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A Curvilinear Approach to Examining Co-Rumination and Depressive Symptoms

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A CURVILINEAR APPROACH TO EXAMINING CO-RUMINATION AND
DEPRESSIVE SYMPTOMS

by

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A Thesis Submitted in Partial Fulfillment
of the Requirements for a Degree with Honors
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Abstract

Co-rumination refers to a pattern of behavior within a dyadic relationship that involves repetitive discussion of personal problems with a focus on the negative thoughts and feelings that those problems create (Rose, 2002). In what has been described as an “adjustment trade-off,” individuals who engage in co-rumination tend to be at higher risk for developing depressive symptoms, but they also tend to experience higher levels of relationship satisfaction and intimacy with the individuals with whom they co-ruminate (Rose, 2002). It is generally assumed that higher levels of co-rumination are associated with higher levels of depressive symptoms in a positive linear relationship; however, this may not be the best way to capture the adjustment trade-off that defines co-rumination. This study examined whether the relationship between co-rumination and depressive symptoms could be better expressed using a quadratic, rather than a linear, regression through better accounting for the benefits of co-rumination, and while no significant differences were found between the two, correlations were found between co-rumination and both depressive symptoms and social support.

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Introduction

Suffering from depression can be a debilitating experience and one that affects countless people, most commonly females, around the world. Often described as experiencing feelings of sadness or being “down,” symptoms include a loss of interest in pleasurable activities, lack of energy, trouble sleeping, and difficulty concentrating. These symptoms can interfere with an individual's ability to perform necessary tasks, which can lead to further distress (Galambos, Leadbeater, & Barker, 2004). In addition, depression has also been linked to other problems, including an increased risk of substance abuse (Abraham & Fava, 1999). Significant increases in the rate of depression begin during adolescence, and it is also during this time that gender differences emerge. College students seem to be at particular risk of developing depression with around 16% reporting to suffer from depression sometime during college and 10.6% reporting either being diagnosed or treated for depression within the previous 12 months (American College Health Association, 2012).

Prior to adolescence, boys tend to be at greater risk for developing depressive disorders (Anderson, Williams, McGee, & Silva, 1987), but following the transition to adolescence, rates of depression increase in females, and they become more likely than males to develop depressive symptoms (Nolen-Hoeksema & Girgus, 1994). For example, a longitudinal study conducted by Hankin and colleagues (1998) found that females begin to experience higher levels of depression than males between the ages of 13 and 15. However, it was between the ages of 15 and 18 that the largest increases in rates of depression in both males and females occurred. At age 15, the lifetime prevalence rate of

depression was found to be 4.49% in males and 6.89% in females. By age 18, these rates increased to 14.07% in males and 27.51% in females. Between ages 18 and 21, the incidence rate of new cases of depression for both males and females dropped with the lifetime prevalence rates increasing by comparatively smaller amounts, 20.65% in males and 42.63% in females. In general, women are approximately 1.7 times as likely as men to experience depression during their lifetimes (Kessler, McGonagle, Swartz, & Blazer, 1993). Several theories have emerged to explain the higher prevalence of depression in females including possible biological predispositions, women's status in society, and potential differences in interpersonal relationship processes (Nolen-Hoeksema, Larson, & Grayson, 1999).

Coinciding with such changes in depression risk are important shifts in the social worlds of adolescents. Peers begin to vie with parents as the most influential social others as close friends become key sources of social support and intimacy. In a study examining the changes in social support through childhood and adolescence, Furman and Buhrmester (1992) found that fourth graders tended to list their parents as the greatest source of support. By seventh grade, same-sex friends were rated as being equal to parents as a source of social support, and by tenth grade, same-sex friends surpassed parents as the primary providers of support. For college students, friends were listed alongside romantic partners and mothers as the greatest sources of social support. Furthermore, it is important to note that throughout this development, females tend to form closer friendships than males (Bukowski, Hoza, & Boivin, 1994) and report greater satisfaction in friendships (Calmes & Roberts, 2008). Thus, friendship is generally

viewed as a protective buffer against depression (Bukowski, Newcomb, & Hartup, 1996), as friends can provide comfort and companionship in times of stress and ward off feelings of loneliness. However, having lower quality friendships may have a negative effect on emotional adjustment. For instance, females in disengaged friendships, who are described as being less willing to engage in cooperative problem-solving with friends, have been shown to have higher levels of depression than those in more supportive, cooperative friendships (Selfhout, Branje, & Meeus, 2009).

One important aspect of friendship is social support, which encompasses emotional forms of support, such as encouragement or consolation, as well as more tangible forms of support such as lending money to a friend (Cooke, Rossmann, McCubbin & Patterson, 1988). A lack of social support has been found to be a predictor of depressive symptoms (Kendler, Myers, & Prescott, 2005). For example, a 4-year longitudinal study conducted by Galambos and colleagues (2004) utilizing adolescent participants (ranging from 12 to 19 years old at the beginning of the study) found that as social support decreased, depressive symptoms increased. Furthermore, it was found that higher levels of depression predicted lower levels of social support. These results suggest there may be a two-way relationship between depression and low social support, with the potential for low social support to lead to higher levels of depressive symptoms which could lead, in turn, to lower levels of social support.

Although friendships are generally believed to serve as a protective factor against depression, this may not be true for females, as they tend to form closer, more supportive friendships, but they are also at increased risk for developing depression. One possible

explanation lies in the nature of the interactions within those close friendships. For example, Rose (2002) identified a particular pattern of interpersonal behavior called co-rumination that could be partly responsible for relationship between depression and friendship. Co-rumination refers to a pattern of behavior within a dyadic relationship that involves repetitive discussion of personal problems with a focus on the negative thoughts and feelings created by those problems (Rose, 2002). These conversations are not directed at finding an active solution to these problems, but rather focus on the nature of, and the distress caused by, the problems (Rose, 2002). Examples of co-rumination may include two friends discussing family troubles, difficulties with school work, or problems within a romantic relationship.

Co-rumination has been found to represent an “adjustment trade-off,” as it is related to both depression and intimate, high-quality relationships (Rose, 2002). Rose (2002) originally applied this construct to third, fifth, seventh, and ninth grade children and adolescents by administering a specifically developed Co-Rumination Questionnaire which participants completed in reference to their interactions with a nominated friend. The results indicated that co-rumination is indeed related to both positive friendship quality and the internalization of depressive symptoms, most notably for females. Furthermore, higher levels of co-rumination were found among adolescents than children. Though the majority of current research has focused on children and younger adolescents, one study conducted by Calmes and Roberts (2008) examined co-rumination in a sample of college students across multiple relationship types, specifically in friends, roommates, parents, and romantic partners. As with younger adolescents, positive

correlations were found between co-rumination and both depressive symptoms and friendship quality, indicating that not only does the propensity to engage in co-rumination exist throughout development and into young adulthood, but that the benefits and consequences remain as well (Calmes & Roberts, 2008).

Co-rumination is thought to account for some of the gender differences in the prevalence of depressive symptoms (Rose, 2002). Females tend to engage in co-rumination in their relationships more often than males, and this process may result in increased symptoms of depression while concurrently increasing the perception of closeness in interpersonal relationships (Rose, 2002). A 6-month longitudinal study conducted by Rose and colleagues (2007) found that co-rumination predicted these perceptions of friendship quality in a sample of children and younger adolescents. The tendency for females to engage in higher levels of co-rumination appears to be most prominent in friendships. Consistent with other studies focusing on younger participants, college women also continued to report higher levels of co-rumination with their friends and greater friendship satisfaction than males (Calmes & Roberts, 2008). However, no significant gender differences were found in levels of co-rumination within other important relationships, specifically with parents, roommates, and romantic partners (Calmes & Roberts, 2008). In the Calmes and Roberts investigation, however, there was still a significant relationship between the levels of satisfaction and co-rumination in these relationships regardless of gender. In other words, males were found to co-ruminate just as frequently as females with their parents, roommates, and romantic partners and generally receive the same benefits of social support, although women reported greater

satisfaction with parents. Overall, these findings suggest that a principle gender difference in co-rumination, which exists throughout adolescence and into young adulthood, is the tendency for females to be more willing to engage in co-rumination with their friends than males.

Co-rumination has been described as the overlap between two other constructs: rumination and self-disclosure (Rose, 2002), and this overlap accounts for the coexistence of positive and negative elements. In a sense, co-rumination combines the social processes of self-disclosure with the negative thought patterns of rumination. Rumination is a response to distress involving repetitive and excessive thoughts focusing on the feelings resulting from the distress, the source of the distress, and the potential consequences of the distress (Nolen-Hoeksema, 1991). Rumination has been closely linked to depression through increasing the likelihood of evaluating a situation in a negative way, interfering with problem solving, and increasing the likelihood of being exposed to stressful events (Nolen-Hoeksema, 1991; Nolen-Hoeksema, Parker, & Larson, 1994). In an attempt to ascertain the effect of rumination in the relationship between co-rumination and depression, Rose (2002) examined how well co-rumination predicted levels of depressive symptoms after controlling for rumination. Results showed that after accounting for the effect of rumination, co-rumination was no longer a statistically significant mediator in the relationship between depressive symptoms and gender. These results suggest that co-rumination is related to depression due to the overlap between it and rumination (Calmes & Roberts, 2008). This does not, however, account for the relationship between co-rumination and friendship quality.

Self-disclosure is another construct that is related to both co-rumination and friendship. Self-disclosure is the act of discussing personal information with others and is an important component of relationships, thought to be indicative of a close friendship. Indeed, friends tend to self-disclose with one another more often than individuals who are not friends (Newcomb & Bagwell, 1995). As with co-rumination, females tend to engage in more self-disclosure than males (Rose & Rudolph, 2006). Furthermore, females are more likely to expect that engaging in self-disclosure will help alleviate distress caused by problems (Rose et al., 2012). It has been theorized that as friendships grow and increase in intimacy, the type of information that is disclosed progresses from superficial to increasingly more personal information, and more intimate self-disclosure has been found to be correlated with greater degrees of liking (Altman & Taylor, 1973). Although same-sex friendships of either gender are more positively affected by intimate self-disclosure than non-intimate self-disclosure, this effect has been shown to be greater in women than in men (Walker & Wright, 1976). Furthermore, men have been consistently shown to be less willing to engage in self-disclosure than women, and they often report that they find both self-disclosing and listening to others self-disclose uncomfortable (Walker & Wright, 1976). Females have also been found to make greater efforts to understand their friends than do males, which likely invites self-disclosure (Matsushima & Shiomi, 2001).

Since co-rumination exists as the overlap between rumination and self-disclosure, it is unsurprising that it is considered an adjustment “trade off.” Similar to rumination, co-rumination involves focusing on negative thoughts and feelings and has been shown to

be associated with higher levels of depressive symptoms and the onset of depression (Rose, 2002). For example, a two-year longitudinal study by Stone and colleagues (2011) found that co-rumination not only predicted clinical levels of depression but also the severity, duration, and time to onset of the disorder in an adolescent sample. Although co-rumination has been shown to predict depression, it cannot be viewed as a singularly negative form of interaction as it also overlaps with self-disclosure. Indeed, research has also shown that individuals tend to have higher levels of intimacy and friendship satisfaction with the people they co-ruminate with (Rose, 2002).

A 6-month longitudinal study by Rose and colleagues (2007), using a sample of older children and adolescents, found that co-rumination predicted feelings of closeness and positive friendship quality. Although increased co-rumination was associated with higher friendship quality, the authors noted that the relationship was likely bidirectional, with co-rumination leading to a closer friendship which in turn could lead to increases in co-rumination. Interestingly, though depression predicted co-rumination for both sexes, co-rumination only predicted depression in females (Rose, Carlson, & Waller, 2007). This seems to imply that females become trapped in a vicious cycle, whereas co-rumination might have a more positive effect for males, allowing them to form closer friendships. It was also noted that this cycle might be especially worrisome for females because depressive symptoms may go undetected because they are involved in close, supportive friendships (Rose et al., 2007). Despite the potential dangers of co-rumination, there may also be negative consequences of not engaging in co-rumination. Indeed, it has been found that those who do not self-disclose, an important component of co-rumination, tend

to feel lonelier and more distant from their friends than individuals who do self-disclose (Matsushima & Shiomi, 2001). In all, co-rumination cannot truly be thought of as a wholly positive or negative form of interaction, but truly as a trade-off of costs and benefits.

Despite the notion of an adjustment trade-off, analyses of co-rumination and depression have been restricted to linear conceptualizations. That is, less co-rumination is thought to be best for adjustment and more is thought to be worse. However, this may not be the best way to capture the adjustment trade-off that defines co-rumination. Indeed, due to increased levels of intimacy and self-disclosure, certain levels of co-rumination may be a healthy form of interaction. Although co-rumination has been associated with depression as a result of increased focus on negative thoughts and feelings, the construct has also been related to closer friendships, which are considered to be protective against depression.

In the present study, an alternative quadratic model of co-rumination will be tested. It is hypothesized that a quadratic regression will better fit the “adjustment trade-off” of the construct by better accounting for the positive effects of co-rumination than a linear model. Within the proposed quadratic model, it is believed that lower levels of co-rumination will be associated with higher levels of depression, as it is hypothesized that this could be symptomatic of not having a friendship close enough to engage in co-rumination. This is the most distinct difference between the quadratic and linear models, as the linear model of co-rumination does not take into account that there could be negative consequences at the lower end of the co-rumination spectrum. On the other

hand, it is also hypothesized that individuals who co-ruminate to a greater degree will also tend to have higher levels of depression as, although they may very well be receiving the benefits of co-rumination, they are also likely to be focusing quite heavily on their negative thoughts and feelings. At this end of the co-rumination spectrum, the proposed quadratic model would hypothetically be quite similar to the linear model. Finally, it is hypothesized that moderate levels of co-rumination may be the best for overall adjustment, allowing for the benefits of closer friendships without the consequences of being exposed to excessive negative thinking.

In order to examine whether a quadratic function might better describe the relationship between co-rumination and depression, a curvilinear regression will be compared to a linear regression of the data. The data will then be split by gender, and it is hypothesized the overall relationship will be significantly stronger in females than in males. It is hypothesized that females will report higher levels of depressive symptoms, social support, and co-rumination than males. It is hypothesized that relationships higher in co-rumination will also be higher in social support, with females reporting significantly higher levels than males; however it is possible that in the same manner as high-level, chronic ruminators, a drop-off in social support may occur for particularly high levels of co-rumination. This would possibly be due to their friends choosing to withdraw from the relationship as a result of growing tired of the excessive levels of co-rumination. It is hypothesized that females will report significantly higher levels of depressive symptoms, social support, and co-rumination than males. As has been shown in previous studies (e.g., Rose, 2002), it is hypothesized that co-rumination will be

positively correlated with depression for both genders; however, this correlation will be significantly stronger for females.

Methods

Participants

This study included 597 participants (300 females and 297 males) recruited from a large suburban New England university. Participants ranged in age from 17 to 42 years ($M = 19.09$, $SD = 2.3$). Consistent with the geographic area, 89.95% of the participants identified as Caucasian, 2.51% as African American, 1.51% as Hispanic, 1.34% as Asian American, 1.17% as Native American, and 3.18% described themselves as other.

Participants were recruited from introductory psychology classes and received research credit for participating in the study.

Procedure

This study utilized an archival dataset. The participants responded through an online self-report survey which included a number of measures as part of a larger study. Participants were recruited through psychology classes and received class credit in return for participation. Data were collected from September 2007 to December 2008.

Participants completed an informed consent sheet and were then asked to fill out an online demographics questionnaire and a number of psychological measures in a 90-minute session. Participants were provided with the e-mail address of a research coordinator in the event that they had any questions. Finally, responses were saved to, and later accessed from, a secure web server.

Measures

Co-Rumination. The Co-Rumination Questionnaire (Rose, 2002) is a 27-item self-report measure used to determine the extent to which individuals engage in co-rumination. The measure covers nine subject areas: frequency of discussing problems, discussing problems instead of engaging in other activities, encouragement by the focal individual of the friend's discussing problems, encouragement by the friend of the focal individual's discussing problems, discussing the same problem repeatedly, speculation about causes of problems, speculation about consequences of problems, speculation about parts of the problem that are not understood, and focusing on negative feelings. Each item of the questionnaire is rated on a 5-point Likert scale ranging from 1 (*Not at all true*) to 5 (*Really true*). The item scores are averaged, creating a total possible range of 1 to 5, with higher scores indicating greater levels of co-rumination. Although most of the current literature utilizing this questionnaire has focused on younger samples, one study that used a college student sample found results consistent with younger samples in that females reported significantly higher levels of co-rumination with friends than males (Calmes & Roberts, 2008). For the current study, the range of scores obtained was 1 to 5. In the current study, there was evidence of high internal consistency (Cronbach's $\alpha = .97$). See Appendix 1 for questionnaire items.

Depression. The Beck Depression Inventory-II (BDI-II; Beck, Brown, & Steer, 1996) is a self-report measure of depressive symptoms. The BDI-II contains 21 groups of statements concerning feelings of sadness, guilt, disappointment in oneself, and other symptoms of depression. Each item on the inventory has a corresponding score ranging from 0 to 3, with higher scores indicating higher depression. Total scores on the BDI-II

range from 0 to 63. Despite some criticism that the BDI is potentially more of a measure of general psychopathology than depression in college students, a study performed by Hill and colleagues (1986) found similarities in responses between a sample of college students and a sample of psychiatric patients across a number of factors including physiological disturbances, depressed mood, and low energy. From this, they determined that the BDI does measure depression independent of general psychopathology within this demographic (Hill, Kemp-Wheeler, & Jones, 1986). The BDI-II has been shown to positively correlate with tests assessing related disorders and constructs, such as anxiety and hopelessness, and has been demonstrated to have a 93% true positive rate in diagnosing clinical levels of depression. The one-week, test-retest reliability of the BDI-II was found to be $r = .93$ in one study (Beck et al. 1996) and the internal consistency across different ethnic groups was found to be $.80$ (Gatewood-Colwell, Kaczmarek, & Ames, 1989). In the current study, the obtained scores ranged from 0 to 53. In the current study, there was evidence of high internal consistency (Cronbach's $\alpha = .92$). See Appendix 2 for questionnaire items.

Social Support. The Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985) is a self-report measure that assesses positive and negative qualities in same-sex friendships, opposite-sex friendships, and romantic relationships. In the current study, only the scores for same-sex friends were utilized in order to parallel the Co-Rumination Questionnaire. The NRI is composed of questions pertaining to 10 relationship quality subscales and each of these subscales contains 3 items. Each of these 30 total items is rated on a 5-point Likert scale. The item scores are averaged, creating a

total possible range of 1 to 5, with higher scores indicating higher levels of the corresponding relationship quality. Obtained scores ranged from 1 to 5. In this study, only the items associated with Social Support were utilized in order to measure the positive qualities associated with co-rumination and to determine if co-rumination was indeed leading to greater friendship quality and support. The Social Support category is composed of the Companionship, Instrumental Aid, Intimacy, Nurturance, Affection, Admiration, and Reliable Alliance subscales. The subscales scores have been shown to be internally consistent (Cronbach's Alpha = .80; Furman & Buhrmester, 1985). The test-retest reliability for the Social Support scale was found to be $r = .77$ in same-sex best friends and $.70$ and $.67$ for other close friendships (Connolly & Konarski, 1994). In the current study, evidence of internal consistency for the Social Support scale was also obtained (Cronbach's $\alpha = .92$). See Appendix 3 for questionnaire items.

Results

To address study hypotheses related to gender and mean differences in key constructs, means and standard deviations were calculated for co-rumination, depressive symptoms, and social support (see Table 1). Independent samples t-tests were used to determine whether there were significant differences in depressive symptoms, social support, and co-rumination between males and females. As expected, results indicated that females reported significantly higher levels of co-rumination, with a mean $.32$ points greater, than males ($t(455) = 4.587, p < .001$), higher levels of depressive symptoms, with an average score 1.63 higher on the BDI-II, than males ($t(551) = 2.355, p = 0.019$), and higher levels of social support on the NRI, with a mean $.29$ points higher than the males'

($t(579) = 4.566, p < .001$).

	Sex	Mean	Std. Deviation	t
Co-Rumination	Males	2.52	.74	4.58***
	Females	2.85	.81	
Depressive Symptoms	Males	7.77	7.90	2.36*
	Females	9.4	8.35	
Social Support	Males	3.42	.77	4.57***
	Females	3.71	.80	
* $p < .05$ ** $p < .01$ *** $p < .001$				

Correlations were used to examine the relationships between co-rumination and both depressive symptoms and social support (see Table 2). A positive correlation was found between co-rumination and depressive symptoms ($r = .13, p = .008$) indicating that as levels of co-rumination increase, depressive symptoms increase as well. In order to examine gender differences, separate correlations were calculated for males and females. However, after splitting the data by gender, co-rumination and depressive symptoms were no longer significantly correlated for either males ($r = .1, p = .172$) or females ($r = .1, p = .128$).

A positive correlation was found between co-rumination and social support ($r = .34, p < .001$), indicating that as levels of co-rumination increase, social support increases as well. Once again, the data were then divided by gender in order to examine whether a

significant difference existed in the strength of the correlations. Unlike with depression, social support remained positively correlated with co-rumination for both genders. A positive correlation of $r = .21$ ($p = .002$) was found for the males and a correlation of $r = .39$ ($p < .001$) was found for the females. A Fisher's r -to- z transformation was performed using an online calculator (Preacher, 2002) in order to test for significant differences in the correlation magnitudes, and the magnitude of the correlation for females was stronger than for males (z -score = 2.13, $p = .03$).

Table 2. <i>Correlations with Co-Rumination</i>		
	Pearson's Correlation (r) with Co-Rumination	z-score
Depressive Symptoms (Males & Females)	.13**	
Depressive Symptoms (Males)	.10	0.07
Depressive Symptoms (Females)	.10	
Social Support (Males & Females)	.34***	
Social Support (Males)	.21**	2.13*
Social Support (Females)	.39***	
* $p < .05$ ** $p < .01$ *** $p < .001$		

Co-rumination and depressive symptom scores were then mapped to a scatterplot (see Figure 1) in order to determine the most fitting way to describe their relationship. Both a linear and a quadratic regression were then performed (see Table 3). These results proved to be relatively similar with the linear regression providing an $R^2 = .016$ ($p < .01$)

and the quadratic regression having an $R^2 = .017$ ($p > .05$). Although the quadratic regression appeared to be a better fit, further analysis showed this difference was not statistically significant. A co-rumination² score was calculated, by multiplying each co-rumination score by itself, in order to address the squared term present within the quadratic formula. This was then entered into a regression alongside the original co-rumination scores to determine if the squared term was a significant predictor of depression beyond the original co-rumination score.

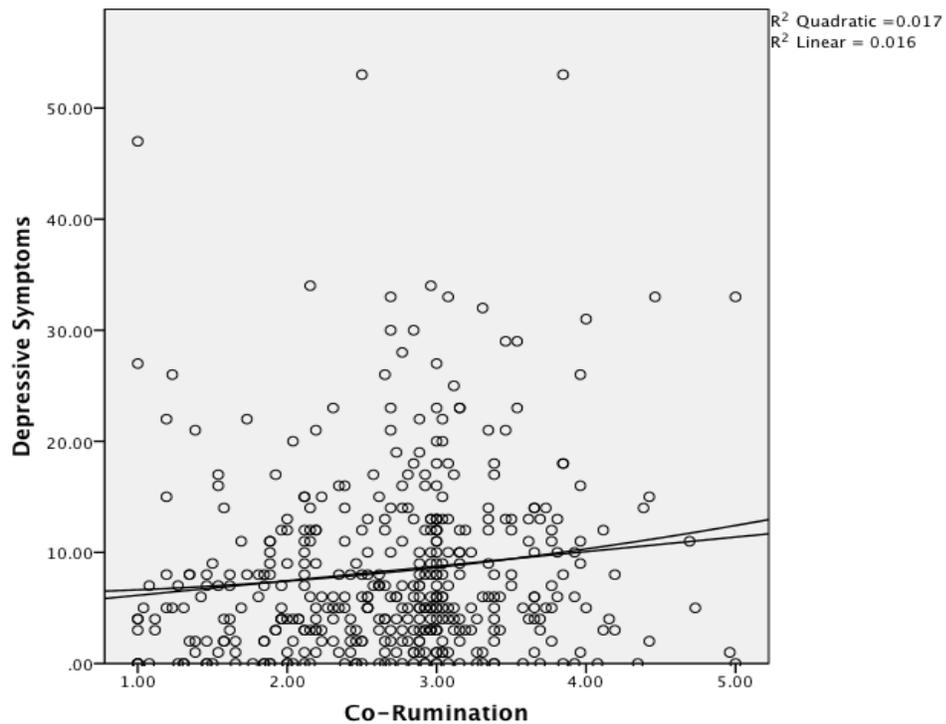


Figure 1. Linear vs. Quadratic Regressions of the Relationship between Co-Rumination and Depressive Symptoms (Full Sample)

Table 3. <i>Comparison of Linear Regression vs. Quadratic Regression</i>					
Model		B	Std. Error	Beta	t
Linear	Co-Rumination	1.31	.49	.13	2.65**
Quadratic	Co-Rumination	.08	2.49	.01	.03
	Co-Rumination ²	.23	.45	.12	.51
*p < .05 **p < .01 ***p < .001					

The data were then split by gender in order to examine whether or not the quadratic regression would be statistically superior for either males or females (see Table 4). Once again, scatterplots were constructed, and linear and quadratic regressions were performed. For males, the linear regression had an $R^2 = .009$, while the quadratic regression had an $R^2 = .015$ (see Figure 2). While the quadratic analysis did appear to perform better here relative to the linear regression than with the full sample, the results were not statistically significant. For females (see Figure 3), interestingly and contrary to expectations, the quadratic curve was inverted. For these data, the linear regression had an $R^2 = .010$ while the quadratic regression had an $R^2 = .011$. Once again, however, this difference was not found to be significantly better than the linear regression.

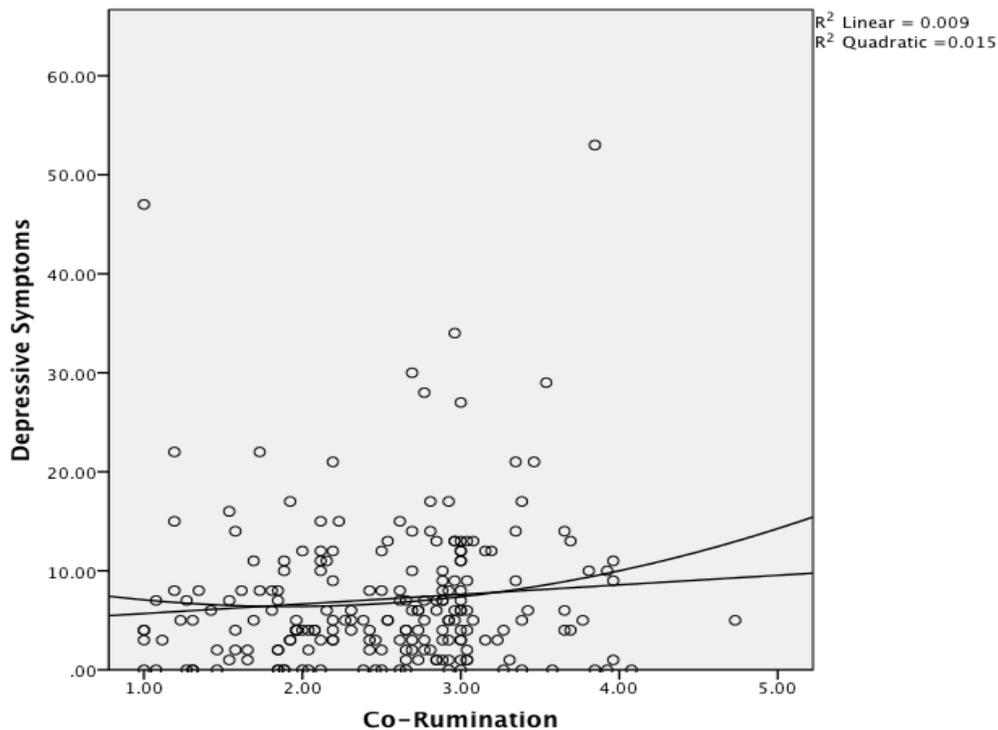


Figure 2. Linear vs. Quadratic Regressions of the Relationship between Co-Rumination and Depressive Symptoms (Males)

Sex	Model		B	Std. Error	Beta	t
Male	Linear	Co-Rumination	.97	.71	.10	1.37
	Quadratic	Co-Rumination	-3.21	3.77	-.32	-.85
		Co-Rumination ²	.84	.74	.42	1.13
Female	Linear	Co-Rumination	1.09	.72	.10	1.53
	Quadratic	Co-Rumination	2.27	3.62	.21	.63
		Co-Rumination ²	-.21	.63	-.11	-.33

*p < .05 **p < .01 ***p < .001

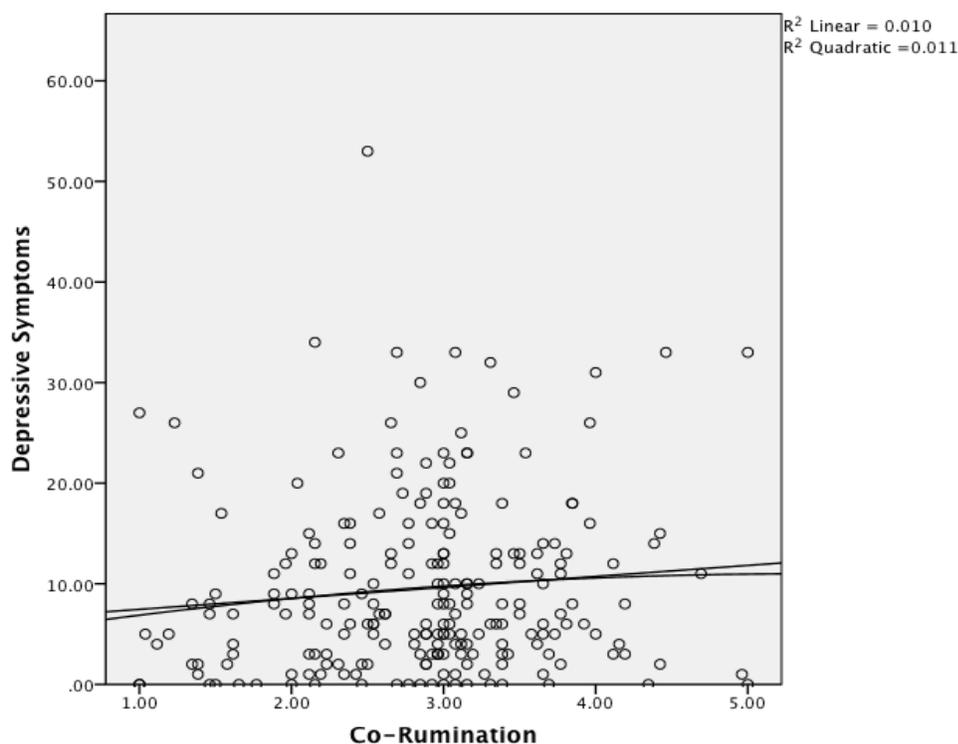


Figure 3. Linear vs. Quadratic Regressions of the Relationship between Co-Rumination and Depressive Symptoms (Females)

Discussion

The current study aimed to examine co-rumination in a sample of college students. The central hypothesis was that a quadratic regression would be a significantly better fit for the relationship between co-rumination and depressive symptoms than the linear view that has generally been accepted within previous studies. Furthermore, the current study also examined gender differences in overall reported levels of co-rumination, social support, and depressive symptoms. Finally, correlations were examined in order to determine whether relationships existed between co-rumination and both social support and depressive symptoms and if gender differences existed between the strengths of these correlations.

As was hypothesized, females reported significantly greater levels of co-rumination, social support, and depressive symptoms than males. These results are consistent with previous findings (e.g. Rose, 2002; Furman & Buhrmester, 1992; Hankin et al., 1998), but seem especially significant in regard to co-rumination as the current research has focused on children and adolescents rather than college students. Thus, these results support those of Calmes and Roberts (2008) in finding that females continue to report engaging in higher levels of co-rumination into young adulthood. In regard to levels of reported depressive symptoms, it is worth noting that the averages for both males and females fell under the range, indicating minimal levels of depressive symptoms as defined by Beck and colleagues (1996). This may be due to the fact that the sample consisted of college students, who are likely to be well-adjusted.

As predicted, based on research with younger samples, co-rumination was found to be positively correlated with depressive symptoms; however, the correlation was found to be relatively weak. It seems likely that this could be due to the overall low levels of depressive symptoms found within the sample. Interestingly, this relationship between co-rumination and depressive symptoms did not hold after dividing the sample by gender. It is possible that dividing the sample reduced the number of participants such that the correlations were no longer significant. Furthermore, the differences that did exist between males and females in the correlation between depression and co-rumination were not found to be statistically significant. While these results could be due to the particularly low levels of depressive symptoms found in the sample, it must also be considered that co-rumination might simply not be as significant a predictor of depressive

symptoms among college-aged individuals as it is with younger adolescents. This does, however, seem unlikely as Calmes and Roberts (2008), reported a more significant correlation between co-rumination and depression among their sample of college student participants.

As predicted, co-rumination was found to positively correlate with social support, especially for females. These results indicate that among college students, co-rumination continues to be a feature of closer, more supportive friendships. It is perhaps unsurprising that this correlation was stronger in females, given that these data focused only on social support from same-sex friendships and that males have been shown to draw more social support from romantic relationships (Furman & Buhrmester, 1992). Interestingly, the correlation between co-rumination and social support was considerably stronger than the correlation between co-rumination and depressive symptoms. While this may be due to, as stated above, the low levels of depressive symptoms found in this sample, it could also be possible that for college students co-rumination represents a greater positive benefit in the form of social support than the negative consequences of depressive symptoms.

The results of the regression analysis indicated that the quadratic model was not a significantly better fit than the linear model of the relationship between co-rumination and depressive symptoms. Interestingly, after dividing the sample by gender, it did appear that the quadratic model was a better fit for the data in males; however, these results were not strong enough to warrant the use of the more complex regression. In females, not only was the quadratic model not significantly better than the linear model, but the

quadratic line was oriented in the opposite way as was predicted. It must be taken into account, again, that this sample reported relatively low levels of depressive symptoms. Thus, it seems likely that the large number of participants scoring low levels of depressive symptoms could have skewed the results such that the curve quadratic regression was minimized. Post-hoc analysis utilizing only the participants whose BDI-II scores indicated mild levels of depressive symptoms and above did not prove significant, as it did not leave enough participants to achieve meaningful results.

Certain limitations did exist within the current study. While the level of racial diversity was consistent with the local area, the predominantly Caucasian sample may have skewed results if any racial or cultural differences exist in co-rumination. Furthermore, whereas this study examined co-rumination solely in reference to same-sex friendships, college students have other important relationships in which co-rumination occurs (Calmes & Roberts, 2008). Thus, this study is likely not capturing the full extent of college student co-rumination. Data for this study were gathered through self-report surveys and the associated potential flaws with this method must be considered. For instance, it is possible that participants, despite the anonymity of the survey, answered in what they perceived to be the socially desirable ways, rather than how they actually felt. For example, males may have underreported levels of co-rumination due to associated gender norms. Furthermore, while it has been assumed that, for the purposes of this study, participants answered the Co-Rumination Questionnaire in reference exclusively to same-sex friendships, it seems likely that they might have answered in reference to other relationships as well. It is especially important to consider this given that only the same-

sex friendship scores of the Network of Relationships Inventory were used in this study.

While the central hypothesis of the current study, that a curvilinear regression would better describe the relationship between co-rumination and depressive symptoms, was not supported, results were found that were consistent with previous studies about the nature of co-rumination. Given the relative lack of information concerning college students and the construct, these results are significant in providing a better picture about the nature of college students' relationships and friendship interactions. A potential line of research for future studies could involve examining a quadratic regression in relationship types other than friendship. Calmes and Roberts (2008) reported that significant levels of co-rumination occurs between college students and their parents, roommates, and romantic partners, and it may be possible that a quadratic regression better describes the relationship between co-rumination and depressive symptoms in these relationships. Furthermore, as co-rumination is a dyadic process, it would be interesting to examine both sides of a relationship for perceptions of co-rumination in that relationships, as looking at only side of the relationship could be missing vital elements. Finally, it may be possible that the quadratic model might be a more appropriate method of examining the relationship between co-rumination and depressive symptoms amongst individuals who are already experiencing higher levels of depressive symptoms or even clinical depression. Thus, further research could focus on a sample consisting solely of these individuals.

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Appendix 1

Co-Rumination Questionnaire Items

(Not at all True) 1 – 2 – 3 – 4 – 5 (Really True)

1. We spend most of our time together talking about problems that my friend or I have.
2. If one of us has a problem, we will talk about the problem rather than talking about something else or doing something else.
3. After my friends tells me about a problem, I always try to get my friend to talk more about it later.
4. When I have a problem, my friend always tries really hard to keep me talking about it.
5. When one of us has a problem, we talk to each other about it for a long time.
6. 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.
7. When my friend has a problem, I always try to get my friend to tell me every detail about what happened.
8. After I've told my friend about a problem, my friend always tries to get me to talk more about it later.
9. We talk about problems that my friend or I are having almost every time we see each other.
10. If one of us has a problem, we will spend our time together talking about it, no matter what else we could do instead.
11. When my friend has a problem, I always try really hard to keep my friend talking about it.
12. When I have a problem, my friend always tries to get me to tell every detail about what happened.
13. We will keep talking even after we both know all of the details about what happened.
14. We talk for a long time trying to figure out all of the different reasons why the problem might have happened.
15. We try to figure out every one of the bad things that might happen because of the problem.
16. We spend a lot of time trying to figure out parts of the problem that we can't understand.
17. We talk a lot about how bad the person with the problem feels.
18. We'll talk about every part of the problem over and over.
19. We'll talk a lot about the problem in order to understand why it happened.
20. We talk a lot about all of the different bad things that might happen because of the problem.
21. We talk a lot about parts of the problem that don't make sense to us.
22. We talk for a long time about how upset it has made one of us with the problem.
23. We usually talk about that problem every day even if nothing new has happened.
24. We talk about all of the reasons why the problem might have happened.
25. We spend a lot of time talking about what bad things are going to happen because of

the problem.

26. We try to figure out everything about the problem, even if there are parts that we may never understand.
27. We spend a long time talking about how sad or mad the person with the problem feels.

Appendix 2

Beck Depression Inventory II Items

1. Sadness
 0. I do not feel sad.
 1. I feel sad much of the time.
 2. I am sad all the time.
 3. I'm so sad and unhappy that I can't stand it.
2. Pessimism
 0. I'm not discouraged about my future.
 1. I feel more discouraged about my future in the past two weeks.
 2. I do not expect things to work out for me.
 - 3 I feel my future is hopeless and will only get worse.
3. Past Failure
 0. I do not feel like a failure.
 1. I have failed more than I should have.
 2. As I look back, I see a lot of failures.
 3. I feel I am a total failure as a person.
4. Loss of Pleasure
 0. I get as much pleasure as I ever did from the things I enjoy.
 1. I don't enjoy things as much as I used to.
 2. I get very little pleasure from the things I used to enjoy.
 3. I can't get any pleasure from the things I used to enjoy.
5. Guilty Feelings
 0. I don't feel particularly guilty.
 1. I feel guilty over many things I have done or should have done.
 2. I feel quite guilty most of the time.
 3. I feel guilty all of the time.
6. Punishment Feelings
 0. I don't feel I am being punished.
 1. I feel I may be punished.
 2. I expect to be punished.
 - 3 I feel I am being punished.
7. Self-Dislike
 0. I feel the same about myself as ever.
 1. I have lost confidence in myself in the past two weeks.
 2. I am disappointed in myself.
 3. I dislike myself.
8. Self-Criticalness
 0. I don't criticize or blame myself more that usual.
 1. I am more critical of myself that I than I used to be.
 2. I criticize myself for all of my faults.
 3. I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes
 0. I don't have any thoughts of killing myself.
 1. I have thoughts of killing myself, but I would not carry them out.
 2. I would like to kill myself.
 3. I would kill myself if I had the chance.
10. Crying
 0. I don't cry more than I used to.
 1. I cry more than I used to.
 2. I cry over every little thing.
 3. I feel like crying, but I can't.
11. Agitation
 0. I am no more restless or wound up than usual.
 1. I feel more restless or wound up than usual.
 2. I am so restless or agitated that it's hard to stay still.
 3. I am so restless or agitated that I have to keep moving or doing something.
12. Loss of Interest
 0. I have not lost interest in other people or activities.
 1. I am less interested in other people or things.
 2. I have lost most of my interest in other people or things.
 3. It's hard to get interested in anything.
13. Indecisiveness
 0. I make decisions about as well as ever.
 1. I find it more difficult to make decisions than usual.
 2. I have much greater difficulty in making decisions than I used to.
 3. I have trouble making any decisions.
14. Worthlessness
 0. I do not feel I am worthless.
 1. I don't consider myself as worthwhile and useful as I used to.
 2. I feel more worthless as compared to other people.
 3. I feel utterly worthless.
15. Loss of Energy
 0. I have as much energy as ever.
 1. I have less energy in the past two weeks.
 2. I don't have enough energy to do very much.
 3. I don't have enough energy to do anything.
16. Changes in Sleep Pattern
 0. I have not experienced any change in my sleeping pattern.
 1. I sleep somewhat more OR less than usual.
 2. I sleep a lot more OR less than usual.
 3. I sleep most of the day OR I wake up 1-2 hours early and can't get back to sleep.
17. Irritability
 0. I am no more irritable than usual.
 1. I am more irritable than usual.

2. I am much more irritable than usual.

3. I am irritable all the time.

18. Changes in Appetite

0. I have not experienced any change in my appetite.

1. My appetite is somewhat less than usual OR My appetite is somewhat greater than usual.

2. My appetite is much less than usual OR My appetite is much greater than usual.

3. I have no appetite at all OR I crave food all the time.

19. Concentration Difficulty

0. I can concentrate as well as ever.

1. I can't concentrate as well as usual.

2. It's hard to keep my mind on anything for long.

3. I find I can't concentrate on anything.

20. Tiredness or Fatigue

0. I am no more tired or fatigued than usual.

1. I am tired or fatigued more easily than usual.

2. I am too tired or fatigued to do a lot of the things I use to do.

3. I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0. I have not noticed any recent change in my interest in sex.

1. I am less interested in sex than I used to be.

2. I am much less interested in sex now.

3. I have lost interest in sex completely.

Appendix 3

Network of Relationships Inventory Items (Social Support Subscales)

(Little or None) 1 – 2 – 3 – 4 – 5 (the Most)

Companionship

- 9. How often do you spend fun time with this person?
- 19. How often do you and this person go places and do things together?
- 29. How often do you play around and have fun with this person?

Instrumental Aid

- 11. How much does this person teach you how to do things that you don't know?
- 21. How much does this person help you figure out or fix things?
- 31. How much does this person help you when you need to get something done?

Intimate Disclosure

- 13. How often do you tell this person things that you don't want others to know?
- 23. How often do you tell this person everything that you are going through?
- 33. How often do you share secrets and private feelings with this person?

Nurturance

- 14. How much do you help this person with things she/he can't do by her/himself?
- 24. How much do you protect and look out for this person?
- 34. How much do you take care of this person?

Affection

- 15. How much does this person like or love you?
- 25. How much does this person really care about you?
- 35. How much does this person have a strong feeling of affection (loving or liking) toward you?

Reassurance of Worth

- 16. How much does this person treat you like you're admired and respected?
- 26. How much does this person treat you like you're good at many things?
- 36. How much does this person like or approve of the things you do?

Reliable Alliance

- 18. How sure are you that this relationship will last no matter what?
- 28. How sure are you that your relationship will last in spite of fights?
- 38. How sure are you that your relationship will continue in the years to come?

Appendix 4

IRB Approval Letter

Office of the Vice President for
Research
*Protection of Human Subjects Review
Board*



5703 Alumni Hall, Room 114
Orono, Maine 04469-5703
Tel: 207-581-1498
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June 6, 2013

To Whom it May Concern

RE: Human Subjects Approval

This letter is to confirm that the project, "Examining the Links Between Psychopathology, Social Relationships, and Social Relationships and Social Processes in a College Student Sample," was approved by the University of Maine's Institutional Review Board for the Protection of Human Subjects (IRB) on December 18, 2006.

Thank you.

Sincerely,

A handwritten signature in cursive script that reads 'Gayle M. Jones'.

Gayle M. Jones
Assistant to the IRB

pc: D. Nangle
A. Bergeron

Author's Biography

Andrew A. Bergeron was born in Augusta, Maine on September 5, 1991. He was raised in the Kennebec County area and graduated from Hall-Dale High School in 2009. At the University of Maine, Andrew majored in psychology and minored in business administration. Andrew acted as an undergraduate research assistant for three years in the psychology department. Upon graduation, Andrew intends to pursue graduate study in clinical psychology.