

## Assessing Anxious Self-Talk in Youth: The Negative Affectivity Self-Statement Questionnaire–Anxiety Scale

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**Abstract** Investigated the development and utility of the Negative Affectivity Self-Statement Questionnaire—Anxiety Scale (NASSQ-A) for youth. Participants in the initial anxiety-disordered (AD) sample were 68 children with a principal diagnosis of generalized anxiety disorder (GAD) or social phobia (SP), and participants in the non anxiety-disordered (NAD) sample were 37 children with no anxiety or mood disorder. Findings were then cross-validated on an additional sample of 138 children with a principal diagnosis of GAD or SP. Thirty-three negative self-statements were found to separate anxious from non-anxious participants, and were combined to form the NASSQ-A. Using Receiver Operating Characteristics (ROC) analyses, a NASSQ-A cutoff score of 49 was determined to be optimal for identifying anxiety-disordered youth. Findings are discussed with regard to the assessment of self-talk in anxiety disorders.

**Keywords** Anxiety · Cognitive assessment · Anxious youth · Self-talk · Self-statements

Cognitive events and processes are important in understanding and predicting psychopathological behavior and the effects of therapeutic interventions (Dombek & Ingram, 1993; Dozois & Westra, 2004; Ingram & Kendall, 1987). Cognitive-behavioral conceptualizations emphasize the role of self-talk or self-statements in emotional disorders of both adults and children (Beck & Emery, 1985; Kendall & Chansky, 1991). Recent research suggests that when maladaptive self-statements are restructured, treatment can be successful and lasting (Allart-van Dam, Hosman, Hoogduin, & Schaap, 2003; Heimberg et al., 1990; Kaufman, Rohde, Seeley, Clarke, & Stice, 2005; Munoz et al., 1995; Tang & DeRubeis, 1999; Tang, DeRubeis, Beberman, & Pham, 2005; Treadwell & Kendall, 1996).

Although all people engage in some form of internal dialogue or private speech, referred to as self-statements (e.g., “I might do poorly on the exam,” “How did this

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happen to me?’’), the content and frequency of self-statements have been found to differ across varying levels of anxiety. For instance, a significant relationship was found between negative self-speech and high dental fear, with the self-statements of high-anxious children indicating stronger preoccupations with the external, aversive stimuli, with the threat of pain, and with escape fantasies (Prins, 1985). High fear during a series of more or less fear-provoking tasks in the swimming pool was related to self-speech indicating a strong preoccupation with the threat of being hurt, with vivid memories of painful experiences in the past, and with negative task expectations (Prins, 1986). Studies examining self-talk in testing situations found that high test-anxious children report more negative self-statements and off-task thoughts than low test-anxious children (King, Mietz, Tinney, & Ollendick, 1995; Lodge, Harte, & Tripp, 1998; Zatz & Chassin, 1983, 1985).

Previous research compared the self-talk of subjects with anxiety disorders to that of a control group. Compared to controls, adult social phobics reported a greater frequency of self-statements characterized by negative evaluation and perceived inability to cope (Beidel, Turner, & Dancu, 1985; Stopa & Clark, 1993). Socially phobic children reported higher levels of negative self-talk in relation to social-evaluative tasks in comparison to a matched sample of non-anxious peers (Spence, Donovan, & Brechman-Toussaint, 1999). Kendall (1984) proposed that negative self-statements, but not positive self-statements, are associated with levels of anxiety. This phenomenon, referred to as the “power of non-negative thinking,” has received empirical support in both clinical and non-clinical samples (Dodge, Hope, Heimberg, & Becker, 1988; Lodge et al., 1998; McKellar, Malcarne, & Ingram, 1996; Prins & Hanewald, 1997; Spence et al., 1999; Stopa & Clark, 1993). For both children and adults, a higher frequency of negative cognition rather than a lower frequency of positive cognition has been found to separate high anxious from low anxious participants.

Given that the content and valence of self-statements have been found to differ between anxious and non-anxious youth, self-talk merits consideration when assessing for clinical levels of anxiety, evaluating treatment response, or examining mediators of change. If self-talk were able to be measured easily and reliably, with cutoff scores indicative of pathological levels of anxious cognition, information regarding the content and frequency of anxious self-talk could contribute to a fuller understanding of the child’s cognitive processes in relation to anxiety. This information could inform treatment goals with regards to cognitive change, and could provide researchers and treatment providers with one method with which to assess treatment response and mediators of change.

The Negative Affectivity Self-Statement Questionnaire (NASSQ; Ronan, & Kendall, Rowe, 1994) is a 70-item self-report endorsement measure assessing self-statements associated with negative affect in youth. According to reviews on cognitive self-statement assessment (Arnkoff & Glass, 1989; Glass & Arnkoff, 1997), the endorsement method is preferable to production techniques (e.g., thought listing) because (a) criterion validity is more clearly demonstrated, (b) there is more success in discriminating known groups, (c) administration and scoring is easier, and (d) accessibility in conditions such as depression and anxiety where attentional focus and short-term memory can be impaired is facilitated. The NASSQ was developed empirically in the manner recommended by Glass and Arnkoff (1994, 1997) to maximize content validity (see Measures section), and is one of the more frequently used and better validated self-statement questionnaires for use with children (Glass & Arnkoff, 1997). With regard to

mediational analyses of treatment outcome, change in negative anxious self-talk was found to be a partial mediator of treatment response in anxious youth (Treadwell & Kendall, 1996).

Despite data supporting the reliability and validity of the NASSQ, it has been used primarily in research and rarely in practice. Glass and Arnkoff (1997) argued for the importance of evaluating the clinical utility for this type of measure. Cutoff scores based on data from clinical samples are needed to address clinical utility. The incremental validity of the NASSQ in identifying children with clinical levels of anxiety is also of interest. Although it is not intended for the NASSQ to replace an in-depth clinical interview with the child and/or parents, it would be of interest to examine whether the assessment of self-statements has usefulness beyond general self-report measures of anxious symptomatology (Glass & Arnkoff, 1997). If information regarding the frequency and content of anxious self-talk does not add to what can be obtained from an existing child self-report measure, one could question its value.

The current study investigated the development and utility of the Negative Affectivity Self-Statement Questionnaire—Anxiety Scale (NASSQ-A) in identifying anxious youth. Using a structured diagnostic interview as the diagnostic standard, we identified a set of NASSQ items that separate anxious from non-anxious children. Based on the “power of non-negative thinking” (Kendall, 1984), we expected that negative self-statements, but not positive self-statements, would discriminate between children with and without anxiety disorders. We then identified an optimal NASSQ-A cutoff score for distinguishing between anxious and non-anxious youth. This cutoff score was cross-validated on an additional sample of anxious youth.

## Method

### Participants

#### *Initial anxiety-disordered sample*

Participants in the initial anxiety-disordered (AD) sample were 68 children between the ages of 7 and 13 who were seeking treatment for an anxiety disorder or participating as community volunteers at the Child and Adolescent Anxiety Disorders Clinic (CAADC). All participants in the AD sample had either a principal or co-principal diagnosis of generalized anxiety disorder (GAD) or social phobia (SP) based on DSM-IV criteria (APA, 1994). Children were excluded from the study if they had an anxiety disorder or mood disorder diagnosis without a principal or co-principal diagnosis of GAD or SP. Children were also excluded from the study if they met criteria for a psychotic disorder, a pervasive developmental disorder, or were taking an anti-anxiety or anti-depressive medication. Of the 68 children in the AD sample, 52.9% had a comorbid anxiety disorder in addition to their principal diagnosis of GAD or SP ( $n = 36$ ), 30.9% had a comorbid externalizing disorder (ADHD, oppositional defiant disorder, or conduct disorder) ( $n = 21$ ), and 4.4% had a comorbid mood disorder (MDD or dysthymia) ( $n = 3$ ). See Table 1 for additional demographic information.

GAD and SP were specifically investigated rather than other anxiety disorders for a number of reasons. First, GAD and SP are highly comorbid (Verduin & Kendall, 2003), are thought to be maintained through similar mechanisms (e.g., Wood, McLeod,

**Table 1** Demographic information

	AD group	NAD group	CV AD group
Age	10.39 ± 1.76	9.82 ± 1.58	11.14 ± 1.37
<i>Gender</i>			
Male	37 (54.4%)	16 (43.2%)	89 (64.5%)
Female	31 (45.6%)	21 (56.8%)	49 (35.5%)
<i>Ethnicity</i>			
Caucasian	60 (88.2%)	30 (81.1%)	112 (81.2%)
African-American	7 (10.3%)	4 (10.8%)	14 (10.1%)
Latino/a	0 (0%)	1 (2.7%)	5 (3.6%)
Asian	0 (0%)	0 (0%)	2 (1.4%)
Other	0 (0%)	1 (2.7%)	5 (3.6%)
Missing information	1 (1.5%)	1 (2.7%)	0 (0%)
<i>Family income</i>			
< \$39,999	6 (8.9%)	9 (24.3%)	40 (28.9%)
\$40,000–59,999	20 (29.4%)	7 (18.9%)	34 (24.6%)
\$60,000–80,000	17 (25%)	9 (24.3%)	43 (31.2%)
> \$80,000	17 (25%)	9 (24.3%)	8 (5.8%)
Missing information	8 (11.8%)	3 (8.1%)	13 (9.4%)

*Note:* AD = initial anxiety-disordered sample; NAD = non anxiety-disordered sample; CV AD = cross-validation anxiety-disordered sample

Sigman, Hwang, & Chu, 2003), and are often treated effectively with similar procedures (e.g., Barrett, Dadds, & Rapee, 1996; Kendall et al., 1997). Previous research has also demonstrated the mediating role of self-statements in the treatment of both GAD and SP (Treadwell & Kendall, 1996). Because separation anxiety disorder tends to develop at a younger age, children with this disorder may have cognitive abilities that are less developed than those with GAD or SP, thereby affecting the occurrence or complexity of self-statements. Lastly, although both post-traumatic stress disorder (PTSD) and obsessive-compulsive disorder (OCD) are considered anxiety disorders, they differ from GAD and SP in the ways in which they develop and are maintained (e.g., PTSD cannot occur without a real trauma), as well as their relation to self-talk (e.g., obsessions are qualitatively different from self-statements).

#### *Non anxiety-disordered sample*

Participants in the non anxiety-disordered (NAD) sample were 37 children between the ages of 7 and 13 who were participating as community volunteers at the CAADC. All participants in the NAD sample had no DSM-IV anxiety or mood disorder diagnoses and were excluded from the study if they met criteria for a psychotic disorder, a pervasive developmental disorder, or were taking an anti-anxiety or anti-depressive medication. Of the 37 children in the NAD sample, 2.7% had a diagnosis of attention-deficit hyperactivity disorder ( $n = 1$ ) and 2.7% had a diagnosis of oppositional defiant disorder ( $n = 1$ ), based on DSM-IV criteria. See Table 1 for additional demographic information.

#### *Cross-validation anxiety-disordered sample*

Participants in the cross-validation anxiety-disordered sample were 138 children between the ages of 8 and 13 who were seeking treatment for an anxiety disorder at the CAADC. All participants included in the cross-validation AD sample had a principal or

co-principal diagnosis of GAD and/or SP, based on DSM criteria used at the time. Children were excluded from the study if they had an anxiety disorder or mood disorder diagnosis without a principal or co-principal diagnosis of GAD or SP. Children were also excluded from the study if they met criteria for a psychotic disorder, a pervasive developmental disorder, or were taking an anti-anxiety or anti-depressive medication. Of the 138 children in the AD sample, 74.6% had a comorbid anxiety disorder in addition to their principal diagnosis of GAD or SP ( $n = 103$ ), 21% had a comorbid externalizing disorder (ADHD, oppositional defiant disorder, and conduct disorder) ( $n = 29$ ), and 15.2% had a comorbid mood disorder (MDD or dysthymia) ( $n = 21$ ). See Table 1 for additional demographic information.

## Measures

### *The Anxiety Disorder Interview Schedule for Children and Parents*

The Anxiety Disorder Interview Schedule for Children and Parents (ADIS-IV-C/P or ADIS-III-R-C/P; Silverman, 1987; Silverman & Albano, 1996) is a downward extension of the adult ADIS (DiNardo, Brown, & Barlow, 1994) and consists of comparable child and parent semi-structured interviews for DSM diagnostic categories that enable the diagnostician to obtain information about symptomatology, course, etiology, and severity of problem behaviors. Impairment ratings are given separately by the child and parents, and each are considered in deriving composite diagnoses. Discrepancies in parent and child report were reconciled in accordance with the guidelines specified in Silverman and Albano's (1996) Clinician Manual (pp. 11–14).

Studies have reported high interrater reliability (e.g.,  $r = .98$  for parent interview and  $r = .93$  for child interview; Silverman & Nelles, 1988) for the DSM-III-R version of the ADIS-C/P and excellent agreement between clinician and consensus diagnoses ( $k = .82-.95$ ; Wood, Piacentini, Bergman, McCracken, & Barrios, 2002) for the ADIS-IV-C/P. The DSM-III-R version was found to have satisfactory 10- to 14- day retest reliability (e.g.,  $k = .67$  for parent interview,  $k = .76$  for child interview, and  $k = .75$  for composite diagnoses; Silverman & Eisen, 1992). The separation anxiety, specific phobia, SP, and GAD sections of the ADIS-IV-C/P were found to have excellent 7- to 14-day retest reliability ( $k = .80-.92$ ; Silverman et al., 2001). Research supports the concurrent validity of the ADIS-IV-C/P. The social phobia, separation anxiety disorder, and panic disorder diagnoses have been found to correlate highly with the empirically derived Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997) factor scores corresponding to these disorders (Wood et al., 2002). The composite scores of the ADIS-IV-C/P (or ADIS-III-R-C/P in the cross-validation AD sample) were used in the present study to identify the presence of GAD, SP, and other anxiety, mood, or externalizing disorders. The AD and NAD groups were formed based on ADIS-C/P composite diagnoses.

### *The Negative Affectivity Self-Statement Questionnaire*

The Negative Affectivity Self-Statement Questionnaire for Children (NASSQ) is a self-report measure consisting of 57 anxious or depressive self-statements (e.g., “I am going to make a fool of myself,” “I cry so much I can't stop”) and 13 positive self-statements (e.g., “I feel good about myself”) that children and adolescents endorse on a scale ranging from 1 (not at all) to 5 (all the time), representing the frequency with which

each thought occurred during the past week (Ronan et al., 1994). The NASSQ was created using items generated by youth, ages 7–15, who recorded the thoughts they experienced while imagining themselves in anxious, depressed, or happy situations. Preliminary analyses yielded a set of self-statements that differentiated anxious participants from normal controls and a second set of self-statements that differentiated depressed from normal children. These item sets were then cross-validated on an additional sample. The NASSQ has been found to demonstrate acceptable alpha reliability ( $r = .89-.96$ ), 2-week retest stability ( $r = .73-.96$ ), concurrent validity (e.g., anxious self-statements demonstrating some specificity to anxiety) and has been found to be sensitive to cognitive-behavioral treatment (Kendall, 1997; Ronan et al., 1994; Treadwell & Kendall, 1996). This self-report form will serve as a measure of the frequency and type of self-statements in children and adolescents.

#### *Revised Children's Manifest Anxiety Scale*

The Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978) is a 37-item self-report measure that assesses chronic or trait anxiety in 6–19-year-olds. All items are presented in a yes-no format, and a Lie scale can be calculated from nine RCMAS items. The remaining 28 items of the RCMAS reveal three anxiety factors: Physiological Symptoms, Worry and Oversensitivity, and Social Concern-Concentration. The RCMAS has high internal consistency, moderate retest reliability ( $r = .68$ ; Reynolds & Richmond, 1985), and reasonable construct validity (Reynolds, 1982). The total RCMAS raw score, excluding the nine Lie scale items, was used in the present study to assess the concurrent and incremental validity of the NASSQ anxiety scale.

#### *Children's Depression Inventory*

The Children's Depression Inventory (CDI; Kovacs, 1981) is a self-report measure consisting of 27 items related to the cognitive, affective, and behavioral symptoms of depression experienced in the past two weeks. Items are presented in a forced-choice format and scored from 0 to 2, with higher scores indicating more severe symptomatology. The CDI has high internal consistency, moderate retest reliability, and was found to be correlated in expected directions with measures of self-esteem, negative attributions, and hopelessness (Kazdin, French, Unis, Esveldt-Dawson, & Sherick, 1983; Saylor, Finch, Spirito, & Bennett, 1984; see review by Kendall, Cantwell, & Kazdin, 1989). The total CDI raw score was used in the present study to assess the discriminant validity of the NASSQ anxiety scale.

#### Procedure

Participants were referred to the CAADC through multiple sources including clinics and practitioners, public and nonpublic counselors, and media descriptions. The treatment-seeking participants were recruited for a treatment outcome study, whereas the community volunteer participants were recruited for an evaluation identical to the treatment-outcome study intake assessment. Children and their parents were first screened over the telephone. If deemed appropriate, they were brought into the clinic for an evaluation conducted on two separate days. Parents and child signed informed consent forms and participated in structured interviews conducted separately with the

child and the parents. Diagnosticians were blind to group status (treatment-seeking vs. community volunteer). Children completed the NASSQ, the RCMAS, and the CDI on the computer as part of a larger set of measures. Instructions and individual items on the self-report questionnaires were read aloud to all children. Instructions for the NASSQ are “Listed below are some thoughts that sometimes pop into children’s heads. Please read each thought and mark how often, if at all, the thoughts came into your mind over the past week. Please read each item carefully, and then circle your answer on the sheet in the following way: 1 = not at all, 2 = sometimes, 3 = fairly often, 4 = often, and 5 = all the time.”

The initial AD sample was formed on the basis of a principal or co-principal diagnosis of GAD and the absence of SP, or a principal or co-principal diagnosis of SP and the absence of GAD. The NAD sample consisted of children with no anxiety or mood disorder diagnoses. The cross-validation AD sample was formed on the basis of a principal or co-principal diagnosis of GAD and/or SP. Groups were formed solely on the presence or absence of relevant diagnoses, regardless of whether participants were treatment seeking or community volunteers. Diagnoses for the initial AD sample, the NAD sample, and the cross-validation AD sample were determined via the ADIS-C/P in use at the time.

Diagnosticians were advanced graduate students in Clinical Psychology who received extensive ADIS-IV-C/P (or ADIS-III-R-C/P) training. Diagnosticians were required to match on three out of four consecutive interviews as an observer and on three out of four consecutive interviews as the interviewer. To match, the diagnostician had to agree with the trained/reliable interviewer on all diagnoses within one Clinical Severity Rating (CSR) and had to be able to distinguish consistently between clinical and non-clinical CSRs. Reliability checks (30% of interviews) were conducted annually, and kappa coefficients were required to reach a minimum of .80.

Community volunteer participants were reimbursed \$150 for their time and travel expenses, whereas treatment-seeking participants were not monetarily compensated. If deemed appropriate, treatment-seeking participants continued on to receive treatment.

### Statistical analytic plan

Independent *t*-tests for unequal variances were conducted on each of the 70 NASSQ items to determine whether individual items separate anxious participants in the initial sample from non-anxious participants. Items discriminating between the two groups were identified and combined to form the NASSQ-A. Receiver operating characteristics (ROC) analyses were used to identify an optimal cutoff score on the NASSQ-A (consisting of those items that separated anxious from non-anxious youth) for ruling in and ruling out an anxiety disorder diagnosis. ROC analysis yields the statistic known as area under the curve (AUC), which spans from .50 (a scale useless for prediction) to 1.00 (a scale with perfect prediction power). ROC analyses were first performed on the initial AD sample and the NAD sample, and then cross-validated using an additional AD sample and the same sample of non-anxious youth.

We employed the following statistics for determining an optimal cutoff score: sensitivity, specificity, positive predictive power (PPP), and negative predictive power (NPP). Sensitivity refers to the percentage of individuals with a given disorder (true positives) who are correctly classified as having the disorder. Specificity refers to the percentage of individuals without a given disorder (true negatives) who are correctly



classified as not having the disorder. Generally, sensitivity values of at least 70% and specificity values of at least 80% are considered essential (Matthey & Petrovski, 2002). A cutoff score conforming to these guidelines should correctly identify at least 70% of participants with a given disorder (true positives) and at least 80% of individuals without a given disorder (true negatives).

Positive predictive power is the probability that an individual has a disorder given the presence of a symptom or score above a designated cutoff point on an assessment measure. Negative predictive power is the probability that an individual does not have a disorder given the absence of a symptom or a score below a designated cutoff point on an assessment measure. It has been argued that PPP and NPP are more relevant to the diagnostic process than sensitivity and specificity, as diagnostic decisions rely on the presence or absence of symptoms and on scores above or below designated cutoff points (Frick et al., 1994). However, PPP and NPP are highly sensitive to base rates of symptoms and diagnoses in a sample (Verhulst & Koot, 1992). Given the high base rate of anxiety symptoms and diagnoses in the present sample, we used a kappa statistic that corrects for the number of accurate predictions on the basis of chance alone when calculating PPP. Frick et al. (1994) used kappa statistics for correcting both PPP and NPP in the DSM-IV field trials for disruptive behavior disorders. The formula to calculate cPPP was used in the current study. However, NPP was not corrected for chance agreement because the base rate of non-anxiety disordered youth was not inflated in the present sample, and was in fact lower than in the general population. In this study, a cutoff score was considered clinically useful if cPPP or NPP was greater than or equal to .65, as specified in Power, Andrews, Eiraldi, Doherty, & Ikeda (1998). Following this guideline, the probability of an individual who scores above the cutoff having the disorder and the probability of an individual who scores below the cutoff not having the disorder are at least .65.

## Results

### Group comparability of the initial AD sample and NAD sample

One-way analyses of variance (ANOVAs) or chi-square values (for non-continuous data) were examined for demographic differences between AD and NAD participants. No significant differences were found for age,  $F(1,103) = 2.7$ , ns, gender,  $X^2(1) = 1.2$ , ns, race (collapsed into Caucasian and Other),  $X^2(1) = .82$ , ns, or family income,  $X^2(3) = .42$ , ns. Similar analyses indicated non-significant differences in age,  $F(1,66) = .15$ , ns, gender,  $X^2(1) = 1.3$ , ns, race (collapsed into Caucasian and Other),  $X^2(1) = .83$ , ns, and family income,  $X^2(2) = 2.79$ , ns, between AD participants with a principal diagnosis of GAD and those with a principal diagnosis of SP. Participants in the initial AD sample with a principal diagnosis of GAD did not differ significantly from those with a principal diagnosis of SP on number of comorbid Axis I diagnoses,  $t(66) = .18$ , ns, or number of comorbid anxiety disorders,  $t(66) = .91$ , ns.

### Item selection for the NASSQ-A

Independent *t*-tests were conducted to determine whether individual items of the NASSQ separate AD participants from NAD participants. Of the 70 items on the NASSQ, 33 individual items were found to separate AD from NAD participants at



the  $\alpha = .01$  level (see Table 2). These items were then combined to form the NASSQ-A. As no positive self-statements were found to separate anxious from non-anxious participants, the total score of the NASSQ-A was calculated by summing the scores for the 33 individual items, with higher scores indicated a greater frequency of negative self-talk (possible range: 33–165). The mean score of the AD participants was 62.9 (SD = 19.29) and the mean score of the NAD participants was 42.11 (SD = 13). AD and NAD participants were found to differ significantly on the NASSQ-A,  $t(98.2) = 6.56$ ,  $p < .001$ ,  $d = 1.32$ . There were no significant main effects of age group (7–10 vs. 11–13),  $F(1,101) = .27$ , ns, or gender,  $F(1, 101) = 1.33$ , ns, on the NASSQ-A, and no significant interactions between age group and anxiety status (AD vs. NAD),  $F(1, 101) = .26$ , ns, or gender and anxiety status,  $F(1, 101) = .19$ , ns, on the NASSQ-A. None of the 33 individual items nor the NASSQ-A total score were found to separate GAD participants from SP participants at the  $\alpha = .01$  level.

**Table 2** Means, SD, and statistics for the NASSQ-A: AD vs. NAD

Item No.	NASSQ-A Item (“self-statement”)	AD group		NAD group		<i>t</i>	<i>p</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
4	I felt like crying	1.72	.93	1.32	.58	2.69	.008
6	I have butterflies in my stomach	1.88	1.02	1.30	.57	3.78	<.001
7	I have lost hope	1.96	.54	1.11	.32	3.61	<.001
8	I feel like hitting something	2.10	1.22	1.35	.79	3.81	<.001
9	I thought my world was coming to an end	1.54	1.09	1.11	.39	2.97	.004
10	I was shaking	1.54	.92	1.16	.37	3.00	.003
12	I feel shy all of the time	2.17	1.23	1.38	.64	3.82	<.001
13	I thought I was going to do something wrong	1.94	.99	1.35	.54	3.95	<.001
20	I feel like I have a lump in my throat	1.56	.85	1.08	.28	4.23	<.001
21	My stomach hurts	2.06	1.2	1.27	.61	4.48	<.001
22	I feel frightened	2.04	1.1	1.35	.68	4.05	<.001
26	Why did it have to happen to me?	2.43	1.33	1.41	.50	5.64	<.001
28	I felt weak like I was going to faint	1.53	.99	1.11	.52	2.88	.005
31	I want to stay in my room forever	1.47	.94	1.08	.28	3.18	.002
33	I feel like everybody was looking at me and laughing	1.72	1.05	1.19	.74	3.02	.003
35	I am very nervous	2.44	1.19	1.30	.52	6.82	<.001
38	I am not happy at all	1.72	1.05	1.19	.57	3.37	.001
40	I was in shock	1.62	.96	1.11	.32	3.99	<.001
42	I get scared	2.59	1.15	1.54	.80	5.46	<.001
45	I feel like my heart is in my throat	1.41	.97	1.03	.16	3.20	.002
49	I am very upset	2.03	1.05	1.30	.62	4.49	<.001
50	I don't feel like doing anything and just want to be alone	1.94	.98	1.41	.65	3.38	.001
52	My hands sweat and my mouth gets dry	1.56	1.01	1.11	.32	3.38	.001
53	I cry so much I can't stop	1.71	1.09	1.19	.70	2.94	.004
54	I feel like screaming	1.87	1.16	1.32	.63	3.12	.002
56	Why do these things happen to me?	2.24	1.31	1.41	.76	4.11	<.001
57	I get confused	2.19	1.14	1.49	.80	3.69	<.001
59	When will this be over?	2.37	1.42	1.59	.96	3.10	.001
60	Just my luck—it went wrong	1.81	1.03	1.30	.78	2.87	.005
62	I can't stand this anymore	2.07	1.12	1.38	.64	4.04	<.001
63	I was afraid I would make a fool of myself	1.78	.99	1.30	.85	2.63	.01
65	I think about somebody dying	1.94	1.22	1.19	.40	4.65	<.001
69	I get a nervous feeling like something is going to happen	2.44	1.16	1.41	.96	4.90	<.001
	Total score	62.9	19.29	42.11	13.0	6.56	<.001

Note: NASSQ-A = Negative Affectivity Self-Statement Questionnaire-Anxiety Scale; AD = anxiety-disordered; NAD = non anxiety-disordered

### Internal consistency and reliability

Item-to-total remainder correlations were computed for the NASSQ-A in the initial sample of AD and NAD youth. All 33 items were significantly correlated with the total score,  $p < .001$ . The item-to-total remainder correlations ranged from .35 (“I feel like I have a lump in my throat”) to .75 (“I am very nervous”). The Cronbach’s alpha was .95.

Fifty-nine children in the cross-validation AD sample were readministered the NASSQ-A after an 8-week period (with no intervention). The 8-week test–retest coefficient for the NASSQ-A was  $r = .72$ ,  $p < .001$ .

### Construct and incremental validity

Pearson correlations were computed between the RCMAS total anxiety raw score, the CDI total raw score, and the NASSQ-A in the initial samples of AD and NAD youth. The correlation between the NASSQ-A and the RCMAS total anxiety raw score ( $r = .73$ ) was significantly higher than the correlation between the NASSQ-A and the CDI total raw score ( $r = .24$ ),  $t(104) = 4.92$ ,  $p < .001$ ,  $d = 0.96$ . In the cross-validation AD sample and the NAD sample, the NASSQ-A significantly predicted anxiety group, even after controlling for the variance accounted for by the RCMAS total score,  $\text{Exp}(B) = 1.05$ ,  $p = .03$ .

### Identifying cut scores

Receiver operating characteristics (ROC) analyses were used to determine an optimal cutoff score for identifying children with anxiety disorders on the NASSQ-A. ROC analyses indicated that the optimal NASSQ-A cutoff score was 49 (see Table 3). A cutoff score of 49 was found to have a sensitivity of .76, a specificity of .81, cPPP of .66, and NPP of .65. With this cutoff score, 76% of anxious children were correctly classified as anxiety-disordered and 81% of non-anxious children were correctly classified as non-anxious. The probability that a child has an anxiety disorder given a score at or above the cutoff of 49 is .66 after correcting for chance agreement, and the probability that a child does not have an anxiety disorder given a score below the cutoff of 49 is .65.

### Cross-validation analyses

ANOVAs or chi-square values were examined for demographic differences between the AD cross-validation sample and the NAD sample. No significant differences were found for race (collapsed into Caucasian and Other),  $X^2(1) = .09$ , ns. However, the AD and NAD samples were found to differ significantly on gender,  $X^2(1) = 5.49$ ,  $p = .02$ , age,  $F(1, 173) = 25.66$ ,  $p < .001$ , and family income,  $X^2(3) = 11.3$ ,  $p = .01$ . To assess whether results were affected by demographic differences, analyses were rerun on a subsample in which AD and NAD participants did not significantly differ on age and gender. This subsample consisted of 101 AD participants and 31 NAD participants. Results from the full sample are reported in the text, and results from the subsample are reported in the footnotes. These results do not differ significantly.

**Table 3** Clinical utility estimates for NASSQ-A cutoff scores in initial AD and NAD samples

Cutoff score	AUC	Base rate	Sensitivity	Specificity	PPP	cPPP	NPP
39	.85	.78	.93	.49	.77	.34	.78
40	.85	.76	.93	.54	.79	.40	.80
41	.85	.70	.91	.68	.84	.54	.81
42	.85	.69	.88	.68	.83	.53	.76
43	.85	.67	.87	.70	.84	.55	.74
44	.85	.65	.85	.73	.85	.58	.73
45	.85	.62	.82	.76	.86	.61	.70
46	.85	.61	.81	.76	.86	.60	.68
47	.85	.61	.81	.76	.86	.60	.68
48	.85	.58	.78	.78	.87	.63	.66
49	.85	.56	.76	.81	.88	.66	.65
50	.85	.53	.74	.84	.89	.70	.63
51	.85	.52	.72	.84	.89	.69	.62
52	.85	.51	.71	.84	.89	.68	.61
53	.85	.51	.71	.84	.89	.68	.61
54	.85	.50	.69	.84	.89	.68	.60
55	.85	.48	.66	.86	.90	.72	.58

Note: NASSQ-A = Negative Affectivity Self-Statement Questionnaire-Anxiety Scale; AD = anxiety-disordered; NAD = non anxiety-disordered; AUC = Area under the curve; PPP = Positive predictive power; cPPP = Kappa-corrected positive predictive power; NPP = Negative predictive power

The cross-validation AD participants and NAD participants were found to differ significantly on the NASSQ-A,  $t(100.02) = 9.25$ ,  $p < .001$ ,  $d = 1.85^1$ . The mean score of the cross-validation AD participants was 68.65 (SD = 22.5), as compared to the NAD mean score of 42.11 (SD = 13). There were no significant main effects of age group (7–10 vs. 11–13),  $F(1, 171) = 1.7$ , ns,<sup>2</sup> or gender,  $F(1,171) = 1.53$ , ns,<sup>3</sup> on the NASSQ-A, and no significant interactions between age group and anxiety status (anxious vs. non-anxious),  $F(1,171) = .77$ , ns,<sup>4</sup> or gender and anxiety status,  $F(1,171) = .05$ , ns,<sup>5</sup> on the NASSQ-A.

Receiver operating characteristics (ROC) analyses were used to cross-validate the score of 49 as the optimal cutoff score for identifying children with anxiety disorders using the NASSQ-A. ROC analyses indicated that the cutoff score of 49 had a sensitivity of .80, a specificity of .81, cPPP of .72, and NPP of .53. With this cutoff score, 80% of anxious children were correctly classified as anxiety-disordered and 81% of non-anxious children were correctly classified as non-anxious. The probability that a child has an anxiety disorder given a score at or above the cutoff of 49 is .72 after correcting for chance agreement, and the probability that a child does not have an anxiety disorder given a score below the cutoff of 49 is .53.

## Discussion

Thirty-three NASSQ items separated diagnosed anxious from non-anxious participants, and these items were combined to form the Negative Affectivity Self-Statement

<sup>1</sup>  $t(123.36) = 9.98$ ,  $p < .001$ ,  $d = 1.80$

<sup>2</sup>  $F(1, 128) = 1.21$ , ns

<sup>3</sup>  $F(1, 128) = 1.06$ , ns

<sup>4</sup>  $F(1, 128) = 3.29$ , ns

<sup>5</sup>  $F(1, 128) = .09$ , ns

Questionnaire–Anxiety Scale (NASSQ-A). The NASSQ-A demonstrated excellent internal consistency and good retest reliability over an 8-week period, and a significantly higher correlation with a measure of trait anxiety than with a measure of the cognitive, affective, and behavioral symptoms of depression. These results are consistent with those reported by Ronan et al. (1994): Twenty-one of the 33 specific self-statements identified in the present study also separated anxious from non-anxious participants in the Ronan et al. (1994) study.

Variations in subject composition and methodology between the current study and the Ronan et al. (1994) study may have contributed to inconsistencies in the specific items identified. The present sample consisted of treatment seeking youth and community volunteers between the ages of 7 and 13. Children in the present sample with and without DSM-IV anxiety disorders were identified via the ADIS-IV-C/P, which considers both child and parent report when assigning diagnoses. The Ronan et al. sample consisted of children from a school system between the ages of 7 and 15, and anxious and non-anxious youth were identified via two child self-report measures. Due to the wide age range in the Ronan et al. sample, participants were separated into a 7–10 and 11–15 age group, and analyses were conducted separately for each group. In contrast, the present study did not separate participants based on age, and the 33 NASSQ-A self-statements were found to separate between anxious and non-anxious youth ages 7–13.

As predicted from the “power of non-negative thinking” (Kendall, 1984), all 33 self-statements found to separate anxious from non-anxious youth in the present study were negatively valenced. Anxious children were not found to differ from non-anxious children in the frequency of positive self-statements. This finding is consistent with that of Ronan et al. (1994), who reported that all of the 11 self-statements found to separate anxious from non-anxious 7–10-year-olds, and 30 of the 31 self-statements found to separate anxious from non-anxious 11–15-year-olds, were negatively valenced. The present study adds to the literature suggesting that a higher frequency of negative cognition rather than a lower frequency of positive cognition is associated with clinical levels of anxiety (see also Treadwell & Kendall, 1996).

Due to the cross-sectional nature of this study, we are unable to determine whether the frequency of the self-statements included in the NASSQ-A increased prior to the anxiety disorder, increased with the development of the anxiety disorder, or increased as a result of the anxiety disorder in the AD sample. In other words, it remains unclear whether anxious self-statements contribute to the development of anxiety disorders, whether anxiety disorders contribute to an increased frequency of anxious self-statements, or whether both are caused by third variables such as temperament or parental modeling. Although we cannot make definite claims regarding the role of self-statements in clinical improvements following treatment based on the results of this study, other studies have suggested that reductions in negative self-talk partially mediate clinical improvements (e.g. Kaufman et al., 2005; Treadwell & Kendall, 1996).

A cutoff score of 49 was found to be clinically useful based on sensitivity, specificity, kappa-corrected positive predictive power, and negative predictive power in the initial anxiety-disordered and non anxiety-disordered samples. Anxious and non-anxious children were correctly identified at rates at or above those recommended by Matthey and Petrovski (2002), and the probability that a child has an anxiety disorder given a score at or above 49 was found to be at or above .65. Similar results were found for the cross-validation sample, although the NPP statistic associated with a cutoff score of 49 fell below the recommended value of .65. This finding raises the question of whether a cutoff score of 49 is clinically useful in specifically identifying children without anxiety

disorders. The cutoff score of 49 should be evaluated in additional samples, particularly those in which the percentage of anxious participants reflects the base rate of anxiety disorders in the general population.

The NASSQ-A was found to have incremental validity over a general self-report measure of anxious symptomatology, suggesting that this type of assessment can contribute unique information when assessing for clinical levels of anxiety. Although it would not be appropriate for the NASSQ-A to replace an in-depth clinical interview with the child and/or parents, this measure could be administered as part of an assessment battery in order to gather information about cognitive processes not explored in depth during the clinical interview. The NASSQ-A could be administered at pre-treatment to inform treatment goals with regard to cognitive change, and during or following treatment to assess treatment response and mediators of change.

The present study was strengthened by cross-validation. However, both initial and cross-validation analyses were run using the same non-anxious sample, and specificity could not be cross-validated in the present study. Some participants were assigned diagnoses based on DSM-III-R, rather than DSM-IV, criteria. Although it is possible that slight changes in diagnostic criteria affected the comparability of the two AD samples, a separate comparison of cases diagnosed independently by both systems found that the characteristics of identified cases were not altered by the change in the nosology (Kendall & Warman, 1996).

Neither age (7–10 vs. 11–13) nor gender was significantly related to NASSQ-A scores, and neither moderated the relationship between anxiety group and the NASSQ-A in either sample. Principal anxiety disorder (GAD vs. SP) was also not significantly related to NASSQ-A scores. However, additional studies with larger samples are needed to further examine these factors.

Because the current study was conducted on data gathered at an anxiety clinic, the base rates of anxiety symptoms and diagnoses were likely higher than those found in the general population. Although PPP analyses were kappa-corrected to address this problem, caution is justified when applying the results of the current study to community or general clinic samples. In addition, research suggests that treatment-seeking populations may differ from the general population on a number of factors, such as severity, comorbidity and ethnicity (Goodman, Lahey, Fielding, Dulcan, Narrow, & Regier, 1997; Sue, Fujino, Hu, Takeuchi, & Zane, 1991). It is possible that the cutoff score of 49 found to be optimal in identifying anxiety-disordered youth presenting to a specialty clinic may not be optimal in other settings. The generalizability of findings may also be limited by the demographics of the samples evaluated in this study (e.g., Caucasian children were overrepresented). Future studies are needed to examine the clinical utility of the NASSQ-A in more heterogeneous samples identified through representative sampling methods.

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