ORIGINAL ARTICLE

# Cognitive and Interpersonal Moderators of Daily Co-occurrence of Anxious and Depressed Moods in Generalized Anxiety Disorder

**Lisa R. Starr · Joanne Davila**

**Abstract** Anxiety and depression co-occur, both at the disorder and symptom levels, and within anxiety disorders, fluctuations in daily anxious mood correspond temporally to fluctuations in depressed mood. However, little is known about the factors or conditions under which anxiety and depressive symptoms are most likely to co-occur. The current study investigated the role of cognitive factors (daily rumination and cognitive attributions about anxiety symptoms) and interpersonal functioning (daily perceived rejection, support, criticism, and interpersonal problems) as moderators of the daily association between anxious and depressed moods. Fifty-five individuals with generalized anxiety disorder completed a 21-day diary assessing daily mood and cognitive and interpersonal functioning. Ratings of anxious and depressed mood were more closely associated on days when participants ruminated about their anxiety or viewed anxiety symptoms more negatively. Furthermore, anxious mood predicted later depressed mood on days when participants reported greater interpersonal problems and more perceived rejection. Results suggest that cognitive and interpersonal factors may elevate the likelihood of anxiety-depression co-occurrence.

**Keywords** Anxiety · Depression · Mood co-occurrence · Comorbidity · Daily diary

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## Introduction

Anxiety and depression co-occur. Anxiety disorders show pronounced comorbidity with depression, with each individual anxiety disorder yielding a tetrachoric correlation with major depression in the range of .42–.62 (Kessler et al. 2005). Anxiety symptoms correlate highly with depressive symptoms, with substantially greater overlap at the symptom level than at the syndrome or disorder levels (Hiller et al. 1989). Not only do anxious individuals also tend to be depressed, but within individuals with anxiety disorders, anxious mood tends to temporally correspond to depressed mood on a daily basis (Starr and Davila 2012).

Based on the temporal antecedence of anxiety disorders over depression (Cole et al. 1998; de Graaf et al. 2003; Essau 2003; Lewinsohn et al. 1997; Wittchen et al. 2000) and of anxious symptoms over depressive symptoms within episodes (Starr and Davila 2012), several researchers have proposed that anxiety may act as a causal risk factor for later depression (e.g., Lewinsohn et al. 1997; Starr and Davila in press; Wittchen et al. 2003). Little is known, however, about the mechanisms through which anxiety may lead to later depression. One possibility is that the tendency to react to anxiety symptoms in maladaptive ways places people at risk for elevated depressive symptoms. For example, Starr and Davila (in press) proposed that negative anxiety response styles (i.e., the tendency to respond to anxiety with rumination and hopeless attributions) increase the likelihood that anxiety and depressive symptoms will co-occur. However, further research is needed to pinpoint the processes that contribute to anxiety-depression co-occurrence.

One way to generate hypotheses about such mechanisms is to determine conditions under which anxiety and depression (or their symptoms) are most likely to co-occur.

Although testing moderators of the co-occurrence between anxiety and depression does not directly identify mechanisms of this co-occurrence, it could provide clues that could help determine such mechanisms. Surprisingly little research has explored moderators of anxiety-depression co-occurrence (Hankin 2008; Starr and Davila in press). Furthermore, no studies have examined moderators of co-occurrence between within-person variations in anxious and depressed mood, an important distinction as between-subjects correlations do not necessarily imply within-subjects associations (Tennen et al. 2000). Comorbidity in the traditional sense has implied between-persons co-occurrence; that is, an individual with one disorder is at elevated likelihood for another disorder at some point in their lifetime. In contrast, "within-persons" co-occurrence, or the tendency of different symptoms or disorders to temporally cluster (Starr and Davila 2012), is relatively unexplored. Examining moderators of within-persons co-occurrence of anxious and depressed mood may help explain how vulnerability to co-occurring symptoms emerges, determine which individuals might be at greatest risk for such co-occurrence, and identify specific targets for intervention.

The current study examines moderators of the association between daily anxious and depressed moods in a generalized anxiety disorder (GAD) sample. Below, we review several potential moderators and outline theoretical rationale for each.

Cognitive Moderators

Although a variety of cognitive variables may increase the likelihood of co-occurring depressed and anxious moods, based on previous research (Starr and Davila in press), we selected two main factors related to how people cognitively respond to their anxiety symptoms: rumination and negative attributions.

*Rumination*

Rumination refers to repetitive, non-productive, negatively-focused cognitions in response to symptoms or stressors (Nolen-Hoeksema et al. 2008). Rumination has most commonly been conceptualized as responses to depressive symptoms, and the most commonly used measure of rumination (the Ruminative Response Scale or RRS; Nolen-Hoeksema and Morrow 1991) reflects this thinking, asking participants to rate how they typically respond when feeling "sad, blue, or depressed." More recently, researchers have examined rumination in response to anxiety symptoms (Rector et al. 2008; Starr and Davila in press). For example, an individual may repeatedly brood about the causes and implications of his or her anxiety symptoms. As the process

of rumination may disrupt adaptive problem-solving and evoke negative autobiographical memories (Lyubomirsky et al. 1998, 1999; Nolen-Hoeksema et al. 1994), Starr and Davila (in press) suggested that ruminative responses to anxiety symptoms may play a role in anxiety-depression comorbidity, as the tendency to ruminate when anxious may make anxiety more likely to lead to depressive symptoms. Supporting this notion, Starr and Davila (in press) showed that anxiety symptoms cross-sectionally interacted with ruminative and hopeless anxiety response styles to predict higher depressive symptoms. This pattern may not be restricted to anxious rumination; Hankin (2008) found that depressive rumination interacted with prospective fluctuations in anxious arousal to predict elevated depressive symptoms over a period of 5 months. Taken together, these studies offer preliminary support for a role for rumination as a risk factor for anxiety-depression co-occurrence. The present study builds on these findings by examining both anxious and depressive rumination. Moreover, we explore both forms of rumination on a day-to-day basis to determine how these processes unfold in people's daily lives, as this more closely approximates the likely time frame over which ruminative thoughts impact mood.

*Negative Attributions*

Research has strongly demonstrated that the tendency to make negative attributions about stressful life events (e.g., that stressors are personally caused, persistent, uncontrollable, and likely to negatively impact important goals) increases vulnerability to hopelessness and depression (e.g., Abramson et al. 1989; Alloy et al. 2000; Fresco et al. 2006; Hankin et al. 2004). Similarly, individuals likely differ in the attributions that they make about their anxiety symptoms. Some people may dismiss anxiety symptoms as transient and inconsequential, while others may view the same symptoms as unrelenting, uncontrollable, and apt to wreak havoc on their lives. All other factors held equal, we would expect the latter group to be at increased risk for co-occurring depressive symptoms. The idea that negative cognitive attributions about anxiety place people at increased risk for co-occurring depressive symptoms has never been directly tested. However, supporting its underlying logic, individuals with comorbid depressive and anxiety disorders show more negative attributions than controls or purely depressed or anxious individuals (Fresco et al. 2006). In the current study, we examine whether negative attributions about daily anxious symptoms predict stronger associations between daily anxious and depressed moods, an idea never directly explored in previous research. We focused specifically on the tendency to view anxiety symptoms as stable, uncontrollable, and having negative consequences for important domains. Note that

this necessarily diverges somewhat from the negative attributions delineated by Abramson et al. (1989), as some negative attributions make less sense conceptually when the target is anxiety symptoms. For example, Abramson et al. (1989) identified internal attributions (i.e., viewing events as caused by oneself or by characteristics of oneself) as predictive of hopelessness and in turn depression; however, anxiety symptoms are arguably inherently internal. The specific cognitions assessed in the current study are meant to capture important aspects of negative attributions about anxiety, but not necessarily the full breadth of potential depressive attributions.

Interpersonal Moderators

A wide body of literature strongly links interpersonal dysfunction, including such diverse factors as lack of social support, criticism, poor relationship quality, insecure attachment, and social stressors, to development and recurrence of depressive symptoms (Abela et al. 2005; Cohen and Wills 1985; Hooley and Teasdale 1989; Joiner and Timmons 2009; Kendler et al. 1999; Whisman and Bruce 1999). Symptoms and the social environment appear to be reciprocally related, with depression exacerbating interpersonal relationships, and relationship dysfunction in turn leading to elevated symptoms (Coyne 1976; Davila et al. 1997; Joiner 1996; Joiner et al. 1999; Joiner and Timmons 2009; Katz et al. 2001). Anxiety has been less explored in relation to interpersonal functioning, but existing research supports an association between anxiety and interpersonal dysfunction, including relationship dissatisfaction and dissolution as well as other forms of interpersonal problems, that cannot be accounted for by comorbid depression (e.g., Beck 2010; Darcy et al. 2005; Eng and Heimberg 2006; McLeod 1994; Overbeek et al. 2006; Starr and Davila 2008; Whisman et al. 2000; Zaider et al. 2010). Not only are individual differences in anxiety generally associated with interpersonal dysfunction, but among anxious individuals, relationship quality decreases on days when anxiety is elevated (Zaider et al. 2010).

Anxiety is not uniformly associated with relationship problems across individuals and circumstances; for example, in a diary study, Zaider et al. (2010) found that the degree to which anxious wives felt their husbands were supportive, communicative, and understanding about their anxiety moderated the association between daily anxiety symptoms and perceived relationship quality. Given the strong association between interpersonal dysfunction and depression, variations in the degree to which anxiety elicits interpersonal distress may impact co-occurring depressive symptoms. For example, anxious mood may be particularly related to depressed mood on days when interpersonal problems are elevated.

In the current study, we examined the role of four interpersonal factors, which we believe may serve as proxy variables for overarching distress in interpersonal relationships. Specifically, we examined perceived rejection, perceived support, perceived criticism, and interpersonal problems. Each of these interpersonal factors has been strongly associated with depressive symptoms (Cohen and Wills 1985; Gunthert et al. 2007; Hooley and Teasdale 1989; Kendler et al. 1999; Segrin and Dillard 1992; Whisman and Bruce 1999), and although the literature on interpersonal aspects of anxiety disorders is less well developed, emerging evidence suggests that anxiety is associated with a range of dysfunctional interpersonal behaviors (see Beck 2010, for a review), which are in turn likely to elicit negative reactions from others.

For example, perceived social support is strongly related to psychological well-being and appears to buffer against the impact of stress (Cohen and Wills 1985); similarly, higher levels of social support could protect against the negative impact of anxiety symptoms and reduce the likelihood of co-occurring dysphoria. Along the same lines, perceived criticism sharply predicts depressive relapse beyond the contributions of conceptually related variables such as marital distress and expressed emotion (Hooley and Teasdale 1989; Renshaw 2008), and is also predictive of poor response to anxiety disorder treatments, including reduced remediation of both anxiety and depressive symptoms (Renshaw et al. 2001, 2003). Thus, although perceived criticism has never been studied in the context of anxiety-depression comorbidity, it seems reasonable that anxious individuals who feel criticized by others may be more likely to develop secondary depressive symptoms. Perceived rejection may play a similar role, as anxiety-related behaviors elicit rejection from others (Alden and Bieling 1998), and interpersonal rejection is in turn strongly related to depression (Segrin and Dillard 1992). It may follow that anxiety symptoms are most strongly associated with depressive symptoms when they evoke rejection from others. Finally, interpersonal problems here refer to subjectively-defined daily hassles within social relationships, and we would again expect that daily anxious and depressed mood would rise in concert on days when the individual experiences corresponding increases in interpersonal problems. Note that these four constructs are not intended to comprehensively encompass the span of potential interpersonal factors that elevate the likelihood of daily co-occurrence of depressed and anxious mood. Instead, we view our daily ratings of perceived support, criticism, rejection, and interpersonal problems as a few general indicators of the overall quality of the individual's social milieu, and intend our analyses as basic tests of the notion that the concurrent association between anxious and depressive symptoms is dependent on interpersonal context.

The Current Study

We examined several potential cognitive and interpersonal moderators of the daily association between anxious and depressed mood in a sample with diagnosed current generalized anxiety disorder (GAD) and a history of depressive symptoms. Using a sample with clinically significant anxiety and a propensity toward depressive symptoms maximized the likelihood that participants would experience significant levels of symptoms over the course of the study and increased generalizability to relevant clinical populations. GAD shows higher comorbidity with depression than any other anxiety disorder (Kessler et al. 2005), and is associated with dysfunctional cognitive processes and interpersonal problems (Eng and Heimberg 2006; Ganellen 1988; McLeod 1994; Mennin et al. 2004; Newman and Erickson 2010; Wells 1999; Whisman et al. 2000). Note that in the current sample, anxious and depressed mood were concurrently associated, and anxious mood preceded depressed mood but not vice versa (see Starr and Davila 2012 for complete results).

We examined hypotheses using a 21-day daily diary study. Diary designs offer several methodological benefits. They capture phenomena in their natural contexts, and reveal within-person patterns not evident in cross-sectional studies (Bolger et al. 2003). Within-subject analyses also offer superior statistical power. Furthermore, if much is unknown about the causes and correlates of between-person comorbidity, next to nothing is known about the underpinnings of within-person symptom co-occurrence.

We examined the following specific hypotheses:

*Cognitive Moderator Hypotheses*

A) Daily rumination will moderate daily concordance between anxious mood and depressed mood, with stronger associations between anxious and depressed moods on days when people ruminated about symptoms. We examined daily rumination about both anxious mood and sad mood, as indicators of anxious versus depressive rumination. Based on the logic outlined above, we expected that rumination about anxious mood would emerge as a stronger moderator.

B) Daily negative attributions about daily anxiety symptoms (i.e., rating anxiety symptoms as uncontrollable, unlikely to stop, and likely to negatively impact functioning) will predict greater associations between daily anxiety mood and depressed mood.

*Interpersonal Moderator Hypotheses*

Daily depressed and anxious mood will be more closely associated on days when participants report (a) greater perceived rejection, (b) lower perceived support, (c) greater perceived criticism, (d) more interpersonal problems.

*Lagged Analyses*

Based on anxiety's temporal precedence over depression (de Graaf et al. 2003; Starr and Davila 2012; Wittchen et al. 2000), in addition to testing whether these factors moderated the association between anxious mood and concurrent (i.e., same day) depressed mood, we also tested moderation of lagged associations between anxious and depressed moods (i.e., moderation of the association between anxious mood on 1 day and depressed mood on a subsequent day; please see the "Data Analysis Approach" section for a more detailed discussion). Examining lagged associations allows us to identify conditions under which anxiety symptoms lead to depressive symptoms. This helps eliminate several alternative interpretations (e.g., that depressed mood causes anxious mood, or that co-occurring symptoms are generally associated with greater cognitive and interpersonal dysfunction) and fits more closely with the notion that anxiety elevates risk for later depression (Starr and Davila in press; Wittchen et al. 2003).

## Method

Participants

Fifty-five participants (49 women, 6 men) completed study procedures. Participants met the following inclusion criteria: (a) met full criteria for current GAD (excluding the major depression exclusion criterion), (b) reported history of one or more clinically significant cardinal symptoms of depression or dysthymia (i.e., depressed mood or anhedonia), (c) no psychotic or bipolar disorders present, (d) age range of 18–65, (e) no reading or language impairments that would interfere with questionnaire comprehension. The requirement of history of depressive symptoms was intended to ensure propensity to depressed mood over the course of the study, but in practice all otherwise eligible participants met this criterion. Forty-nine percent met full criteria for current major depressive episode or dysthymia. Participants were not excluded on the basis of intra-anxiety disorder comorbidity, and 42% met criteria for an anxiety disorder in addition to GAD. Participants were recruited from a variety of sources, including the general community (via flyers posted on and near campus and online advertisements, $n = 31$), graduate training therapy clinics ($n = 6$), undergraduate psychology courses ($n = 14$), and other research studies with adult community samples ($n = 4$). As participants were held to the same research inclusion criteria, recruitment source was unrelated to gender, number of baseline diagnoses, or baseline symptoms, although participants recruited from undergraduate

courses were younger than participants recruited from other sources, $F(51, 3) = 5.39$, $P = .003$.

Participants described themselves as non-Hispanic white (71%), Asian or Asian-American (18%), Latino (4%), Native-American (2%). The remaining 5% represented other or multiple racial/ethnic backgrounds. Participants reported a diverse range of household incomes (46% earned under $50,000 and 20% earned less than $30,000).

Measures

Screening

For participants recruited from training clinics and through community advertisements, research staff administered relevant modules from the Mini-International Neuropsychiatric Interview (MINI; Sheehan et al. 1998), a brief structured interview designed to quickly generate psychiatric diagnoses. The MINI produces similar results to longer interviews (Sheehan et al. 1998). For logistical reasons (i.e., because they were drawn from a large, unselected pool), participants recruited from undergraduate courses were instead screened with self-report symptom measures. Participants who appeared to meet study criteria were referred for diagnostic interviews to confirm study eligibility.

Diagnostic Interview

The Structured Clinical Interview for the DSM-IV (SCID; Spitzer et al. 1995) was used to confirm eligibility. A trained clinical psychology doctoral student administered all anxiety and mood disorder modules and the psychotic disorder screening module. To reduce burden, SCID data from prior studies (collected within 6 months) were used for participants recruited from research studies when possible. To capture both subthreshold symptoms and diagnosable disorders, interviews were coded using a four-point dimensional system (0 = no symptoms, 1 = mild symptoms, 2 = moderate symptoms, and 3 = DSM-IV disorder). Study eligibility required a zero on bipolar and psychotic disorders, a one or greater on lifetime major depressive episode or dysthymia, and a three on current GAD. Audiotapes of twenty-two percent of interviews were evaluated by a second coder. Relevant to eligibility, intraclass correlation coefficients for current GAD, lifetime MDD, and lifetime dysthymia were 1.00, .90, and .77 respectively.

Baseline

Baseline depressive symptoms were assessed using the Beck Depression Inventory-II (BDI; Beck et al. 1996), a

21-item, self-report measure of depressive symptoms. Baseline anxiety symptoms were assessed using the Beck Anxiety Inventory (BAI; Beck et al. 1988a), a 21-item, self-report assessment of cognitive and somatic components of anxiety. Both the BDI and BAI are very widely used and have demonstrated strong psychometric properties (Beck et al. 1988b; Fydrich et al. 1992), and in the current study Cronbach's alpha for both measures was .91.

Diary

Because excessive diary length substantially reduces compliance (Morren et al. 2009), and because no measures of relevant constructs have been specifically validated as diary assessments (to our knowledge), all diary items were face valid and designed to quickly and efficiently assess constructs of interest.

Daily Mood   Daily depressed and anxious moods were assessed using 10-point Likert-scale ratings of face-valid descriptors of mood experienced over the course of that day (e.g., "How anxious [depressed] did you feel, on average, over the course of the day today?"). As a test of convergent and divergent validity, we entered baseline BAI and baseline BDI simultaneously into two separate multilevel models with (a) daily anxious mood and (b) daily depressed mood as outcomes. Supporting convergent and divergent validity, daily anxious mood was predicted by baseline BAI ($b = .08$, SE = .02, $P < .001$) but not baseline BDI ($b = .03$, SE = .02, $P = .26$), and daily depressed mood was predicted by baseline BDI ($b = .07$, SE = .02, $P = .004$) but not baseline BAI ($b = .04$, SE = .02, $P = .09$).

Cognitive Moderators   Daily anxious rumination was assessed with the item "how much did you think or ruminate about feeling anxious today?" with a 1–10 Likert-type scale ranging from "not at all" to "a whole lot." For comparison purposes, a similar item assessed rumination about sad mood. We refer to this latter item as "depressive rumination" for simplicity, but please note that it refers to rumination about only a single symptom of depression (sad mood) and may not correspond precisely with the construct of depressive rumination as described in the literature.

In an adaptation of previous conceptualizations of negative attributions about stressful events associated with hopelessness (e.g., Abramson et al. 1989), negative attributions about anxiety symptoms were assessed as follows: On days when participants endorsed experiencing anxious mood (rating ≥2), they were directed to an additional section asking the extent (on a ten-point Likert scale) to which they felt "like your anxiety is never going to stop," "like you can't control your anxiety," and "that your

anxiety will negatively impact your life." These three items were averaged for a total score of negative attributions about anxiety. To compute internal reliability, daily scores for the three times were aggregated across time points, to create mean scores on each item for each subject. Cronbach's alpha was .98.

*Interpersonal Moderators* Participants rated on ten-point Likert-type scales (ranging from "not at all" to "extremely") the degree to which they felt supported, criticized, and rejected by others over the course of the day. Daily interpersonal problems were assessed by asking participants whether or not they had experienced problems that day (a) in their romantic relationship, (b) with their friends/peers, and (c) with family members, and the degree to which these problems negatively affected them (on a 1–10 scale). A composite score for total interpersonal problems was computed by taking the maximum impact rating across the three assessed interpersonal domains.

### Procedure

Baseline assessments included the SCID and a battery of questionnaires including the BDI and BAI. For logistical reasons and to reduce participant burden, participants were given a choice of completing baseline components in person or remotely (i.e., over the phone and online; each produces similar results to in-person/paper and pencil data collection; Fouladi et al. 2002; Rohde et al. 1997). Results and compliance did not differ by baseline modality.

After completing their interviews and questionnaires, participants were given thorough diary instructions. Participants were asked to begin their diary the night of their baseline interview, and complete the diary nightly for 21 days, as close to bedtime as was convenient. Participants were given the option to complete their diaries online or on paper; the substantial majority of diaries (92%) were completed online. The diary website was administered through http://www.psychdata.com, and was completely secure. The website recorded the time and date of diary completion, allowing research staff to monitor compliance. At times participants completed multiple surveys in 1 day, and in these cases all of that participant's data for that day were excluded. All participants were given paper surveys as a back-up for use on days when internet access was unavailable or inconvenient. Participants were asked to return the paper surveys by mail within 1–2 days of completion, and research staff inspected postmarks for compliance. Previous research suggests that electronic and paper diaries produce comparable results (Green et al. 2006).

To enhance compliance, participants received an automatic reminder email listing their identification number and a survey link at the same time every day. In addition, participants were entered into raffles based on their diary compliance. Raffle prizes included an MP3 player and GPS navigation device. Participants completed an average of 18.82 diary entries (90% compliance rate). Participants were compensated with $25 for the baseline interview and $125 for the remainder of the study. Students were compensated with course credit comparable to payment amounts. Compliance did not differ by form of compensation. For more details about recruitment and participant characteristics, see Starr and Davila (2012). This research was approved by the Stony Brook University Committee for Research on Human Subjects and the UCLA Institutional Review Board.

### Data Analysis Approach

All analyses were conducted using multilevel modeling (MLM) in IBM SPSS 18.0. MLM accounts for the non-independence of nested data. MLM also offers significant power advantages over traditional analytic methods and handles missing data well. All predictor variables were grand-mean centered. Time was included in initial models but dropped where non-significant at $P > .2$. Initial models included both fixed and random effects for main effects (interactions were only included as fixed effects); random effects were dropped (but retained as fixed effects) when $P > .2$. An unstructured covariance type was specified for random effects, and a first-order auto-regressive covariance (AR[1]) type was used to control for auto-correlation of residuals.

Analyses sometimes failed to converge using this strategy, and we then took the following measures (see Garson 2009): (a) removed any variables with correlations approaching 1.0, (b) increased maximum iterations, (c) increased step-halving, (d) increased singularity tolerance value, (e) increased scoring steps, and (f) increased parameter convergence value. If convergence failures persisted, we altered the repeated covariance type from AR(1) to diagonal. Continued convergence problems likely indicated that the model was attempting estimation of very small random effects (Garson 2009; Nezlek 2001), so changes from prior steps were reset and the smallest random effects were removed (the variables were still included as fixed effects) until the model achieved convergence.

Some analyses were lagged; that is, predictor variables (anxious mood and moderator variables) were assessed at an earlier time point than the outcome variable (depressed mood). Many daily diary studies default to 1-day time lags in analyses; however, 1-day lags are not necessarily optimal for evaluating processes that unfold over time, as some processes may occur over longer or shorter time periods. Indeed, earlier findings using the current dataset

demonstrated that anxious mood predicts later depressed mood most strongly using a time lag of 2 days (Starr and Davila 2012). Based on these results, we used a time lag of 2 days, with depressed mood on day $t$ as the outcome and anxious mood and the moderator variable both measured on day $t - 2$ (i.e., 2 days prior) as predictors.

## Results

### Bivariate Correlations and Concurrent Associations Among Daily Variables

Table 1 shows the between-subjects bivariate correlations between daily diary variables aggregated across observations (i.e., mean scores were taken across daily data points for each participant, resulting in one score on each variable for each participant, and correlations were computed based on these data). Table 1 also reports descriptive data for aggregated variables. As shown in Table 1, between-subjects correlations among variables were generally high. To ensure that diary variables were not redundant with each other, we next computed within-subjects concurrent associations between daily variables; that is, the extent to which one variable on a given day predicted a second variable measured on the same day. To do so, concurrently measured predictor and outcome variables were entered into multilevel models, following steps listed in the "Data Analysis Strategy" section. Note that unstandardized effect sizes are reported here because there is no ideal way to compute standardized effect sizes in MLM (see Heck et al. 2010); however, all variables were assessed on the same 1–10 scale, so unstandardized effect sizes can be compared

with each other. Anxious mood predicted concurrent depressed mood ($b = .54$, SE $= .04$, $P < .001$). Both anxious mood and depressed mood were concurrently associated with every moderator variable. For anxious mood, concurrent association unstandardized magnitudes ranged from .22 (negative attributions about anxiety) to .68 (anxious rumination). For depressed mood, unstandardized magnitudes ranged from .19 (negative attributions about anxiety) to .64 (depressive rumination). The three cognitive variables were all associated with each other (all $Ps < .01$), and anxious and depressive rumination were related but not excessively so ($b = .53$, SE $= .04$, $P < .001$). The four interpersonal variables were also associated with each other (all $Ps < .001$). Perceived support was negatively associated with all other variables; all other concurrent associations were positive.

### Moderators of Concurrent Association Between Anxious and Depressed Moods

#### Does Daily Rumination Moderate the Daily Association Between Anxious and Depressed Mood?

We examined both rumination about anxious mood and rumination about sad mood. First, daily anxious mood, daily anxious rumination, and their interaction were included in a multilevel model. As shown in Table 2, the interaction term was significant. To decompose the interaction, simple slope tests were conducted following the procedures of Aiken and West (1991). As predicted, daily anxious mood was more predictive of daily depressed mood on days when anxious rumination was high (defined as one SD above the grand mean; $b = .53$, SE $= .05$,

**Table 1** Between-subjects bivariate correlations among daily diary variables aggregated across observations

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|---|---|
| 1. Anxious mood | – | | | | | | | | |
| 2. Depressed mood | .74** | – | | | | | | | |
| 3. Anxious rumination | .89** | .70** | – | | | | | | |
| 4. Depressive rumination | .69** | .90** | .77** | – | | | | | |
| 5. Negative attributions about anxious mood | .81** | .66** | .86** | .70** | – | | | | |
| 6. Perceived rejection | .46** | .48** | .49** | .53** | .55** | – | | | |
| 7. Perceived support | −.11 | −.10 | −.04 | −.11 | −.01 | −.17 | – | | |
| 8. Perceived criticism | .52** | .49** | .52** | .51** | .59** | .88** | −.16 | – | |
| 9. Interpersonal problem ratings | .47** | .51** | .49** | .48** | .55** | .39** | −.08 | .36** | – |
| Between-subjects descriptive data (aggregated across observations) | | | | | | | | | |
| Mean | 4.80 | 3.93 | 4.39 | 3.88 | 4.70 | 3.21 | 5.60 | 3.56 | 5.77 |
| Standard deviation | 1.86 | 1.78 | 2.16 | 2.03 | 2.45 | 1.94 | 2.12 | 1.97 | 1.79 |

Data were averaged across daily observation points to yield one data point per participant per variable

* $P < .05$, ** $P < .001$

**Table 2** Results of MLM analyses testing cognitive and interpersonal moderators of the concurrent association between daily anxious and depressed moods

| Outcome = daily depressed mood | Unstandardized estimate | SE | df | t | P |
|---|---|---|---|---|---|
| *Daily anxious rumination as moderator* | | | | | |
| Intercept | 3.59 | .17 | 52.74 | 20.57 | <.001 |
| Daily anxious mood | .43 | .05 | 50.42 | 9.40 | <.001 |
| Daily anxious rumination | .15 | .05 | 46.82 | 2.92 | .005 |
| Daily anxious mood × daily anxious rumination | .04 | .01 | 407.72 | 3.78 | <.001 |
| *Daily depressive rumination as moderator* | | | | | |
| Intercept | 3.80 | .10 | 60.19 | 36.53 | <.001 |
| Daily anxious mood | .29 | .04 | 49.56 | 7.90 | <.001 |
| Daily depressive rumination | .53 | .04 | 46.29 | 15.04 | <.001 |
| Daily anxious mood × daily depressive rumination | −.01 | .01 | 343.24 | −1.77 | .078 |
| *Daily negative attributions about anxious mood as moderator* | | | | | |
| Intercept | 3.90 | .21 | 77.31 | 18.42 | <.001 |
| Daily anxious mood | .40 | .04 | 777.01 | 9.99 | <.001 |
| Daily negative attributions about anxious mood | .25 | .06 | 68.34 | 4.23 | <.001 |
| Daily anxious mood × daily negative attributions | .04 | .01 | 662.91 | 3.91 | <.001 |
| Time | −.01 | .01 | 265.11 | −1.34 | .182 |
| *Daily perceived rejection as moderator* | | | | | |
| Intercept | 3.76 | .16 | 48.80 | 22.87 | <.001 |
| Daily anxious mood | .50 | .04 | 41.13 | 12.31 | <.001 |
| Daily perceived rejection | .16 | .03 | 24.93 | 4.72 | <.001 |
| Daily anxious mood × daily perceived rejection | −.01 | .01 | 197.06 | −0.95 | .344 |
| *Daily perceived support as moderator* | | | | | |
| Intercept | 3.75 | .17 | 49.07 | 22.27 | <.001 |
| Daily anxious mood | .52 | .04 | 45.13 | 12.37 | <.001 |
| Daily perceived support | −.10 | .03 | 39.46 | −3.42 | .001 |
| Daily anxious mood × daily perceived support | .00 | .01 | 267.17 | −0.29 | .772 |
| *Daily perceived criticism as moderator* | | | | | |
| Intercept | 3.73 | .16 | 47.51 | 22.74 | <.001 |
| Daily anxious mood | .52 | .04 | 38.00 | 12.87 | <.001 |
| Daily perceived criticism | .09 | .03 | 24.82 | 3.13 | .004 |
| Daily anxious mood × daily perceived criticism | .00 | .01 | 147.80 | 0.20 | .844 |
| *Daily interpersonal problems as moderator* | | | | | |
| Intercept | 3.84 | .17 | 52.33 | 22.21 | <.001 |
| Daily anxious mood | .43 | .05 | 50.59 | 9.34 | <.001 |
| Daily perceived criticism | .20 | .03 | 695.53 | 6.66 | <.001 |
| Daily anxious mood × daily perceived criticism | .00 | .01 | 556.48 | 0.49 | .623 |

All variables (predictor, moderator, and outcome) measured concurrently (at day *t*). Time was initially included in all models, but was subsequently dropped where non-significant (*P* > .2)

$t(80.70) = 9.91$, $P < .001$), compared to when anxious rumination was low (one SD below the mean; $b = .32$, SE = .05, $t(76.32) = 6.02$, $P < .001$).

Next, daily anxious mood, daily depressive rumination, and their interaction were entered into a separate model. In contrast to daily anxious rumination, daily depressive rumination did not significantly moderate the association between daily anxious and depressed moods (see Table 2).

**Do Daily Negative Attributions About Anxiety Symptoms Predict Stronger Associations Between Daily Anxious Mood and Concurrent Depressed Mood?**

Daily anxious mood was entered into a multilevel model along with daily negative attributions about anxious mood and the interaction between daily negative attributions and anxious mood. Supporting predictions, concurrent associations between daily anxious and depressed mood were

stronger at higher levels of negative attributions about anxious mood more negatively (one SD above mean; $b = .44$, SE $= .04$, $t(777.31) = 10.55$, $P < .001$) than at lower levels of negative attributions about anxious mood (one SD above mean; $b = .36$, SE $= .04$, $t(772.25) = 8.77$, $P < .001$).

### Do Daily Interpersonal Factors Moderate the Daily Association Between Anxious and Depressed Moods?

Following the same procedures as listed above, we next tested daily perceived rejection, support, and criticism and daily interpersonal problems (each separately) as moderators of the concurrent association between daily depressed and anxious moods. As shown in Table 2, no interpersonal factors emerged as significant moderators (all $p$s > .05).

### Moderators of Lagged Association Between Anxious Mood at Day $t - 2$ and Depressed Mood at Day $t$

We next tested for moderation of the association between anxious mood and later depressed mood. In each analysis, depressed mood at day $t$ was the outcome variable, and anxious mood and the moderator variable were each lagged at day $t - 2$ and entered along with their interaction and time. Results are presented in Table 3. No cognitive variables (including anxious rumination, depressive rumination, and negative attributions about anxious mood) significantly interacted with anxious mood to predict later depressed mood. However, two interpersonal variables emerged as significant moderators. First, perceived rejection significantly moderated the lagged association between anxious mood and later depressed mood. We decomposed this interaction following Aiken and West's (1991) procedures. Anxious mood was a stronger and significant predictor of later depressed mood at high levels (one SD above mean) of perceived rejection ($b = .18$, SE $= .05$, $t(18.96) = 3.66$, $P < .001$), compared to at low levels (one SD below mean) of perceived rejection; at low levels, anxious mood did not significantly predict later depressed mood ($b = .05$, SE $= .05$, $t(415.64) = 1.00$, $P = .319$).

Next, interpersonal problem ratings significantly moderated the association between anxious mood and later depressed mood. Decomposition revealed that at high levels of interpersonal problems, anxious mood significantly predicted later depressed mood ($b = .20$, SE $= .05$, $t(56.13) = 3.76$, $P < .001$). In contrast, at low levels of interpersonal problems, anxious mood was not a significant predictor of later depressed mood ($b = .05$, SE $= .06$, $t(73.97) = .81$, $P = .423$). Perceived support and criticism did not moderate the lagged association between anxious and depressed moods.

## Discussion

Findings yielded several interesting patterns. First, we found that daily cognitions about anxious mood moderated the concurrent association between daily anxious mood and daily depressed mood. Specifically, anxious and depressed moods were most strongly associated on days when people (a) ruminated about their anxiety symptoms, and (b) made negative attributions about their anxiety symptoms (i.e., viewed them as uncontrollable, unrelenting, and likely to negatively impact their lives). Although limited prior research has examined cognitive moderators of the association between anxiety and depression (and no prior work has examined moderators of the daily association between anxious and depressed moods), these results converge with a few existing studies. For example, Starr and Davila (in press) showed that the tendency to ruminate and make hopeless inferences when anxious moderated the cross-sectional association between self-reported anxiety and depression symptoms (also see Hankin 2008). The current study extends these findings to within-person patterns of daily reports of depressed and anxious moods, helping to clarify the day-to-day micro-processes by which symptoms co-occur.

Interestingly, daily depressive rumination did not interact with anxious mood to predict depressed mood (although daily depressive rumination was marginally significant as a moderator). This discrepancy is consistent with the notion that anxious rumination has correlates and consequences distinct from those of depressive rumination (Rector et al. 2008). The fact that anxious rumination was more predictive of symptom co-occurrence is also in line with the idea that ruminating about anxiety symptoms creates a vulnerability to co-occurring depressive symptoms, perhaps by disrupting adaptive problem-solving or provoking recall of negative autobiographical memories (Starr and Davila in press). Depressive rumination may, however, still play a role in anxiety-depression co-occurrence (Hankin 2008), and future research should further identify and explore clinically meaningful ways in which anxious and depressive rumination differ.

In an important caveat, the current sample met criteria for GAD, the defining feature of which is worry. Several researchers have noted substantial construct overlap between worry and rumination. Worry is typically considered future focused and has been more strongly linked to anxiety than depression, whereas rumination is typically considered present- or past-focused and has been strongly linked to depressive symptoms; overall, research suggests that these are related but distinct constructs (Fresco et al. 2002; McLaughlin et al. 2007; Muris et al. 2004; Nolen-Hoeksema et al. 2008; Watkins et al. 2005; although note that previous studies have focused on depressive

**Table 3** Results of MLM analyses testing cognitive and interpersonal moderators of lagged association between anxious mood at day $t − 2$ and depressed mood at day $t$

| Outcome = daily depressed mood$_t$ | Unstandardized estimate | SE | df | t | P |
|---|---|---|---|---|---|
| *Daily anxious rumination as moderator* | | | | | |
| Intercept | 3.46 | .25 | 109.61 | 13.77 | <.001 |
| Daily anxious mood$_{t−2}$ | .01 | .05 | 84.66 | 0.15 | .885 |
| Daily anxious rumination$_{t−2}$ | .17 | .05 | 823.49 | 3.44 | .001 |
| Daily anxious mood$_{t−2}$ × daily anxious rumination$_{t−2}$ | .01 | .01 | 204.28 | 0.49 | .622 |
| Time | −.03 | .02 | 228.55 | −1.84 | .067 |
| *Daily depressive rumination as moderator* | | | | | |
| Intercept | 3.43 | .23 | 99.70 | 15.10 | <.001 |
| Daily anxious mood$_{t−2}$ | .04 | .04 | 48.51 | 0.83 | .412 |
| Daily depressive rumination$_{t−2}$ | .21 | .04 | 736.72 | 5.19 | <.001 |
| Daily anxious mood$_{t−2}$ × daily depressive rumination$_{t−2}$ | .00 | .01 | 287.42 | 0.42 | .677 |
| Time | −.03 | .01 | 245.63 | −1.77 | .078 |
| *Daily negative attributions about anxious mood as moderator* | | | | | |
| Intercept | 3.64 | .28 | 100.10 | 13.19 | <.001 |
| Daily anxious mood$_{t−2}$ | .00 | .07 | 26.55 | −0.05 | .959 |
| Daily negative attributions about anxious mood$_{t−2}$ | .27 | .08 | 38.32 | 3.56 | .001 |
| Daily anxious mood$_{t−2}$ × daily negative attributions$_{t−2}$ | .00 | .02 | 127.33 | −0.02 | .988 |
| Time | −.03 | .02 | 220.01 | −1.94 | .054 |
| *Daily perceived rejection as moderator* | | | | | |
| Intercept | 3.47 | .26 | 93.12 | 13.57 | <.001 |
| Daily anxious mood$_{t−2}$ | .11 | .04 | 748.55 | 3.07 | .002 |
| Daily perceived rejection$_{t−2}$ | .04 | .04 | 19.24 | 1.04 | .310 |
| Daily anxious mood$_{t−2}$ × daily perceived rejection$_{t−2}$ | .02 | .01 | 107.01 | 1.98 | .050 |
| Time | −.03 | .02 | 221.35 | −1.80 | .074 |
| *Daily perceived support as moderator* | | | | | |
| Intercept | 3.47 | .25 | 94.80 | 13.79 | <.001 |
| Daily anxious mood$_{t−2}$ | .12 | .04 | 38.80 | 2.81 | .008 |
| Daily perceived support$_{t−2}$ | −.04 | .03 | 720.15 | −1.04 | .300 |
| Daily anxious mood$_{t−2}$ × daily perceived support$_{t−2}$ | .00 | .01 | 208.67 | 0.07 | .942 |
| Time | −.03 | .02 | 227.03 | −1.85 | .066 |
| *Daily perceived criticism as moderator* | | | | | |
| Intercept | 3.48 | .25 | 94.21 | 13.67 | <.001 |
| Daily anxious mood$_{t−2}$ | .14 | .04 | 36.70 | 3.50 | .001 |
| Daily perceived criticism$_{t−2}$ | −.06 | .04 | 806.40 | −1.68 | .093 |
| Daily anxious mood$_{t−2}$ × daily perceived criticism$_{t−2}$ | .00 | .01 | 271.87 | −0.17 | .866 |
| Time | −.03 | .02 | 225.92 | −1.83 | .068 |
| *Daily interpersonal problems as moderator* | | | | | |
| Intercept | 3.48 | .27 | 101.86 | 13.10 | <.001 |
| Daily anxious mood$_{t−2}$ | .13 | .05 | 35.54 | 2.75 | .009 |
| Daily perceived criticism$_{t−2}$ | .03 | .04 | 616.27 | 0.65 | .516 |
| Daily anxious mood$_{t−2}$ × daily perceived criticism$_{t−2}$ | .03 | .01 | 292.98 | 2.10 | .036 |
| Time | −.03 | .02 | 204.91 | −1.49 | .137 |

rumination). However, given their high overlap, it may be important to more closely differentiate worry and rumination as mechanisms versus symptoms of GAD and depression.

We also found that anxious and depressed moods were more closely associated on days in which people made negative attributions about their anxiety (that is, they viewed it as difficult to control, unlikely to stop, and

negatively impactful). In prior research, negative attributions have typically been evaluated in regards to negative or positive life events (Abramson et al. 1989; Alloy et al. 2006; Fresco et al. 2006; Sturman et al. 2006). The idea that individuals similarly differ in how they appraise clinical symptoms such as anxious mood is relatively novel, but could help explain existing findings, such as elevated negative cognitive attributions among comorbid individuals, compared to purely anxious or depressed people (Fresco et al. 2006). Importantly, this study did not include a validated measure of cognitive attributions (such as the ASQ; Peterson et al. 1982), so it is unclear whether cognitive attributions of anxious mood is associated with the general tendency to make negative attributions about life events. Furthermore, the daily diary did not include symmetrical items evaluating attributions about depressed mood, so it is unclear if the attributions about other types of symptoms is also associated with symptom co-occurrence. However, the current findings test new ideas and introduce important venues for future research.

Both cognitive variables (anxious rumination and negative attributions about anxiety symptoms) were only significant moderators of the concurrent association between daily depressed and anxious moods; they did not significantly moderate the association between anxious mood and later depressed mood. Perhaps the impact of cognitive factors is relatively instantaneous, and multi-day lags may be too long to detect how they unfold over time. Although moderation of concurrent symptom co-occurrence is an important question with interesting ramifications, it introduces interpretation challenges. As raised above, one explanation of our results is that ruminating or making negative attributions about anxiety symptoms directly places individuals at higher risk for depressive symptoms, fitting with causal models of anxiety-depression comorbidity (Starr and Davila in press; Wittchen et al. 2003). However, several alternative explanations could also reasonably explain results. Elevated depressive symptoms could lead to more negative cognitions about anxiety symptoms. Co-occurring depressive symptoms could be a marker of greater symptom severity, which could be associated with more negative cognitive states. Rumination and negative cognitive attributions could represent greater general impairment, which in turn has been associated with anxiety-depression comorbidity in numerous studies (e.g., Lewinsohn et al. 1995). Ultimately, the current analyses provide preliminary evidence that cognitive responses to anxiety symptoms may be associated with symptom co-occurrence, but the specifics about whether and how these cognitive processes actually contribute to the development of symptom co-occurrence and disorder comorbidity needs much more thorough exploration.

In contrast, two interpersonal factors, daily interpersonal problems and perceived rejection, emerged as significant moderators of the lagged association between anxious mood and later depressed mood. Specifically, anxiety symptoms seem to be more likely to lead to later depressive symptoms when the anxiety is accompanied by feelings of rejection or interpersonal hassles. The lagged analyses provide stronger support for the idea that these factors actually help contribute to symptom co-occurrence, but how and why this occurs remains unclear. Although we tested moderation and not mediation, one might wonder whether anxiety-related behaviors sometimes actively elicit social rejection and interpersonal stressors, which subsequently provoke depressive symptoms. Alternatively, co-occurrence between anxious mood and interpersonal problems may suggest that the anxiety symptoms often center on interpersonal relationships (e.g., worry about rejection), and in turn, these interpersonally-focused anxiety symptoms may be particularly depressogenic. Finally, the anxious mood and interpersonal dysfunction may develop separately, but experiencing both simultaneously may be particularly dysregulating. Our moderation analyses are unable to distinguish between these possibilities, and future research should attempt to explicate why the combination of anxiety symptoms and interpersonal problems seems to elevate the likelihood that depressed mood will develop in later days.

Despite these caveats, our findings provide some preliminary indication that interpersonal factors may play an important role in the generation of anxiety-depression co-occurrence. This idea fits with ample research supporting a potent connection between depression and interpersonal dysfunction (Joiner and Timmons 2009) and a growing literature suggesting a link between anxiety and interpersonal problems (Beck 2010). Little research has investigated the role of interpersonal dysfunction in anxiety-depression co-occurrence and comorbidity, though the few existing studies support a link between co-occurring anxiety and depression and interpersonal problems, particularly greater conflict, alienation, and stress generation, and fewer friendships (Connolly et al. 2010; Lewinsohn et al. 1995; Starr and Davila 2008). In a rare attempt to test interpersonal factors as a mechanism of anxiety-depression co-occurrence, Grant et al. (2007) found that negative interpersonal styles (specifically avoidance of expressing emotion) mediated the association between social anxiety and depressive symptoms 1 year later; however, this interesting hypothesis has not been applied to other anxiety disorders. Future research should continue to explore the role of interpersonal factors in bridging comorbid disorders.

Importantly, our self-report indicators do not necessarily reflect actual interpersonal behaviors; they instead reflect perceptions of social events, which may become distorted in synchronization with fluctuations in anxious and depressed mood. This distinction is particularly critical in

light of evidence suggesting a greater discrepancy between self- and informant-reports of interpersonal behaviors for people with GAD compared to controls, with GAD participants self-reporting more negative ratings of their interpersonal problems than do their peers (Eng and Heimberg 2006). Although examining self-report ratings is a necessary first step (as individuals are an incontrovertibly important source of information on their own behaviors), future research should explore informant-reported or observationally-assessed interpersonal behaviors in the context of co-occurring depression and anxiety to more closely ascertain whether actual events versus distorted perceptions more closely contribute.

This study should be evaluated within the context of its methodological limitations. First, items included in the diary were generally face-valid indicators, and reliability and validity of these measures are unclear. Unfortunately, at the time of study completion no measures of the constructs of interest have to our knowledge been systematically validated for use in diary studies (Ebner-Priemer and Trull 2009) and validity of measures for within-person data analysis cannot be inferred from between-subject studies (Cranford et al. 2006). Furthermore, diary studies require item brevity to maximize compliance (Morren et al. 2009), so more extensive measures could not be employed. Consequently, single-item measures are commonly employed in diary research (Brinker and Dozois 2009; Mor et al. 2010; Swendsen 1998). However, it is possible that the single-item measures did not fully capture the complexities of the constructs they were intended to measure. Single-item measures often perform as well as longer instruments when the measured construct is relatively concrete (Bergkvist and Rossiter 2007); for example, a single item assessing perceived criticism is more predictive of depressive relapse than longer measures of expressed emotion and related constructs (Hooley and Teasdale 1989). However, several of the constructs assessed here are more complex and may require multiple items to fully capture different domains. Future studies should utilize validated measures, as they become available, to explore the current research questions.

In addition, the current study explored a relatively narrow range of the many possible cognitive and interpersonal moderators and mechanisms of mood co-occurrence. Future studies should use similar methods to explore other possible factors, including meta-worry, anxiety sensitivity, experiential and behavioral avoidance, attachment-related behaviors, reassurance seeking, and rejection sensitivity. It would also be informative to identify factors that protect against the development of co-occurring symptoms. For example, the degree to which people accept their anxiety symptoms (vs. engaging in self-destructive behaviors to avoid them) may reduce the likelihood that they will develop co-occurring depressive symptoms.

The current sample was recruited for GAD. Given that no similar studies have been conducted on any anxiety disorder, GAD seems like a reasonable starting point, especially given its pronounced co-occurrence with depression (Kessler et al. 2005). Furthermore, given the significant symptom overlap between GAD and depression, exploring within-person associations among symptoms allows us to better understand associations between anxiety and depression outside of the confines of taxonomical limitations. However, the question remains whether other anxiety disorders would have produced similar or differing results. As noted previously, the prominence of worry as a hallmark of GAD may impact the likelihood of rumination. In addition, although research has begun to specifically link GAD to interpersonal problems (Eng and Heimberg 2006; Newman and Erickson 2010), other anxiety disorders, such as social phobia, may have a stronger interpersonal component (Alden and Taylor 2004; Darcy et al. 2005; Davila and Beck 2002; Grant et al. 2007; Stangier et al. 2006), and interpersonal factors may be more likely to moderate co-occurrence of depressive symptoms for these disorders. Indeed, as a significant percentage (42%) of our sample met criteria for an additional anxiety disorder, we cannot be certain that effects found in this study are specific to GAD; it is possible that moderation effects were driven by comorbid disorders. We encourage researchers to explore these ideas in samples with anxiety disorders other than GAD.

In an additional limitation, our sample included relatively few men, precluding the examination of potentially interesting gender effects. Although our predominantly female sample is consistent with increased rates of internalizing disorders among women (Armstrong and Khawaja 2002), future studies should ensure that results can be adequately generalized to men and examine gender differences in the daily co-occurrence of depressed and anxious moods. Finally, our sample was small, and although our 21-observation repeated measures design allowed for sufficient power for analyses, future research should replicate these results in larger samples.

Despite the limitations of the current study, we believe it has important practical and conceptual ramifications. For example, our results present clear clinical implications. Studies have suggested that comorbidity decreases the effectiveness of psychosocial interventions (e.g., Young et al. 2006), perhaps because the complex interplay of cognitive and interpersonal factors with co-occurring symptoms presents challenges that reduce treatment efficacy. Better understanding these factors may help clinicians overcome these difficulties. For example, anxious rumination and negative attributions about anxiety symptoms may be important targets of treatment, as reducing these tendencies may decrease the likelihood of

co-occurring depressive symptoms. Clinicians should also be vigilant about how disruptions in interpersonal relationships interact with anxiety symptoms, as these too may contribute to co-occurring depressed mood. Teaching patients to better identify and reduce the impact that their anxiety has on others, or simply helping them to improve the overall quality of their interpersonal relationships, may help reduce overall distress. Similarly, patients may also benefit from learning how to alter distorted perceptions of the social environment that may emerge with anxiety symptoms.

Furthermore, although the daily symptom co-occurrence explored in this study should not be confused with disorder comorbidity, our results may at least provide the basis for new ideas about the origins of comorbidity. Recent research has moved increasingly toward structural models of comorbidity of anxiety and depression (Barlow 2002; Clark and Watson 1991; Mineka et al. 1998), attributing comorbidity to shared structural components and nosological shortcomings. Although it is valuable to explore the natural boundaries between anxiety and depression, we hope that this does not come at the expense of identifying how and why anxiety and depression co-occur—that is, identifying mechanisms of comorbidity. We hope that future researchers will explore whether and how cognitive and interpersonal factors such as anxious rumination, negative attributions about symptoms, perceived rejection, and interpersonal problems produce conditions under which anxiety and depression are more likely to co-occur.

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