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# Associations Among Negative Parenting, Attention Bias to Anger, and Social Anxiety Among Youth

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Theories of affective learning suggest that early experiences contribute to emotional disorders by influencing the development of processing biases for negative emotional stimuli. Although studies have shown that physically abused children preferentially attend to angry faces, it is unclear whether youth exposed to more typical aspects of negative parenting exhibit the same type of bias. The current studies extend previous research by linking observed negative parenting styles (e.g., authoritarian) and behaviors (e.g., criticism and negative affect) to attention bias for angry faces in both a psychiatrically enriched (ages 11–17 years;  $N = 60$ ) and a general community (ages 9–15 years;  $N = 75$ ) sample of youth. In addition, the association between observed negative parenting (e.g., authoritarian style and negative affect) and youth social anxiety was mediated by attention bias for angry faces in the general community sample. Overall, findings provide preliminary support for theories of affective learning and risk for psychopathology among youth.

*Keywords:* anxiety, biased information processing, emotion, youth, selective attention

Cognitive theories of psychopathology posit that negative biases in information processing are associated with the onset, maintenance, and recurrence of emotional problems and disorders (e.g., Beck, 1976). These negative biases act as filters for stimuli in the environment, affecting the way an individual perceives, evaluates, attends to, and remembers emotionally salient information (Beck, 1976; Gotlib & Joormann, 2010). For instance, anxious adults, especially those with a diagnosis of social phobia, selectively attend to threat-related stimuli (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007). Despite the established link between biased information processing of negative emotional stimuli and psychopathology, relatively few studies have examined potential environmental predictors of these negative biases, such as parenting. Research by Pollak and colleagues has demonstrated that children who experience physical abuse from parents selectively attend to threatening stimuli, especially facial displays of anger (e.g., Pollak, Klorman, Brumaghim, & Cicchetti, 2001; Pollak & Tolley-Schell, 2003). Moreover, Pollak's theory of affective learning (2003) suggests that overattending to anger may mediate the relation between early emotional experiences (e.g., abusive parenting) and psychopathology among youth. We sought to extend Pollak's seminal research by investigating whether more typical aspects of negative parenting (e.g.,

authoritarian parenting) would be associated with preferential attention to angry faces in a normative sample of youth. In addition, we tested whether the robust association between negative parenting and youth anxiety (McLeod, Wood, & Weisz, 2007) would be mediated by youth's biased attention to anger.

## Environmental Predictors of Attention Bias to Anger

Very few studies have investigated potential environmental predictors of preferential attention for negative emotional stimuli in youth samples. It has been suggested that early experiences play a large role in shaping how children process emotional stimuli (Pollak, 2003). In his theory of experience-dependent affective learning, Pollak (2003) proposed that children are biologically prepared for emotion, but the development of affective systems is contingent upon input from salient emotional signals in the environment. Pollak further posited that exposure to threatening, inconsistent, or excessive emotional signals affects allocation of attention to emotional cues, leading to biased processing of emotional information across many contexts (Pollak, 2003).

Parenting is one type of early experience that may contribute to the development of biased emotional processing. Pollak and colleagues have conducted a series of studies showing that children who are physically abused by their parents exhibit a bias for threat-related stimuli, especially angry faces. In particular, they have found that physically abused children perceive angry faces as highly salient compared with other emotional faces (Pollak, Cicchetti, Hornung, & Reed, 2000), devote more attentional resources to the processing of angry faces (Pollak et al., 2001), accurately identify angry faces using limited perceptual information (Pollak & Sinha, 2002), and have greater difficulty disengaging from angry faces (Pollak & Tolley-Schell, 2003). Preferential processing of threat-related stimuli has therefore been identified across multiple task paradigms and at different levels of analysis, which points to the fact that this phenomenon is robust among physically abused children.

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Despite evidence showing that exposure to abusive parenting contributes to an attention bias for anger cues, there has been only one study examining whether milder forms of parent negativity is associated with attention bias for anger (expressed emotion criticism; Gibb et al., 2011). Moreover, no researcher to date has investigated whether mildly negative parenting practices and behaviors directed toward youth (e.g., parenting exhibited during dyadic parent-youth interactions) are associated with biased information processing.

### Negative Parenting and Youth Anxiety

A separate area of research suggests that milder forms of negative parenting contribute to the development of emotional disorders, especially anxiety, in youth (McLeod et al., 2007). More specifically, parenting characterized by low levels of warmth (e.g., rejection, criticism, hostility) and high levels of control (e.g., overinvolvement, lack of autonomy-granting) is associated with child social anxiety (Knappe, Beesdo, Fehm, Lieb, et al., 2009b; Rapee & Spence, 2004). Authoritarian parenting style is characterized by a constellation of attributes and attitudes consistent with low warmth and high control (Baumrind, 1991; Darling & Steinberg, 1993). These parents are demanding, directive, and value child obedience, but are not responsive or supportive (Baumrind, 1991). Parenting styles are associated with child anxiety (Stark, Humphrey, Crook, & Lewis, 1990; Stark, Humphrey, Laurent, Livingston, & Christopher, 1993), and authoritarian parenting has been shown to be specifically associated with social anxiety (Klonsky, Dutton, & Liebel, 1990).

In addition to parenting styles, parenting behaviors have also been linked to social anxiety. Parental rejection or criticism is typically defined as disapproving, judgmental, dismissive, and critical parenting behavior (Dumas & LaFreniere, 1995; Hibbs, Hamburger, Lenane, & Rapoport, 1991; Lieb et al., 2000) and is often conceptualized as existing on the opposite end from warm parenting on a warmth–rejection continuum (e.g., Rohner, 1986). Several studies have shown an association between parental rejection and child social anxiety (Knappe, Beesdo, Fehm, Hofler, et al., 2009a; Knappe, Beesdo, Fehm, Lieb, & et al., 2009b). The presence of critical and disapproving parenting behaviors may be especially predictive of child social anxiety given that cross-cultural research has shown an association between parental use of shaming tactics and child social anxiety (Leung, Heimberg, Holt, & Bruch, 1994). Moreover, critical parenting may be particularly relevant for the etiology of social anxiety because sensitivity to negative evaluation from others is a core feature of social anxiety (Rapee & Spence, 2004). Youth who are consistently exposed to rejecting parenting characterized by high levels of criticism and disapproval may develop sensitivity to negative evaluation, which may contribute to social anxiety.

Finally, research suggests that parental displays of emotion play an important role in the development of both emotional and social competence among youth (Carson & Parke, 1996; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Parke, 1994). For example, parental expressions of negative affect are associated with poor child emotion-regulation abilities as well as social avoidance (Carson & Parke, 1996; Eisenberg & Fabes, 1994; Melnick & Hinshaw, 2000). Negative affectivity in parents is also associated with anxiety in children (Edwards, Rapee, & Kennedy, 2010). There-

fore, research suggests that parental negative affect may contribute to social anxiety independently of parental criticism.

### Negative Parenting and Youth Anxiety: Attention Bias to Anger a Potential Mediator

Despite the well-established association between parenting and anxiety, there has been little attention to potential mediators of this link. Among physically abused children, Pollak (2003) has suggested that facial displays of anger may signal a threat of imminent abuse. Therefore, early recognition of threat may serve an adaptive purpose by facilitating attempts to avoid or defend against the abuse. However, difficulties controlling attentional processes may lead to increased sensitivity to threat across many different social contexts that do not necessarily involve threat, which may be maladaptive and, in turn, could lead to emotional problems (Cicchetti, Sheree, & Maughan, 2000; Pollak, Vardi, Putzer Bechner, & Curtin, 2005). In support of this theory, Shackman, Shackman, and Pollak (2007) demonstrated that excessive attention to anger cues mediated the association between physical abuse and child-reported anxiety symptoms.

A growing body of literature suggests that parents play an important role in emotion socialization (Eisenberg, Cumberland, & Spinrad, 1998; Gottman, Katz, & Hooven, 1997; Morris et al., 2011), possibly by influencing information processing such as the perception and interpretation of emotional stimuli (see Hadwin, Garner, & Perez-Olivas, 2006, for a review). Hadwin and colleagues presented initial evidence suggesting that parental verbalizations and affect influence information processing biases for threat. Therefore, parenting may relate to attention biases for social threat among youth. It is possible that repeated exposure to milder forms of negative parenting may lead youth to pair facial expressions of anger and threat with negative feedback and behaviors from parents. Thus, exposure to negative parenting may be associated with social anxiety through biased attention to displays of social threat. Specifically, parenting shown to be associated with poor socioemotional development and social anxiety, such as authoritarian style, criticism, and displays of negative affect, may be especially likely to relate to youth attentional biases. This hypothesis is consistent with theoretical models of social anxiety, which maintain that people with this disorder are sensitive to facial cues that signal negative evaluation from others (Rapee & Heimberg, 1997). For instance, it is hypothesized that socially anxious individuals rapidly detect and orient toward faces that reflect threat or anger (Rapee & Heimberg, 1997).

### Current Studies

In the current studies, we sought to extend the work of Pollak and colleagues, which has demonstrated a relationship between childhood maltreatment and biased processing of threat stimuli, by assessing attentional bias to facial displays of anger in a sample of youth experiencing more normative aspects of parenting behaviors and styles. In addition, we sought to investigate how attention to affective stimuli may mediate the well-established association between negative parenting and anxiety disorders.

We conducted two studies to address several important gaps in knowledge about attention bias to affective stimuli among youth. First, as noted previously, exposure to negative parenting as a

predictor of attentional biases to emotional stimuli is understudied. Given that Pollak and colleagues demonstrated an association between extremely negative parenting and attention bias to threat in high-risk samples of physically abused children, we hypothesized that preferential attention to angry faces would be associated with more negative aspects of typically observed parenting behaviors (e.g., criticism) and styles (e.g., authoritarian). We first investigated the robustness of this phenomenon with a moderately at-risk sample (psychiatrically enriched) in Study 1 and then sought to further test this association in a low-risk, general community sample in Study 2. We reasoned that finding significant associations between negative aspects of parenting and attentional biases to threat in samples ranging from high-risk to low-risk would contribute to a growing body of evidence that is consistent with the framework outlined in Pollak's (2003) affective learning theory (e.g., Gibb et al., 2011).

Second, no study has investigated whether attention bias to anger mediates the association between typical aspects of negative parenting and clinical levels of social anxiety among youth. Based on the findings of Pollak (2003) and colleagues (Shackman et al., 2007), we hypothesized that biased attention to angry faces would mediate the association between threatening emotional input from the environment (e.g., negative parenting) and social anxiety in a community sample of youth (Study 2). The specific link between preferential attention to social threat-related stimuli and social anxiety is well established in the adult literature (Amir & Foa, 2001; Mogg, Philippot, & Bradley, 2004), but has been relatively understudied in youth populations (Puliafico & Kendall, 2006; Shechner et al., 2012). In large part, findings show that compared with healthy controls, clinically anxious children and adolescents exhibit an attentional bias for angry faces. This bias can be directed toward angry faces (Hankin, Gibb, Abela, & Flory, 2010; Roy et al., 2008; Waters, Mogg, Bradley, & Pine, 2008) as well as away from angry faces (Monk et al., 2006; Pine et al., 2005). Although the dot-probe task has yielded mixed findings in anxious youth, the discrepancy in findings may be due to particular methodological differences across dot-probe tasks, especially differences in stimulus presentation time (e.g., 500 ms vs. 1,000 ms). In addition, the discrepancy in findings may also be due to the sample characteristics, namely, the type of anxiety disorder studied (e.g., posttraumatic stress disorder [PTSD], Pine et al., 2005; generalized anxiety disorder, Waters, et al., 2008). Indeed, hierarchical models of psychopathology have suggested that anxiety disorders be characterized according to two factors: fear (e.g., panic disorder, agoraphobia, social phobia, specific phobia) and distress (e.g., generalized anxiety disorder, PTSD; Watson, 2005). Thus, studies that are focused on a single type of anxiety disorder or a heterogeneous mix of anxiety disorders may expect to obtain different findings. Despite these mixed results, the majority of studies with clinically anxious youth support biased attention *toward* angry faces (Bar-Haim et al., 2007). In a similar line of research, attention bias toward threat links youth behavioral inhibition, a temperament linked to anxious behaviors, to youth social withdrawal (e.g., Pérez Edgar et al., 2011). Taken together, a small body of research links attentional bias for angry faces to youth anxiety and other related traits, with a majority of this research showing that this bias is toward anger, as opposed to away from anger.

We included specific phobia in our analysis as a test of discriminant validity for this hypothesized mechanism, given that prior literature

has suggested that different forms of psychopathology may be related to attentional biases for specific types of affective stimuli (see Hankin et al., 2010, for a discussion of anxiety and depression-specific attentional biases). We hypothesized that the specificity of attentional bias for facial displays of angry emotion would hold for particular types of anxiety disorders and not others, such that attention bias toward anger would be associated with social anxiety and *not* specific phobia. This hypothesis is also supported by research that has shown that individuals with a specific phobia only attend to phobia-relevant stimuli (e.g., pictures of spiders; Mogg & Bradley, 2006).

In the current studies, we evaluated youth's attention biases for facial displays of emotion (e.g., anger) using a modified dot-probe task. Moreover, we utilized observational methods to assess parenting behaviors and styles because this approach provides a more objective assessment of parenting that is not subject to the limitations of questionnaire methods and yields larger effects for associations between parenting and child anxiety (McLeod et al., 2007; Rothbaum & Weisz, 1994). Therefore, the following studies are the first to test the association between observational methods of normative aspects of negative parenting and attentional bias to negative emotional stimuli as a preliminary investigation of putative environmental predictors of biased information processing, which in turn is hypothesized to function as one mechanism contributing vulnerability to social anxiety in youth.

## Study 1

### Method

A moderately high-risk sample of 67 youth (49% girls; 64% White, 36% African American) between the ages of 11 and 17 years ( $M = 13.6$ ,  $SD = 1.75$ ) was recruited. The current study was part of a larger study investigating specific and transdiagnostic risk factors (e.g., cognitive, interpersonal, emotional) for externalizing (e.g., attention-deficit/hyperactivity disorder, or ADHD) and internalizing psychopathology (e.g., both anxiety and depression). Therefore, we intended this to be a psychiatrically enriched sample and included youth with a lifetime history of clinical depression, a diagnosis of an externalizing disorder, and no diagnosis of any Axis I psychiatric disorder. Youth were excluded if they had been diagnosed with an intellectual disability or an autism spectrum disorder. We recruited youth by sending letters home to mothers of youth attending public schools, placing advertisements in pediatric or orthodontic clinics and in local newspapers, or distributing announcements through university and college listserves. Both mothers and youth were interviewed with the Kiddie Schedule for Affective Disorders and Schizophrenia–Present and Lifetime Version (K–SADS; Kaufman et al., 1997), which is a frequently used semistructured diagnostic interview (Kaufman et al., 1997; Klein, Dougherty, & Olinio, 2005). The K–SADS has demonstrated reliability and validity (Kaufman et al., 1997) and was used to ascertain youths' current and past psychiatric history.

A total of 60 out of the 67 youth were included in analyses because they had full data on both parent observation and attention bias; 18 had a diagnosis of remitted clinical depression (30% of sample: six pure past depressed, 12 comorbid with externalizing disorder; nine with comorbid anxiety), 17 met criteria for a current externalizing disorder (28% of sample: 14 with ADHD, 10 with oppositional defiant disorder, and five with conduct disorder;

several youth were comorbid and met criteria for several disorders, including seven with comorbid anxiety), and 25 (42% of sample) carried no current or lifetime psychiatric disorder. Thus, 16 youth (nine with social anxiety; five with generalized anxiety disorder; two with separation anxiety disorder) had an anxiety disorder that was comorbid with depression and/or externalizing disorders.

Youth and their mothers were videotaped playing Jenga (Parker Brothers, Beverly, Massachusetts) for 5 min, and parenting styles and behaviors during the interaction were coded by independent raters. One global code for the entire 5-min interaction was given for each parenting construct on a scale between 1 and 5, where 1 = *not at all characteristic of parent behavior during the interaction*, and 5 = *highly characteristic of parent behavior during the interaction*. Codes were based on the coding system by Melnick and Hinshaw (2000). Parenting styles included *authoritarian* parenting, characterized by punitive parenting that emphasizes compliance to parental rules and commands (i.e., high levels of control, low levels of warmth); in contrast, *authoritative* parenting is characterized by parents warmly responding to the child and encouraging child input when establishing clear rules, expectations, and/or consequences (i.e., high levels of warmth and control). Parenting behaviors assessed as *criticism* included parental expressions of disapproval, name calling, or insults directed at child. Parental *negative affect* was coded by observing the extent to which parents displayed negative voice, facial expressions, or body posture. Finally, presence of *parental support* included parental demonstrations of encouragement, praise, or validation directed at the child. Approximately 20% of videotaped observations were double coded. Intraclass correlations between coders ranged from .64 to .77 on all subscales, indicating adequate interrater reliability.

Youth's attentional biases for facial displays of emotion were assessed using a modified dot-probe task (MacLeod, Mathews, & Tata, 1986) administered using E-Prime (Psychology Software Tools, Sharpsburg, PA). Stimuli for the dot-probe task consisted of pairs of facial expressions that contained one affective (sad or angry), and one neutral photograph from the same actor taken from a standardized stimulus set (Tottenham et al., 2009). Sad and angry faces were included in order to test hypothesized disorder-specific biases (see Hankin et al., 2010). Photographs from each actor were used to create sad-neutral and angry-neutral stimulus pairs. Each stimulus pair was presented in random order over the course of two blocks, with a rest in between blocks, for a total of 192 trials. Each trial began with a blank computer display with only a white fixation cross in the middle of the screen for 1,000 ms. Then, a pair of pictures was presented for 1,000 ms, followed by a dot where one of the prior pictures had been (either the affective or neutral picture) that was presented for 1,000 ms. Youth were instructed to indicate as quickly as possible the location of the dot (left vs. right side of the screen) using the computer keyboard ("z" labeled "left"; "f" labeled "right"). Although dot-probe tasks typically assess attention bias in anxiety using a shorter stimulus presentation time (e.g., >500 ms; Bar-Haim et al., 2007) in order to capture biases in orienting, this task was part of a larger study investigating risk factors for externalizing (e.g., ADHD) and internalizing (e.g., both anxiety and depression) psychopathology. The literature on attention bias in depression typically employs a longer stimulus presentation time (e.g., 1,000 ms; Joormann & Gotlib, 2007) in order to capture biases in elaborating. We ultimately chose the stimulus presentation duration of 1,000 ms because previous research has

found attention biases in both anxiety and depression using a dot-probe task with pairs of pictures presented for 1,000 ms (Hankin et al., 2010). The computer recorded the accuracy and response time for each response. Trials with response errors were excluded as were trials with response times of less than 150 ms or greater than 1,500 ms. Error rates were quite low (>1.5%), and a small portion (1.8%) were excluded for being out of response time range; neither differed by diagnostic group nor showed significant association with age. Mean attention bias scores (Mogg, Bradley, & Williams, 1995) were then calculated separately for each affective stimulus type (sad or angry face) by subtracting the mean response time for cases in which the probe replaced the affective face from mean response times for cases in which the probe replaced the neutral face. Positive bias scores represent preferential attention toward the affective face; negative scores indicate attentional avoidance of the affective face.

## Results and Discussion

Age was not associated with any attention bias to emotion variables. None of the attention bias scores, for either angry or sad faces, differed significantly from zero; and they did not differ from each other. Also, there were no significant bias score differences across any of the diagnostic groups ( $F = 2.29$ , for attentional bias to sad faces difference for remitted depressed youth;  $F = 1.49$  for attention bias to angry faces difference for anxiety-disordered youth). While there was no significant difference between diagnostic groups, the means and direction of attention bias for the psychiatric disordered groups was in the direction that has been consistently demonstrated in the literature: anxiety-disordered youth exhibited nonsignificantly greater attention to threat ( $M = 10.43$ ,  $SD = 63.06$ ) relative to controls ( $M = 0.55$ ,  $SD = 63.54$ ); remitted depressed youth exhibited nonsignificantly greater attention to sadness ( $M = 3.22$ ,  $SD = 43.36$ ) relative to controls ( $M = 7-.67$ ,  $SD = 43.32$ ).

Results supported our hypothesis that negative parenting was associated with attention toward negative emotional stimuli (see Table 1). Authoritarian parenting was positively correlated with attentional bias to angry faces ( $r = .39$ ,  $p < .05$ ), as was parent negative affect ( $r = .41$ ,  $p < .05$ ) and criticism ( $r = .35$ ,  $p < .05$ ). Authoritarian parenting and parent negative affect were also associated with attention to sad faces ( $r = .29$ ,  $p < .05$ , and  $r = .23$ ,

Table 1  
Means, Standard Deviations, and Bivariate Associations Among Primary Variables in Study 1

Variable	1	2	3	4	5	6	7
1. Criticism	—						
2. Negative affect	.35**	—					
3. Support	-.27*	-.60***	—				
4. Authoritarian	.31*	.50***	-.29*	—			
5. Authoritative	-.34**	-.22	.46***	-.07	—		
6. Angry faces	.35*	.41*	-.16	.39*	-.06	—	
7. Sad faces	.13	.23*	-.05	.29*	.08	.23*	—
Mean	1.66	1.8	1.8	1.54	2.68	21.34	.47
SD	0.93	0.71	0.73	0.90	0.75	63.03	43.34

Note.  $N = 67$ . Means and standard deviations for attention to angry and sad faces are measured in milliseconds.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

$p < .05$ ), respectively). However, authoritative parenting was not associated with either attention to angry faces ( $r = -.06$ , *ns*) or sad faces ( $r = .09$ , *ns*). Similarly, parent support was also not associated with attention to either angry faces ( $r = -.16$ , *ns*) or sad faces ( $r = -.05$ , *ns*).

Findings suggest that negative parenting is associated with biased information processing among youth. Specifically, an authoritarian parenting style and parenting behaviors characterized by high levels of criticism and negative affect are associated with selective attention to negative stimuli in the environment. In Study 2, we attempted to replicate and extend Study 1 findings in a general community sample of youth. We tested whether attention bias to angry faces mediated the association between negative parenting and anxiety disorders, particularly social anxiety (e.g., Bar-Haim et al., 2007). To test for hypothesized specificity, we also examined whether attention bias to angry faces would mediate a link between negative parenting and specific phobia.

## Study 2

### Method

A general community sample of 75 youth (59% girls; 51% White, 45% African American, 4% Hispanic) between the ages of 9 and 15 years ( $M = 12.58$ ,  $SD = 2.5$ ) were recruited by letters sent home to parents of youth attending public schools. Youth and a mother participated in a standardized 5-min conflict discussion task in which they discussed a source of disagreement between them (Feng et al., 2009; Kim Park, Garber, Ciesla, & Ellis, 2008). Discussions were videotaped, and the same constructs described in Study 1 were coded by independent raters (*authoritarian* and *authoritative* parenting styles, and parent *criticism*, *support*, and *negative affect*). Approximately 20% of videotaped observations were double coded. Intraclass correlations between coders ranged from .71 to .85 on all subscales in this study, indicating good interrater reliability.

The youth's attentional bias to emotion faces was also assessed in the same way as in Study 1. However, happy faces were also included as a stimulus in this study, which resulted in happy-neutral facial pairs presented randomly in addition to sad-neutral and angry-neutral pairs, for a total of 192 trials. Again, happy faces were included in order to test potential emotion- and disorder-specific biases (Hankin et al., 2010). As in Study 1, mean attention bias scores were calculated separately for each affective stimulus type (sad, angry, or happy face). It was expected that attention bias to anger, specifically, would relate to negative parenting and social anxiety and mediate this association.

The Anxiety Disorders Interview Schedule for *DSM-IV-Child* and Parent Versions (ADIS; Silverman & Nelles, 1988; Silverman, Saavedra, & Pina, 2001; American Psychiatric Association, 1994) was used to diagnose youth with social anxiety and specific phobia according to *DSM-IV-TR* (American Psychiatric Association, 2000) criteria. The ADIS is the most frequently used and most studied diagnostic interview with youths and has demonstrated strong evidence of reliability and validity (Silverman & Ollendick, 2005; Silverman, Saavedra, & Pina, 2001). Trained interviewers administered the Child Version to youth and the Parent Version to parents separately. Best estimate procedures were used to arrive at a potential anxiety diagnosis (social anxiety or specific phobia).

The "best-estimate" procedure requires that the interviewer use his or her best clinical judgment to integrate potentially conflicting information from parent and youth informants, and has demonstrated very high reliability in previous research (see Klein et al., 2005, for further discussion of best-estimate procedures). Regarding diagnoses, 11% of youth met criteria for current social anxiety ( $n = 8$ ), 13.5% for simple phobia ( $n = 10$ ), and 16% ( $n = 12$ ) received a diagnosis of past clinical depression using the K-SADS (half of the previously depressed youth also carried a comorbid anxiety disorder). Interrater reliability for ADIS, based on 20% of the sample interviews ( $n = 15$ ), was good ( $\kappa = .78$ ).

### Results and Discussion

Age was not associated with any attention bias to emotion variables, although older youth were more likely to have a previous depressive disorder ( $r = .25$ ,  $p < .05$ ). As with Study 1, none of the attention bias scores (for angry, happy, or sad faces), differed significantly from 0; and they did not differ from each other.

Key associations between negative parenting behaviors and attention bias to angry faces replicated findings in Study 1 (See Table 2). Specifically, authoritarian parenting was associated with youth's attention to angry faces ( $r = .40$ ,  $p < .05$ ), as was parent criticism ( $r = .55$ ,  $p < .05$ ), and parent negative affect ( $r = .52$ ,  $p < .05$ ). However, in contrast to findings in Study 1, no parenting style or behavior was associated with attention to sad faces. Additionally, there was no association between parenting constructs and attention to happy faces or between positive parenting constructs (authoritative style, support) and attentional biases.

Binary logistic regression analyses were conducted to examine if attention bias to angry faces mediated the association between negative parenting and social anxiety (coded as dichotomous outcome). Given significant age effects with diagnosis of depression, age was controlled for in these analyses. As described earlier, there were significant associations between negative parenting and attention to angry faces, meeting the first condition of mediation (an association between the independent variable and the mediator; Baron & Kenny, 1986). Also, there were significant associations between social anxiety and authoritarian parenting ( $\beta = .46$ ,  $p < .01$ ), parent negative affect ( $\beta = .35$ ,  $p < .01$ ), and parental criticism ( $\beta = .39$ ,  $p < .01$ ). The remaining analyses for mediation are illustrated in Table 3, in which attention bias to angry faces and each of the relevant parenting variables (entered in separate analyses) were included in the model to relate to youths' social anxiety. As revealed in these analyses, attention bias to threat was significantly related to social anxiety after including each of the parenting variables in different models. Finally, the association between authoritarian parenting and social anxiety (independent and dependent variable) was no longer significant (decreased from  $\beta = .46$ ,  $p < .01$  to  $.15$ , *ns*) when controlling for the influence of attention bias to angry faces, supporting a full mediation effect (Baron & Kenny, 1986). Similarly, the association between parent negative affect and social anxiety was also no longer significant (decreased from  $\beta = .35$ ,  $p < .05$ , to  $\beta = .15$ , *ns*) when controlling for attention bias to angry faces. However, the association between parent criticism and social anxiety remained significant when controlling for attention to angry faces (decreased from  $\beta = .39$ ,  $p < .01$  to  $\beta = .34$ ,  $p < .01$ ), suggesting no mediation effect. Sobel

Table 2  
Means, Standard Deviations, and Bivariate Associations Among Primary Variables in Study 2

Variable	1	2	3	4	5	6	7	8	9
1. Criticism	—								
2. Negative affect	.59***	—							
3. Support	-.39***	-.44***	—						
4. Authoritarian	.64***	.55***	-.39***	—					
5. Authoritative	-.29*	-.27*	.32**	-.35***	—				
6. Angry faces	.55***	.52***	-.57***	.40***	-.43***	—			
7. Sad faces	-.27	-.21	.02	-.20	.10	.17	—		
8. Happy faces	-.21	.00	-.03	.06	-.17	-.35**	-.27	—	
9. Social anxiety	.39**	.35*	.03	.46**	-.16	.41*	-.03	-.42*	—
10. Specific phobia	.01	.12	-.13	.19	-.15	.14	.03	-.02	.22
Mean	2.1	1.74	3.24	2.3	2.6	6.6	4.97	5.09	
SD	0.95	0.95	0.92	1.2	1.03	34.33	39.80	44.45	

Note.  $N = 75$ . Means and standard deviations for attention to angry, sad, and happy faces are measured in milliseconds.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

(1994) tests showed that attention bias to angry faces significantly mediated the association between authoritarian parenting and social anxiety ( $z = 2.83, p < .01$ ) as well as between negative affect and social anxiety ( $z = 3.21, p < .01$ ).

Finally, consistent with prior research, specific phobia was not significantly associated with attentional biases. This nonsignificant association is consistent with our hypothesis and provides support for specificity of the association between preferential attention to angry faces and social anxiety. Further analyses were not conducted with specific phobia. Overall, findings suggest that negative parenting—specifically authoritarian parenting style and parental negative affect—is associated with social anxiety among youth through biased social information processes toward threatening stimuli.

Although parent criticism was strongly related to both attention bias and social anxiety, mediation analyses suggested that attention bias to angry faces did not account for the association between parent criticism and social anxiety. One possibility is that exposure to frequent parental criticism, such as insults, put downs, and other types of disapproving and judgmental parenting behavior, has a direct effect on the development of social anxiety in youth, instead of simply an indirect effect via processing bias for facial displays of threat. Fear of exposure to scrutiny, rejection, and humiliation is

the defining feature of social anxiety (American Psychological Association, 2000; Hartman, 1983). Therefore, parental criticism that scrutinizes, rejects, and humiliates youth may be an especially potent predictor of social anxiety and may directly contribute to youth's anticipation and fear of negative evaluation from others.

## General Discussion

Pollak's theory of affective learning and risk for psychopathology (2003) proposes that early emotional experiences contribute to emotional problems through attention biases. Whereas prior research by Pollak and colleagues has established processing biases for threat-related stimuli in samples of physically abused children, research examining this association in youth with more normative dimensions of parenting who have not been exposed to physical abuse was lacking. The current studies provide evidence for the existence of attentional biases toward anger in two independent samples of youth exposed to normative levels of negative parenting. Additionally, prior research has demonstrated a relationship between negative parenting and psychopathology, particularly social anxiety; however, few studies have explored potential mechanisms accounting for this association, especially in youth. Findings from Study 2 support a mediational process model in which aspects of typical negative parenting are associated with social anxiety through youth's biased attention to angry facial cues. Although the cross-sectional study design precludes firm conclusions about causal direction, findings are indeed consistent with the framework provided by Pollak's theory of affective learning and provide preliminary evidence with normative youth suggesting that early emotional experiences may contribute to specific, clinically significant emotional problems via aberrant processing of emotional, threat-relevant facial cues.

Our finding that normative levels of negative parenting, specifically an authoritarian parenting style, as well as parental criticism and negative affect, were associated with attention bias to anger replicates and extends Pollak et al. (2000, 2001, 2002, 2003) prior research with physically abused young children. This conceptual replication constitutes strong evidence that this is a robust association observed in youth samples ranging from high risk (i.e., physically abused) to moderate risk (i.e., psychiatrically enriched

Table 3  
Mediation Analysis of Processes Involved in Accounting for Youths' Social Anxiety Disorder

Predictor	$R^2$	$\beta$	$T$
Negative affect	.25		
Attention bias to angry faces		.47	3.97***
Parental negative affect		.15	1.29
Authoritarian	.28		
Attention bias to angry faces		.46	3.63***
Authoritarian		.15	1.11
Criticism	.34		
Attention bias to angry faces		.39	3.32***
Parental criticism		.34	2.94**

Note.  $N = 75$ .

\*\* $p < .01$ . \*\*\* $p < .001$ .

in Study 1) and low-risk (i.e., general community in Study 2). Our studies were the first to use observational methods of parenting to investigate whether normative aspects of negative parenting exhibited during parent–child dyadic interactions are associated with information processing biases in youth. Furthermore, findings were replicated across two different types of parent–child observational tasks (parent–child play task, and conflict discussion), providing further support for the robust association between negative parenting and attention bias to anger.

Additionally, Study 2 is the first to provide evidence showing that attentional bias to threatening stimuli, specifically angry faces, accounts for the well-known association between negative parenting and social anxiety diagnoses among youth (McLeod et al., 2007). Specifically, attentional biases mediated the association between authoritarian style and social anxiety, as well as the association between parental displays of negative affect and social anxiety. Although there are numerous processes contributing to social anxiety, these findings provide preliminary evidence that suggests a speculative mechanistic pathway in which authoritarian parents and parents exhibiting higher, more frequent negative affect are more likely to have socially anxious children. Youth with authoritarian or negatively affective parents may be reared in relatively overcontrolled and hostile environments, which may contribute to vigilance to cues signaling social threat. This hypothesis is consistent with and integrates the research documenting information-processing biases to threat in anxiety (Bar-Haim et al., 2007; Hallion & Ruscio, 2011), as well as Pollak's series of studies showing that physically abused children are hypervigilant to threatening cues. Although parents engaging in negative forms of normative parenting are not committing abusive acts, findings suggest that these styles and behaviors nonetheless may be contributing to negative emotional sequelae for their children, such as social anxiety, via biased processing of socially and emotionally salient information. It is likely that these children are vigilant for potentially threatening stimuli because it facilitates their ability to better predict threat in their environment and protect themselves from relatively harsh, punitive, or hostile caregivers.

For the most part, our hypothesized findings were obtained and replicated across studies. Of interest is the exception that authoritarian parenting style and parental negative affect were associated with children's attention bias to sad faces in Study 1 but not in Study 2. This inconsistent finding might be explained by relative differences in sample composition between the two studies. Study 1 was composed of a relatively high-risk, psychiatrically enriched sample with a larger percentage of youth diagnosed with current externalizing disorders and past depression (30% previously depressed), whereas youth from Study 2 consisted of a general community sample (16% previously depressed). Prior research has found attention biases to sad faces in formerly and currently depressed adults (Joormann & Gotlib, 2007) and youth (Hankin et al., 2010), as well as never-disordered offspring of depressed mothers (Joormann, Talbot, & Gotlib, 2007; Kujawa et al., 2011). It seems reasonable that the association between negative parenting and attention to sad faces found only in Study 1 may be related to the greater percentage of youth with psychiatric disorder in that sample relative to Study 2 (i.e., 30 vs. 16%). In the future, researchers can investigate whether the association between negative parenting and attention to sad faces depends on sample characteristics (e.g., higher in at-risk relative to low-risk samples).

These studies have a number of strengths that help to advance knowledge of development of biased information processing and associations with parenting and psychopathology. The use of multiple, nonoverlapping methods and informants to examine associations among negative parenting styles and behaviors, biased information processing, and anxiety in youth means that the strength of the relations are not inflated by shared method or informant variance. In addition, attentional bias toward anger was found in both studies. The replication of this attentional bias in two independent samples contributes to a growing body of literature that has also found attention bias toward anger in anxious youth (see Bar-Haim et al., 2007). Although some studies have found attention bias away from anger in anxious youth, these studies included youth with PTSD (e.g., Pine et al., 2005) and generalized anxiety disorder (e.g., Monk et al., 2006), which are both classified as disorders of distress according to proposed hierarchical models of psychopathology (e.g., Watson, 2005). Social phobia, on the other hand, is considered to be a disorder of fear, which may potentially explain the discrepancy in findings. Finally, the key hypothesized association between negative parenting and attention bias to anger was also replicated in two different samples of youth (i.e., psychiatrically enriched and general community), so findings are likely robust and generalizable to a variety of youth populations.

However, it is important to note that both studies are limited by a cross-sectional design that precludes determining the direction of effects. It is possible that negative parenting styles and behaviors precede biased processing of emotional stimuli and social anxiety; however, negative processing biases and anxious child behavior may also elicit negative parenting. In addition, it is possible that a third variable (e.g., neuroticism) may account for the relationship among negative parenting, attention bias for negative emotion, and social anxiety. Prospective longitudinal research could be used to determine the temporal direction or potential bidirectional associations of these relations over time, which would provide a further test of Pollak's theory of experience-dependent learning. Also, in the current study, we examined preferential attention for threat with only one specific task, namely, the dot-probe task. Future studies of attentional bias in which a variety of tasks at different levels of analysis (e.g., functional magnetic resonance imaging, event-related potential) are used could help researchers to determine the robustness of the association between more typical aspects of negative parenting and preferential attention for threat. Finally, we assessed attention bias via a dot-probe task that presented emotional stimuli for 1,000 ms. Although previous studies have found that attention bias for negative emotion in anxiety can be ascertained by 1,000-ms stimulus presentation (Hankin et al., 2010), this is less consistent with the literature on attention bias in anxiety, which typically utilizes 500-ms stimulus presentation. Future studies using this shorter stimulus presentation may provide a more stringent test of the specific link between attention bias to anger and anxiety.

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