The Relationship Between Anger and Anxiety Symptoms in Youth with Anxiety Disorders

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Abstract

This study examined the relationship between anger and anxiety in youth in an outpatient anxiety treatment clinic. Participants included 40 primarily female and Caucasian youth, all diagnosed with a primary anxiety disorder. Youth provided ratings of anger, anxiety, and depressive symptoms. We also obtained parent and clinician ratings of anxiety severity. Analyses supported a significant relationship between trait anger and anxiety severity. When rated by youth, trait anger was significantly related to physical symptoms of anxiety and harm avoidance. Youth report of anger symptoms was not related to parent or clinician report of youth anxiety severity. Assessing symptoms of anger in youth with anxiety disorders may be important, as it may be related to higher anxiety symptom severity for some youth. Future research in larger samples is needed to understand the co-occurrence of different components of anger and anxiety disorders and its impact on prognosis and treatment process.

Keywords

Anxiety disorders commonly occur in youth, with a lifetime prevalence ranging from 15 to 30% in children and adolescent community samples (Essau & Gabbidon, 2013; Merikangas et al., 2010; Polanczyk, Salum, Sugaya, Caya, & Rohde, 2015). Youth with anxiety often avoid developmentally-appropriate interactions and situations, and anxiety disorders in

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youth are associated with negative consequences, including being poorly perceived by peers (Verduin & Kendall, 2008), poor social relations (Greco & Morris, 2005; Kingery, Erdley, Marshall, Whitaker, & Reuter, 2010), and impaired academic achievement (Nail et al., 2015; Van Amerigen, Mancini, & Farvolden, 2003). Childhood anxiety disorders are highly comorbid with a range of other disorders in childhood, adolescence and young adulthood, including depression, oppositional defiant disorder (ODD), and conduct disorder (CD; Bittner, Egger, Erkanli, Costello, Foley, & Angold, 2007; Merikangas et al., 2010). The relationship between anxiety and depression has been well studied, and anxious symptoms tend to be more severe in youth with anxiety with comorbid depressive disorders (Axelson & Birmaher, 2001; Garber & Weersing, 2010). Service utilization also differs between anxious youth with and without comorbid disorders. Youth with comorbid disorders such as depression or externalizing disorders receive higher levels of care in comparison to their purely anxious peers (Chavira, Garland, Yeh, McCabe, & Hough, 2009; Chavira, Stein, Bailey, & Stein, 2004). However, less research has explored the relationship between anxiety and emotions more commonly associated with externalizing disorders in youth, such as anger. This is concerning as youth with anxiety and anger may be more likely to present to treatment (Merikangas et al., 2011), yet we understand little of how co-occurring anger may interact with and exacerbate symptoms of anxiety. Anger has also emerged as an important predictor of physical and psychological health in youth (Kerr & Schneider, 2008). Thus, anger's potential relationship with anxiety is an important line of inquiry to better understand symptom expression, functioning, and physical health in youth.

Anger is important to define in relation to other related constructs such as irritability, as they are commonly used interchangeably, leading to difficulties with interpretation in the literature due to imprecise terminology (DiGuiseppe & Tafrate, 2006). Anger refers to a basic and universal emotional state brought forth by a perception of threat. It is associated with cognitions centered on other's transgressions (Deater-Deckard & Wang, 2012; DiGuiseppe & Tafrate, 2006). Researchers have suggested that anger is a multifaceted construct, consisting of trait anger (i.e., the tendency to experience anger frequently and intensely), internal anger expression (i.e., unhealthy or non-adaptive suppression of anger when experienced, hereafter referred to as "internalized anger"), external anger expression (i.e., aggressive and external expression of anger, hereafter referred to as "anger expression"), and anger control (i.e., control of angry feelings by relaxing, cooling off, and not expressing it towards people or other objects; Martin & Dahlen, 2005; Spielberger, 1999). In contrast, irritability is a physiological state characterized by a lowered threshold for responding with negative affect to stimuli, often with anger and aggression (American Psychiatric Association, 2013; Stoddard, Stringaris, Brotman, Montville, Pine, & Leibenluft, 2014). Some researchers believe irritability can be distinguished from anger as it is generally a state without the cognitions that occur with anger, includes other emotions such as sadness, and often precedes or follows a discrete anger episode (Deater-Deckard & Wang, 2012; DiGuiseppe & Tafrate, 2006).

Historically, anger has not been included as a feature or symptom associated with anxiety disorders during the diagnostic process, while irritability has been included as part of the Generalized Anxiety Disorder (GAD) diagnosis. However, evidence has emerged in samples of adults with anxiety disorders that the rate and intensity of anger are elevated when

compared to healthy controls, and is uniquely associated with anxiety severity even when controlling for comorbid depression and other demographic variables (Hawkins & Cougle, 2011; for a detailed review of this literature, see Cassiello-Robbins & Barlow, 2016). In addition, anger may be expressed differently depending on anxiety diagnosis. For example, clients with GAD may experience angry feelings but suppress them (i.e., internalized anger) more often than healthy controls, leading to higher levels of anxiety severity (Deschênes, Dugas, Fracalanza, & Koerner, 2012; Fracalanza, Koerner, Deschênes, & Dugas, 2014).

Despite extensive literature finding a relationship between anger and anxiety in adults, few studies have been conducted in youth samples. Studies in community and school settings have found a relationship between anger and internalizing symptoms in youth. In several cross-sectional studies, youth who suppressed anger, inappropriately expressed anger (e.g., threw tantrums, slammed doors), and demonstrated non-adaptive coping of anger had higher levels of anxious symptoms than peers who appropriately regulated and expressed anger (Puskar, Ren, Bernardo, Haley, & Stark, 2008; Suveg & Zeman, 2004; Zeman, Shipman, & Suveg, 2002). The long-term impact of anger on anxiety symptoms in youth is poorly understood, although one study found that youth with more deregulated anger, sadness and inhibited worry had higher anxiety symptoms two years later (Folk, Zeman, Poon, & Dellaire, 2014). Further complicating matters, youth may present with anxiety symptoms differently than adults. In youth, anxiety may be expressed as crying, irritability, and angry outbursts, leading to anxiety being miscategorized as oppositional by teachers and parents (Connolly & Bernstein, 2007). Findings that youth with anxiety in community samples have more difficulty coping with and expressing anger appropriately has implications for the psychosocial functioning of these youth. For example, youth who are dysregulated in their expression of anger may be perceived more negatively than anxious youth without dysregulated expression (Suveg, Sood, Comer, & Kendall, 2009).

However, to our knowledge, no studies have explored the relationship between facets of anger and anxiety in clinically-referred youth with anxiety. Several studies in child clinical samples have examined constructs closely related to anger (e.g., irritability; Cornacchio, Crum, Coxe, Pincus, & Comer, 2016; Stoddard et al., 2014) or have examined a single component of anger like rage (i.e., short and intense outbursts of anger that are inconsistent with the trigger; Johnco et al., 2015), but more research in this area is needed. It is important to examine the multiple components of anger simultaneously to parse apart any individual contributions each anger component makes to levels of anxiety severity, given that the adult literature suggests differential relationships between anger components and important mental and physical health outcomes (Brosschot & Thayer, 1998; Okifuji, Turk, & Curran, 1999; Schum, Jorgensen, Verhaeghen, Sauro, & Thibodeau, 2003; Thomas & Atakan, 1993).

We examined the relationship between anger and anxiety symptoms in a sample of 40 youth with primary anxiety disorders presenting to an urban anxiety clinic to better understand the relationship between the multiple components of anger and anxiety severity. We measured several components of anger identified in the literature, including trait anger, anger expression, internalized anger, and anger control. Our first research question was whether higher levels of anger are related to higher levels of anxiety symptoms in youth. We hypothesized that elevated trait anger, anger expression, and internalized anger would be

related to elevated anxiety severity given previous findings documenting a positive relationship between these constructs in community samples (Zeman, Shipman, & Suveg, 2002). Compared to the aforementioned components of anger, anger control represents appropriate regulation of anger, thus is not expected to follow a similar pattern to anxiety as other components of anger. In addition, previous literature relating anger control to anxiety is limited. Thus, an examination of the relationship between anger control and anxiety symptomatology was exploratory. We also examined whether higher levels of anger were related to higher instances of GAD diagnoses, as irritability, a related construct to anger, is a diagnostic component of GAD, but not other anxiety disorders. We hypothesized that elevated internalized anger would be related to higher likelihood of GAD diagnosis due to past research in adult samples (Deschênes, Dugas, Fracalanza, & Koerner, 2012; Fracalanza, Koerner, Deschênes, & Dugas, 2014).

Method

Participants

Participants included 40 youth, ages 7–17 years (M=11.18, SD=2.87), who were female (57.5%) and Caucasian (87.2%). The remaining participants were African American/Black (5%), Asian (5%), Hispanic/Latino (2.5%), and missing ethnicity (2.5%). Primary diagnoses included Generalized Anxiety Disorder (GAD; 35%), Social Phobia (25%), Separation Anxiety Disorder (SAD; 5%), Other Anxiety Disorders (AD, includes Obsessive Compulsive Disorder, Panic Disorder, and Posttraumatic Stress Disorder; 30%) and co-primary GAD and Social Phobia (5%). With regard to externalizing disorders, five youth (12.5%) met criteria for a diagnosis of Attention Deficit/Hyperactivity Disorder (ADHD). Youth were included if they met diagnostic criteria for a primary anxiety disorder. There were no exclusion criteria for receiving treatment at the clinic. However, if the youth did not have a primary anxiety disorder, they were referred elsewhere. Although a comorbid externalizing diagnosis was not a study exclusion criterion, no youth met full diagnostic criteria for ODD or CD. However, 12.5% of parents reported elevated levels of ODD and CD symptoms.

Procedure

All procedures were approved by the Institutional Review Board and conducted at an outpatient anxiety clinic serving youth based in a northeastern urban United States university. All families seeking treatment at the clinic completed a brief telephone screen to obtain information on youths' symptomatology. Families who were appropriate to receive treatment in the clinic were invited to a one-time assessment before beginning treatment. Consent and assent were obtained from all participants to engage in research at this initial assessment visit. All measures were collected during this initial assessment visit, and youth and parents completed measures independently of one another. Semi-structured interviews (see Measures section) were administered by trained doctoral students in the university clinical psychology program.

Measures

The *Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Version* (ADIS-IV-C/P; Silverman & Albano, 1996) is a semi-structured diagnostic interview administered to parents and youth. Although targeting anxiety disorders, the ADIS also assesses mood disorders and externalizing disorders and screens for pervasive developmental disorders, providing information on possible comorbid conditions. A combined clinician severity rating (CSR) for all assigned diagnoses is computed from the parent and youth reports. CSR scores of four or greater suggest clinically significant impairment due to anxiety symptoms. The ADIS has demonstrated favorable psychometric properties, including excellent test-retest reliability (Silverman, Saavedra, & Pina, 2001), concurrent validity (Wood, Piacentini, Bergman, McCracken, & Barrios, 2002), and good inter-rater reliability (Rapee, Barrett, Dadds, & Evans, 1994). The ADIS-IV-C/P has been validated for use in clinic and community samples. Consistent with other clinic-based anxiety studies, the ADIS was administered by advanced graduate students in clinical psychology. Training followed recommendations set forth by the ADIS-IV-C/P manual (Silverman& Albano, 1996). Interviewers attended didactic sessions discussing DSM-IV-TR criteria and clinical interviewing skills, observed ADISes conducted by certified assessors, coded audiotaped assessments, and conducted initial ADISes with a certified assessor present. Interviewers were considered reliable if they assigned CSRs within 1 point of certified assessor ratings at least 80% of the time. After interviewers met initial training requirements, ongoing reliability checks were conducted weekly with a licensed psychologist.

The *Anger Expression Scale for Children* (AESC; Steele, Legerski, Nelson, &Phipps, 2009) is a 26-item youth-report measure designed to assess anger and anger expression in youth ages 7–17. Four subscale scores (trait anger, anger expression, anger in/internalized anger, and anger control) were derived from AESC items. Example items for each subscale are: "I get very angry if my parent or teacher criticizes me," trait anger; "I slam doors or stomp my feet," anger expression; "I stay mad at people but keep it secret," anger in/internalized anger; and "I try to stay calm and settle the problem," anger control. Each item is rated on a 4-point Likert scale (almost never, sometimes, often, and almost always) with higher values related to higher endorsement of particular items. The AESC was originally validated in a pediatric sample, comparing healthy youth recruited from classrooms to youth with chronic physical illness including cystic fibrosis, cancer, and juvenile rheumatoid arthritis. The AESC demonstrates acceptable internal consistency for all four subscales (a=.69–84). The AESC is significantly positively correlated with other parent and youth reports of youth aggression, hostility, and anger (Steele et al., 2009). Internal consistency across subscales was variable in the present sample; internal consistency was acceptable for the anger expression, trait anger, anger control subscales (a=.83–.88), where a .7 is considered acceptable (De Vellis & Dancer 1991; Tavakol &Dennick, 2011). The anger in/internalized anger subscale's internal consistency was lower than preferred (a=.52), falling within the poor range. Within the anger in/internalized anger subscale, one item (item #26) was identified as lowering the internal consistency, and also showed low and negative correlations with other items (−.29 to .20) on the subscale. In the confirmatory factor analysis of this measure by Steele et al. (2009), this item showed low loading with the anger in/internalized anger factor. Thus, all analyses run with this subscale were done with all items in the subscale, and again with item

#26 removed, which increased internal consistency to .69. Results did not significantly differ using either version of the subscale, thus item #26 was retained.

The *Multidimensional Anxiety Scale for Children: Child and Parent Version* (MASC-C/P; March, Parker, Sullivan, Stallings, & Conners, 1997) is a 39-item scale assessing four factors of anxiety: Physical Symptoms, Harm Avoidance (i.e., the extent to which the youth attempts to avoid negative outcomes, behaviors, or dangers), Social Anxiety, and Separation/Panic (i.e., the extent to which the youth is anxious about being alone or of afraid of certain places or things). Questions on the MASC are answered on a 4-point scale (0 = never true about me to 3 = often true about me). Higher scores indicate higher anxiety. A MASC total score is also calculated. This measure has undergone validation in both school-based and clinic-based samples (March et al., 1997). The MASC has acceptable psychometric properties (March, 1979; March et al., 1997), identifies youth meeting diagnostic criteria (Villabø, Gere, Torgersen, March, & Kendall, 2012), and has good internal consistency (March et al., 1997). In our sample, good internal consistency was demonstrated for the MASC-C and MASC-P total scores (a=.90 and .86 respectively). Acceptable to good internal consistency was demonstrated for the four factors of the MASC-C (a=.74–.87), and questionable to good internal consistency was demonstrated for the four factors of the MASC-P (a=.64–.86).

The *Children's Depression Inventory* (CDI; Kovacs, 1992) is a 27-item self-rated child questionnaire that measures symptoms of depression in youth ages 7–17. The CDI has been used in clinical and non-clinical youth samples, and is commonly used as a measure of depressive symptoms in anxiety specialty clinics (e.g., Kendall, 1994; Kendall, Safford, Flannery-Schroeder, Webb, 2004). We used the total score for this study. Reliability of the total score are acceptable (Craighead, Smucker, Craighead, & Ilardi, 1998; Hodges, 1990; Timbremont, Braet, & Dreessen, 2004), including internal consistency above .80 (Ollendick & Yule, 1990). The total score also demonstrates adequate discriminant validity between clinical and control populations (Carey, Faulstich, Gresham, Ruggiero, & Enyart, 1987), and between depression, anxiety, and disruptive behavior disorders (Timbremont et al., 2004). Internal consistency was acceptable in the present sample (a=.72).

Data Analyses

Primary analyses included 12 linear regressions using hierarchical entry. We did not adjust for multiple models given the exploratory nature of the analyses (Rothman, 1990). For all analyses, the independent variables were the youth-rated AESC subscales. Additionally, we controlled for depressive symptoms via youth report (CDI total score), given previous findings suggesting a relationship between anger, anxiety, and depressive symptoms in community youth (e.g. Puskar et al, 2008; Zeman et al., 2002). Child age was also included as a control variable due to the wide variability of youth age in our sample. CDI total score and child age were entered first in the model, and each individual AESC subscale was entered in a second model.

For the main study analyses, the dependent variables were the youth- and parent-reported MASC-C/P total scores and the clinician-rated ADIS-IV-C/P CSR. We hypothesized that elevated trait anger, anger expression, and internalized anger would be related to elevated

scores on the MASC-C/P and ADIS-IV-C/P CSR. We did not specify a priori relationships between anger control and anxiety symptomatology. To further explore how the different subscales of the AESC related to anxiety, we also examined the relationship between each subscale of the AESC and the MASC-C/P factors. As there are no equivalent constructs to the four MASC-C/P factors on the ADIS-IV-C/P, clinician ratings were not used for these sub-analyses.

Finally, to test the hypothesis that elevated internalized anger would be related to higher likelihood of GAD diagnosis, we examined the relationship between the AESC subscales and likelihood of GAD diagnosis using binomial logistic regression. A diagnosis of GAD was considered present if the evaluating clinician gave a CSR rating of 4 or greater for this diagnosis. A total of four regression models were run, one for each of the AESC subscale scales. Other anxiety diagnoses (e.g., Social Phobia, Panic) were not investigated due to lower numbers of clients with these diagnoses.

We conducted a power analysis for linear regression with a fixed model, and R^2 increase using G*Power software. Based on an alpha level of .05 and a power of .80, the current sample size was sufficient to detect a medium effect size of $f^2 = .21$ (Cohen, 1988). In order to directly compare the results of the regressions to the f^2 effect size used in our power analyses, we used Cohen's (1988) formula to transform R^2 into f^2.

Results

Means and standard deviations are reported in Table 1 for all self-, parent-, and clinician-report measures included in analyses.

Relationship Between Anger, Anxiety Severity, and Factors of the MASC-C and MASC-P

When each subscale of the AESC was used to separately predict MASC-C total score, only the AESC trait anger subscale was significant (β=.328, R^2 =.079, p=.040, Table 2). This value corresponded to f^2=.13, a small-medium effect size (Cohen, 1988).

When the AESC subscales were used to predict the MASC-P total score, none of the relationships were significant (all p's>.05). Results were also not significant in the models predicting the CSR (all p's>.05).

Several significant relationships were found between youth-reported anger on the AESC subscales and select factors of the MASC-C. There was a significant positive relationship between the AESC trait anger subscale and the MASC-C Physical factor (β=.342, R^2=.085, p=.043), corresponding to f^2=.12, a small-medium effect size (Cohen, 1988; Table 3). In addition, there was a significant positive relationship between the AESC trait anger subscale and the MASC-C Harm Avoidance factor (β=.389, R^2=.111, p=.036), corresponding to f^2=.16, a medium effect size (Cohen, 1988; Table 4). No significant relationships were identified between the AESC anger in/internalized anger, anger expression, and anger control subscales and the MASC-C factors.

In terms of relationships between AESC subscales and scores on the MASC-P factors, no significant relationships were identified.

Relationship between AESC subscales and likelihood of GAD diagnosis and externalizing symptoms

None of the AESC subscales were significant predictors of youth meeting criteria for a GAD diagnosis (i.e., endorsing a CSR of 4 or greater on the ADIS-IV-C/P).

Due to differences in significant results by reporter (i.e., analyses using youth-report versus parent- and clinician report of anxiety severity and symptoms), post-hoc analyses using binomial logistic regression examined the relationship between the AESC subscales and likelihood of parents and clinicians endorsing externalizing symptoms to determine if youth report of anger symptoms was interpreted by parents and clinicians as externalizing symptoms instead of anxious symptoms or severity. Clinician and parent severity ratings of externalizing symptoms reported on the ADIS-IV-C/P were used, with any endorsement of externalizing symptoms coded as "1" and no endorsement of externalizing symptoms coded as "0." This new variable was used as the dependent variable in these analyses. None of the AESC subscales were significant predictors of clinician or parent endorsement of externalizing symptoms.

Discussion

Our results paint a complex picture regarding the relationship between anger and anxiety severity and symptoms in youth. We found a positive relationship between youth-reported trait anger and anxiety severity in clinically referred youth presenting for treatment, such that as trait anger increases, anxiety severity increases. However, this was only found in youth-report of anxiety severity. A relationship between internalizing anger and anger expression with anxiety severity was not found, contrary to hypotheses. When examining the factors of the MASC-C and MASC-P, trait anger had a significant positive relationship with two MASC-C factors (i.e., Physical Symptom factor and Harm Avoidance factor), indicating that youth with more experiences of intense and frequent anger also experienced more physical symptoms of anxiety and avoided negative outcomes, behaviors, or danger more than youth with lower levels of trait anger. Contrary to our initial hypothesis, no relationship was found between components of anger and likelihood of GAD diagnosis. Depressive symptoms were significantly related to anxiety severity across analyses, consistent with previous research in youth with anxiety disorders (Axelson & Birmaher, 2001; Garber & Weersing, 2010).

The lack of concordant results between the reporters in this study has several possible explanations. The lack of relationship seen between AESC scores and parent and clinician report of youth anxiety could be explained by theories postulated in the larger field of informant disagreement, whereby agreement is more likely on overt constructs (e.g., physical fighting) relative to covert symptoms (e.g., anger suppression; Comer & Kendall, 2004; De Los Reyes & Kazdin, 2005). As anxiety symptoms and more internal states of anger (e.g. cognitions, physiological arousal) could be construed as internalizing symptoms, it may be unlikely for parent and clinician report of youth anxiety to correlate with youth anger symptoms.

Another related possibility is that parents and clinicians may interpret youth symptoms of anger as related to youth externalizing symptoms, whereas youth perceive symptoms of anger as impacting their anxiety severity in our sample. Specifically, youth who have higher anger with comorbid anxiety could demonstrate the "fight" response in anxiety provoking stimuli, consistent with observations in adults (Cassiello-Robbins & Barlow, 2016), while parents and clinicians may interpret this "fight" response as stemming from externalizing rather than anxiety symptoms. While limited data were collected on externalizing symptoms in our sample, we did run post-hoc analyses examining whether higher youth report of anger symptoms was associated with parent or clinician report of the presence of comorbid externalizing symptoms; these results did not suggest a significant relationship between youth anger and parent or clinician report of externalizing symptoms. However, our sample was small, so future work examining this relationship in a larger sample with adequate power is needed.

Our results might also reflect difficulty for youth to rate anger and anxiety as distinct constructs. This hypothesis may be supported by the fact that one of the significant relationships between anger and anxiety were found for youth report of physical symptoms of anxiety, which may mimic some of the physical symptoms of anger. Parents and clinicians in our study may have been better able to parse apart these constructs, thus the lack of findings regarding the relationship between anger and anxiety using their reports of anxiety. More clearly delineating between experiences of anger and anxiety represents a future direction in measurement of these two constructs.

An alternative explanation is common method variance, or variance that is attributed to the method of measurement rather than the constructs being measured (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). As the majority of our significant results were obtained in the models using all youth reported symptomatology, common method variance seems unlikely. If it were the primary explanation for findings, we would expect youth to report higher symptoms in general when compared to parents and clinicians, which was not the case, and also would expect to see additional significant relationships between youth anger and youth-reported anxiety symptoms.

Despite mixed results, we believe that there are some important takeaways from this study. The strongest pattern of results came from the relationship of trait anger with youth-report anxiety symptoms, suggesting that trait anger in particular is an important construct warranting further study. The findings that no components of anger were related to GAD diagnosis is consistent with the idea that anger and irritability are separate constructs (DiGuiseppe & Tafrate, 2006).

The present study has several limitations. Our sample size was small. Although the study was powered to detect a medium effect and some significant findings were evidenced, replication in a larger sample sufficient to apply advanced statistical approaches, such as structural equation modelling, is needed. Additionally, our sample was primarily Caucasian and of moderate to high socioeconomic status, similar to other studies conducted with clinically-referred youth with anxiety. Future studies would benefit from including diverse samples. Few exclusion criteria were present, contributing to the study's generalizability.

Despite little exclusion, we had low numbers of youth included with comorbid externalizing disorders. Purposeful sampling of youth with anxiety disorders with comorbid externalizing disorders in future studies would add much to this area of inquiry. We focused only on anger, not on sadness in these youth with anxiety, another emotion that warrants future consideration. Additional constructs, such as emotional sensitivity, emotional awareness, defensiveness, intolerance of uncertainty, impulsivity, or emotional dysregulation, may influence self-reporting of both anxiety and anger and underlie the association found between the two. Future studies of the association between anger and anxiety may benefit from the addition of measures like the *Children's Emotional Management Scales* (CEMS; Zeman, Shipman, & Penza-Clyve, 2001) or the *Difficulties in Emotion Regulation Scale* (DERS; Gratz & Roemer, 2004) to examine the role these additional constructs play in the relationship between youth anxiety and anger. Future studies that utilize a non-anxiety control group and follow youth longitudinally for anxiety and anger would also help advance the field. Two of our measures, the AESC and MASC also demonstrated questionable internal consistency on certain subscales, which may have impacted our results. Finally, future studies should employ multi-informant assessment approaches of anger and anxiety to better understand patterns of informant disagreement.

Our results align with a growing body of literature that suggests anger is not specific to externalizing disorders in youth, and youth with anxiety may also experience high levels of anger (e.g. Puskar et al., 2008). Future work should examine whether youth who experience concurrent anxiety and difficulties with anger respond differently to treatment than those with purely internalizing symptoms. This is important because while cognitive-behavioral therapy (CBT) has been shown to be an efficacious program for youth with anxiety, up to 30% of youth treated do not respond (Hannesdottir & Ollendick, 2007). Treatments often do not focus on the experience and regulation of emotions beyond anxiety, which may be important for youth with concurrent anger. In addition, skills taught in anxiety and anger treatments may be contradictory (e.g., exposing children to feared stimuli in anxiety treatment and restructuring their thoughts versus teaching thought stopping in anger treatments), so co-occurring anger and anxiety may suggest the need for adaptation of evidence based anxiety treatment, which is an important area of future study.

Implication for counselors

Anxiety disorders are one of the most common disorders of childhood (Merikangas et al., 2010), making it likely that counselors will frequently encounter youth with clinically significant anxiety. However, anxiety in youth is under identified (Katon, Russo, Richardson, McCauley, & Lozano, 2008; Masia Warner, Fisher, Shrout, Rathor, & Klein, 2007). Anger, especially anger in response to feared stimuli, may be one way that anxiety manifests (Cassiello-Robbins & Barlow, 2016). Thus, even when anger outbursts are the presenting concern, a thorough functional assessment of anger triggers may be important to determine whether treatment of underlying anxiety is justified. Although our results are preliminary, assessing components of anger at the beginning of treatment along with other emotions (e.g., sadness), emotion regulation, and anxiety symptoms in some cases may provide a more holistic picture to aid in case conceptualization and tailoring treatment for youth with anxiety. For example, if a youth presents for anxiety treatment and their caregiver reports

significant anger on a broad measure, an in-depth assessment of anger may be warranted in addition to assessment of anxiety symptoms. In addition, our results suggest that there is not a one-to-one relationship between intensity of anger and the severity of anxiety broadly. Instead, specific types or expressions of anger may interact with different facets of anxiety, further supporting that, when indicated, assessing anger and anxiety in-depth may be the most accurate way to understand each child's experience of both strong emotions. Finally, while we know little about how anger may impact the treatment of youth with anxiety, transdiagnostic or trans-emotion disorder treatments, such as the Unified Protocol for Children (Ehrenreich, Goldstein, Wright, & Barlow, 2009), may allow for clinician flexibility to address many strong emotions in children simultaneously, including anxiety, sadness, and anger, while still using techniques consistent with the evidence base for treatment of youth with anxiety.

Conclusion

Adult samples show an important link between anger and anxiety, but to date this relationship has been relatively unexplored in youth. Despite the need for additional inquiries into this area, this study has several potential implications for youth functioning and treatment. Future work examining the impact of different components of anger beyond anxiety severity is warranted to determine if this relationship has meaningful impact on youth's functioning. For example, work by Suveg et al. (2009) suggests that dysregulation of anger has an impact on anxious youth's social relationships. Additional work examining other domains of functioning such as the parent-child relationship and academic performance and replicating these findings in social domains would be important next steps. In interventions, if anger impacts anxiety severity consistent with our results, it is reasonable to assume that treatment should address anger in addition to anxiety symptoms. Although CBT is the most widely validated treatment for difficulties with anxiety and anger in youth separately (Blake & Hamrin, 2007; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012), no treatments currently exist to treat both within the same protocol. This work, along with further investigations in this area, provide an important first step informing if treatment needs to be adapted, or whether our current method of addressing these difficulties separately may be sufficient.

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Table 1

Measure Scores[†]

Measure	Mean	Standard Deviation
AESC Trait Anger	16.88	6.76
AESC Anger Expression	9.17	3.51
AESC Anger In	8.42	3.38
AESC Anger Control	16.77	4.40
CDI Total Score	8.60	5.93
MASC-C Total Score	47.94	18.37
MASC-C Physical Scale	11.33	6.41
MASC-C Social Anxiety Scale	11.21	6.93
MASC-C Separation Anxiety Scale	9.81	4.99
MASC-C Harm Avoidance Scale	17.49	5.92
MASC-P Total Score	58.99	13.08
MASC-P Physical Scale	12.53	5.83
MASC-P Social Anxiety Scale	15.74	6.64
MASC-P Separation Anxiety Scale	13.74	4.79
MASC-P Harm Avoidance Scale	18.90	3.98
ADIS-IV-C/P CSR	5.30	0.82

[†]AESC: Anger Expression Scale for Children, CDI: Children's Depression Inventory, MASC-C: Multidimensional Anxiety Scale for Children-Child Version, MASC-P: Multidimensional Anxiety Scale for Children-Parent Version, ADIS-IV-C/P CSR: Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Version, Clinician Severity Rating for primary anxiety disorder.

Table 2

Linear models of predictors of youth-reported anxiety severity, including youth-rated trait anger, anger control, anger in/internalized anger, and anger expression, controlling for youth-rated depressive symptoms, and child age

Initial Model for all AESC linear regressions [^]				
Model	**B**	**SE(B)**	**B**	**p**
1 Constant	44.94	10.20	--	<.001 ***
CDI total score	1.77	.45	.57	<.001 ***
Child age	−1.09	.93	−.17	.25
Youth Reported Anxiety Model: Trait Anger [†]				
2 Constant	31.35	11.65	--	.01 *
CDI total score	1.22	.50	.39	.02 *
Child age	−.79	.89	−.13	.38
AESC trait anger	.89	.42	.33	.04 *
Youth Reported Anxiety Model: Anger Control [††]				
2 Constant	45.30	16.16	--	.008 **
CDI total score	1.77	.48	.57	.001 ***
Child age	−1.10	.95	−.17	.25
AESC anger control	−.02	.62	−.004	.98
Youth Reported Anxiety Model: Anger In [†††]				
2 Constant	49.31	13.64	--	.001 ***
CDI total score	1.80	.46	.58	<.001 ***
Child age	−1.11	.94	−.17	.25
AESC angerin	−.53	1.09	−.07	.63
Youth Reported Anxiety Model: Anger Expression [††††]				

Initial Model for all AESC linear regressions[^]

Model		B	SE(B)	B	p
2	Constant	30.81	12.94	--	.02 *
	CDI total score	1.35	.50	.44	.01 *
	Child age	−.64	.94	−.10	.49
	AESC anger expression	1.39	.82	.27	.09

[^] R^2=.295 for Step 1 for this model and all subsequent model (p=.002***), CDI: Children's Depression Inventory, Dependent variable: Multidimensional Anxiety Scale for Children-Child Version total score.

[†] R^2=.079 for Step 2 (p=.040*), AESC: Anger Expression Scale for Children.

[††] R^2<.001 for Step 2 (p=.977).

[†††] R^2=.005 for Step 2 (p=.628).

[††††] R^2=.053 for Step 2 (p=.097).

*
p<0.05,

**
p<0.01,

***
p<0.005

Table 3

Linear models of predictors of scores on the MASC-C Physical Scale, including youth-rated trait anger, anger control, anger in/internalized anger, and anger expression, controlling for youth-rated depressive symptoms, and child age

Initial Model for all AESC linear regressions [^]

Model	B	SE(B)	B	p
1 Constant	5.94	3.75	--	.12
CDI total score	.49	.17	.45	.006**
Child age	.11	.34	.05	.75

Youth Reported Anxiety Model: Trait Anger [†]

Model	B	SE(B)	B	p
2 Constant	.99	4.29	--	.82
CDI total score	.29	.19	.26	.13
Child age	.22	.33	.09	.52
AESC trait anger	.32	.15	.34	.04*

Youth Reported Anxiety Model: Anger Control [††]

Model	B	SE(B)	B	p
2 Constant	8.60	5.91	--	.15
CDI total score	.46	.17	.42	.01*
Child age	.092	.35	.041	.79
AESC anger control	-.13	.23	-.091	.56

Youth Reported Anxiety Model: Anger In [†††]

Model	B	SE(B)	B	p
2 Constant	2.67	4.96	--	.59
CDI total score	.46	.17	.43	.009**
Child age	.12	.34	.05	.73
AESC anger in	.39	.40	.15	.32

Youth Reported Anxiety Model: Anger Expression [††††]

Model	B	SE(B)	B	p
2 Constant	3.10	4.89	--	.53

Initial Model for all AESC linear regressions[^]

Model	B	SE(B)	B	p
CDI total score	.40	.19	.37	.04 *
Child age	.20	.36	.09	.58
AESC anger expression	.28	.31	.15	.37

[^] R^2=.219 for Step 1 for this model and all subsequent model (p=.010), CDI: Children's Depression Inventory, Dependent variable: Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Version, Clinician Severity Rating.

[†] R^2=.085 for Step 2 (p=.043), AESC: Anger Expression Scale for Children.

[††] R^2=.007 for Step 2 (p=.561).

[†††] R^2=.021 for Step 2 (p=.332).

[††††] R^2=.017 for Step 2 (p=.371).

[*] p<0.05,

[**] p<0.01,

[***] p<0.005

Table 4

Linear models of predictors of scores on the MASC-C Harm Avoidance Scale, including youth-rated trait anger, anger control, anger in/internalized anger, and anger expression, controlling for youth-rated depressive symptoms, and child age

Initial Model for all AESC linear regressions^

Model	B	SE(B)	B	p
1 Constant	18.55	3.83	--	<.001 ***
CDI total score	.21	.17	.21	.21
Child age	-.26	.35	-.13	.46

Youth Reported Anxiety Model: Trait Anger †

Model	B	SE(B)	B	p
2 Constant	13.35	4.37	--	.004 **
CDI total score	.002	.19	.002	.99
Child age	-.15	.34	-.07	.67
AESC trait anger	.34	.16	.39	.03 *

Youth Reported Anxiety Model: Anger Control ††

Model	B	SE(B)	B	p
2 Constant	17.77	6.06	--	.006 **
CDI total score	.22	.18	.22	.22
Child age	-.25	.35	-.12	.48
AESC anger control	.04	.23	.03	.87

Youth Reported Anxiety Model: Anger In †††

Model	B	SE(B)	B	p
2 Constant	20.14	5.12	--	<.001 ***
CDI total score	.23	.17	.23	.19
Child age	-.27	.35	-.13	.46
AESC anger in	-.19	.41	-.08	.64

Youth Reported Anxiety Model: Anger Expression ††††

Model	B	SE(B)	B	p
2 Constant	13.65	4.89	--	.008 **

Initial Model for all AESC linear regressions^

Model	B	SE(B)	B	p
CDI total score	.07	.19	.07	.73
Child age	–.10	.36	–.05	.77
AESC anger expression	.48	.31	.29	.13

^
R^2=.212 for Step 1 for this model and all subsequent model (p=.426), CDI: Children's Depression Inventory, Dependent variable: Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Version, Clinician Severity Rating.

[†] R^2=.111 for Step 2 (p=.036), AESC: Anger Expression Scale for Children.

[††] R^2=.001 for Step 2 (p=.868).

[†††] R^2=.006 for Step 2 (p=.638).

[††††] R^2=.061 for Step 2 (p=.128).

[*]
p<0.05,

[**]
p<0.01,

[***]
p<0.005