


Somatic Symptoms of Anxiety and Suicide Ideation Among Treatment-Seeking Youth With Anxiety Disorders

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Objective: The severity of anxiety, in general, has been associated with suicide ideation (SI) among youth, but research has yet to examine the specific anxiety symptoms that may contribute to SI among youth. This study examined the severity of specific anxiety symptom clusters (i.e., tense/restless, somatic/autonomic symptoms, humiliation/rejection, performing in public, separation anxiety, perfectionism, and anxious coping) and SI in youth who met diagnostic criteria for an anxiety disorder.

Method: Participants ($N = 87$) were treatment-seeking children and adolescents ages 6–17 ($M = 11.1$ years, $SD = 3.06$; 52.9% male) diagnosed with a principal anxiety disorder. Youth and their parents completed measures of youth anxiety symptom severity, depression, and SI.

Results: Hierarchical linear regressions revealed that when anxiety symptom clusters were entered simultaneously, only youth self-reported (and not parent-reported) somatic/autonomic symptoms of anxiety significantly predicted SI, after controlling for depression and sex. Importantly, the relationship between somatic/autonomic symptoms of anxiety and SI was stronger than that between depression and SI.

Conclusions: These results suggest that assessing somatic symptoms of anxiety is especially important when quantifying suicide risk among anxiety-disordered youth.

Suicide ideation (SI), plans, attempts, and death by suicide present a major public health concern in youth: Suicide is the second leading cause of death among 10- to 24-year olds (Heron, 2017). In the most recent national survey, 17.7% of youth reported seriously considering a suicide attempt in the prior 12 months (Centers for Disease Control and Prevention, 2015), 33% of children and

adolescents with SI develop a suicide plan, and 34% of ideators make an attempt (Nock et al., 2013). Given these data, it is critical to address SI in youth and to effectively quantify and mitigate the risk.

The growing body of research on the relationship between anxiety and suicide-related outcomes was addressed in a recent meta-analysis (Bentley et al., 2016) that

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established anxiety and its disorders as statistically significant, albeit weak, prospective predictors for SI and attempts among adolescents and adults. However, the strength and importance of anxiety as a risk factor may be underestimated due to methodological limitations. Although the association between anxiety and suicide-related outcomes within the context of comorbid depression has been established (Busch, Fawcett & Jacobs, 2003; Fawcett et al., 1990; Norton, Temple & Pettit, 2008), there is a paucity of research on anxiety as an independent predictor of suicide-related outcomes beyond the effects of comorbid psychopathology. Moreover, anxiety has tended to be measured broadly in terms of disorders and trait-like constructs, rather than examining the differential predictive ability of the distinct features of anxiety (Bentley et al., 2016). Retrospective studies suggest that physiological symptoms of anxiety often precede suicide attempts and deaths (Ribeiro et al., 2015). Yet, the majority of adult and adolescent studies have not examined specific elements of anxiety as they are related to SI and behavior.

Although limited in scope as compared to the adult literature, there is mounting evidence that anxiety is independently associated with suicide-related outcomes in youth beyond the effects of comorbid depression. The support for an independent association has come from epidemiological samples (Boden, Fergusson & Horwood, 2007; Gould et al., 1998; Nelson et al., 2000), community samples (Pilowsky, Wu & Anthony, 1999; Valentiner, Gutierrez & Blacker, 2002), hospitalized patients (Gallagher, Prinstein, Simon & Spirito, 2014; Ghaziuddin, King, Naylor & Ghaziuddin, 2000; Goldston et al., 1999, 2009), and treatment-seeking youth (Carter, Silverman, Allen & Ham, 2008; O'Neil, Puleo, Benjamin, Podell & Kendall, 2012; O'Neil Rodriguez & Kendall, 2014). However, this literature contains similar methodological limitations as in adult samples: The majority of studies examined anxiety disorders such as panic disorder (PD; Boden et al., 2007; Goldston et al., 2009), social anxiety disorder (SAD; Boden et al., 2007; Nelson et al., 2000;

Gallagher et al., 2014), or nonspecific anxiety traits (e.g., worry, nervousness; Carter et al., 2008; Goldston et al., 1999). This potentially dilutes stronger, more predictive relationships that underlie broader diagnostic categorizations.

Fewer studies have examined the features/symptoms of anxiety that may drive the relationship with SI (Ghaziuddin et al., 2000; Gould et al., 1998; Pilowsky et al., 1999; Valentiner et al., 2002). One study of a community sample of 118 high school students measured anxiety symptom clusters with the Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings & Conners, 1997). The tense/restless cluster was predictive of SI, controlling for levels of depression (Valentiner et al., 2002). Notably, despite support for an independent association between anxiety symptoms and SI, this study relied upon a nonclinical sample of primarily older adolescents ($M = 15.95$ years) and, thus, did not examine this relationship in younger children or in those seeking treatment for anxiety. Another study (Ghaziuddin et al., 2000) comprised of 56 hospitalized adolescents measured physiological anxiety, worry/oversensitivity, and social concerns/concentration and found that all three clusters were individually associated with self-reported SI, but not clinician-reported ideation. Additionally, it found that, collectively, the three clusters made an independent contribution to the severity of ideation controlling for the presence of depression (Ghaziuddin et al., 2000). Two studies have shown that panic attacks significantly predict suicidal behavior. As described in the DSM-5 (American Psychiatric Association, 2013), panic attacks consist of a sudden increase in physiological symptoms, such as accelerated heart rate, sweating, trembling/shaking, feelings shortness of breath, chest pain/discomfort, nausea, or dizziness (American Psychiatric Association, 2013). In a community-based sample of 1,580 adolescents, those with panic attacks were three times more likely to have expressed SI and approximately two times more likely to have made suicide attempts than were adolescents without panic

attacks, controlling for demographic factors, major depression, and the use of alcohol and illicit drugs (Pilowsky et al., 1999). A second study examined panic attacks, runaway behavior, perfectionism, and aggressiveness in an epidemiological sample of 1,285 adolescents, determining that panic attacks and aggressiveness were significant predictors of suicide risk, adjusting for psychiatric disorder (Gould et al., 1998). However, no study to date has tested the specific anxiety symptoms driving the relationship between anxiety and SI in a child and adolescent treatment-seeking, anxiety-disordered sample.

Physiological symptoms of anxiety may be a potential risk factor for suicidal behaviors and outcomes among children and adolescents. Physiological symptoms may directly contribute to suicidal behavior via several mechanisms. It is posited that prolonged distress from anxiety leads to the consideration of suicide as a means for symptom relief (O'Neil Rodriguez & Kendall, 2014). Consistent with this theory, individuals experiencing physical symptoms of anxiety may be prone to suicidal thoughts and behaviors due to an escape-based mentality (escape theory of suicide; Baumeister, 1990; Williams & Pollock, 2000). Further, several studies of adults suggest that acute agitation, tension, nervousness, and panic attacks may be harbingers for imminent, near-term suicide risk (Ribeiro et al., 2015; Robins, 1981). Therefore, it is particularly important to examine physiological constructs as precursors to suicide-related outcomes.

This study examined the degree to which the severity of specific anxiety symptom clusters (i.e., tense/restless, somatic/autonomic symptoms, humiliation/rejection, public performance fears, separation anxiety, perfectionism, and anxious coping) predicts SI. Given existing findings, it was hypothesized that more severe levels of each anxiety symptom cluster, as measured by youth self-report and parent-report, would predict higher levels of youth self-reported and parent-reported SI, controlling for depression. Based on prior literature, it was further hypothesized that the physical symptoms of

anxiety including both the somatic/autonomic and tense/restless symptom clusters would serve as the most potent anxiety symptom clusters in predicting SI, across both parent- and youth-reported indices.

METHODS

Participants

Participants were treatment-seeking youth and their parents receiving a diagnostic assessment at an outpatient specialty clinic for anxiety disorders in the north-eastern United States. Youth were included in this study if they met diagnostic criteria for a principal anxiety disorder (separation anxiety disorder [SEP], generalized anxiety disorder [GAD], SAD, specific phobia [SP], obsessive-compulsive disorder [OCD], PD, or anxiety disorder not otherwise specified [AD-NOS]) as assessed by the Anxiety Disorder Interview Schedule for DSM-IV (ADIS-IV-C/P; Silverman & Albano, 1996). Youth were included if they had coprincipal or comorbid (secondary) nonanxiety disorder(s), but were excluded from this study if they received a principal diagnosis of a disorder other than anxiety. This study used the sample described in O'Neil Rodriguez and Kendall (2014) with the inclusion of an additional participant; this study did not require completion of a behavioral task that was needed for inclusion in O'Neil Rodriguez and Kendall (2014).

Participants were 87 youth aged 6–17 ($M = 11.1$ years, $SD = 3.06$; 52.9% male) and their parents. Participant demographics were as follows: 85.1% Caucasian, 3.4% African American, 3.4% Asian American, and 4.6% Hispanic (3.4% has missing ethnicity data). Of the 87 youth, 41.4% met for principal GAD, 27.6% SAD, 12.6% SP, 10.3% SEP, 3.4% OCD, 3.4% PD (with and without agoraphobia), and 1.1% AD-NOS. Seventy-one percent (71.3%) had one or more comorbid anxiety disorders (14% had a coprincipal anxiety disorder), and 4.6% and 3.4% were diagnosed with comorbid depression and dysthymia, respectively (2.3% had a

coprincipal mood disorder), 4.6% had a past depressive episode (not current), and 23.0% had comorbid externalizing disorders (e.g., attention-deficit/hyperactivity disorder and oppositional defiant disorder; 4.6% had a coprincipal externalizing disorder).

Measures

Youth and their parents independently completed a semistructured diagnostic interview to assess the presence of anxiety and other comorbid disorders, as well as self- and parent-report measures of their anxiety, mood, and behaviors.

Anxiety Disorders Interview Schedule for DSM-IV-Parent and Child Versions (ADIS-IV-C/P; Silverman & Albano, 1996). The ADIS-IV-C/P are semistructured, clinician-administered diagnostic interviews that assess the presence of anxiety disorders as well as mood and externalizing disorders. Youth and their parents completed the interviews separately with a reliable clinician. Diagnoses were assigned if youth and/or their parents endorsed symptoms consistent with DSM-IV criteria, and the clinical severity rating (CSR) was given a 4 of 8 or higher. The diagnosis with the highest CSR was considered the principal disorder. The ADIS-IV-C/P has demonstrated convergent validity (March et al., 1997; Wood, Piacentini, Bergman, McCracken & Barrios, 2002), retest reliability (Silverman, Saavedra & Pina, 2001), and interrater reliability (Chavira, Stein, Bailey & Stein, 2004). In this study, clinicians were trained to reliability (Cohen's kappa $\geq .85$).

Suicidal Ideation Questionnaire-Junior (SIQ-Jr; Reynolds, 1988). The SIQ-Jr is a 15-item self-report measure of SI. The frequency of occurrence of each item is rated on a 7-point Likert scale ranging from 0 (*I never had this thought*) to 6 (*everyday*). Total scores were created by summing the items, with higher scores indicating greater severity of SI. The SIQ-Jr has demonstrated good internal consistency (Keane, Dick, Bechtold & Manson, 1996; Reynolds, 1988; Reynolds & Mazza, 1999), good test-retest reliability

(Reynolds & Mazza, 1999), good convergent validity (Reynolds, 1988), concurrent validity in differentiating suicidal ideators/attempts from nonsuicidal psychiatric controls (King, Raskin, Gdowski, Butkus & Opipari, 1990; Pinto, Whisman & McCoy, 1997), and criterion-related validity (Reynolds & Mazza, 1999). In this study, the internal consistency for the SIQ-Jr was excellent ($\alpha = .89$).

Multidimensional Anxiety Scale for Children-Child and Parent Versions (MASC-C/P; March et al., 1997). The MASC-C/P are 39-item questionnaires completed by youth and their parents that assess the frequency of anxiety symptoms in the last 2 weeks. Items are rated on a 4-point Likert scale from 0 (*never true*) to 3 (*very true*), with higher scores indicating greater anxiety. Factor analyses have confirmed four factors within the MASC: physical symptoms, social anxiety symptoms, harm avoidance, and separation anxiety (e.g., March & Parker, 2004). The physical symptoms subscale can be further divided into somatic/autonomic symptoms (e.g., trouble catching breath, feeling dizzy, chest pains, racing heart, gastrointestinal symptoms, and sweaty) and tense/restless symptoms (e.g., shaking, restless, feeling strange, jumpy, and tense). Social anxiety symptoms can be divided into humiliation/rejection symptoms (e.g., fears of people laughing, judgment from others, doing something embarrassing) and public performance fears (e.g., being shy, afraid of performing in public, asking others to play). The harm avoidance subscale can be divided into perfectionism symptoms (e.g., obeying others, doing things right) and anxious coping behaviors (e.g., staying away from upsetting things, telling others when upset, checking for danger). The separation subscale consists of items such as being afraid of being apart from parents, sleeping alone, avoiding scary movies, and having phobic fears (e.g., storms, darkness). The MASC-C/P have demonstrated good test-retest reliability (March, Sullivan & Parker, 1999; March et al., 1997) and internal consistency (Baldwin & Dadds, 2007; Dierker et al., 2001; March et al., 1997; Wei et al., 2014) with regard to the overall measure as well as each

subscale. The MASC also has demonstrated acceptable divergent and convergent validity (Baldwin & Dadds, 2007; March et al., 1997; Muris, Merckelbach, Ollendick, King & Bogie, 2002; Rynn et al., 2006). Parent-child agreement on the MASC has ranged from low to fair (Baldwin & Dadds, 2007; Villabø, Gere, Torgersen, March & Kendall, 2012; Wei et al., 2014). In this study, the internal consistency was excellent ($\alpha = .91$ for the MASC-C and $\alpha = .86$ for the MASC-P). Internal consistency for the MASC-C subscales ranged from questionable to excellent: Physical = .87 (Tense/Restless = .82, Somatic/Autonomic = .80), Social = .89 (Humiliation/rejection = .92, Public Performance = .73), Separation = .74, Harm Avoidance = .76 (Perfectionism = .64; Anxious Coping = .59). Internal consistency for the MASC-P subscales ranged from poor to excellent: Physical = .85 (Tense/restless = .72, Somatic/autonomic = .81), Social = .87 (Humiliation/rejection = .93, Public Performance = .76), Separation = .75, Harm Avoidance = .67 (Perfectionism = .41, Anxious Coping = .61).

Children's Depression Inventory (CDI; Kovacs, 1981, 1992). The CDI is a self-report measure of youth depressive symptoms. For each of the 27 items, participants select one of three statements that best describes how they have been feeling in the past week. Total scores range from 0 to 54 with higher scores indicating greater severity. The CDI has demonstrated acceptable test-retest reliability, internal consistency (Saylor, Finch, Spirito & Bennett, 1984; Smucker, Craighead, Craighead & Green, 1986), and discriminant validity (March et al., 1997). The internal consistency was good ($\alpha = .80$) in the current sample.

Child Behavior Checklist (CBCL, Achenbach & Rescorla, 2001). The CBCL is a 112-item parent-report measure of internalizing, externalizing, and other behavioral problems in youth in the last 6 months. Parents rate items on a 3-point scale from 0 (*not true*) to 2 (*very true or often true*). Scores are then converted to *T*-scores to compare ratings to same-aged peers. The CBCL has

demonstrated acceptable test-retest reliability, internal consistency, and validity (Achenbach & Rescorla, 2001; Nakamura, Ebesutani, Bernstein & Chorpita, 2009). Consistent with O'Neil Rodriguez and Kendall (2014), two items were used to assess parental report of the youth's self-injurious thoughts and behaviors (SITBs; i.e., "talks about killing self" and "deliberately harms self or attempts suicide"). These items were used to create a dichotomous variable for the presence of SITBs according to parents (SITB present if items summed > 0).

Procedure

The study was approved by the Temple University Institutional Review Board. Once families provided informed consent/assent, parents and youth completed the diagnostic interview independently with trained clinicians. Following the interviews, youth and their parents completed questionnaires. If youth reported any SI and/or intent, a thorough risk assessment was completed and the youth's parents were informed. As appropriate, safety plans were developed and/or referrals were provided.

Data Analytic Plan

First, the outcome variable, total score on the SIQ-Jr, was inspected to determine whether it was normally distributed. Due to an inflated number of zeroes, the scale evidenced non-normality (Skewness = 2.97; Kurtosis = 11.35). Thus, a log transformation was conducted on the SIQ-Jr, resulting in acceptable normality (Skewness = 0.46; Kurtosis = -1.07). Because the MASC-C/P Perfectionism and Anxious Coping scales showed questionable or poor internal consistencies in the current sample, we ran analyses using the overarching subscale, Harm Avoidance (which demonstrates acceptable internal consistency) in subsequent analyses. Bivariate correlations and *t* tests were conducted to determine whether demographic variables (age, sex, race) were associated with the main outcome variable,

SI. Given that male youth reported significantly greater levels of SI than females, sex was controlled for in subsequent analyses. Bivariate correlations also were run to examine the relationships between youth-reported SI, and parent- and youth-reported anxiety symptom clusters.

To evaluate the main study hypotheses, a series of independent hierarchical linear regressions were conducted. The Variance Inflation Factor was inspected to detect for possible multicollinearity. To determine the independent association between each anxiety symptom cluster and SI, depressive symptoms and sex were entered in Step 1 in a series of hierarchical linear regressions, with each anxiety symptom cluster entered in Step 2 independently. Next, to examine the relative predictive capacity of each of the anxiety symptom clusters, we conducted a final hierarchical regression entering all significant anxiety symptom clusters simultaneously in Step 2, after controlling for depressive symptoms and sex in Step 1.

RESULTS

Preliminary Analyses

Youth self-report of SI as measured by the SIQ-Jr revealed a mean score of 5.34 ($SD = 8.49$). There were no significant differences in the log of SIQ-Jr score as a function of race or age. However, males demonstrated significantly greater levels of SI than females in the current sample, $t(85) = 2.43$, $p = .017$. Table 1 shows the means and standard deviations of anxiety severity (total and per anxiety cluster), depressive symptoms, and SI.

A dichotomous indicator of parent-reported youth SITB was correlated with youth-reported SI at a trend level ($r = .22$, $p = .055$). Approximately 11% of parents in this study endorsed that their children exhibited any SITBs. Several parent- and youth-reported MASC subscales were significantly correlated with each other (Table 2). Strength of correlations ranged from low to moderate ($r = .22$ to $.41$). Parent and youth

TABLE 1
Means and Standard Deviations of Symptomatology

	<i>M (SD)</i>
SIQ total	5.24 (8.49)
Parent report of SITB presence	$n = 10$
CDI total	9.14 (5.97)
MASC-C total	50.77 (19.03)
Tense	6.32 (4.46)
Somatic	4.96 (4.01)
Hum/Rej	6.32 (4.89)
PubPerf	5.40 (3.16)
Sep	10.17 (5.46)
Harm avoid	17.59 (5.30)
MASC-P total	59.26 (15.43)
Tense	6.87 (3.51)
Somatic	4.92 (4.09)
Hum/Rej	9.28 (4.44)
PubPerf	6.85 (3.19)
Sep	13.06 (6.08)
Harm avoid	18.26 (4.16)

SIQ, Suicidal Ideation Questionnaire-Junior; CBCL SITB, Child Behavior Checklist self-injurious thoughts and behavior items (18 and 91); CDI, Children's Depression Inventory; MASC, Multidimensional Anxiety Scale for Children; tense, tense/restless; somatic, somatic/autonomic; HumRej, humiliation/rejection; PubPerf, public performance anxiety; harm avoid, harm avoidance.

total MASC scores were not significantly associated.

Table 3 provides the correlations among the main variables. Youth-reported SI was significantly correlated with depressive symptoms and each of the youth-reported anxiety symptom clusters. The majority of the youth-reported anxiety symptom clusters were significantly correlated with one another. Importantly, youth-reported SI was not significantly correlated with any of the parent-reported anxiety symptom clusters. Parent-reported SITB was significantly correlated with youth-reported depressive symptoms (Table 3). However, parent-reported SITB was not significantly correlated with any of the youth-reported anxiety symptom clusters (Table 3). Furthermore, parent-reported SITB was not significantly

TABLE 2*Bivariate Correlations Between Parent- and Youth-Reported MASC Scales*

	Total (Child)	Tense (Child)	Somatic (Child)	Hum/Rej (Child)	PubPerf (Child)	Sep (Child)	Harm avoid (Child)
Total (Parent)	.193	.194	.242*	.053	.249*	.136	.010
Tense (Parent)	.240*	.409***	.266*	.101	.131	.154	-.012
Somatic (Parent)	.159	.221*	.371**	-.057	.124	.080	.000
Hum/Rej (Parent)	.203	.101	.087	.391***	.434***	-.000	-.045
PubPerf (Parent)	-.060	.009	.028	.024	.367**	-.261*	-.221*
Sep (Parent)	.061	-.015	.075	-.182	-.056	.339**	.030
Harm avoid (Parent)	.101	.060	.093	-.004	.034	.003	.223*

MASC, Multidimensional Anxiety Scale for Children; tense, tense/restless; somatic, somatic/autonomic; HumRej, humiliation/rejection; PubPerf, public performance anxiety; harm avoid, harm avoidance.

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

correlated with any parent-reported anxiety symptom clusters. Given that neither parent-reported SITB nor youth-reported SI was significantly correlated with parent-reported anxiety symptom clusters, we did not examine these associations further using hierarchical linear regression.

Youth-Reported Anxiety Symptom Clusters as Predictors of Youth-Reported SI

To determine which anxiety symptom clusters explained the greatest degree of variance in the prediction of youth-reported SI, a series of independent hierarchical linear regressions were conducted (Table 4). Results of the independent regression analyses suggested that the tense/restless, somatic, public performance, and separation anxiety symptom clusters were significantly associated with youth-reported SI, after controlling for sex and current depressive symptoms¹ and after a Bonferroni alpha adjustment of .008 (.05/6). Of note, the somatic/autonomic symptoms of anxiety ($B = .59$, $t(85) = 6.57$,

$p < .001$) outperformed current depression ($B = .48$, $t(85) = 5.04$, $p < .001$) in explaining variance in SI in this sample, when controlling for sex.

To examine the strength of each of the anxiety symptom clusters in predicting SI, we entered all significant anxiety symptom clusters simultaneously into a hierarchical linear regression. Of note, the Variance Inflation Factors suggested that the collinearity among predictor variables was acceptable. Our results suggested that when controlling for depressive symptoms and sex and the other symptom clusters, only the somatic/autonomic symptoms of anxiety significantly predicted SI among our sample of anxiety-disordered youth (Table 5).

DISCUSSION

The present study found that the youth-reported, but not parent-reported, anxiety symptom clusters of tense/restless, somatic, public performance, and separation anxiety were significantly associated with youth-reported SI, after controlling for depressive symptoms and youth sex. Importantly, when these symptom clusters were included in the model simultaneously, only the somatic/autonomic symptoms of anxiety significantly predicted SI, and this anxiety

¹Given that our sample had a large age range, we also explored whether age moderated the associations between anxiety symptom clusters and youth-reported SI. We found that age did not moderate the anxiety symptom clusters and SI associations.

TABLE 3*Bivariate Correlations Between SI- and Youth-Reported Anxiety Symptoms*

	1	2	3	4	5	6	7	8	9
1. SI_Child	—								
2. SI_Parent	.217	—							
3. CDI	.506***	.306**	—						
4. MASC tense	.510***	.151	.496***	—					
5. MASC somatic	.613***	.163	.362***	.628***	—				
6. MASC HumRej	.425***	.157	.541***	.444***	.374***	—			
7. MASC PubPerf	.443***	.106	.413***	.353**	.512***	.598***	—		
8. MASC sep	.404***	.119	.176	.355**	.416***	.288**	.264*	—	
9. MASC harm avoid	.268*	.047	.140	.298**	.268*	.312**	0.225*	.488**	—

SI_Child, Suicidal Ideation Questionnaire-Junior (log); SI_Parent, dichotomous indicator of SI based on two items of Parent Child Behavior Checklist; CDI, Children's Depression Inventory Depression; MASC, Multidimensional Anxiety Scale for Children; tense, tense/restless; somatic, somatic/autonomic; HumRej, humiliation/rejection; PubPerf, public performance anxiety; Sep, separation anxiety; harm avoid, harm avoidance.

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

TABLE 4

Independent Hierarchical Linear Regressions Evaluating Anxiety Symptom Clusters as Predictors of SI (Controlling for Depression and Gender)

Predictor	β	SE	t	p	ΔR^2
MASC tense	.35*	.03	3.45	.001	.09
MASC somatic	.48*	.03	5.45	.000	.19
MASC HumRej	.26	.03	2.37	.020	.05
MASC PubPerf	.31*	.04	3.21	.002	.08
MASC sep	.31*	.02	3.56	.001	.10
MASC harm avoid	.20	.02	2.18	.032	.04

SI, Suicidal Ideation Questionnaire (log); CDI, Children's Depression Inventory Depression; MASC, Multidimensional Anxiety Scale for Children; Tense, tense/restless; somatic, somatic/autonomic; HumRej, humiliation/rejection; PubPerf, public performance anxiety; sep, separation anxiety; harm avoid, harm avoidance.

*Significant using Bonferroni adjusted $\alpha = .008 (.05/6)$.

symptom cluster explained greater variance in SI than depression. This finding is consistent with past research that found physical symptoms of anxiety to be associated with SI (Ghaziuddin et al., 2000; Valentiner et al., 2002).

In the current sample of treatment-seeking youth, it was youth-reported

TABLE 5

Hierarchical Linear Regression Evaluating Anxiety Symptom Clusters as Predictors of SI Simultaneously

Step	Predictor	β	SE	t	p	R^2
1	CDI	.48	.02	5.04	.000	.28
	Sex	-.17	.22	-1.75	.083	
2	MASC	.08	.03	0.66	.509	.50
	tense					
	MASC	.33	.04	2.67	.009	
	somatic					
	MASC	.10	.04	1.03	.306	
	PubPerf					
	MASC sep	.16	.02	1.81	.074	

CDI, Children's Depression Inventory Depression; MASC, Multidimensional Anxiety Scale for Children; tense, tense/restless; somatic, somatic/autonomic; PubPerf, public performance anxiety; sep, separation anxiety.

symptoms of anxiety that significantly predicted SI (after controlling for depressive symptoms and sex). Neither youth- nor parent-reported anxiety predicted parent-reported SITBs. This pattern of findings is consistent with previous research suggesting that youth and their parents tend to have low to fair agreement with regard to internalizing

symptoms and report of SI (Baldwin & Dadds, 2007; De Los Reyes, Alfano & Beidel, 2010; Klaus, Mobilio & King, 2009; McBride, Johnco, Salloum, Lewin & Storch, 2017; Prinstein, Nock, Spirito & Grapentine, 2001; Villabø et al., 2012; Wei et al., 2014). In the current study, youth SI was not assessed using the same tools among youth and parents. Whereas youth were administered a 15-item measure inquiring about a wide range of suicidal thoughts, parents were asked to report on suicidal talk and behavior, measured by two items (O'Neil Rodriguez & Kendall, 2014). Indeed, youth were presented with a greater number of opportunities to report on SI as well as a greater range of suicidal experiences, which may explain the divergence between youth and parent report of SI.

The social anxiety symptom cluster of public performance fears independently predicted SI (~8% of variance). This finding replicates previous findings that SAD is associated with SI (Boden et al., 2007; Nelson et al., 2000; Simon, Spirito, Prinstein, & Gallagher, 2014). Although our exploratory analyses indicated that age did not impact the relationship between social fears and SI, this relationship is particularly relevant among adolescents and emerging adolescents as they become more aware of other's social judgments and are trying to fit in with their peers (Blakemore, 2008; Steinberg & Morris, 2001). Youth reporting greater social fears and/or perceived negative evaluations during this developmental stage may also be prone to suicidal thoughts. The separation symptom cluster also independently predicted SI (~10% variance). Previous findings have identified that youth with SEP are more likely to demonstrate a less secure attachment to caregivers, which has been associated with depressive symptoms, including SI (Armsden, McCauley, Greenberg, Burke & Mitchell, 1990).

Our findings indicate that the physiological symptoms of anxiety were significantly predictive of SI, after accounting for depressive symptoms and sex. The somatic/autonomic symptom cluster accounted for 19% of the variance and the tense/restless symptom

cluster accounted for 9%. These findings are in line with theory suggesting that prolonged exposure to physiological distress may result in suicidal thoughts due to a desire to escape from the pain or an intolerable situation (Baumeister, 1990; Williams & Pollack, 2000). Moreover, these findings are in line with a recent meta-analysis on the relationship between agitation (physical and mental over-arousal) and suicidal behavior, which suggests that there is a moderate association when considering both cross-sectional and prospective studies (Rogers, Ringer & Joiner, 2016).

Our finding that the somatic/autonomic symptoms of anxiety were more strongly related to SI than the tense/restless symptoms of anxiety was consistent with literature on the association between panic attack symptoms and SI (Gould et al., 1998; Pilowsky et al., 1999), but conflicted with findings utilizing the same anxiety symptom scale among a sample of youth. Past findings using the MASC subscales suggested that among the physical symptoms of anxiety assessed, the tense/restless symptoms were significantly related to SI, whereas the somatic/autonomic symptoms were not (Valentiner et al., 2002). Our finding also contradicts findings that have suggested that agitation is associated with suicidal behaviors (Rogers et al., 2016) and that agitation, in turn, is more consistent with the tense/restless symptoms than the somatic/autonomic symptoms assessed in the MASC. However, the present findings align with previous findings that panic symptoms are associated with SI. It may be the case that the somatic/autonomic response to anxiety, whether or not experienced during a panic attack, is associated with suicidal thoughts. Future research should attempt to understand whether the current study's dissimilar findings from those of Valentiner et al. (2002) may be due to differing sample characteristics. Indeed, Valentiner et al. (2002) participants were community high school students, whereas our sample consisted of outpatient children and adolescents with an anxiety disorder. It is possible that among a sample with a diagnosed

disorder, somatic/autonomic symptoms may differentiate between youth with and without SI better than symptoms of tension and restlessness. Moreover, Valentiner et al. (2002) sample was significantly older ($M = 15.95$ years), spanning from ages 12–18 as compared to our sample ($M = 11.1$ years), which also included a greater range of ages (7–17 years old). Thus, it is possible that somatic/autonomic symptoms may be more relevant for younger children in assessing SI than symptoms of tension and restlessness. Future research should examine the potential effects of sample and age differences.

The current findings support the notion that some clusters of anxiety symptoms better predict SI than others and that specific anxiety symptom clusters may explain more variance in SI than depression. This may dispel previous findings that anxiety does not independently increase the risk of suicidal thoughts and behaviors beyond the effects of comorbid psychopathology (Esposito & Clum, 2002; Foley, Goldston, Costello & Angold, 2006; Greene, Chorpita & Austin, 2009; Strauss et al., 2000). Notably, the majority of these studies did not examine specific anxiety symptom clusters, but rather focused on generalized anxiety and symptomatology as assessed in diagnostic interviews. A general assessment of anxiety might show a weaker correlation with SI and behavior because nonspecific symptom severity may obscure the predictive capacity of relevant, specific symptom clusters. Future studies should continue to examine anxiety symptom clusters, in addition to general anxiety, to inform this conjecture.

Strengths and Limitations

A major strength of the current study is that it is the first to our knowledge to examine the relationships between individual anxiety symptom clusters and SI among a sample of anxiety-disordered youth. Moreover, the study incorporated both youth- and parent-report of anxiety symptomatology as well as SI. Potential limitations merit mentioning. First, the cross-sectional nature of our study

restricts our ability to make causal conclusions. Additionally, the sample size was relatively small ($n = 87$) and may have limited the ability to find significant relationships among the anxiety symptom clusters. Second, we examined only SI and did not examine suicidal behavior. Although SI is predictive of suicidal behavior (e.g., Beck, Brown, Steer, Dahlsgaard & Grisham, 1999; Brown, Beck, Steer & Grisham, 2000), only a minority of those who experience suicidal thinking actually attempt suicide (Nock et al., 2013). Future studies should examine the relationship between anxiety symptom clusters and both SI and suicidal behavior using prospective designs, with an emphasis on the physical symptoms of anxiety. Third, the SIQ-Jr total score used in this study includes two items that assess thoughts about death (e.g., “I thought about death,” “I thought about people dying”), which may artificially inflate the level of SI in this sample. Indeed, when we removed these items, 42.5% of youth endorsed a nonzero SIQ-Jr score as compared to 58.6% when including these items. Youth with anxiety may worry about potential harm to self and others and, as a result, may have rated these two items on the SIQ-Jr according to these worries. Fourth, our results indicated that males exhibited significantly higher levels of SI as compared to females. Given research suggesting that rates of SI are similar across genders prior to midadolescence, and with the well-established gender difference in SI (in which females become significantly more at risk for SI) emerging in midadolescence (e.g., Burke et al., 2015), our findings should be interpreted with caution. Fifth, due to the poor internal consistency of the MASC perfectionism scale in the current sample, we used its overarching subscale, harm avoidance, in the current study. Thus, the findings may differ if the subscale were to have acceptable reliability. Future research should address this limitation by employing more extensive and reliable measures of perfectionism. Sixth, because parent-report of anxiety severity was not used in the analyses because of nonsignificant correlations with the outcome, the results are limited by method

invariance, as youth-report was used to assess both anxiety severity and SI. It is also possible that the absence of relationships between parent-report of anxiety and youth SI may be related to how SI was operationalized for parents: Parents completed two items from the CBCL, one measuring SI and one measuring self-harm behavior. In comparison, youth-report of SI was assessed using a well-validated measure of SI. However, post hoc analyses suggested that even when examining only the SI-specific item of the CBCL the findings were identical.

Additionally, it is important to note that the range of ages in the current sample (7–17 years old) included both young children and late adolescents. Although post hoc moderation analyses examining age interactions with the anxiety symptom clusters were not significant, it remains possible that the relationships between anxiety symptom clusters and SI differ depending on age. Finally, there may be several limitations to the generalizability of the findings. There were low rates of comorbid depression in the sample relative to national estimates (Belzer & Schneier, 2004). Given the low rates of comorbidity and that the study recruited from an outpatient clinic specializing in the treatment of anxiety, the sample may not be characteristic of anxiety-disordered samples outside of a nonspecialized setting. The sample also was principally Caucasian, which may also limit the generalizability of the findings to other demographics.

Future Directions

Youth experiencing higher levels of the somatic/autonomic symptoms of anxiety may

be at greater risk of SI. As such, monitoring and addressing physical symptoms of anxiety may be an important component of treatment. Indeed, a recent study found that effectively reducing anxiety symptoms and improving coping skills in youth lead to reduced SI and behaviors in adulthood (Wolk, Kendall & Beidas, 2015). Many treatment protocols already include modules on identifying physical aspects of anxiety. For example, the Coping Cat (Kendall & Hedtke, 2006), a cognitive behavior therapy protocol for youth anxiety, dedicates two sessions to identifying and coping with the physical symptoms of anxiety. Youth are taught to recognize their body's "clues" that they are anxious (e.g., tense muscles, stomachaches, shakiness) so that they may later cope with the symptoms themselves or the anxiety-provoking situation. In another session, youth are taught relaxation techniques (e.g., progressive muscle relaxation and deep breathing) to reduce the intensity of their physical symptoms. For youth reporting high levels of somatic symptoms at the beginning of treatment, it may be particularly important for clinicians to emphasize identifying and coping with these somatic symptoms. As exposure tasks and cognitive restructuring have been identified as key components of CBT associated with significant reductions in anxiety (Peris et al., 2015), therapists working with these youth may want to address somatic symptoms in and of themselves during these portions of treatment through interoceptive and/or in vivo exposure so that youth may habituate to the symptoms. It also may be of benefit to youth experiencing high levels of somatic symptoms for therapists to incorporate training in distress tolerance skills.

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