on attentional control. This weak correlation is generally consistent with the low to moderate agreement found between youth and parent ratings of parenting behaviors (Korelitz and Garber 2016) and youth anxiety (Silverman and Eisen 1992; Grills and Ollendick 2002; De Los Reyes et al. 2015), and demonstrates that youth and parent ratings provide complementary sources of information, based on their different perspectives. The discrepant findings across informants in this first study on the associations between maternal PC, youth attentional control and bias to threat, and youth anxiety severity open new directions for research. Specifically, the findings lay the groundwork for research aimed at replicating and explaining how these discrepancies contribute to a distinct pattern of findings across informants. Possible explanations of discrepancies in perceptions of parenting behaviors include informant characteristics (e.g., age, family intactness) and youth psychosocial functioning (e.g., clinical status) (Korelitz and Garber 2016). For example, with regards to clinical status, youth with internalizing disorders tend to display negative social information-processing biases (Luebbe et al. 2010) that may lead them to perceive parenting behaviors more negatively than typically-developing youth. Regarding family intactness, parental divorce or separation may affect the quality of parent-child interactions (Pelton and Forehand 2001), thereby leading to perceptual differences between parents and youth on parenting behaviors.

It is intriguing that the indirect path using a performance-based measure (attention to threat) was significant in a model using mothers' ratings, whereas the indirect path using a youth self-rating scale (ACS-C) was significant in a model using youths' ratings. The former suggests congruence between youths' scores on a performance-based task and youths' behaviors rated by mothers, while the latter suggests greater congruence between youths' self-ratings on internal experiences of attention regulation and anxiety. It is also possible that the latter associations could have been

inflated by informant bias (i.e., all measures were completed by youths). We encourage further research to examine these possibilities and the circumstances under which commonalities and discrepancies are found across informants.

The indirect path model involving youth threat-related attention bias was significant when using mother ratings of PC and youth anxiety severity, even though the association between maternal PC and youth threat-related attention bias (i.e., path a3) was not statistically significant. This finding suggests that increases in maternal PC are associated with increases in youth anxiety indirectly through increases in youth threat-related attention bias, in spite of a nonsignificant correlation between maternal PC and youth threat-related attention bias (for a thorough discussion of significant indirect effects in the absence of significant "a" paths, we refer readers to Hayes and Rockwood 2017). The indirect path model involving youth threat-related attention bias was not significant when using youth ratings of PC and anxiety severity.

Age did not moderate the indirect effect paths of threat-related attention bias or youth attentional control according to youth or maternal ratings. Although mean levels of maternal PC and youth threat-related attention bias decreased with age, the indirect paths between maternal PC and anxiety via attentional control and threat-related attention bias applied across the developmental spectrum examined in our study.

The current findings hold promise to have implications for theory and practice. They would advance etiological models of youth anxiety and provide insight into potential mediators of parent-involved treatments for youth anxiety. Evidence supports the efficacy of cognitive behavioral therapies (CBTs) that involve parents and target parental PC in reducing youth anxiety (Bodden et al. 2008; Silverman et al., in press; Wood et al. 2006). Treatments that target parental PC have focused on providing psychoeducation to parents about the importance of granting autonomy and involve generating a list of ways that parents can encourage youth independence (e.g., not telling the child what to do all the time, being friendly with the child even when s/he disagrees with mother's way) (e.g., Silverman et al. 2009). However, little is known about mediators of CBTs that target parental PC. The current findings suggest the promise of youth threat-related attention bias and attentional control as potential mediators of such treatment approaches. Further, the current findings suggest that targeting threat-related attention bias and attentional control might offer additional treatment options to prevent or reduce the severity of anxiety symptoms in youth whose parents are high in PC. Threat-related attention bias and attentional control may be targeted via attention bias modification programs (see Heeren et al. 2015; Bernstein and Zvielli 2014). This option could be valuable especially when parents are not able to participate in treatment sessions or efforts to intervene on parental PC are not effective.

Results from the current study should be interpreted in light of its limitations and sample characteristics. Limitations include an absence of data on fathers; a reliance on rating scales to measure maternal PC, youth attentional control, and youth anxiety severity; and the cross-sectional design. Although our conceptual model proposes paths from maternal PC to youth attentional processes and from youth attentional processes to youth anxiety, it is possible that paths may be reversed or bi-directional. Further, common method variance (e.g., youth self-ratings on anxiety and attentional control) may have influenced our results. Additional factors (e.g., genetics) cannot be ruled out as alternative or additional explanations for these associations. For example, parents who demonstrate high PC may also have lower attentional control and higher threat-related attention biases, and these attentional processes may be transmitted in part via genetic mechanisms.

Future studies would benefit from evaluating this conceptual model using fathers and multiple methods, such as behavioral observations of parental control (e.g., Gordon et al. 1981) and performance-based measures of attentional control (e.g., Attention Network Task; Fan et al. 2002). Future studies would also benefit from evaluating this conceptual model using prospective and/or experimental designs. For example, maternal PC could be manipulated (e.g., via treatment or using experimental procedures; cf. de Wilde and Rapee 2008) to examine the influence of change in maternal PC on youth attentional control, and attentional control as a mediator of reductions in youth anxiety. Finally, the sample comprised of predominantly Hispanic/Latino participants referred to an anxiety disorders specialty clinic. Although previous research using samples of predominantly Hispanic/Latino youth with anxiety tend to indicate high similarity to youth from other ethnic groups with respect to phenomenology, etiology, and treatment response (Pina and Silverman 2004; Pina et al. 2012) the generalizability of findings to other populations remains unknown. It is also possible that the severity of the clinic-referred sample resulted in a restricted range of scores on measured variables. We encourage future research to examine this conceptual model in other populations.

In summary, the current study has bridged theoretical models of parenting behaviors and attentional processes implicated in youth anxiety and identified youth threat-related attention bias and attentional control as potential explanatory variables in the association between maternal PC and youth anxiety severity. Replication and extension of the current findings using prospective designs and multiple methods would provide an impetus for refining etiological models of youth anxiety, evaluating youth attentional processes as mediators of parent-involved treatments, and targeting youth attentional processes in anxiety treatments.

Compliance with Ethical Standards

Conflict of Interest Deepika Bose, Daniella Vaclavik, Victor Buitron, Yasmin Rey, Wendy K. Silverman, and Jeremy W. Pettit declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Animal Rights This article does not contain any studies with animals performed by any of the authors.

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