



# Psychometric Properties of the Response to Anxiety Questionnaire

Danielle L. Taylor<sup>1</sup> · DeMond M. Grant<sup>1</sup> · Kristen E. Frosio<sup>1</sup> · Jacob D. Kraft<sup>1</sup> · Evan J. White<sup>1</sup>

Published online: 6 February 2018

© Springer Science+Business Media, LLC, part of Springer Nature 2018

## Abstract

Recent research highlights the importance of transdiagnostic factors of psychopathology, particularly in understanding comorbidity. Repetitive negative thinking (RNT) is one such factor, which may elucidate anxiety-depression comorbidity. The Response to Anxiety Questionnaire (RAQ) aims to evaluate repetitive negative thinking (RNT) related to anxiety-depression comorbidity, specifically hopelessness and rumination about anxiety symptoms. Anxious hopelessness is negative thoughts about the future due to anxiety symptoms, and anxious rumination includes negative evaluations of the meaning of anxiety symptoms, therefore the current study assessed the RAQ in three studies. We used exploratory and confirmatory factor analysis methodologies to examine the factor structure of the RAQ. In addition, we tested indirect effects of the two factors of RAQ (Rumination and Hopelessness) between anxiety and depression, and tested measure convergent validity. Results of the current study provide additional support for the psychometric properties of the RAQ, suggesting a two factor makeup (hopelessness, rumination), as well as its use in predicting anxiety and depressive symptoms.

**Keywords** Anxiety · Depression · Repetitive negative thinking (RNT) · Response to anxiety questionnaire

## Introduction

Anxiety and depression are highly comorbid disorders and their co-occurrence is associated with longer symptom duration (Penninx et al. 2011) and increased symptom severity (Johansson et al. 2013). Research suggests anxiety often takes temporal precedence and may be a risk factor for subsequent depressive symptomology (Cohen et al. 2014; Jacobson and Newman 2014). Symptom overlap between these disorders suggests transdiagnostic factors may be key in examining their comorbidity, consistent with directives to understand dimensions of psychopathology (Krueger and Eaton 2015; Mansell, Harvey, Watkins, Shafran, 2008). Furthermore, including mechanisms of comorbidity in transdiagnostic CBT shows efficacy compared to diagnosis specific CBT outcomes (Norton and Barrera 2012; Norton & Philipp, 2008), and results in lower rates of comorbidity post-treatment (Norton et al. 2013), likely due to treating symptom processes shared

by disorders. Thus, evaluation of mechanisms underlying comorbid anxiety and depression is important.

Cognitive theories highlight the salience of negative thinking patterns in the development of depression and anxiety (Alloy et al. 1990). Starr and Davila (2012b) theorize that depressive symptoms result from two Negative Anxiety Response Styles (NARS; Starr et al. 2016) associated with anxiety: anxious rumination and anxious hopelessness. Specifically, anxious rumination consists of negative cognitions, evaluations, and anxious images, whereas anxious hopelessness is characterized by negative predictions regarding anxiety's effects on future outcomes. These styles of repetitive negative thinking (RNT) about anxious symptomology or NARS may operate cyclically in combination with anxiety, as co-occurring RNT and anxious symptoms interact, leading to increased likelihood for depressive symptoms. Additionally, they propose NARS may be a mechanism for developing depressive symptoms: anxious symptoms lead to NARS, resulting in increased depressive symptoms. Recent research offers evidence for these predictions (Grant et al. 2014; Starr and Davila 2012b; Starr et al. 2016; Mills et al. 2014; Grant et al. 2007). For example, Grant et al. (2014) found that brooding mediated the relationship between social anxiety and depression over a 2-month period. In addition, recent research has documented NARS among individuals

---

✉ Danielle L. Taylor  
danielle.taylor@okstate.edu

<sup>1</sup> Department of Psychology, Oklahoma State University, 116 North Murray Hall, Stillwater, OK 74078, USA

diagnosed with GAD (Starr and Davila 2012a). Furthermore, research supports that NARS moderates the relationship between anxiety and depression and predicts anxiety and depression increases when controlling for co-occurring symptoms (Starr et al. 2016), functioning much like the originally proposed diathesis stress model (Starr and Davila 2012b).

Whereas research in this area has suggested RNT is essential to understanding comorbidity (Ehring & Watkins, 2008), instruments used to assess RNT have received insufficient evaluation. One promising measure to document these thought patterns, which may be useful in investigating their association with co-morbid anxiety and depression, is the Response to Anxiety Questionnaire (RAQ; Starr and Davila 2012b; Starr et al. 2016). Since the initial construction and evaluation of this scale, no other study has evaluated the psychometric properties of the RAQ. The initial factor analysis provided a single solution, although the RAQ was intended to detect ruminative and hopeless thought patterns regarding anxious symptoms. Given the significance of comorbidity between anxiety and depression, additional investigation is needed to validate the factor structure and predictive validity of the RAQ with respect to related anxious and depressive symptomology. Broadly, hopelessness has been previously theorized to be highly associated with suicidality (Abramson et al. 2000), and increased depressive symptom severity and duration (Smith et al. 2006; Abramson, Metalsky, & Alloy, 1989). Hopelessness also has evidence as a predictor from anxiety to depression (Alloy et al. 1990). Additionally, rumination is theorized to result in difficulties disengaging from negative information about the self, or difficulties with attentional control (Koster et al. 2011), and is also associated with suicidal ideation (Smith et al. 2006). Therefore, we evaluated the associations between ruminative and hopeless responses to anxiety with other anxiety and depressive related constructs.

Furthermore, evaluation of the NARS construct also may have implications for specific forms of anxiety. For example, worry is a common form of RNT and the core feature of GAD. Researchers have found that the uncontrollability of worry is important in distinguishing between those who do and do not meet criteria for GAD (Ruscio and Borkovec 2004). In addition, Newman and Llera (2011) suggest that worry may serve the function of maintaining distress in order to avoid rapid changes in negative emotionality. This negative emotional state characterized by anxious symptomology is negatively reinforced by worry, and maintains symptoms of psychopathology. NARS focuses on the unpleasant experience of anxiety symptoms, and perceived implications of anxiety on the future, and therefore may in fact play a role in the reinforcement of worry symptoms as well. Additionally, given high levels of comorbid GAD and MDD (Lenze et al., 2005; Brown, Campbell, Lehman, Grisham, Mancill, 2001), evaluating whether NARS influences worry may document mechanisms of comorbidity between these two disorders. To address these goals, the

present report evaluated the factor structure and convergent validity of the RAQ. We also evaluated the proposed mediation and moderation models of comorbidity using both a measure of state and trait anxiety as well as symptoms of worry.

## General Method

### Overview

We evaluated the measure with an exploratory factor analysis (EFA; Study 1) to determine underlying factor structure, followed by a confirmatory factor analysis (CFA; Study 2) to validate the model fit found in Study 1. In a third study, we evaluated convergent and criterion validity based on predictions from Starr and Davila (2012b), along with tests of moderation and indirect effects of anxiety on depression.

### Measures

The Response to Anxiety Questionnaire (RAQ; Starr and Davila 2012b; Starr et al. 2016).

The RAQ is a 32-item questionnaire developed to assess ruminative and hopeless reactions to anxiety symptoms. Participants respond on a scale of 1 (“almost never”) to 4 (“almost always”). The RAQ has demonstrated adequate convergent and discriminant validity, and is stable over time (Starr and Davila 2012b). Although this measure assesses two NARS, the original analysis determined the best model is a one-factor solution. In the current study, the RAQ demonstrated excellent internal reliability ( $\alpha = .97$  in Study 1;  $\alpha = .99$  in Study 2;  $\alpha = .97$  in Study 3).

## Study 1

### Participants

The sample included 634 participants, which were largely female (66%). Three individuals chose not to respond regarding their gender identity. Participant age ranged from 18 to 54 years of age ( $M = 19.41$ ,  $S.D. = 2.69$ ). Ethnicity included 78.4% Caucasian, 5.6% Hispanic/Latino/Latina, 5.3% Native American, 3.7% African American, 2% Asian American, 2.3% chose “Other”, and .9% chose not to respond regarding their ethnicity.

### Procedure

The university’s Institutional Review Board approved all procedures. The study included a survey administered through the university’s web-based research pool as part of a mass departmental questionnaire. Informed consent was obtained from all individual participants, after which participants

completed questionnaires and received course credit for their participation.

### Analytic Strategy

Missingness was no more than 1% for any item and was unrelated to sex ( $\chi^2[2] = 0.65, p = ns$ ), year in school ( $\chi^2[4] = 1.68, p = ns$ ), ethnicity ( $\chi^2[6] = 3.79, p = ns$ ), and age ( $t[598] = -.244, p = ns$ ). RAQ kurtosis values were within normal limits (Tabachnick and Fidell 2007), although the data were largely skewed ( $z = 7.52, S.E. = .099$ ). For adequate power, recommendations by Tabachnick and Fidell (2007) suggest samples of at least 300 for factor analysis, and another recommendation suggests our sample of 634 would be considered “very good” to “excellent” (Comrey and Lee 1992). Additionally, depending on whether communalities are low or high, MacCallum and colleagues recommend 20:1 to 4:1 subjects to variables (MacCallum et al. 2001). Our sample was over 19 subjects to each variable, so we determined this sample size was sufficient for our factor analysis. Principal axis factoring (PAF) was used to examine the factor structure of the RAQ. The scree plot and a parallel analysis (Horn 1965) were used to determine the number of factors to extract. For the parallel analysis, eigenvalues were compared to values from 1000 simulated samples. Studies have supported the efficacy of parallel analysis in determining the number of factors to extract in categorical or dichotomous data (Weng and Cheng 2005; Garrido et al. 2016). The eigenvalues which were greater than the randomly generated samples were retained for evaluation (O'Connor 2000). Recommendations suggest that non-normal categorical data produces biased chi-squared test statistics. However, large sample sizes (Muthen and Kaplan 1992) and robust least squares estimators are appropriate for handling such data. Therefore, a WLSMV estimator was employed in Mplus to accommodate non-normal categorical indicator variables (Muthén, du Toit, & Spisic, 1997). Oblique rotation was utilized (geomin), as we expected the factors to correlate. Only items with loadings above .40 were retained for further analysis. Cross-loaded items were defined as having a factor loading within .10 of the highest loading for that item and were excluded from the final solution. Due to the use of WLSMV estimator, degrees of freedom and chi-square values were adjusted to maintain fidelity of the  $p$ -value (Asparouhov and Muthén 2010).

### Results

The scree plot indicated three factors prominently above the bend. Results of the parallel analysis indicated three significant eigenvalues; therefore, solutions with one-, two-, or three-factors were evaluated for theoretical interpretability. The one-factor solution exhibited significant factor loadings for all items, whereas the two-factor solution exhibited

significant loadings on all items except 8 and 11. These items cross-loaded on both factors, and they were excluded from further analyses. Additionally, two items (27 and 28) had factor loadings greater than one. This is problematic when the solution provides negative residual variances (Brown, 2014). However, the current data did not provide negative residual variances. Additionally, Jöreskog (1999) suggests in oblique PAF where factors are expected to correlate, loadings  $>1$  are admissible. Items 8 and 11 also cross-loaded in the 3-factor solution, and no items clearly loaded onto a third factor, suggesting this solution did not adequately explain the data. Correlations between items were inspected to ensure no correlations exceeded .90, as was the case in our data. See Table 1 for factor structure, loadings, and scale/subscale internal consistency.

### Discussion

In Study 1, we sought to determine the factor structure of the RAQ. In the one-factor solution, all items significantly loaded onto the factor, whereas in the two and three-factor solutions all items either loaded onto the first or second factors aside from items 8 and 11. The three-factor solution provided no significant loadings on the third factor, aside from items 8 and 11 that loaded on the second and third factors. Upon further examination of the two-factor solution, items in the first factor appeared consistent with Anxious Rumination (e.g. “Why do I always react this way?”), whereas items loading on the second factor were consistent with Anxious Hopelessness (e.g. “Think your anxiety will stop you from enjoying life”). The two factors maintained strong internal validity, providing support for Starr and Davila’s (2012b) predictions regarding two NARS: Anxious Hopelessness and Anxious Rumination. Additionally, because the NARS are specific response styles to anxiety we sought to determine if this was a nested solution. Thus, we further evaluated the one- and two-factor solutions in Study 2, using confirmatory factor analysis and a bifactor confirmatory factor analysis.

## Study 2

### Participants

The sample included 300 participants, 68.7% female. One individual chose not to report their gender. Participants were 18–37 ( $M = 20.05, S.D. = 2.7$ ). Ethnicity in the current sample included 73.7% Caucasian, 8% Native American, 5.3% Hispanic/Latino/Latina, 5% African American, 3.7% Asian American, 3.7% selected “Other,” and .7% chose not to respond regarding their ethnicity.

**Table 1** Geomin exploratory factor analysis of the RAQ and internal consistency for each scale/subscale

	1 Factor	2 Factor		3 Factor		
	Response $\alpha = .97$	Rumination $\alpha = .93$	Hopelessness $\alpha = .97$	1 $\alpha = .93$	2 $\alpha = .97$	3
1. Think “I won’t be able to do my job if I don’t snap out of this.”	.69(.78)	.81(.81)	-.06	.86	-.12	-.00
2. Analyze recent events to try to understand why you are anxious	.69(.81)	.85(.83)	-.10	.87	-.01	-.39
3. Think “Why do I always react this way?”	.78(.86)	.82(.88)	.02	.84	.03	-.09
4. Think about a recent situation, wishing it had gone better.	.69(.79)	.82(.81)	-.07	.87	-.12	-.02
5. Think “I won’t be able to concentrate if I keep feeling this way.”	.79(.84)	.87(.87)	-.01	.92	-.06	-.01
6. Think “Why do I have problems other people don’t have?”	.84(.79)	.65(.82)	.27	.69	.17	.14
7. Think “Why can’t I handle things better?”	.84(.85)	.72(.88)	.20	.76	.11	.11
8. Think about how anxious you feel.	.82(.85)	.49	.41	.45	.50	-.19
9. Think about all your shortcomings, failings, faults, and mistakes.	.81(.90)	.52(.93)	.36	.52	.33	.07
10. Analyze your personality to try to think about your feelings.	.71(.85)	.62(.87)	.16	.60	.23	.19
11. Think about how angry you are with yourself.	.80(.85)	.45	.43	.45	.35	.20
12. Think about how you won’t be able to sleep.	.73(.76)	.68(.79)	.12	.64	-.00	.40
13. Think about how restless or keyed up you feel.	.79(.86)	.73(.89)	.13	.72	-.00	.37
14. Think about how difficult it is to concentrate.	.77(.81)	.68(.84)	.15	.72	.05	.19
15. Go someplace alone to think about your anxiety/worries.	.66(.72)	.49(.75)	.23	.48	.26	-.09
16. Think about how your anxiety will keep you from doing things you want to do.	.87(.88)	.35	.60(.89)	.31	.67	-.15
17. Think about how you won’t be able to go anywhere without feeling anxious or panicky.	.86(.87)	.16	.75(.88)	.09	.81	-.04
18. Think about how difficult it is to socialize.	.74(.79)	.07	.71(.80)	.01	.75	.05
19. Feel stupid for feeling this way.	.85(.90)	.36	.56(.92)	.33	.57	.04
20. Think “I’m going crazy.”	.84(.86)	.29	.61(.87)	.27	.57	.17
21. Think about how tense you feel.	.84(.88)	.37	.55(.89)	.33	.57	.00
22. Feel hopeless, like things will never get better.	.89(.89)	.08	.85(.90)	.14	.64	.40
23. Think you might as well give up, because you can’t make things better for yourself.	.90(.88)	-.04	.95(.89)	.01	.72	.46
24. Think that your future seems dark.	.85(.84)	-.08	.94(.85)	-.06	.77	.42
25. Think that your anxiety will keep you from getting what you want.	.91(.92)	.07	.87(.93)	-.01	.91	.06
26. Think that the future seems vague and uncertain.	.79(.82)	.09	.74(.83)	.07	.68	.23
27. Think your anxiety is uncontrollable.	.93(.91)	-.10	1.02(.92)	-.19	1.09	.01
28. Think your anxiety is never going to stop.	.93(.94)	-.09	1.01(.94)	-.18	1.09	-.01
29. Think your anxiety will stop you from enjoying life.	.94(.94)	-.01	.96(.94)	-.07	1.03	-.10
30. Think your anxiety will have negative effects on things that are important to you.	.94(.96)	.05	.91(.96)	.00	.99	-.14
31. Feel bad about yourself for feeling anxious.	.90(.92)	.16	.79(.92)	.11	.86	-.11
32. Think “What’s wrong with me?”	.88(.91)	.32	.62(.93)	.29	.62	.08

Loadings in parantheses represent factor loadings from [study 2](#) for the one- and two-factor solutions

**Procedure**

All procedures were approved by the IRB. Participants completed informed consent and then completed questionnaires on the university’s web-based research pool as part of a mass departmental questionnaire. Each participant received course credit.

**Analytic Strategy**

We used MPlus (Muthén and Muthén 2011) to compare the fit of the one- and two-factor solutions from [Study 1](#) in a CFA using a WLSMV estimator. Recommendations for adequate

sample size were again followed, suggesting our sample of 300 was “good” to “very good” (Comrey and Lee 1992), and the ratio of our subjects to items was over 9, suggesting our data were sufficient for analysis (MacCallum et al. 2001). A nested two-factor solution was tested and compared to the one- and two-factor solutions, using bifactor modeling with a WLSMV estimator (Reise 2012). Bifactor modeling is a particularly useful method in which items are allowed to load both on a general factor (NARS) as well as a latent construct (Anxious Hopelessness). This approach evaluates shared and unique variance across the latent factors. Excellent fit of each model to the data was defined as CFI and TLI values close to

.95 or higher and RMSEA values close to .06 or lower (Hu and Bentler 1999). Fit of our model to the data was deemed adequate if CFI and TLI exceed .90 and RMSEA values were less than .10 (Bentler 1992). RMSEA values are sensitive to large samples and the influence of models with differing numbers of factors and items loading on factors, and so were not compared (Meade et al. 2008). Therefore, change in CFI was examined to compare the fit of the models (Kline 2011); CFI change less than .002 is considered trivial (Meade et al. 2008). After testing each of the models for adequate fit, we then evaluated whether the bifactor model was invariant to sex using a WLSMV chi-square difference test in MPlus.

## Results

For the one-factor model [ $\chi^2(464) = 1467.179, p < .001$ ], two indices showed close fit to the data (TLI = .967, CFI = .970), and one indicated adequate absolute fit (RMSEA = .088). For the two-factor model [ $\chi^2(404) = 1099.339, p < .001$ ], two indices indicated close relative fit to the data (TLI = .976, CFI = .978), and one indicated adequate fit (RMSEA = .078). For the bifactor model, [ $\chi^2(434) = 974.85, p < .001$ ], two indices indicated close relative fit to the data (TLI = .981, CFI = .984), and one indicated adequate fit (RMSEA = .067). In addition, in both the one- and two-factor models, all items loaded onto their respective factors consistent with Study 1 (see Table 1). Categorical CFA models often produce misleading chi-square test statistics (Muthén and Muthén 2007) and weighted least squares models do not rely on the log likelihood function used for the AIC statistic (Akaike 1973). Therefore, because the fit indices between these models were not substantially different, the computed difference value for  $\Delta CFI$  was compared to the general cut-off value of  $\leq .002$  for each model (Meade et al. 2008). For the one-factor compared to the two-factor ( $\Delta CFI = .008$ ), the one-factor compared to the bifactor ( $\Delta CFI = .014$ ), and for the two-factor compared to the bifactor ( $\Delta CFI = .006$ ), our  $\Delta CFI$  indicates that the bifactor model provides the best fit to the data. All factor loadings were significant and substantial, and the correlation between Hopelessness and Rumination was  $r = .84$  ( $p < .001$ , 95% CI [.80, .87]). The bifactor model was tested for sex invariance, and results suggested that the model was invariant to sex, [ $\chi^2(28) = 27.257, p < .11$ ].

## Discussion

In Study 2, we sought to confirm the factor structure of the RAQ found in Study 1 and compare the one- and two-factor solutions using CFA. The two-factor solution provided a closer fit to the data compared to the one-factor solution. However, the bifactor solution provided the best fit compared to the one- and two-factor solutions. Additionally, the bifactor

model demonstrated invariance to sex suggesting that the bifactor solution has similar fit for males and females. The nested two-factor solution is consistent with Starr and Davila's theory that anxious rumination and anxious hopelessness share variance, but are inherently distinct constructs. Our results suggest that anxious rumination and anxious hopelessness each independently provide necessary variance to considering NARS, although there could be mechanistic differences between these two constructs. Alternatively, NARS are both thoughts patterns about the implications of anxiety symptoms, and our results suggesting the fit of a bifactor solution are in line with this consideration. Considering NARS broadly, anticipation about the negative consequences of anxiety may be informative to understanding the severity of their anxious symptomology. On the other hand, Anxious Rumination and Anxious Hopelessness may provide more specificity in predicting the potential for comorbid depressive symptoms and other vulnerabilities. Study 3 built on these results by evaluating differential correlations between each construct, and evaluated the RAQ subscales' (Anxious Rumination and Anxious Hopelessness) moderation of anxiety and depressive symptoms based on hypotheses by Starr and Davila (2012b). Study 3 also tested hypotheses regarding the indirect effects of anxiety on depressive symptoms via the two subscales.

## Study 3

### Participants

In Study 3, there were 93 female participants, and ethnicity consisted of 78.5% Caucasian, 7.5% Latino/Latina, 4.3% African American, 3.2% Asian, and 6.5% reported "Other." Ages were between 18 and 30 years ( $M = 19.47, S.D. = 2.27$ ).

### Materials

#### Penn State Worry Questionnaire (PSWQ; Meyer et al. 1990)

The PSWQ is a 16-item measure of worry, in which respondents indicate frequency and distress of worry thoughts (e.g. "My worries overwhelm me") on a scale from 1 ("Not at all typical") to 5 ("Very Typical"). Higher scores indicate increased trait worry. Validation studies suggest that the PSWQ is efficacious in distinguishing those with GAD from other anxiety disorders (Behar, Alcaine, Zuellig, & Borkovec, 2003), including social anxiety (Fresco, Mennin, Heimberg, & Turk, 2003). The PSWQ displayed good internal consistency in the current study ( $\alpha = .91$ ).

### **Social Interaction Anxiety Scale (SIAS; Mattick and Clarke 1998)**

The SIAS is a 20-item measure of social fears. Respondents indicate the degree to which statements (e.g. “I get nervous if I have to speak with someone in authority”) are characteristic of them on a scale from 0 (“Not at all”) to 4 (“Extremely”). Higher scores indicate higher levels of social anxiety. The SIAS had good internal consistency in the current study ( $\alpha = .92$ ).

### **State-Trait Anxiety Inventory (STAI; Spielberger et al. 1983)**

The STAI is a 40-item measure of trait and state anxiety; respondents indicate the degree of present anxiety and general anxiety on a scale from 1 (“not at all”) to 8 (“extremely”). Higher scores indicate higher levels of anxiety. In the current study, the STAI demonstrated good internal consistency for both the trait ( $\alpha = .91$ ) and state ( $\alpha = .92$ ) measures.

### **Attentional Control Scale (ACS; Derryberry and Reed 2002)**

The ACS is a 20-item measure of attentional control including inhibition and shifting attention. Respondents rate how strongly statements apply to them (“When I need to concentrate and solve a problem, I have trouble focusing my attention”) on a scale of 1 (“Almost Never”) to 4 (“Always”). Higher scores indicate lower trait attentional control. The ACS exhibited adequate internal consistency overall ( $\alpha = .87$ ) in our sample.

### **Anxiety Sensitivity Index (ASI-3; Reiss et al. 1985; Taylor et al. 1999)**

The ASI-3 is an 18-item measure of anxiety frequency and sensitivity. Respondents rate how strongly they identify with particular statements (“It is important for me not to appear nervous”) on a scale from 1 (“Very little”) to 4 (“Very much”). Higher scores indicate greater anxious feelings and increased sensitivity to anxiety symptoms. The ASI-3 assesses three facets of anxiety concerns: Social Concerns about how others will perceive symptoms of anxiety, Physical Concerns that anxiety symptoms may implicate their health, and Cognitive Concerns about the inability to concentrate due to anxiety symptoms. The ASI-3 showed good internal consistency in the current study ( $\alpha = .93$ ).

### **Center for Epidemiology Survey for Depression (CES-D; Radloff 1977)**

The CES-D is a 20-item measure of depressive symptomology, in which respondents rate how often they have particular experiences (e.g., “I felt depressed”) on a scale

from 0 (“Rarely or none of the time”) to 3 (“Most or all of the time”). Higher scores indicate increased depressive symptoms. In the current study the CES-D showed adequate internal consistency ( $\alpha = .71$ ). Internal consistency for the CES-D was notably lower in our study compared to the development study ( $\alpha = .85$ ).

### **Panic Disorder Severity Scale-Self Report (PDSS-SR; Houck et al. 2002)**

The PDSS-SR is a self-report version of the PDSS based on Shear et al. (1997). The PDSS-SR is a 7-item measure of panic disorder symptoms, in which respondents are shown DSM-5 criteria for panic disorder and rate the level that they experience each symptom on a scale from 0 to 4. Scores are summed with higher scores indicating increased symptomology. The PDSS-SR demonstrated adequate internal consistency ( $\alpha = .88$ ) in the current study.

## **Procedures**

All procedures were approved by the IRB. Participants were recruited through the university’s web-based research pool for participation in a larger study conducted in lab. They were provided informed consent and seated at a computer to complete questionnaires. The remainder of the in-lab study was conducted, and participants were debriefed and released.

## **Data Analytic Procedure**

Following recommendations for sample size by Fritz and MacKinnon (2007), a sample size of 71 to 148 is needed to acquire .80 power with a medium effect size using bias corrected bootstrapping. Therefore, we determined our sample ( $N = 93$ ) was adequate to test our hypotheses. Zero-order correlations were calculated among the subscales and other symptoms scales. We tested differences between correlations of each measure for Anxious Rumination and Anxious Hopelessness (Lee and Preacher 2013). Additionally, we evaluated the indirect effects of anxiety on depressive symptoms through Anxious Rumination and Anxious Hopelessness in parallel mediation, and Anxious Rumination/Hopelessness as moderators of the relationship between anxiety and depression using PROCESS (Hayes 2013), which utilizes bootstrapping methods using linear regression (Hayes and Rockwood 2016). Bootstrapped mediation and moderation produces confidence intervals by randomly resampling and replacing cases from the data  $n$  times. In the current study, data were resampled 5000 times.

## Results

### Correlations

Table 2 presents the zero-order correlations by RAQ subscale. Both subscales exhibited significant correlations with all measures, and the correlation between Anxious Rumination and Anxious Hopelessness was significant ( $r = .81, p < .001$ ). Correlations for STAI-Trait, SIAS, PDSS, and ASI-3 Cognitive concerns subscale were significantly lower for Anxious Rumination compared to Anxious Hopelessness, whereas correlations for ACS ( $z = 2.18, p = .03$ ) were significantly greater for Anxious Rumination compared to Anxious Hopelessness. There were no significant differences between Anxious Rumination and Anxious Hopelessness on other scales or sub-scales (Table 2).

### Moderation Analyses

We sought to evaluate proposed moderators of the relationship between anxiety and depressive symptoms via Anxious Rumination and Anxious Hopelessness responses to anxiety (Starr and Davila 2012b), by evaluating different measures of anxiety symptoms, including the PSWQ, the STAI-S, and the STAI-T.

Our overall moderation model for Anxious Rumination and PSWQ was significant,  $F(3, 85) = 29.57, p < .001$ . Anxious Rumination was associated with greater levels of depression,  $b = .74, t(85) = 5.96, p < .001, 95\% \text{ CI } [.50, .99]$ , and the interaction between PSWQ and Anxious Rumination also was significant,  $b = .02, t(85) = 2.20, p = .03, 95\% \text{ CI } [.002, .03]$ . Simple slopes for the association between PSWQ and CES-D were tested at low (1 SD below the mean;  $b = .05, t(85) = .73, p = .47, 95\% \text{ CI } [-.09, .20]$ ), medium (at the mean;  $b = .20, t(85) = 2.26, p = .03, 95\% \text{ CI } [.02, .37]$ ), and high (1 SD above the mean;  $b = .34, t(85) = 2.51, p = .01, 95\% \text{ CI } [.07, .61]$ )

levels of Anxious Rumination, such that PSWQ predicted increased CES-D at medium and high levels of Anxious Rumination, but not at low levels of Anxious Rumination (Fig. 1). Anxious hopelessness did not significantly moderate the relationship between PSWQ and CES-D, as the interaction between PSWQ and Anxious Hopelessness was not significant,  $b = .01, t(88) = 1.72, p = .09, 95\% \text{ CI } [-.001, .02]$ .

Anxious Rumination and Anxious Hopelessness were each individually evaluated as potential moderators for the relationship between state anxiety (STAI-S) and depression. For Anxious Rumination, the overall model was significant,  $F(3, 91) = 47.73, p < .001$ , with Anxious Rumination being associated with increased scores on the CES-D,  $b = .53, t(91) = 4.87, p < .001, 95\% \text{ CI } [.31, .74]$ . The interaction between STAI-S and Anxious Rumination was significant,  $b = .02, t(91) = 3.29, p = .001, 95\% \text{ CI } [.01, .03]$ . Simple slopes for the association between STAI-S and CES-D were tested at low (1 SD below the mean;  $b = .17, t(91) = 1.53, p = .13, 95\% \text{ CI } [-.05, .40]$ ), medium (at the mean;  $b = .37, t(91) = 3.91, p < .001, 95\% \text{ CI } [.18, .56]$ ), and high (1 SD above the mean;  $b = .57, t(91) = 5.09, p < .001, 95\% \text{ CI } [.35, .80]$ ) levels of Anxious Rumination, such that STAI-S predicted increased CES-D at medium and high levels of Anxious Rumination, but not at low levels of Anxious Rumination (Fig. 2).

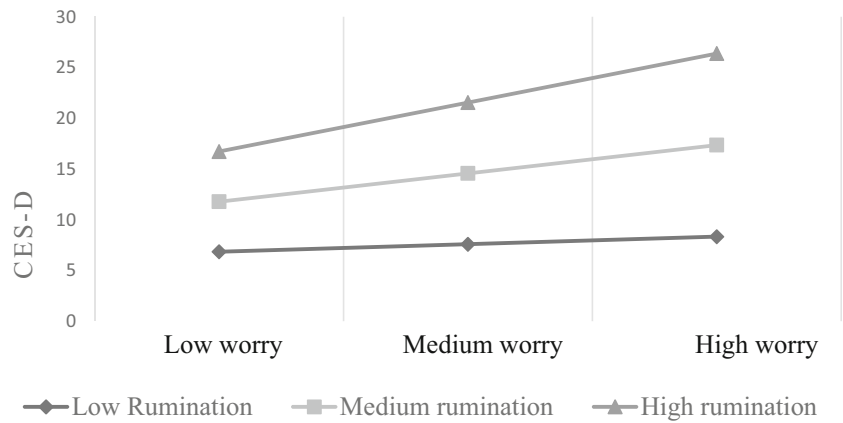
For Anxious Hopelessness, the overall model was significant,  $F(3, 92) = 48.63, p < .001$ . Anxious Hopelessness significantly predicted CES-D,  $b = .35, t(92) = 4.41, p = .001, 95\% \text{ CI } [.19, .51]$ , and there was a significant interaction,  $b = .01, t(92) = 2.09, p = .04, 95\% \text{ CI } [.0004, .02]$ . Simple slopes for the association between STAI-S and CES-D were tested at low (1 SD below the mean;  $b = .26, t(92) = 2.62, p = .01, 95\% \text{ CI } [.06, .45]$ ), medium (at the mean;  $b = .36, t(92) = 4.33, p < .001, 95\% \text{ CI } [.20, .53]$ ), and high (1 SD above the mean;  $b = .47, t(92) = 4.84, p < .001, 95\% \text{ CI } [.28, .66]$ ) levels of Anxious Hopelessness, such that STAI-S predicted increased

**Table 2** Convergent and discriminant zero-order correlations

	Rumination		Hopelessness		Test of significant differences	
	<i>r</i>	<i>p</i>	<i>R</i>	<i>p</i>	<i>z</i> -score	<i>p</i>
STAI Trait	0.74	<0.001	0.82	<0.001	-2.23	=.02*
STAI State	0.69	<0.001	0.71	<0.001	-0.55	=.58
CES-D	0.69	<0.001	0.74	<0.001	-1.13	=.26
SIAS	0.58	<0.001	0.68	<0.001	-2.26	=.02*
PDSS	0.50	<0.001	0.68	<0.001	-3.81	<.001*
ACS	0.47	<0.001	0.35	<0.001	2.18	=.03*
ASI-3	0.67	<0.001	0.70	<0.001	-0.83	=.41
Physical Concerns	0.55	<0.001	0.57	<0.001	-0.28	=.80
Cognitive Concerns	0.57	<0.001	0.66	<0.001	-1.84	=.06*
Social Concerns	0.65	<0.001	0.64	<0.001	0.19	=.84
PSWQ	0.55	<0.001	0.57	<0.001	-0.19	=.85

*P*-values significant at the .05 level are denoted with a “\*”

**Fig. 1** PSWQ and CES-D moderated by Anxious Rumination



CES-D at each level of Anxious Hopelessness with this relationship stronger at high compared to low levels of Anxious Hopelessness (Fig. 3).

Anxious Rumination and Anxious Hopelessness were evaluated as moderators between trait anxiety (STAI-T) and depression. Anxious Rumination was associated with increased scores on the CES-D,  $b = .28, t(91) = 2.27, p = .03, 95\% \text{ CI } [.03, .53]$ , though the interaction between STAI-T and Anxious Rumination was not significant. Anxious Hopelessness did not predict CES-D, and there was not a significant interaction, suggesting neither moderated this relationship.

**Indirect Effects Analyses**

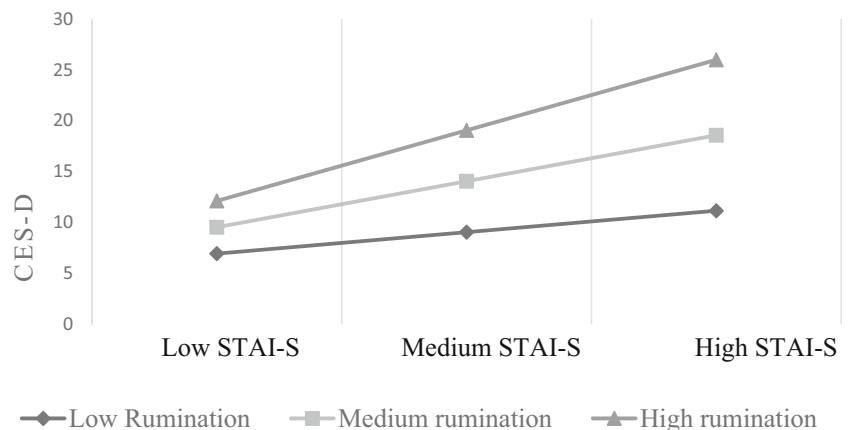
The RAQ subscales were evaluated in parallel mediation for indirect effects between symptom measures of anxiety (PSWQ, STAI-S, STAI-T) and depression. Results for the PSWQ and CES-D through the RAQ subscales revealed there was not a significant indirect effect of PSWQ of CES-D through Anxious Rumination when Anxious Hopelessness was accounted for,  $b = .12, SE = .06, 95\% \text{ CI } [-.005, .24]$ , but Anxious Hopelessness did when Anxious Rumination was accounted for,  $b = .23, SE = .09, 95\% \text{ CI } [.07, .44]$ . Additionally, there was a significant total indirect effect,

$b = .35, SE = .07, 95\% \text{ CI } [.22, .51]$ . PSWQ no longer predicted CES-D when Anxious Rumination and Hopelessness were accounted for in the model,  $b = .10, SE = .08, 95\% \text{ CI } [-.05, .26]$ . Results of this parallel mediation are presented in Fig. 4.

Next, we evaluated the indirect effects of both RAQ subscales in a parallel mediation of STAI-S and CES-D. Results suggested there was not a significant indirect effect for Anxious Rumination,  $b = .11, SE = .08, 95\% \text{ CI } [-.04, .29]$ , but there was an indirect effect for Anxious Hopelessness,  $b = .25, SE = .10, 95\% \text{ CI } [.07, .45]$ . The total indirect effect was significant, as well,  $b = .37, SE = .07, 95\% \text{ CI } [.25, .52]$ . After accounting for both indirect effects STAI-S still predicted CES-D,  $b = .33, SE = .10, 95\% \text{ CI } [.14, .52]$ . Results of this parallel mediation are presented in Fig. 5.

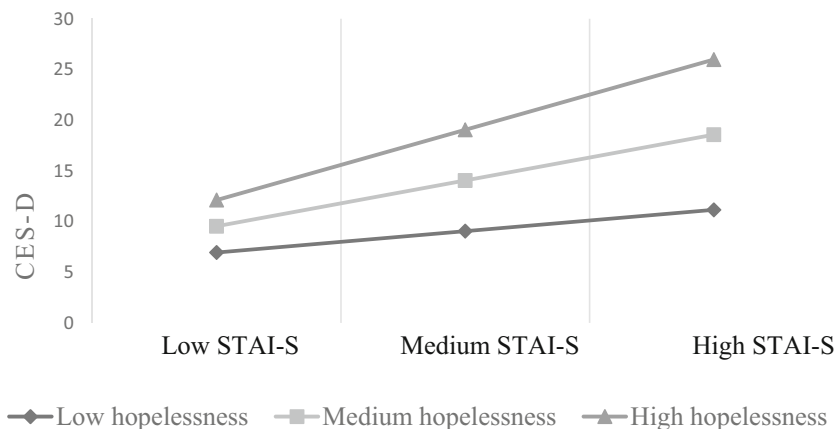
Finally, we evaluated the individual indirect effects of STAI-T on CES-D through Anxious Rumination and Hopelessness in a parallel mediation through the RAQ subscales. There was not a significant indirect effect for Anxious Rumination accounting for the indirect effect of Anxious Hopelessness,  $b = .08, SE = .09, 95\% \text{ CI } [-.09, .25]$ , and there was not a significant effect of Anxious Hopelessness accounting for the indirect effect of Anxious Rumination,  $b = .08, SE = .10, 95\% \text{ CI } [-.13, .28]$ . Also, the total indirect effect of STAI-T on CES-D through the RAQ subscales was not significant,  $b = .16, SE = .08, 95\% \text{ CI } [-.01, .32]$ .

**Fig. 2** STAI-S and CES-D moderated by Anxious Rumination





**Fig. 3** STAI-S and CES-D moderated by Anxious Hopelessness

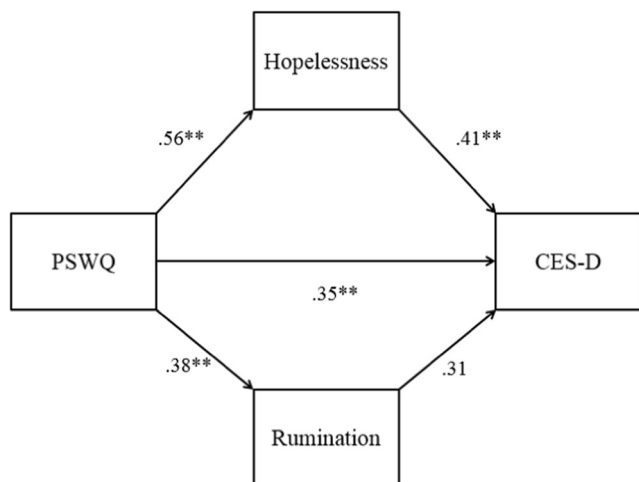


**Discussion**

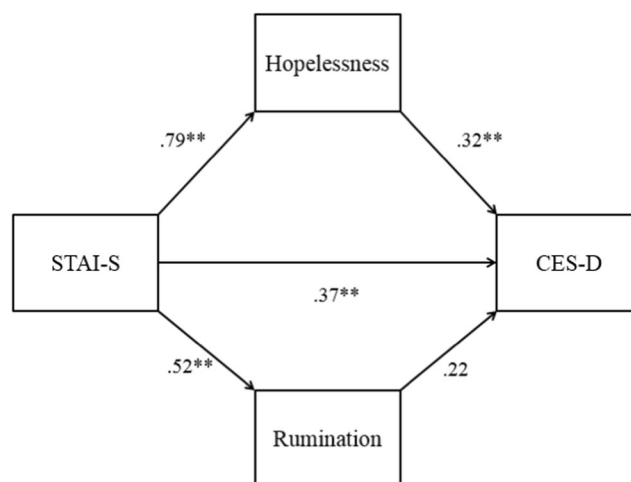
The results of Study 3 showed that the RAQ subscales generally correlated with related constructs, although they did demonstrate differential relationships, such that Anxious Hopelessness was more closely related to trait anxiety, social anxiety, anxiety sensitivity (cognitive control subscale), and panic related symptoms, whereas Anxious Rumination was more highly associated with attention control. However, the sub-scales did not differ in their relationships with state anxiety, depressive symptoms, and the other anxiety sensitivity subscales. Our evidence for the bifactor model suggests the RAQ broadly measures NARS, but has smaller latent dimensions. These results are in line with predictions by Starr and Davila (2012b). Anxious Hopelessness more closely relates to trait anxiety, as opposed to state anxiety, likely due to more sustained cognitions about negative long-term consequences. On the other hand, temporary anxiety symptoms are less likely to have lasting outcomes. With respect to depression, both NARS were associated with higher levels of depressive symptoms. We evaluated whether NARS moderated the

relationship between anxiety and depression and evaluated the indirect effects using the PSWQ, STAI-S, and the STAI-T.

Researchers investigating these similar patterns have suggested focusing on cardinal symptomology, as opposed to diagnoses may be most useful in determining transdiagnostic factors (Starr and Davila 2012c; McEvoy, Watson, Watkins, & Nathan, 2013). The current study expanded on this by evaluating worry, the cardinal symptom of GAD. These results suggest evaluations of both state and trait anxiety along with Anxious Rumination and Anxious Hopelessness may be key to understanding NARS. Given the mechanistic differences of Anxious Rumination and Anxious Hopelessness and their correlations with anxiety symptoms and risk factors in different domains, these results support NARS being important for both cognitive and physical anxiety symptomology. In addition, investigating symptom comorbidity may be informative for worry, the core symptom of GAD. Only Anxious Rumination moderated the relationship between worry and depressive symptoms, whereas Anxious Rumination and Anxious Hopelessness both moderated STAI-S and CES-D. In contrast, we demonstrated that in a parallel mediation, only



**Fig. 4** Parallel mediation of PSWQ and CES-D through Anxious Rumination and Anxious Hopelessness



**Fig. 5** Indirect effects of STAI-S on CES-D through Anxious Rumination and Anxious Hopelessness

Anxious Hopelessness mediated the relationship between worry and depression, and these results held for state anxiety symptoms. The parallel indirect effects were not significant for trait anxiety, although we might expect to detect a relationship in a prospective design investigating those who are reporting significant symptoms on the STAI-T over time. These results suggest that assessing the two subscales of the RAQ may provide differential information in the prediction of concurrent depressive symptoms, as well as suggest the subscales may be differentially related to cognitive effects, social fears, and panic symptoms.

## General Discussion

The purpose of the current study was to evaluate the psychometric properties of the Response to Anxiety Questionnaire and evaluate theoretical predictions about the nature of NARS and their relationship between anxiety and depression. Results show that the RAQ is comprised of a two-factor nested solution (Anxious Hopelessness and Anxious Rumination), in contrast to the original study, which found a one-factor solution (Starr and Davila 2012b). However, this fits theoretically with their original hypothesis that anxious hopelessness and anxious rumination are RNT styles specifically for anxiety symptoms (e.g. NARS) and they are potential transdiagnostic factors for anxiety and depression comorbidity. In addition, the RAQ displayed strong convergent validity and internal consistency. Our results demonstrate support for proposed moderation and mediation models of anxiety-depression comorbidity.

The findings suggest the RAQ may have further utility in multiple domains. Specifically, the Anxious Rumination subscale was more closely associated with attentional control, consistent with past research (Koster et al. 2011). It is possible that rumination about the effects of anxiety consumes cognitive resources required for adaptive coping with anxiety, much like the effects of worry on attention (Eysenck et al. 2007). Furthermore, the Anxious Rumination subscale supported the moderation hypotheses between worry and state anxiety symptoms and depressive symptoms (Starr and Davila 2012b). This suggests that ruminating about the meaning of anxious symptoms and the effects of uncontrollable worry may be particularly important to the development of depression. We also found that the Anxious Hopelessness subscale moderated the relationship between state anxiety symptoms and depression. Anxious Hopelessness also mediated the relationship between both worry and anxiety symptoms (PSWQ, STAI-S) and depression. This is consistent with Starr and Davila's (2012b) hypotheses regarding interactive effects of anxiety and depression as a result of NARS, and provides support for some of their more recent research (Starr et al. 2016), which found NARS moderated the relationship between anxiety and depression.

Differences between the subscales may point to functional distinctions between these two NARS. For example, those engaging in anxious rumination may be preoccupied by past oriented thoughts about a recent anxious experience, whereas those engaging in anxious hopelessness may be bothered by thoughts of a discouraging future because of their symptoms. Additionally, Starr and Davila (2012a) argue that although worry and rumination are related, they carry distinguishing features and individuals who ruminate over their anxious arousal may be at particular risk for developing depressive symptomology. As demonstrated in Study 3, each subscale demonstrates significant predictive validity. Our findings also suggest that perhaps more attention should be paid to hopelessness as a form of RNT/NARS, as much research has focused on other forms of RNT (e.g., worry, rumination, anticipatory processing). Furthermore, these results provide support for cognitive theories of depression, suggesting hopelessness is a key factor in developing interpersonal stress and increases in depressive symptoms (Joiner et al. 2005; Sarin, Abela, & Auerbach, 2005). In conjunction with differential relationships of these subscales and related constructs, these results support the utility in examining these constructs using the subscales of the RAQ. Thus, the current study provides evidence that both subscales may help us better understand factors associated with comorbid anxiety and depressive symptoms.

Limitations to the current study include that the sample was female in Study 3, which presents issues for generalizability. However, women often experience higher rates of anxiety and depression, and present increased risk for comorbidity (McLean et al. 2011), and the results of Study 2 suggest the RAQ is invariant to sex. One limitation to our bifactor model is that the general factor (NARS) may be difficult to differentiate from other forms of shared variance, such as self-report and similar wording within items. Additionally, the use of a college sample may limit the findings of the current study, although investigating a homogenous sample bears utility in investigating the dimensional characteristics of psychopathology (Insel et al. 2010). Whereas we did find evidence for indirect effects of anxiety on depression through NARS, we could not assess true mediation due to the use of cross-sectional data. The CES-D demonstrated adequate internal consistency in Study 3, though it was markedly lower than that in the development study (Radloff 1977), so our moderation and indirect effect sizes may be reduced as a result. More recent research has evaluated the impact of NARS on the development of depression in a prospective design (Starr et al. 2016), although Anxious Hopelessness and Anxious Rumination should be evaluated as individual factors in such a design, as well.

In sum, this study supported the psychometric properties of the RAQ, and indicated that the two subscales may provide unique information in the prediction of related anxiety symptoms. Moreover, the results suggest that individuals who

respond to anxious symptoms with NARS are at increased risk for the onset of depressive symptoms. Furthermore, Anxious Rumination may interact with anxiety symptoms to increase depression. More importantly, these findings provide additional evidence for the utility of researching and utilizing transdiagnostic factors for use in predicting symptoms of psychopathology, and continued research is essential to continued improvement of our diagnostic and treatment methodologies.

## Compliance with Ethical Standards

**Experiment Participants** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Conflict of Interest** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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

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

## References

- Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: a theory-based subtype of depression. *Psychological Review*, *96*(2), 358–372.
- Abramson, L. Y., Alloy, L. B., Hogan, M. E., Whitehouse, W. G., Gibb, B. E., Hankin, B. L., & Cornette, M. M. (2000). The hopelessness theory of suicidality. In T. E. Joiner & M. D. Rudd (Eds.), *Suicide Science* (pp. 17–32). Boston: Kluwer Academic Publishing.
- Akaike, H. (1973). Information theory and an extension of the maximum likelihood principle. In B. N. Petrov & F. Csaki (Eds.), *Proceedings of the second international symposium on information theory* (pp. 267–281). Budapest: Akademiai Kiado.
- Alloy, L. B., Kelly, K. A., Mineka, S., & Clements, C. M. (1990). Comorbidity of anxiety and depressive disorders: A helplessness/hopelessness perspective. In J. D. Maser & C. R. Cloninger (Eds.), *Comorbidity of anxiety and mood disorders*. Washington, D.C.: American Psychiatric Press.
- Asparouhov, T., & Muthén, B. (2010). Simple second order Chi square correction. Technical report. [www.statmodel.com](http://www.statmodel.com).
- Behar, E., Alcaine, O., Zuellig, A. R., & Borkovec, T. D. (2003). Screening for generalized anxiety disorder using the Penn State Worry Questionnaire: A receiver operating characteristic analysis. *Journal of Behavior Therapy and Experimental Psychiatry*, *34*(1), 25–43.
- Bentler, P. M. (1992). On the fit of models to covariances and methodology to the bulletin. *Psychological Bulletin*, *112*, 400–404. <https://doi.org/10.1037//0033-2909.112.3.400>
- Brown, T. A. (2014). *Confirmatory factor analysis for applied research*. New York, NY: Guilford Publications.
- Brown, T. A., Campbell, L. A., Lehman, C. L., Grisham, J. R., & Mancill, R. B. (2001). Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *Journal of Abnormal Psychology*, *110*(4), 585–599.
- Cohen, J. R., Young, J. F., Gibb, B. E., Hankin, B. L., & Abela, J. R. (2014). Why are anxiety and depressive symptoms comorbid in youth? A multi-wave, longitudinal examination of competing etiological models. *Journal of Affective Disorders*, *161*, 21–29.
- Comrey, A. L. & Lee, H. B. (1992). *A first course in factor analysis*. A.L. Comrey & H.B. Lee. (Eds.) New York, NY: Lawrence Erlbaum Associates.
- Derryberry, D., & Reed, M. A. (2002). Anxiety-related attentional biases and their regulation by attentional control. *Journal of Abnormal Psychology*, *111*(2), 225–236. <https://doi.org/10.1037/0021-843X.111.2.225>
- Ehring, T., & Watkins, E. R. (2008). Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy*, *1*(3), 192–205. <https://doi.org/10.1521/ijct.2008.1.3.192>
- Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: attentional control theory. *Emotion*, *7*(2), 336.
- Fresco, D. M., Mennin, D. S., Heimberg, R. G., & Turk, C. L. (2003). Using the Penn State Worry Questionnaire to identify individuals with generalized anxiety disorder: A receiver operating characteristic analysis. *Journal of Behavior Therapy and Experimental Psychiatry*, *34*(3–4), 283–291.
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*(3), 233–239.
- Garrido, L. E., Abad, F. J., & Ponsoda, V. (2016). Are fit indices really fit to estimate the number of factors with categorical variables? Some cautionary findings via Monte Carlo simulation. *Psychological Methods*, *21*(1), 93. <https://doi.org/10.1037/met0000064>
- Grant, D. M., Beck, G. J., Farrow, S. M., & Davila, J. (2007). Do interpersonal features of social anxiety influence the development of depressive symptoms? *Cognition and Emotion*, *21*(3), 646–663.
- Grant, D. M., Judah, M. R., Mills, A. C., Lechner, W. V., Davidson, C. L., & Wingate, L. R. (2014). Rumination and excessive reassurance seeking: Mediators of the relationship between social anxiety and depression? *Journal of Psychopathology and Behavioral Assessment*, *36*(3), 465–474. <https://doi.org/10.1007/s10862-013-9399-5>
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Hayes, A. F., & Rockwood, N. J. (2016). Regression-based statistical mediation and moderation analysis in clinical research: observations, recommendations, and implementation. *Behavior Research and Therapy*. <https://doi.org/10.1016/j.brat.2016.11.001>
- Horn, J. L. (1965). A rationale and test for the number of factors in a factor analysis. *Psychometrika*, *30*, 179–185. <https://doi.org/10.1007/BF02289447>
- Houck, P. R., Spiegel, D. A., Shear, M. K., & Paola Rucci, D. S. (2002). Reliability of the self-report version of the panic disorder severity scale. *Depression and Anxiety*, *15*, 183–185. <https://doi.org/10.1002/da.10049>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55. <https://doi.org/10.1080/10705519909540118>
- Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., & Wang, P. (2010). Research domain criteria (RDoC): toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, *167*(7), 748–751
- Jacobson, N. C., & Newman, M. G. (2014). Avoidance mediates the relationship between anxiety and depression over a decade later. *Journal of Anxiety Disorders*, *28*(5), 437–445. <https://doi.org/10.1016/j.janxdis.2014.03.007>

- Johansson, R., Carlbring, P., Heedman, Å., Paxling, B., & Andersson, G. (2013). Depression, anxiety and their comorbidity in the Swedish general population: point prevalence and the effect on health-related quality of life. *PeerJ*, 1, e98. <https://doi.org/10.7717/peerj.98>
- Joiner, T. E., Wingate, L. R., & Otamendi, A. (2005). An interpersonal addendum to the hopelessness theory of depression: hopelessness as a stress and depression generator. *Journal of Social and Clinical Psychology*, 24(5), 649–664. <https://doi.org/10.1521/jscp.2005.24.5.649>
- Jöreskog, K. G. (1999). How large can a standardized coefficient be. Unpublished Technical Report. Retrieved from: <http://www.ssicentral.com/lisrel/techdocs/HowLargeCanaStandardizedCoefficientbe.pdf>
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.
- Koster, E. H., De Lissnyder, E., Derakshan, N., & De Raedt, R. (2011). Understanding depressive rumination from a cognitive science perspective: the impaired disengagement hypothesis. *Clinical Psychology Review*, 31(1), 138–145. <https://doi.org/10.1016/j.cpr.2010.08.005>
- Krueger, R. F., & Eaton, N. R. (2015). Transdiagnostic factors of mental disorders. *World Psychiatry*, 14(1), 27–29. <https://doi.org/10.1002/wps.20175>
- Lee, I. A. & Preacher, K. J. (2013). Calculation for the test of the difference between two dependent correlations with one variable in common [Computer software]. Available from <http://quantpsy.org>
- Lenze, E. J., Mulsant, B. H., Mohlman, J., Shear, M. K., Dew, M. A., Schulz, R., & Reynolds, C. F. (2005). Generalized anxiety disorder in late life: lifetime course and comorbidity with major depressive disorder. *The American Journal of Geriatric Psychiatry*, 13(1), 77–80.
- MacCallum, R. C., Widaman, K. F., Preacher, K. J., & Hong, S. (2001). Sample size in factor analysis: the role of model error. *Multivariate Behavioral Research*, 36(4), 611–637.
- Mansell, W., Harvey, A., Watkins, E. R., & Shafran, R. (2008). Cognitive behavioral processes across psychological disorders: a review of the utility and validity of the transdiagnostic approach. *International Journal of Cognitive Therapy*, 1(3), 181–191. <https://doi.org/10.1521/ijct.2008.1.3.181>
- Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, 36, 455–470. [https://doi.org/10.1016/S0005-7967\(97\)10031-6](https://doi.org/10.1016/S0005-7967(97)10031-6)
- McEvoy, P. M., Watson, H., Watkins, E. R., & Nathan, P. (2013). The relationship between worry, rumination, and comorbidity: Evidence for repetitive negative thinking as a transdiagnostic construct. *Journal of Affective Disorders*, 151(1), 313–320. <https://doi.org/10.1016/j.jad.2013.06.014>
- McLean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research*, 45(8), 1027–1035. <https://doi.org/10.1016/j.jpsychires.2011.03.006>
- Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in test of measurement invariance. *Journal of Applied Psychology*, 93(3), 568–592. <https://doi.org/10.1037/0021-9010.93.3.568>
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State worry questionnaire. *Behaviour Research and Therapy*, 28(6), 487–495. [https://doi.org/10.1016/0005-7967\(90\)90135-6](https://doi.org/10.1016/0005-7967(90)90135-6)
- Mills, A. C., Grant, D. M., Lechner, W. V., & Judah, M. R. (2014). Relationship between trait repetitive negative thinking styles and symptoms of psychopathology. *Personality and Individual Differences*, 71, 19–24.
- Muthén, B., & Kaplan, D. (1992). A comparison of some methodologies for the factor analysis of non-normal Likert variables: a note on the size of the model. *British Journal of Mathematical and Statistical Psychology*, 45(1), 19–30. <https://doi.org/10.1111/j.2044-8317.1992.tb00975.x>
- Muthén, L. K., & Muthén, B. O. (2007). *Mplus. Statistical analysis with latent variables. Version, 3*. New York, NY: Wiley.
- Muthén, L. K., & Muthén, B. O. (2011). *Mplus user's guide. Sixth edition*. Los Angeles: Muthén & Muthén.
- Muthén, B., du Toit, S., & Spisic, D. (1997). Robust inference using weighted least squares and quadratic estimating equation in latent variable modeling with categorical and continuous outcomes. Los Angeles: University of California.
- Newman, M. G., & Llera, S. J. (2011). A novel theory of experiential avoidance in generalized anxiety disorder: a review and synthesis of research supporting a contrast avoidance model of worry. *Clinical Psychology Review*, 31(3), 371–382.
- Norton, P. J., & Barrera, T. L. (2012). Transdiagnostic versus diagnosis-specific CBT for anxiety disorders: a preliminary randomized controlled noninferiority trial. *Depression and Anxiety*, 29(10), 874–882. <https://doi.org/10.1002/da.21974>
- Norton, P. J., & Philipp, L. M. (2008). Transdiagnostic approaches to the treatment of anxiety disorders: A quantitative review. *Psychotherapy*, 45(2), 214–226. <https://doi.org/10.1037/0033-3204.45.2.214>
- Norton, P. J., Barrera, T. L., Mathew, A. R., Chamberlain, L. D., Szafranski, D. D., Reddy, R., & Smith, A. H. (2013). Effect of transdiagnostic CBT for anxiety disorders on comorbid diagnoses. *Depression and Anxiety*, 30(2), 168–173. <https://doi.org/10.1002/da.22018>
- O'Connor, B. P. (2000). SPSS, SAS, and MATLAB programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, and Computers*, 32, 396–402. <https://doi.org/10.3758/BF03200807>
- Penninx, B. W., Nolen, W. A., Lamers, F., Zitman, F. G., Smit, J. H., Spinhoven, P., et al. (2011). Two-year course of depressive and anxiety disorders: results from the Netherlands Study of Depression and Anxiety (NESDA). *Journal of Affective Disorders*, 133(1), 76–85. <https://doi.org/10.1016/j.jad.2011.03.027>
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401. <https://doi.org/10.1177/014662167700100306>
- Reise, S. P. (2012). The rediscovery of bifactor measurement models. *Multivariate Behavioral Research*, 47(5), 667–696.
- Reiss, S., Peterson, R., Gursky, D., & McNally, R. (1985). Anxiety sensitivity, anxiety frequency and the predictions of fearfulness. *Behavior Research and Therapy*, 24(1), 1–8. [https://doi.org/10.1016/0005-7967\(86\)90143-9](https://doi.org/10.1016/0005-7967(86)90143-9)
- Ruscio, A. M., & Borkovec, T. D. (2004). Experience and appraisal of worry among high worriers with and without generalized anxiety disorder. *Behaviour Research and Therapy*, 42(12), 1469–1482.
- Sarin, S., Abela, J., & Auerbach, R. (2005). The response styles theory of depression: a test of specificity and causal mediation. *Cognition & Emotion*, 19(5), 751–761. <https://doi.org/10.1080/02699930441000463>
- Shear, M. K., Brown, T. A., Barlow, D. H., Money, R., Sholomskas, D. E., Woods, S. W., et al. (1997). Multicenter collaborative panic disorder severity scale. *American Journal of Psychiatry*, 154(11), 1571–1575. <https://doi.org/10.1176/ajp.154.11.1571>
- Smith, J. M., Alloy, L. B., & Abramson, L. Y. (2006). Cognitive vulnerability to depression, rumination, hopelessness, and suicidal ideation: multiple pathways to self-injurious thinking. *Suicide and Life-threatening Behavior*, 36(4), 443–454.
- Spielberger, C. D., Gorsuch, R. L., Lushene, R. E., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the state-trait anxiety inventory*. Palo Alto: Consulting Psychologists Press.
- Starr, L. R., & Davila, J. (2012a). Cognitive and interpersonal moderators of daily co-occurrence of anxious and depressed moods in

- generalized anxiety disorder. *Cognitive Therapy and Research*, 36, 655–669.
- Starr, L. R., & Davila, J. (2012b). Responding to anxiety with rumination and hopelessness: mechanism of anxiety-depression symptom co-occurrence? *Cognitive Therapy and Research*, 36(4), 321–337. <https://doi.org/10.1007/s10608-011-9363-1>
- Starr, L. R., & Davila, J. (2012c). Temporal patterns of anxious and depressed mood in generalized anxiety disorder: a daily diary study. *Behavior Research and Therapy*, 50(2), 131–141.
- Starr, L. R., Stroud, C. B., & Li, Y. I. (2016). Predicting the transition from anxiety to depressive symptoms in early adolescence: Negative anxiety response style as a moderator of sequential comorbidity. *Journal of Affective Disorders*, 190, 757–763.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Allyn & Bacon/Pearson Education.
- Taylor, S., Arabian, B., & Fedoroff, I. C. (1999). Anxiety sensitivity: progress, prospects, and challenges. *Anxiety Sensitivity: Theory, Research, and Treatment of the Fear of Anxiety*, 339–353.
- Weng, L. J., & Cheng, C. P. (2005). Parallel analysis with unidimensional binary data. *Educational and Psychological Measurement*, 65(5), 697–716. <https://doi.org/10.1177/0013164404273941>