

The Interaction of Co-rumination, Coping Strategies, and Stress in Predicting Depression and  
Anxiety

By

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## Abstract

Co-rumination, defined as a repetitive, problem-focused dialogue with close friends, has been demonstrated to be a cognitive vulnerability factor for both depression and anxiety. This risk factor has been posited as one explanation to why women have higher rates of these mental health issues than men, despite also reporting higher rates of social support. Due to co-rumination's relationship to both adaptive and maladaptive outcomes, recent research has proposed that individual's coping abilities may be important in determining whether co-rumination predicts emotional difficulties. The current study proposed that problem-solving, emotion coping, and different types of social support would interact with co-rumination in order to differentially predict depression and anxiety. Current stress level was predicted to also interact with co-rumination and coping variables to predict these outcomes. A sample of 63 female undergraduate students completed measures of co-rumination, coping, stress, and anxiety and depressive symptoms. Findings indicated that co-rumination, coping, and stress did not interact to predict depressive symptoms. Functions of social support individually predicted depressive symptoms. The relationship between co-rumination and anxiety varied as a function of both appraisal support and stress level. The present findings highlight the need for more research in this area and especially further exploration of the role of co-rumination in anxiety.

*Keywords:* anxiety, co-rumination, depression, emotion coping, problem-solving, social support, stress

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Depression and anxiety disorders are some of the most common mental health issues in the United States (U.S.). Approximately 16 million adults aged 18 years and older have experienced at least one major depressive episode in the last year (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014). Further, anxiety disorders affect approximately 40 million adults aged 18 years and older each year (National Institute of Mental Health [NIMH], 2012). The prevalence of both major depression and anxiety disorders is higher in women than men. Women are 70% more likely than men to experience a depressive episode during their lifetime and 60% more likely than men to experience an anxiety disorder (NIMH, 2012).

There are many different ways in which individuals try to cope with the distressing feelings associated with anxiety disorders and major depression. Risk for these disorders is often explained in terms of cognitive vulnerability factors. One of these factors, rumination, is defined as the excessive focus on negative thoughts surrounding one's distress, including its possible causes and consequences (Nolen-Hoeksema, 1991). The response styles theory postulates that rumination exacerbates depression by interfering with the effective problem-solving (Nolen-Hoeksema, 1991). Rumination is similar to worry, which is traditionally thought of as being characteristic of anxiety. The difference between these cognitive vulnerability factors is that rumination involves dwelling on bad feelings and experiences from the past, whereas worry focuses on the potential negative outcomes of future events (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). More recently, though, theory has shed light on how rumination can be manifested in social relationships to confer risk for both depressive and anxiety symptoms.

When people excessively discuss negative information for extensive periods of time, both partners involved in the dialogue may be at risk for negative outcomes. Co-rumination is

described as a social process that involves intense discussion of a problem in which the predominant focus is on the negative aspects of the problem and the emotions associated with it (Rose, 2002). Research has found that extensively discussing problems in this way (i.e., co-ruminating) can lead to internalizing symptoms in either partner in the dyad, regardless of which one has initiated the co-ruminative dialogue (Rose, 2002). Another important aspect of co-rumination is that, due to its nature of substantial and repetitive self-disclosure, those who co-ruminate also report having close, high-quality friendships (Rose, 2002; Rose, Carlson, & Waller, 2007). As discussed in coping literature, having close relationships has generally been found to be protective against emotional difficulties (e.g., Bukowski, Newcomb, & Hartup, 1996). Thus, co-rumination functions as a double-edged sword: On one hand, it can account for increased relationship closeness, a protective mechanism against emotional difficulties, but on the other hand, it is a risk factor for emotional difficulties such as depressive symptoms (Hankin, Stone, & Wright, 2010).

As a risk factor for emotional difficulties, co-rumination has been found to consistently predict internalizing (i.e. depression and anxiety) symptoms (e.g., Hankin et al., 2010; Rose, 2002; Rose et al., 2007; Starr & Davila, 2009; Tompkins, Hockett, Abraibesh, & Witt, 2011). For example, Rose (2002) found a relationship between co-rumination and internalizing symptoms in a sample of children and adolescents. In a longitudinal follow-up study, co-rumination was predictive of depressive and anxiety symptoms, which reciprocally contributed to greater co-rumination in a sample of girls. (Rose et al., 2007). In boys, depressive symptoms predicted co-rumination, but not vice versa. Hankin, et al. (2010) conducted another longitudinal study that provided further evidence of co-rumination's prospective relationship with depression: In a sample of early to middle adolescents, co-rumination predicted internalizing symptoms in

both girls and boys after a 5-month follow-up. Thus, evidence demonstrates that co-rumination has a correlational, and potentially causal, relationship with depressive and anxiety symptoms, and this relationship is especially strong in females.

Several studies have also documented the adaptive function of co-rumination in facilitating close relationships (Hankin et al., 2010; Rose, 2002; Rose et al., 2007; Starr & Davila, 2009). For example, Rose (2002) found that co-rumination was associated with adjustment tradeoffs, such as higher self-reported quality of friendships, for both boys and girls. Even over time, co-rumination appears to be related to increased friendship quality and feelings of closeness in both males and females, despite also predicting later depressive and anxiety symptoms (Rose et al., 2007). Rose et al. (2007) postulated that the nature of co-rumination - an intimate and intense form of self-disclosure - is what may be contributing to individuals viewing their relationship in a positive light. Starr and Davila (2009) found that among adolescent girls, co-rumination was positively correlated with friendship security and communication, number of romantic experiences, and perceived interpersonal competence, in both same and opposite sex relationships. In contrast, Hankin et al. (2010) found that the relationship between co-rumination and later internalizing symptoms was mediated by interpersonal-dependent stress. They suggested that interpersonal risks of co-rumination may outweigh the initial benefits as they accumulate over time. In this way, excessively revisiting problems with others may later prove problematic for some adolescents as they continue through development.

The mixed role of co-rumination in both predicting emotional difficulties and high-quality friendships, at least concurrently, has led some researchers to associate co-rumination with the findings of gender differences in depression prevalence (Rose, 2002; Rose, Carlson, & Waller, 2007). That is, women report higher rates of depression than men, and also report co-

ruminating more often than men (Nolen-Hoeksema & Girgus, 1994; Pratt & Brody, 2008; Rose, 2002; Rose, Carlson, & Waller, 2007). Further, women also tend to report having a higher number of emotionally-close friendships than men, which the coping literature generally regards as a protective mechanism for emotional difficulties (Bukowski et al., 1996; Rose, 2002). It is noteworthy that the coping literature does not generally define emotionally-close in terms of content of the self-disclosure, whether positive or negative, but rather relies solely on self-report about perceived emotional closeness (Rose, 2002). Co-rumination consists of substantial and repetitive self-disclosure about issues perceived as problematic. Hence, depending upon the nature of the self-disclosure, emotionally-close relationships may be qualitatively different between those relationships between dyads who co-ruminate, and those who do not. That is, despite having emotionally-close friendships, the negative self-disclosure of co-rumination has a negative impact on emotional well-being. This phenomenon, therefore, purports to make sense of these seemingly discrepant findings.

Because co-rumination has been found to relate to both emotional difficulties and mechanisms protective of these same difficulties, researchers have proposed that there may be other factors that play a role in the relationships between co-rumination and depression and anxiety. In this way, there may be factors that interact with co-rumination in order to confer risk for, or protect against, depression and anxiety. Some recent studies have alluded to the importance of coping variables in the relationship between co-rumination and depression. For example, Hankin et al. (2010) suggested that coping abilities may be influential in an individual's trajectory of internalizing symptoms as well as in the transactional relationship among co-rumination, interpersonal stressors, and internalizing symptoms. Hence, a dyadic partner's coping abilities may affect his or her willingness to participate in co-rumination. There

may also be individual differences in the dyadic partner's ability to cope with the sharing of negative affect. Some individuals may rely on other adaptive coping abilities that interact with co-rumination in a way that is protective of emotional difficulties. However, no research to date has explored coping factors that may change the relationship between co-rumination and depression/anxiety symptoms.

Only one study has examined the relationship of coping mechanisms and co-rumination. Tompkins et al. (2011) investigated the association between co-rumination and general coping efforts in a sample of adolescents. Co-rumination was positively related to youth self-rated anxiety/depression symptoms and overall coping, which included primary and secondary control coping, disengagement, involuntary engagement, and involuntary disengagement. Co-rumination was negatively associated with youth reports of aggressive symptoms, number of friends, and teacher ratings of social acceptance. Primary and secondary control coping were protective of depressive symptoms, while all other coping strategies were positively associated with depression. Co-rumination and secondary coping (which includes acceptance, cognitive restructuring, distraction, and positive thinking) each accounted for a small albeit unique amount of variance in internalizing symptoms. Although these findings provide preliminary evidence for the connection between co-rumination and coping variables, specifically in the context of depression and anxiety symptoms. As previous literature has suggested, the relationship between co-rumination and depression/anxiety may change in the context of different coping variables. Yet, there has been no further exploration of how co-rumination and coping may interact to predict emotional difficulties.

The present study explored three potential interactive effects of co-rumination and coping strategies, specifically in regards to their ability to predict depressive symptoms. First, Star and

Davila (2009) found that co-rumination was related to depression concurrently, but did not predict longitudinal changes in depression. They suggested that this finding may deviate from those of Rose et al. (2007) because there may be “certain conditions under which co-rumination increases risk for depression” (p. 32). More specifically, they hypothesized that if co-rumination interferes with effective problem-solving, then the extensive discussion of problems would be more likely to lead to depressive symptoms. This hypothesis parallels Nolen-Hoeksema’s (1991) response styles theory of depression, which states that rumination produces depression by interfering with effective problem-solving. Conversely, Starr and Davila (2009) also hypothesized that individuals with stronger problem-solving skills may experience more adaptive outcomes from co-rumination. Thus, if individuals are able to generate solutions as a result of extensive discussion of problems, then for these individuals, co-rumination may be helpful rather than harmful to mental health (Starr & Davila, 2009).

Second, while co-ruminating, the dyadic partners are encouraging and eliciting emotional expression from one another, particularly expression of negative emotions and feelings. Tompkins et al. (2011) demonstrated that a coping strategy such as secondary control coping, which included acceptance, cognitive restructuring, distraction, and positive thinking, accounted for unique variance in internalizing symptoms. Therefore, if an individual is able to engage in this type of strategy while co-ruminating, this may introduce a way to palliate negative emotions brought up during the dialogue. Emotion coping is particularly relevant to co-rumination, in that co-rumination is the excessive sharing of negative emotions and of problems.

Third and finally, research has clearly demonstrated the linkage between co-rumination and close, high-quality, friendships as both an association and as a predictive, causal relationship (i.e., co-rumination predicting close friendships). However, the effects of these two coping styles

have not yet been explored in conjunction in terms of producing potential interactive effects. These variables have never been taken into account together to see their simultaneous effect on depression or anxiety. For the purposes of the current study, a measure of social support was used. Social support has been divided into different functions, including tangible, appraisal, self-esteem, and belonging support (Cohen & Hoberman, 1983). Tangible support refers to the perceived availability of material aid; appraisal support is the perceived availability of someone to talk to about issues; self-esteem support refers to the perceived availability of a positive comparison when comparing oneself to others; and belonging support is the perceived availability of people one can do things with (Cohen & Hoberman, 1983, p. 104).

These studies implicate the importance of different types of coping strategies in co-rumination and depression as well as co-rumination and anxiety. No studies to date have specifically taken into account the effects of either the coping strategies of social support, problem-solving, or emotion coping along with co-rumination when predicting depression or anxiety. Therefore, the first aim of the present study was to investigate whether co-rumination interacts with these different coping strategies to differentially predict these outcomes. The second aim of the study was to examine the role of stress in the interaction of these coping variables. It has been suggested that coping mechanisms are protective of emotional difficulties for those experiencing high levels of stress, but are relatively unimportant for those experiencing low levels of stress (Cohen & Hoberman, 1983). Further, Hankin et al. (2010) found that interpersonal stressors were important in explaining both the relationship between internalizing symptom and later elevations in co-rumination, and the relationship between co-rumination and later depressive symptoms. A measure of stress relevant to the current sample (i.e. college students) was used to investigate this relationship.

The study tested the following hypotheses: (1) The overall sample would demonstrate that co-rumination is related to depressive and anxiety symptoms in the context of higher levels of the coping strategies problem-solving, emotion-focused coping, and different functions of social support. (2) Lower levels of coping mechanisms, to include co-rumination would be more strongly related to depressive and anxiety symptoms. More specifically, co-rumination was hypothesized to interact with the social support functions of self-esteem and belonging support to predict lower levels of depressive and anxiety symptoms. (3) Levels of co-rumination were predicted to interact with appraisal support and be associated with higher levels of depression and anxiety. (4) In the context of higher levels of stress, the interaction of co-rumination and the aforementioned coping variables would be more strongly related to depression and anxiety than in the context of lower levels of stress.

In order to address these hypotheses, these interactive relationships were examined in a sample of female participants from an introductory psychology course. Participants were selected based on their scores on a pre-screen measure. They completed widely-used measures of coping, social support, depression, and anxiety, as well as Rose's (2002) measure of co-rumination and a measure of stress intended for undergraduate students.

## **Method**

### **Participants**

Participants in this sample were 63 female college students recruited from introductory psychology courses at the University of Kansas. Recruitment took place through a website provided by the university using a research pool of students recruited from introductory psychology classes. Study participants were required to be at least 18 or older and to have

indicated that they were female on the prescreening demographics questionnaire. Those who had scores on the Beck Depression Inventory-II (BDI-II; Beck, Steer & Brown, 1996) between 3 and 30 on the prescreening questionnaire were able to sign up for the study. Data were only used from participants whose BDI-II scores fell within the range of 3 to 30 on the day of the study administration.

Participants ranged in age from 18 to 22 years old, and the entire sample consisted of women who indicated that they were single and had never been married. Participants endorsed that their years in school ranged from freshman to senior, with the majority reporting that they were currently freshmen (85.1%). The majority of the sample identified as Caucasian/White (68.9%), and other participants identified as African American (6.8%), Asian American (5.4%), Hispanic (5.4%), American Indian (1.4%), and Other (12.2%).

## Measures

**Co-rumination.** The Co-Rumination Questionnaire (CRQ; Rose, 2002) is a 27-item self-report measure which assesses tendency to co-ruminate with close friends. Nine content areas are assessed: (a) frequency of discussing problems, (b) discussion of problems instead of engaging in other activities, (c) encouragement of problem discussion, (d) encouragement by a friend discussing problems, (e) discussing the same problem repeatedly, (f) speculation about causes of problems, (g) speculation about consequences of problems, (h) speculation about parts of the problem that are not understood, and (i) focusing on negative feelings. Participants rate these items on a 5-point Likert scale, which ranges from 1 (not at all true) to 5 (really true). Total possible scores range from 27 to 135, with higher scores indicating higher levels of co-rumination. For example, some of the sample items include “When we talk about a problem that

one of us has, we try to figure out everything about the problem, even if there are parts that's we may never understand;" and "When we see each other, if one of us has a problem, we will talk about the problem even if we had planned to do something else together." The measure has demonstrated excellent internal reliability ( $\alpha = .96$ ; Rose, 2002).

Although this questionnaire was designed to assess co-rumination with closest, same-sex friends, the measure used in this study was adjusted to assess for co-rumination with any close friend. This seemed more appropriate given our sample of college-age students, whose closest friends may be of the opposite gender. This measure was also revised to ask about use of this coping strategy in the past month. The range of scores in the current sample were 33 to 111. Consistent with prior research, the scale demonstrated excellent internal consistency in the current study ( $\alpha = .93$ ).

**Social support.** The Interpersonal Support Evaluation List (ISEL; Cohen & Hoberman, 1983) is a 40-item self-report scale designed to measure perceived availability of social resources. This items in this measure were theoretically derived and were specifically created to cover the domain of socially supportive situations that a college student may experience. The 40 items are counterbalanced in that half are considered positive statements (e.g. "There are several people that I trust to help solve my problems") and the other half are negative (e.g. "Most of my friends are more interesting than I am"). These items can yield an overall score of social support as well as four separate subscales: tangible support, belonging support, self-esteem support, and appraisal support. Participants rate each item on a 4-point scale ranging from 0 (Definitely False) to 3 (Definitely True). The ISEL has demonstrated adequate internal reliability for the total support scale ( $\alpha = .77$ ) as well as the four individual subscales (cf. Cohen & Hoberman, 1983). This measure was revised to ask about use of social support during the past month. Within the

current study, all of the four subscales demonstrated adequate internal consistency (Appraisal Support:  $\alpha = .85$ ; Tangible Support:  $\alpha = .85$ ; Self-esteem Support:  $\alpha = .79$ ; Belonging Support:  $\alpha = .82$ ).

**Problem-solving and Emotion coping.** The Coping Orientation to Problems Experienced (COPE; Carver, Scheier, & Weintraub, 1989) is a 60-item self-report questionnaire designed to assess how one generally copes when under considerable stress. The 60 items yield 15 subscales that assess conceptually distinct and theoretically-derived dimensions of coping. Participants are asked to rate each item on a 4-point Likert scale ranging from 1 (I usually don't do this at all) to 4 (I usually do this a lot) to indicate their coping style. Carver et al. (1989) reported satisfactory psychometric properties for all of the 15 COPE subscales and established evidence for validity (cf. Carver & Scheier, 1993; Carver, Scheier, & Pozo, 1992). This measure was revised to ask about use of these coping strategies in the past month according to the situational instructions provided by Stanton et al. (2000). Carver et al. (1989) offered three different formats to include as the directions, i.e. dispositional, a time-limited version for a particular event, and a time-limited version for a particular period of time. To keep consistent with the other measures, the time-limited version for a particular period of time was used, asking about coping behaviors during the past month.

For the purposes of this study, the Active coping and Planning subscales used in the original article validating the scale (Carver et al., 1989), as well as other recent studies (Thompson, Mata, Jaeggi, Buschkuhl, Jonides, & Gotlib, 2010), were combined to form a measure of Problem-solving. This scale has previously demonstrated high internal consistency ( $\alpha = .93$ ; Thompson et al., 2010). In the current study, the problem-solving scale also demonstrated high internal consistency ( $\alpha = .84$ ). The Positive reinterpretation and growth and Acceptance

subscales from Carver et al. (1989) were compiled to form the Emotion coping scale in order to capture the similarities of secondary control coping. These scales were combined in order to parallel the facets of the secondary control coping scale (which include positive thinking, cognitive restructuring, acceptance, and distraction) used by Tompkins et al. (2011).

**General Life Stress.** The Undergraduate Stress Questionnaire (USQ; Crandall; Preisler, & Ausprung, 1992) was used to measure level of life stressors. This measure was designed specifically for undergraduate college students. The USQ is a self-report checklist questionnaire that consists of 83 items which represent major and minor life events. Total scores range from 0 to 83. Participants were asked to check items that they have experienced in the past week. The language of the measure has been revised slightly to ask about stressful life events in the past month, rather than the past week to maintain consistency. Also, the item “Problem with printing things out” has been expanded to include “printing things out, uploading, or e-mailing something” and item “Checkbook didn’t balance” was expanded to include “Check book/bank account didn’t balance” in effort of updating references. The USQ has previously demonstrated good internal consistency ( $KR-21 = .80$ ), adequate split-half reliability ( $\alpha = .71$ ) and good test-retest reliability ( $\alpha = .83$ ). With the current sample, the USQ also demonstrated adequate split-half reliability ( $\alpha = .782$ ). The scores in the current sample ranged from 7 to 47.

**Depression.** The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) is a 21-item self-report measure of depressive symptoms (e.g. loss of interest or pleasure, fatigue), which assesses presence of symptoms as well as severity. Participants were asked to rate items based on the degree to which they have had in these symptoms in the past two weeks. These items are rated on a 4-point Likert scale ranging from 0 (not at all) to 3 (all of the time). Some examples include “I do not feel sad” and “I’m so sad and unhappy that I can’t stand it”. A score between 0-

13 indicates minimal depression; 14-19 mild depression; 20-28 moderate depression; and 29-63 severe depression. In the current sample, scores ranged from 3 to 26. The BDI-II has demonstrated high internal consistency ( $\alpha = .91$ ; Beck, Steer, Ball & Ranieri, 1996) and a high test-retest reliability ( $r = .93$ ; Beck et al., 1996). The BDI-II demonstrated adequate reliability in the present study ( $\alpha = .79$ ).

**Anxiety.** The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) was used to assess the cognitive and behavioral symptoms of anxiety experienced in the past month. Symptoms include “numbness or tingling,” “feeling hot,” and “fear of the worst happening.” Participants rated each of 21 items on a Likert scale ranging from 0 (Not at all) to 3 (Severely: I could barely stand it). A score between 0-7 indicates minimal anxiety; 8-15 mild anxiety; 16-25 moderate anxiety; and 26-63 severe anxiety. The current sample’s scores ranged from 3 to 62. The BAI has demonstrated acceptable reliability, including high internal consistency ( $\alpha = .92$ ), and validity. Consistent with previous research, the BAI demonstrated high internal consistency within the current sample ( $\alpha = .91$ ).

## **Procedure**

Qualified participants were able to view a schedule with times that they could sign up to come into the lab to participate in the study. Up to five participants could sign up to participate in a single time slot. The researcher met participants in a previously-scheduled, quiet room where the researcher went over the consent form and study procedures. After consenting, the researcher administered the questionnaires. Upon completion, the researcher gave a debriefing form to each participant that included more information about the purpose of the study, contact information of the principal investigator, and referral sources in the community. If a participant endorsed any

suicidal ideation on the BDI-II (indicated by anything other than a 0 on item 9), a graduate student was notified by the researcher and subsequently followed up about the item with the participant during debriefing. Depending on level of severity, the graduate student gave referrals, established a safety plan or notified the appropriate agency.

## Results

First, skewness and kurtosis were examined following recommendations from West, Finch, and Curran (1995). No violations of assumptions were identified. The means and standard deviations of study variables are presented in Table 1. Correlations were run to assess the associations among predictor and outcome variables and are also presented in Table 1. It was noteworthy that co-rumination and stress did not have any significant relationships with other study variables. Anxiety and depressive symptoms were significantly related,  $r = .37, p < .01$ .

In order to test the hypothesis that co-rumination would be less strongly related to depressive and anxiety symptoms in the context of high levels of the identified coping variables, as well as in the context of lower stress, twelve separate hierarchical regression analyses were conducted. In the first step of each equation, co-rumination and one coping variable (i.e., problem-solving, emotion-focused coping, and functions of social support) were entered. In the second step, the two-way interaction of these variables (e.g. co-rumination by problem-solving) was entered. In the third step, the three-way interaction of co-rumination, one of the coping variables, and current life stressors was entered. Additionally, a multiple regression analysis was conducted assessing the two-way interaction between co-rumination and stress level. All of these steps were run using both depressive and anxiety symptoms as the outcome variable. To enhance

interpretability of the interactions, all of the predictor variables were centered prior to being entered into the equation, following the recommendations of Aiken and West (1991).

First, the relationship among co-rumination, problem-solving and depression was examined. Depressive symptoms were regressed on co-rumination, problem-solving, and stress level. Then, depressive symptoms were regressed on the interaction of co-rumination and problem-solving. Finally, depressive symptoms were regressed on the interaction between co-rumination, problem-solving, and stress level. As demonstrated in Table 2, both the predictor variables and their interactions were nonsignificant and thus did not significantly predict changes in depressive symptoms. Anxiety symptoms were also regressed on co-rumination, problem-solving, and stress level, as well as the two-way and three-way interactions among the variables. As with depressive symptoms, none of these variables were significant in contributing to anxiety symptoms (see Table 2 for standardized regression coefficients).

Second, the relationship among co-rumination, emotion coping, and stress level was examined, including the interactions between (a) co-rumination and emotion coping, and (b) co-rumination, emotion coping, and stress level. Both depressive and anxiety symptoms were regressed on each of these variables. As shown in Table 3, neither the predictor variables nor their interactions significantly predicted depressive or anxiety symptoms. This finding comes in contrast with study hypotheses, i.e., that the effects of co-rumination on depressive and anxiety symptoms vary as a function of emotion coping and levels of stress.

Third, depressive and anxiety symptoms were regressed on (a) co-rumination, self-esteem support, and stress level; (b) the interaction of co-rumination and self-esteem support; and (c) the interaction of co-rumination, self-esteem support, and stress level. As shown in Table 4, self-

esteem support significantly contributed to changes in levels of depressive symptoms,  $\beta = -.36$ ,  $t = -3.09$ ,  $p < .01$ , which suggested that increases in self-esteem support are associated with decreases in depressive symptoms. In terms of anxiety symptoms, neither the individual variables, two-way, or three-way interactions were significant.

Fourth, depressive and anxiety symptoms were regressed on (a) co-rumination, belonging support, and stress level; (b) the interaction of co-rumination and belonging support; and (c) the interaction of co-rumination, belonging support, and stress level. As demonstrated in Table 5, belonging support significantly contributed to changes in levels of depressive symptoms,  $\beta = -.39$ ,  $t = -3.34$ ,  $p < .01$ , indicating a negative relationship between belonging support and depressive symptoms. Neither the two-way nor the three-way interaction significantly predicted depressive symptoms. In terms of anxiety, neither belonging support nor the two- or three-way interactions significantly contributed to changes in anxiety symptoms (see Table 5).

Fifth, depressive and anxiety symptoms were regressed on (a) co-rumination, appraisal support, and stress level; (b) the interaction of co-rumination and appraisal support; and (c) the interaction of co-rumination, appraisal support, and stress level (see Table 6). In terms of depression, appraisal support significantly predicted changes in depressive symptoms,  $\beta = -.27$ ,  $t = -2.25$ ,  $p < .05$ , meaning that as appraisal support increased, depressive symptoms tended to decrease. In terms of anxiety symptoms, the interaction of co-rumination and appraisal support contributed significantly to anxiety,  $\beta = .36$ ,  $t = 2.08$ ,  $p < .05$ . This interaction added significant variance above the individual terms entered in step one of the model,  $\Delta R^2 = .066$ ,  $p < .05$ . In a post-hoc analysis, this interaction was probed to examine this interaction was probed to examine simple slopes. To look at the simple slope for co-rumination, one standard deviation above and below the mean of co-rumination were examined. Results from the simple slope analysis

demonstrated that for those with high co-rumination, as appraisal support increased, anxiety symptoms also increased. On the other hand, for those with low co-rumination, as appraisal support increased, anxiety symptoms decreased (see Fig. 1 for a graphical representation).

Finally, depressive and anxiety symptoms were regressed on co-rumination and stress level, and their interaction. As shown in Table 7, neither co-rumination, stress level, nor their interaction contributed significantly to depressive symptoms. In terms of anxiety, the interaction of co-rumination and stress level contributed significantly to these symptoms,  $\beta = -.30$ ,  $t = -2.43$ ,  $p < .05$ , which added variance beyond the combination of the variable's individual contributions,  $\Delta R^2 = .086$ ,  $p < .05$ . This result suggests that the effects of co-rumination on anxiety symptoms varied as a function of stress level. A post-hoc analysis was conducted to examine simple slopes. In this analysis, one standard deviation above and below the mean of co-rumination were examined. Results from this analysis demonstrated that for those with high co-rumination, as stress level increased, anxiety symptoms decreased. On the other hand, for those with low co-rumination, as stress levels increased, anxiety symptoms increased (see Fig. 2).

## Discussion

In this study, I examined whether problem-solving, emotion coping, different functions of social support, and stress level in the presence of co-rumination were associated with differential levels of depressive and anxiety symptoms in a sample of women. The first aim of the study was to address whether the relationship between depressive/anxiety symptoms and co-rumination varied as a function of different coping mechanisms. The hypotheses that the associations between depressive/anxiety symptoms and co-rumination depended on the level of problem-solving and emotion coping were not supported. The hypotheses that the relationships between

depressive/anxiety symptoms and co-rumination depended on the social support functions of self-esteem and belonging support were also not supported. The relationship between depressive symptoms and co-rumination also did not vary as a function of appraisal support. However, as hypothesized, appraisal support was important in the relationship between co-rumination and anxiety symptoms. In regards to the second aim of this study, results indicated that the relationship between anxiety symptoms varied as a function of stress level.

The present finding that the relationship between anxiety symptoms and co-rumination varied as a function of appraisal support, i.e. having friends with whom to discuss issues, was in the same direction as hypothesized. That is, at higher levels of appraisal support, those who reported co-ruminating more often had higher levels of anxiety symptoms, and those who reported co-ruminating less often had lower levels of anxiety symptoms. Thus, for those who reported higher levels of co-rumination, having people available more often to talk to about issues appeared to also be associated with risk for anxiety symptoms. One explanation could be that the more friends one has available, those who have a tendency to co-ruminate experience more anxiety by discussing problems in contrast with those who report lower rates of co-rumination. On the other hand, for those who reported co-ruminating less often, higher levels of appraisal support contributed to decreases in anxiety symptoms. These findings support the notion that appraisal support is protective of anxiety, as long as one is engaging in discussion of issues that are not overall problem-focused and negative in content.

The second important finding of this study was that the relationship between anxiety symptoms and co-rumination varied as a function of stress. Interestingly, the results ran counter to the study hypothesis. Findings indicated that for those who had higher co-rumination scores, higher levels of stress were associated with lower levels of anxiety. Therefore, it appears that co-

rumination was protective of anxiety in the context of higher levels of stress. In contrast, for those who had lower co-rumination scores, higher levels of stress were associated with higher levels of anxiety. This is the first study that has investigated the relationship between co-rumination and general anxiety symptoms, excluding measures of internalizing symptoms which combine symptoms of both anxiety and depression. The only other study that has explored co-rumination and anxiety found that social anxiety and co-rumination had a positive relationship after controlling for depressive symptoms (Starr & Davila, 2009). Their finding was disparate from the current finding that co-rumination served as a protective factor of anxiety at higher levels of stress levels for the current sample.

Study results implicate the importance of stress and coping in the relationship between co-rumination and anxiety symptoms. It appears that co-rumination can function as a protective factor to anxiety in the context of stress, but also as a risk factor in the context of appraisal support. These findings support the notion that co-rumination may have different trajectories depending upon one's stress level and coping abilities. One difference between these studies and the current study was that the other studies have focused on samples of children and adolescents, while the current study used a sample of college students. Future research will need to elucidate how the coping function of co-rumination may change across the development. As Hankin et al. (2010) suggested, excessively revisiting problems with close friends may create problems for some adolescents as they get older. Clearly, further research is needed to elucidate the role of co-rumination in anxiety.

Finally, in the current sample, co-rumination did not significantly predict depression symptoms, as has been demonstrated in previous literature (Hankin et al., 2010; Rose, 2002; Rose et al., 2007; Starr & Davila, 2009; Tompkins et al., 2011). Again, this may be attributed to

differences in the developmental level of the current sample, but more research needs to be done to elucidate this finding. It is interesting to note that the only significant predictors of depressive symptoms were the functions of social support, i.e., self-esteem, belonging, and appraisal support. Although this was not the study's focus, the finding that social support has a negative relationship with depressive symptoms is consistent with a large body of literature that demonstrates the protective function of social support against depression as well as other mental health issues (Kendler, Myers, & Prescott, 2005).

In sum, these findings are indicative of the importance of the relationships between stress, coping, and emotional difficulties. One's strategies of coping with stress can predict his or her trajectory of depression and anxiety symptoms over time. Thus, it is important to elucidate the ways in which an individual copes with his or her environment—and of particular importance in co-rumination, the social environment. Coping abilities do not exist in a vacuum, and therefore more studies which assess the complexities of coping are important in determining how the risk for developing depression and anxiety is conferred. The current findings lend to the understanding of the complex process of co-rumination and how it functions to predict anxiety and depression symptoms in young adulthood.

These results should be interpreted acknowledging several limitations. First, the data were obtained from a sample of college students with limited diversity in backgrounds. That is, the sample consisted of female college students who were in attendance at the same university in similar introductory psychology courses. The sample's age range and ethnicities were also limited. However, the age range (i.e., 18 to 22) of the current sample is also a strength of the study in that co-rumination has been relatively unexplored in this age-ranged population. Second, this study did not investigate clinical levels of anxiety or depression. It is unclear whether the

present findings would generalize to those populations. Use of structured diagnostic assessment tools in future research could address this issue. Third, the emotion coping scale used in this study has often been correlated with distress (Austenfeld & Stanton, 2004). This is consistent with the current study, as emotion coping had positive correlations, albeit nonsignificant, with depression and anxiety. Thus, future research that explores these relationships could use the emotion approach coping scale, developed by Stanton, Kirk, Cameron, and Danoff-Burg (2000), in order to explore emotion coping without the potential overlap of distress. Finally, there are limitations to using a cross-sectional measure, especially when assessing coping. The present study assessed participants' coping styles within the past month, whereas it may be beneficial to assess trait-level coping styles. Nonetheless, I assessed for participants' stress level in the past month as well due to its potential influence on whether or not participants were presented with situations in which they needed to use these coping strategies.

The present study expands upon the much needed empirical work in the area of co-rumination. Although further research is needed to elucidate the role of co-rumination in depression and anxiety, the present findings implicate the importance of the relationship between co-rumination and anxiety. Because the results in this study seem to contradict the findings of previous research, this is an area of research that warrants further investigation. It is important that the effect of co-rumination on both depression and anxiety continues to be explored, especially in different-aged individuals. Determining the developmental context of co-rumination would allow for a better picture of how this coping mechanism changes over time as well as interacts with different coping mechanisms to predict mental health outcomes.

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## Appendices

**Table 1.**

*Descriptive Statistics for Study Variables.*

	<i>M</i>	<i>SD</i>	Minimum	Maximum
CRQ	77.6	16.49	33	111
COPE - Problem-solving	21.27	4.71	13	32
COPE - Emotion coping	22.92	4.13	15	32
ISEL - Appraisal support	24.32	5.18	7	30
ISEL - Self-esteem support	19.92	4.46	7	30
ISEL - Belonging support	23.67	4.90	6	30
USQ	27.71	9.27	7	47
BDI-II	9.65	4.77	3	26
BAI	25.60	14.68	3	62

*Note.* The Co-rumination Questionnaire (CRQ) is from Rose (2002); the Coping Orientation to Problems Experienced (COPE) is from Carver et al. (1989); the Interpersonal Support Evaluation List (ISEL) is from Cohen & Hoberman (1983); the Undergraduate Stress Questionnaire (USQ) is from Crandall et al. (1992); the Beck Depression Inventory-II (BDI-II) is from Beck et al. (1996).; and the Beck Anxiety Inventory (BAI) is from Beck et al. (1988).

**Table 2.***Correlations among Study Variables*

	1	2	3	4	5	6	7	8	9	10
1. Co-rumination	1	.155	-.086	-.047	-.054	.041	-.075	.023	.139	.153
2. Problem-solving	-	1	.502***	.316*	.385*	.203	.365**	.069	-.009	.233
3. Emotion coping	-	-	1	.232	.285*	.097	.271*	.192	.034	.129
4. Appraisal support	-	-	-	1	.580**	.725**	.682**	.047	-.270*	-.063
5. Self-esteem support	-	-	-	-	1	.590**	.566**	.019	-.366**	-.124
6. Belonging support	-	-	-	-	-	1	.658**	.070	-.368**	-.171
7. Tangible support	-	-	-	-	-	-	1	.021	-.168	-.111
8. Stress Level	-	-	-	-	-	-	-	1	.193	.183
9. Depression	-	-	-	-	-	-	-	-	1	.370**
10. Anxiety	-	-	-	-	-	-	-	-	-	1

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**Table 3.**

*Hierarchical Multiple Regression Analyses of Co-rumination, Problem-Solving, and Stress Predicting Depression and Anxiety Symptoms*

Coping/predictor variables	Depression	Anxiety
Step 1	$F\Delta(3, 59) = 1.193, R^2 = .057$	$F\Delta(3, 59) = 2.086, R^2 = .096$
Co-rumination	$\beta = .142, t = 1.107$	$\beta = .117, t = .936$
Problem-solving	$\beta = -.044, t = -.343$	$\beta = .204, t = 1.622$
Stress Level	$\beta = -.044, t = -.343$	$\beta = .166, t = 1.339$
Step 2	$F\Delta(4, 58) = .053, \Delta R^2 = .001$	$F\Delta(4, 58) = .196, \Delta R^2 = .003$
Co-rumination by Problem-solving	$\beta = -.030, t = -.230$	$\beta = .057, t = .443$
Step 3	$F\Delta(7, 55) = .508, \Delta R^2 = .025$	$F\Delta(7, 55) = 2.398, \Delta R^2 = .104$
Co-rumination by Problem-solving by Stress Level	$\beta = .116, t = .735$	$\beta = -.143, t = -.966$

**Table 4.**

*Hierarchical Multiple Regression Analyses of Co-rumination, Emotion Coping, and Stress Predicting Depression and Anxiety Symptoms*

Coping/predictor variables	Depression	Anxiety
Step 1	$F(3, 59) = 1.153, R^2 = .055$	$F(3, 59) = 1.426, R^2 = .068$
Co-rumination	$\beta = .136, t = 1.068$	$\beta = .159, t = 1.257$
Emotion coping	$\beta = .009, t = .072$	$\beta = .112, t = .872$
Stress Level	$\beta = .188, t = 1.454$	$\beta = .158, t = 1.231$
Step 2	$F(4, 58) = .606, \Delta R^2 = .010$	$F(4, 58) = .607, \Delta R^2 = .010$
Co-rumination by Emotion coping	$\beta = -.100, t = -.778$	$\beta = -.100, t = -.779$
Step 3	$F(7, 55) = .233, \Delta R^2 = .012$	$F(7, 55) = 1.628, \Delta R^2 = .075$
Co-rumination by Emotion coping by Stress Level	$\beta = .079, t = .538$	$\beta = .059, t = .423$

**Table 5.**

*Hierarchical Multiple Regression Analyses of Co-rumination, Self-Esteem Support, and Stress Predicting Depression and Anxiety Symptoms*

Coping/predictor variables	Depression	Anxiety
Step 1	$F\Delta(3, 59) = 4.529, R^2 = .187^{**}$	$F\Delta(3, 59) = 1.479, R^2 = .070$
Co-rumination	$\beta = .115, t = .979$	$\beta = .142, t = 1.129$
Self-esteem support	$\beta = -.364, t = -3.094^*$	$\beta = -.120, t = -.955$
Stress Level	$\beta = .197, t = 1.678$	$\beta = .182, t = 1.449$
Step 2	$F\Delta(4, 58) = .116, \Delta R^2 = .002$	$F\Delta(4, 58) = 2.468, \Delta R^2 = .038$
Co-rumination by Self-esteem support	$\beta = -.044, t = -.340$	$\beta = .215, t = 1.571$
Step 3	$F\Delta(7, 55) = .585, \Delta R^2 = .025$	$F\Delta(7, 55) = 2.688, \Delta R^2 = .114$
Co-rumination by Self-esteem support by Stress Level	$\beta = .075, t = .589$	$\beta = .208, t = 1.650$

Note. \* $p < .05$ , \*\* $p < .01$

**Table 6.**

*Hierarchical Multiple Regression Analyses of Co-rumination, Belonging Support, and Stress Predicting Depression and Anxiety Symptoms*

Coping/predictor variables	Depression	Anxiety
Step 1	$F\Delta(3, 59) = 5.090, R^2 = .206^{**}$	$F\Delta(3, 59) = 1.986, R^2 = .092$
Co-rumination	$\beta = .150, t = 1.293$	$\beta = .156, t = 1.257$
Belonging support	$\beta = -.389, t = -3.341^{**}$	$\beta = -.191, t = -1.532$
Stress Level	$\beta = .216, t = 1.859$	$\beta = .193, t = 1.549$
Step 2	$F\Delta(4, 58) = 1.225, \Delta R^2 = .016$	$F\Delta(4, 58) = .850, \Delta R^2 = .013$
Co-rumination by Belonging support	$\beta = -.132, t = -1.107$	$\beta = .118, t = .992$
Step 3	$F\Delta(7, 55) = .685, \Delta R^2 = .028$	$F\Delta(7, 55) = 2.689, \Delta R^2 = .115$
Co-rumination by Belonging support by Stress Level	$\beta = .064, t = .475$	$\beta = .136, t = .982$

Note. \* $p < .05$ , \*\* $p < .01$

**Table 7.**

*Hierarchical Multiple Regression Analyses of Co-rumination, Appraisal Support, and Stress Predicting Depression and Anxiety Symptoms*

Coping/predictor variables	Depression	Anxiety
Step 1	$F\Delta(3, 59) = 2.941, R^2 = .148^*$	$F\Delta(3, 59) = 1.249, R^2 = .060$
Co-rumination	$\beta = .122, t = 1.002$	$\beta = .146, t = 1.151$
Appraisal support	$\beta = -.274, t = -2.252^*$	$\beta = -.065, t = -.510$
Stress Level	$\beta = .203, t = 1.667$	$\beta = .183, t = 1.445$
Step 2	$F\Delta(4, 58) = .664, \Delta R^2 = .010$	$F\Delta(4, 58) = 4.347, \Delta R^2 = .066^*$
Co-rumination by Appraisal support	$\beta = -.140, t = .419$	$\beta = .362, t = 2.085^*$
Step 3	$F\Delta(7, 55) = .855, \Delta R^2 = .038$	$F\Delta(7, 55) = 2.530, \Delta R^2 = .106$
Co-rumination by Appraisal support by Stress Level	$\beta = .257, t = 1.348$	$\beta = .308, t = 1.665$

Note.  $*p < .05$

**Table 8.**

*Hierarchical Multiple Regression Analyses of Co-rumination and Stress Predicting Depression and Anxiety Symptoms*

Coping/predictor variables	Depression	Anxiety
Step 1	$F\Delta(2, 60) = 1.757, R^2 = .055$	$F\Delta(2, 60) = 1.765, R^2 = .056$
Co-rumination	$\beta = .135, t = 1.075$	$\beta = .149, t = 1.184$
Stress Level	$\beta = .190, t = 1.510$	$\beta = .180, t = 1.431$
Step 2	$F\Delta(3, 59) = .319, \Delta R^2 = .005$	$F\Delta(3, 59) = 5.914, \Delta R^2 = .086^*$
Co-rumination by Stress Level	$\beta = -.072, t = -.565$	$\beta = -.297, t = -2.432^*$

Note.  $*p < .05$

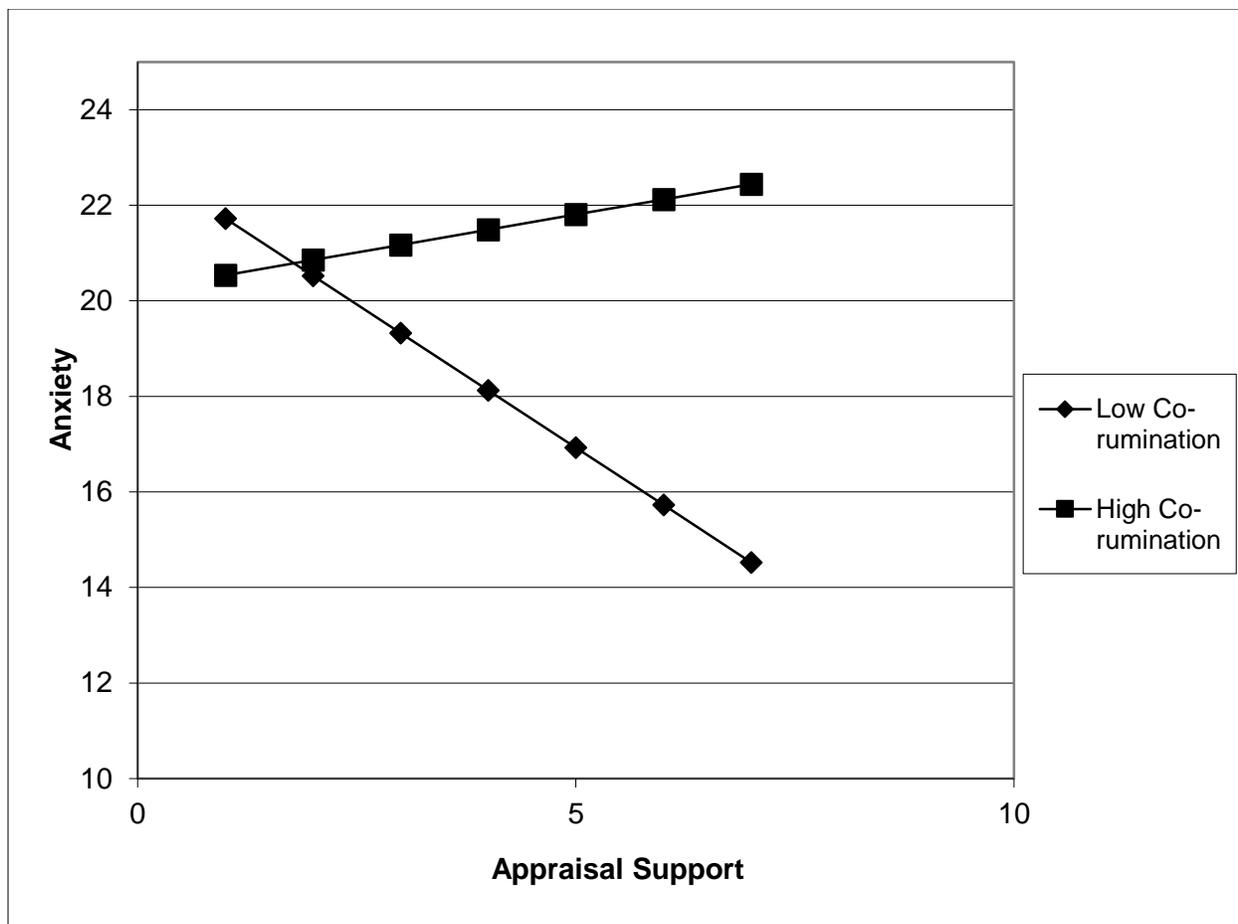


Figure 1. The interaction of co-rumination and appraisal support predicting anxiety symptoms.

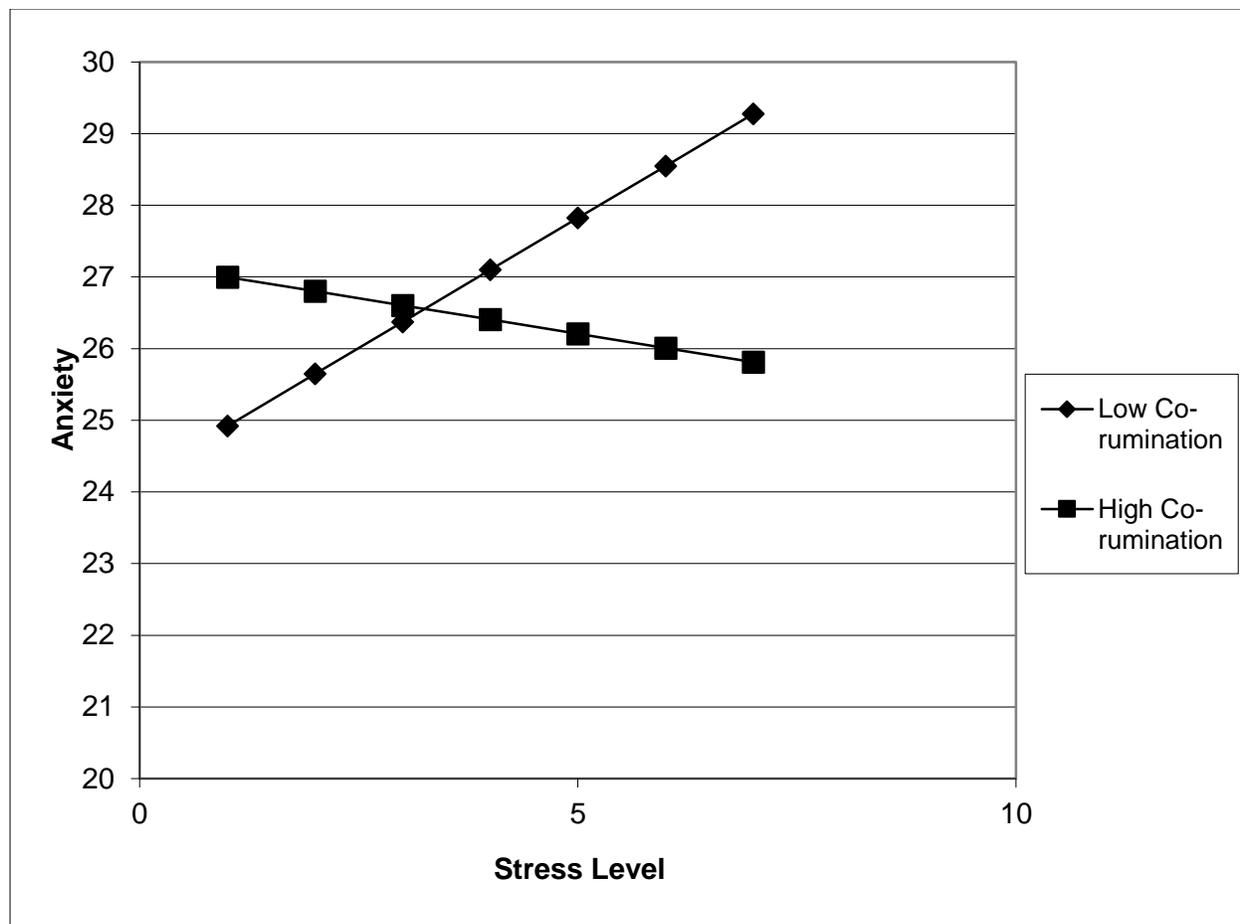


Figure 2. The interaction of co-rumination and stress level predicting anxiety symptoms.