



Predictors of rumination and co-rumination: the role of attachment dimensions, self-compassion and self-esteem

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Abstract

This study systematically examined the unique, mediating, and moderating effects of fundamental attachment dimensions (anxiety and avoidance), self-esteem, and self-compassion on the dimensions of rumination (brooding and reflection) and co-rumination. Turkish university students ($N = 510$) completed the measures of the major variables. Results revealed that attachment anxiety (but not attachment avoidance) and self-esteem predicted both dimensions of ruminations. Self-compassion predicted the brooding dimension of rumination and co-rumination, and moderated the effect of attachment avoidance on the reflection dimension of rumination. Self-compassion also mediated the effect of both self-esteem and attachment anxiety dimensions on brooding and co-rumination, respectively. Results suggested that while attachment anxiety and self-esteem emerged as the predominant predictors of rumination and co-rumination, self-compassion plays an additional role on both rumination and co-rumination via its unique, moderating, and mediating effects. Finally, diverse effects of attachment anxiety and avoidance on co-rumination have critical implications for close relationships.

Keywords Brooding and reflection · Co-rumination · Attachment dimensions · Self-compassion · Self-esteem

Introduction

Rumination refers to repetitive thoughts without problem-solving, whereas co-rumination refers to continuously revisiting, extensively discussing, and speculating about

problems within a dyadic context (Rose, 2002). Rumination has been shown as a risk factor for a number of psychological and interpersonal problems, especially for depressive symptomatology (Lam et al., 2003; Nolen-Hoeksema et al., 2008; Nolen-Hoeksema et al., 1994; Nolen-Hoeksema et al., 1993). Past studies have documented two types of rumination, reflection (adaptive contemplation) and brooding as a pessimistic thinking style (Schoofs et al., 2010). Co-rumination is also linked with different types of personal and interpersonal adjustment problems (Boren, 2013; Rose et al., 2007). However, the critical predictors of co-rumination have been left unexamined with a few exceptions (e.g., Calmes & Roberts, 2008). In other words, although antecedents, correlates, and consequences of rumination have been extensively studied (Johnson & Whisman, 2013), we have limited knowledge about the unique predictors of co-rumination.

Past work has shown that fundamental attachment dimensions (i.e., attachment anxiety and avoidance), self-compassion, and self-esteem were independently associated with rumination (e.g., Barnard & Curry, 2011; Burnette et al., 2009; Krieger et al., 2013; Lanciano et al., 2012; Nolen-Hoeksema, 2000). However, we still do not know if they uniquely predict co-rumination and the two types of rumination (i.e., reflection and brooding). Moreover, the potential mediating and moderating mechanisms between these constructs and rumination

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need further exploration. Therefore, in this study, we aim to investigate the relative power of the three critical psychological constructs, attachment (in)security, self-compassion, and self-esteem in predicting rumination and co-rumination. Specifically, we examined both unique and the interactive (moderating) as well as the mediating effects of these constructs in predicting rumination and co-rumination.

Rumination and co-Rumination

Nolen-Hoeksema (1991) defined rumination within the context of depressive thoughts as “repetitively focusing on the fact that one is depressed; on one’s symptoms of depression; and on the causes, meanings and consequences of depressive symptoms” (p. 1). Specifically, rumination has been conceptualized as a vulnerability factor to depression that puts one in a cognitive trap with repetitive questioning, such as ‘Why cannot I manage the issues?’, ‘Why does it always happen to me?’, ‘Why do I feel like this?’ Extant work on ruminative reactions to stressful experiences have shown that rumination seriously weakens coping capacity and creates a basis for many adjustment problems, anxiety, and depressive mood in particular (Grassia & Gibb, 2008; Nolen-Hoeksema et al., 2008; Olatunji et al., 2013).

Past work has shown that rumination is a multifaceted construct with two main components; reflection (adaptive contemplation) and brooding (obsessive thought or pessimistic thinking) (Treyner et al., 2003). The reflection component may indeed have an adaptive pondering effect (Joorman et al., 2006) and may help a person analyze his/her thoughts for taking active problem-solving strategies (Treyner et al., 2003). The brooding component, however, restrains individuals from taking action for effective problem solving by making them excessively focus on obsessive and passive thoughts (Schoofs et al., 2010). Brooding has been shown to play a significant role in formation of depressive symptomatology (Arnarson et al., 2016), and was correlated with suicidal ideation (Miranda & Nolen-Hoeksema, 2007). Previous studies using rumination as a single dimension have also demonstrated that rumination is a critical risk factor for psychological health and well-being (e.g., Genet & Siemer, 2012; Gilbert & Gruber, 2014).

Besides rumination, the effects of co-rumination have been explored, especially within the context of dyadic relationships. Specifically, co-rumination refers to repetitive sharing with others about a problem with a focus on negativities mostly without a problem-solving orientation (Rose, 2002). In her study with early adolescents Rose (2002) found that, although co-rumination was positively associated with friendship quality and closeness in the short term, it was potentially maladaptive and was linked to emotional adjustment problems in the long run. Calmes and Roberts (2008) found that co-rumination with close friends predicts high levels of

anxiety and depression. Especially females co-ruminate more and experience higher depressive symptoms than males. In return, increased co-rumination makes females experience more depression and anxiety along with higher friendship quality, but more co-rumination increases friendship quality for males only (Rose et al., 2007). Besides, co-rumination with parents was found to be associated with anxiety, but not with depression (Calmes & Roberts, 2008). Overall, past research findings suggest that the effects of co-rumination differ depending on the types of close relationships (family, romantic relationships, or roommates). Therefore, co-rumination seems to lead to depression under specific circumstances (Starr & Davila, 2009).

Individuals who are prone to ruminate are also more likely to co-ruminate. Similar to rumination, co-rumination was also found to be related to depression and other psychological problems (Calmes & Roberts, 2008; Rose, 2002). Furthermore, co-rumination mediates the link between the tendency to excessive approval seeking from others and depression (Weinstock & Whisman, 2007). Although social networking and sharing with others reinforce friendship and facilitate coping, past research demonstrated that sharing which focuses on negative feelings and thoughts only, without a problem-solving motivation, increases the level of emotional stress due to co-rumination (Rose, 2002). Although co-rumination may increase relationship satisfaction in the short term, it increases the possibility of conflict in close relationships over time (Johnson, 2004).

In sum, both rumination and co-rumination are associated with similar psychological problems though the magnitude of their effects varies. However, co-rumination seems to have positive effects on certain close relationships by enhancing self-disclosure (see Rose et al., 2007). Compared to rumination, studies on co-rumination are still limited and it should be explored more if the predictors and the consequences of co-ruminations differ from rumination. Hence, the present study aims to investigate the unique, as well as mediated and moderated role of the critical predictors of both rumination and co-rumination, namely, self-esteem, fundamental attachment dimensions, and self-compassion.

Self-Esteem, Rumination, and co-Rumination

Past studies have confirmed that rumination is negatively associated with self-esteem (e.g., Ciesla & Roberts, 2007; Luyckx et al., 2008). In a recent study using the mediated moderation analysis, it was found that the link between rumination and depression is moderated by self-esteem showing that the association between rumination and depression is stronger for people with low self-esteem than those with high self-esteem (Wang et al., 2018). Moreover, fluctuations in contingent self-esteem, defined as whether one’s self-esteem is contingent on some interpersonal standards of excellence

(Deci & Ryan, 1995), seem to heighten rumination tendency since individuals with contingent self-esteem constantly evaluate themselves and tend to ruminate the reasons for these fluctuations (Cambron et al., 2009).

Because the majority of previous studies investigating the link between rumination and self-esteem had a correlational design, the direction of the effect was unclear. Specifically, it is unknown if low self-esteem causes rumination or similar to the process in depression if ruminative tendencies decrease self-esteem. In a five-wave longitudinal study, Kuster et al. (2012) investigated the direction of the effect and found that rumination indeed mediates the relationship between low self-esteem and depression, suggesting that low self-esteem increases depressive symptoms through rumination. Similarly, Di Paula and Campbell (2002) found that low self-esteem individuals ruminate more than high self-esteem ones when they failed in a task. In line with these findings, ruminative responses were shown to decrease when self-esteem experimentally enhanced (Koole et al., 1999; Nolen-Hoeksema, 2000).

Based on the past work, we expect that self-esteem would be negatively correlated with rumination. However, we specifically hypothesized that the association between self-esteem and rumination would be stronger for the brooding dimension than the reflection dimension. Furthermore, although past studies investigated the association between self-esteem and rumination, the power of self-esteem in predicting co-rumination has been left unexamined. Despite the lack of empirical research, there are several reasons to expect a negative association between self-esteem and co-rumination. The repetitive and persistent focus on problems without a meaningful action in dyadic contexts may cause individuals with low self-esteem to make internal attributions about the problems (Moreira et al., 2016). In such a way, they perceive themselves as ineffective in coping with the problems (Metalsky et al., 1993). This situation may trigger subsequent co-rumination. Therefore, it is plausible to expect a negative association between self-esteem and co-rumination.

Self-Compassion and Rumination

Self-compassion (Neff, 2003) refers to a warm and nonjudgmental stance towards the aspects of the self. It has three components, *self-kindness* (i.e., being kind and understanding towards one's sufferings and failures, instead of harsh self-criticism), *common humanity* (i.e., seeing one's pains and failures as unavoidable aspects of the human experience, rather than seeing them separated and isolated), and *mindfulness or awareness-balancing* (i.e., having an equilibrated view of one's painful thoughts and emotions rather than over-identifying with them). Despite the distinct definitions of these components, they are strongly positively associated and thus, self-compassion develops as a whole as an adaptive emotion

regulation strategy. Because self-compassion involves an open and accepting attitude towards emotions, it was claimed to reduce the ruminative process which is an emotional avoidance strategy hindering the adaptive emotion regulation (Evans & Segerstrom, 2011). Previous research has demonstrated that a low level of self-compassion is associated with rumination (e.g., Barnard & Curry, 2011; Neff, 2003; Neff & Vonk, 2009; Samaie & Farahani, 2011) and symptom-focused rumination (thinking about one's depressive symptoms and implications recurrently) (Krieger et al., 2013). Neff et al. (2007) found that experiencing an increase in self-compassion over one month period was related to a decrease in rumination, suggesting that self-compassion is an effective strategy in coping with rumination.

In this study, we expect a strong negative association between self-compassion and the brooding aspect of rumination, but not the reflection dimension. Considering that self-esteem and self-compassion are strongly correlated (Neff & Vonk, 2009), we also aim to examine the unique power of self-compassion in predicting both rumination and co-rumination after controlling for the effect of self-esteem.

Attachment Dimensions and Rumination

Based on Bowlby's theory (Bowlby, 1969/1982, 1973), adult attachment (in)security has recently been conceptualized into two basic dimensions, *attachment avoidance* and *attachment anxiety* (see Mikulincer & Shaver, 2007). Attachment avoidance refers to the extent to which individuals mistrust others' (especially partners') goodwill and intentions, strive for independence and emotional distance from others, and are hesitant to seek support from others, and thus they have a low level of intimacy and closeness in relationships. Attachment anxiety, however, refers to the degree to which a person worries that his/her partner (attachment figure) may abandon him/her, and thus clings to the partner to avoid a potential abandonment. By definition, attachment anxiety heightens ruminative tendencies. When anxiously attached individuals feel a threat in their close relationships, they are more likely to use ruminative coping strategies (e.g., Burnette et al., 2009). Although it has not been investigated, attachment avoidance could be expected to buffer co-ruminative tendencies since avoidantly attached individuals prefer interpersonal distance.

In their study, Burnette et al. (2007) found that secure attachment decreases angry rumination. Moreover, Saffrey and Ehrenberg (2007a) demonstrated that after a romantic breakup, young adults with higher attachment anxiety experience more brooding, feeling of regression, and less reflection. The reason behind this is that having high attachment anxiety causes them to make negative attributions for their partners, and then they keep these negative attributions and former relationships stay alive through rumination. By integrating attachment and maladaptive rumination theories, Lanciano

et al. (2012) proposed that attachment anxiety and avoidance are positively linked to dysfunctional rumination including brooding and depression-oriented rumination. Using attachment categories, Reynolds et al. (2014) examined the association between rumination and young adults' attachment styles and adults with anxious attachment style experience higher rumination than those with secure and avoidant attachment styles. Hence, we expect that attachment anxiety, but not attachment avoidance would be predictive of rumination, especially the brooding dimension.

To the best of our knowledge, there is no study investigating the association between attachment avoidance and the reflection dimension of rumination. Moreover, extant findings regarding the effects of reflection on depression are mixed (see Saffrey & Ehrenberg, 2007b). For instance, some studies demonstrated that reflection decreases depressed mood (Joorman et al., 2006), while others could not confirm this effect (e.g., Burwell & Shirk, 2007). Therefore, we also aim to investigate the link between attachment avoidance and reflection and the possible moderators in this relationship. For instance, a recent study showed that self-compassion moderated the emotional reactivity of individuals to ambivalent feedback from others in interpersonal relationships (Leary et al., 2007).

Finally, past studies also examined the link between attachment anxiety and co-rumination. Using a dyadic design, Homa and Chow (2014) investigated the predictor roles of attachment, rumination, and depression on co-rumination in dyadic relationships (as actor and partner). They found that attachment avoidance was significantly related to actors' and partners' co-rumination, and attachment anxiety is associated with the co-rumination level of partners. Attachment anxiety seems to be a consistent correlate of co-rumination (Campbell et al., 2001). Due to their emotion regulation strategies that intensify emotions, anxiously attached individuals are more likely to engage in co-rumination in times of distress. Avoidant individuals, on the other hand, seek distance and suppress their emotions and thus, they are less likely to co-ruminate. Based on past research and the premises of attachment theory, we hypothesize that co-rumination would be positively associated with attachment anxiety and negatively associated with attachment avoidance.

Finally, we aim to test the mediating and moderating mechanisms between the rumination constructs and their documented predictors, namely, attachment dimensions, self-esteem, and self-compassion. Considering that attachment security is a strong predictor of self-compassion (Neff & McGehee, 2010), we expect that self-compassion would be a potential mediator between attachment anxiety and rumination, especially the brooding dimension of it. Similarly, given that self-esteem is positively correlated with self-compassion and negatively correlated with rumination, we expect that self-compassion would also mediate the association between self-esteem and rumination.

Method

Participants

University students ($N = 510$) from different departments of a major state university in Turkey participated in the current study in exchange for extra course credits. The study was announced and advertised in psychology courses by the course instructors. The mean age of the participants was 21.8 ($SD = 2.29$) and 57.3% of them were female. The majority of the participants (84.3%) indicated that their socioeconomic status as the middle. The online survey was completed via the SONA system, a data collection tool allowing researchers to share their studies online and enables participants to search and complete these studies themselves (Gamblin et al., 2017). The online survey took approximately 20 min to complete.

Measures

Rumination Scale (RS)

The ruminative tendency was measured using the well-known 21-item Rumination Scale (Nolen-Hoeksema & Morrow, 1991). Items were rated using 4-point Likert scales (1 = *never*, 4 = *always*). An example item from the brooding subscale: "Think 'What am I doing to deserve this?'" and an example item from the reflection subscale: "Write down what you are thinking about and analyze it". The RS was adapted to Turkish by Erdur (2002). Cronbach's α reliability coefficients for the brooding and the reflection subscales were .74 and was .77, respectively in the current study.

Co-Rumination Questionnaire

Rose' (2002) 27-item Co-Rumination Questionnaire was used to measure the extent to which participants co-ruminate with their close same-sex friends. Items were rated on 5-point scales (1 = *not true at all*, 5 = *completely true*). The scale was adapted to Turkish by Bugay and Erdur-Baker (2015) and supported its psychometric quality. An example item from the scale: "We spend most of our time together talking about problems that my friend or I have". Cronbach's α reliability coefficient of the scale was .96 in the present study.

Self-Compassion Scale

Self-compassion was measured with the short version (12-item) (Raes et al., 2011) of Neff's (2003) self-compassion scale. The short version has a one-dimensional structure that is different from the original version. Items on the scale were rated on 5-point scales (e.g., "When I fail at something important to me I become consumed by feelings of inadequacy").

Deniz et al. (2008) adapted the scale to Turkish. Cronbach's α reliability coefficient of the scale was .86 in the current study.

Rosenberg Self-Esteem Scale (RSES)

Self-esteem was measured with a 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965) using 4-point scales (1 = *strongly agree*, 4 = *strongly disagree*). The RSES is composed of an equal number of positively and negatively worded items (e.g., "I feel that I have a number of good qualities"). The RSES was adapted to Turkish by Cuhadaroglu (1986). Cronbach's α reliability coefficient of the scale was .89 in the present study.

Experience in Close Relationships Inventory (ECR)

The two attachment dimensions were assessed using the short version of ECR (Brennan et al., 1998) which is composed of 5 items for each subscale. Items were rated on 7-point scales. The attachment avoidance subscale represents individuals' discomfort with closeness (e.g., "I don't feel comfortable opening up to other people") and the attachment anxiety subscale represents individuals' fear of abandonment (e.g., "I worry that people close to me think that I don't measure up to other people"). The ECR was translated and adapted into Turkish and shown to have high reliability and good construct validity (Sümer, 2006). Cronbach's α reliability coefficients were .66 and .81 for the avoidance and anxiety subscales, respectively in the current study.

Data Analysis

Prior to the main analyses, preliminary analyses were conducted regarding descriptive statistics, t-tests and correlation analyses among the major variables. First, normality assumption was checked out by computing skewness and kurtosis values. Then, to examine the unique and moderating effects of the predictors, a regression analyses modeling program which is Process macro for SPSS was used with Model 2. Finally, mediating role of self-compassion in different relationships between the main variables was tested with Model 4 of Process Macro for SPSS (Hayes, 2013).

Results

Preliminary Analyses

Descriptive statistics and correlations between the major variables were displayed in Table 1. The two dimensions of rumination, brooding, and reflection, were strongly correlated ($r = .59, p < .001$), and they both correlated with the major variables in the expected direction. Co-rumination was

positively and significantly correlated with brooding ($r = .25, p < .001$), but it was not correlated with reflection ($r = .05$) (see Table 1).

Independent samples t-tests were conducted to explore the differences between males and females on the major variables in the study. There were significant gender differences on the rumination variables. As compared to males, females reported higher levels of brooding ($M_{female} = 2.29, SD = .58; M_{male} = 2.15, SD = .59, t(508) = 2.60, p < .01$), reflection ($M_{female} = 2.35, SD = .61; M_{male} = 2.17, SD = .67, t(508) = 3.26, p < .001$), and co-rumination ($M_{female} = 3.13, SD = .80; M_{male} = 2.86, SD = .80, t(508) = 3.78, p < .001$).

Analytical Approach

To examine both the unique and moderating effects of the predictors, namely self-esteem, self-compassion, attachment anxiety, and avoidance, regression analyses with Model 2 of Process Macro for SPSS were performed separately on brooding, reflection, and co-rumination. In all analyses, the effect of gender was controlled. In Model 2, only two independent moderators can be tested (Hayes, 2013). The variables were standardized to obtain β coefficients. Before the analyses, Variance Inflation Factor (VIF) was calculated to determine the potential multicollinearity between the predictors. The VIF values were between 1.06 and 2.01, demonstrating that multicollinearity was not a problem in performing the analyses (O'Brien, 2007). Besides, the skewness and kurtosis values ranged between .07 and $-.67$ and did not exceed threshold values (Kline, 1998), indicating that the data were normally distributed.

Hypothesis Testing

Unique and moderating roles of the predictors on the rumination variables were tested via a series of regression analyses. As seen in Table 2, in the first set of regression analyses, brooding was predicted by attachment dimensions, self-esteem, and self-compassion. While attachment anxiety was entered to the equation the first regression, attachment avoidance was entered in the second regression. In this way, we tested all possible combinations of the moderators (self-esteem and self-compassion) with attachment dimensions. The moderating effects of self-esteem and self-compassion on the relationship between attachment anxiety/avoidance and brooding were tested via interaction terms. Gender ($\beta = -.06, SE = .02, p < .01, 95\% CI = [-.10, -.01]$), self-esteem ($\beta = -.16, SE = .03, p < .001, 95\% CI = [-.21, -.10]$), self-compassion ($\beta = -.19, SE = .03, p < .001, 95\% CI = [-.25, -.14]$), and attachment avoidance ($\beta = .06, SE = .02, p < .01, 95\% CI = [.01, .11]$) significantly predicted brooding. However, there was no significant interaction (moderating) effect in the association between avoidance and self-esteem/self-compassion. The

Table 1 Descriptive statistics and correlations between study variables

	1	2	3	4	5	6	7	8	9
1. Gender	–								
2. Age	.20*	–							
3. Brooding	-.11*	-.15*	–						
4. Reflection	-.14*	-.14*	.59*	–					
5. Co-rumination	-.17*	.05	.25*	.27*	–				
6. Self-esteem	.07	.09*	-.52*	-.38*	-.12*	–			
7. Anxiety	-.05	-.12*	.58*	.44*	.30*	-.54*	–		
8. Avoidance	.08	-.05	.31*	.23*	-.04	-.38*	.42*	–	
9. Self-compassion	.01	.07	-.53*	-.31*	-.24*	.63*	-.61*	-.35*	–
Women <i>M</i>		21.45	2.89	2.35	3.13	2.92	3.72	3.85	3.10
<i>SD</i>		2.12	.58	.61	.80	.58	1.46	1.19	.76
Men <i>M</i>		22.36	2.15	2.17	2.86	3.01	3.57	4.04	3.09
<i>SD</i>		2.41	.59	.67	.80	.57	1.38	1.21	.64

Note. * = Significant at $p < .01$

results showed that avoidance, self-esteem, self-compassion, and gender contributed significantly to the model, [$F(6, 503) = 47.03, p < .001$] and accounted for 36% of the variation in brooding.

In the second analysis, brooding was significantly predicted by gender ($\beta = -.04, SE = .02, p < .05, 95\% CI = [-.08, -.01]$), self-esteem ($\beta = -.12, SE = .03, p < .001, 95\% CI = [-.18, -.07]$), self-compassion ($\beta = -.11, SE = .03, p < .001, 95\% CI = [-.16, -.05]$), and attachment anxiety ($\beta = .21, SE = .03, p < .01, 95\% CI = [.15, .26]$). There was no significant interaction effect in the association between avoidance and self-esteem/self-compassion. The results revealed that anxiety, self-esteem, self-compassion, and gender contributed significantly to the model, [$F(6, 503) = 61.15, p < .001$] and accounted for 42% of the variation in brooding.

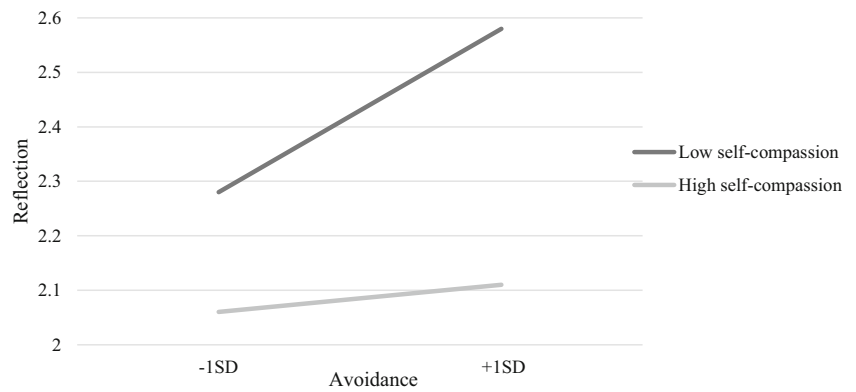
In the set of regression analyses, first reflection was predicted with the same variable set used for brooding. Gender ($\beta = -.08, SE = .03, p < .01, 95\% CI = [-.13, -.03]$), self-esteem ($\beta = -.17, SE = .03, p < .001, 95\% CI = [-.24, -.10]$), and avoidance ($\beta = .07, SE = .03, p < .01, 95\% CI = [.02, .13]$) predicted reflection significantly. Results revealed a significant interaction effect of self-compassion in the relationship between attachment avoidance and reflection ($\beta = -.09, SE = .03, p < .01, 95\% CI = [-.15, -.03]$) (see Fig. 1). Specifically, simple slope analysis showed that the association between reflection and avoidance is weaker for the individuals with high self-compassion (i.e., one standard deviation above the mean) than for individuals with low self-compassion (i.e., one standard deviation below the mean) (see Fig. 1). The predictors contributed significantly to the model, [$F(6, 503) = 19.94, p < .001$] and accounted for 19% of the variation

Table 2 The moderating role of self-compassion and self-esteem in the associations between attachment insecurity and brooding

Predictors	Attachment avoidance predicting brooding				Attachment anxiety predicting brooding			
	β	SE	p	95% CI	β	SE	p	95% CI
Constant	2.22	.02	<.001	[2.18, 2.27]	2.22	.02	<.001	[2.17, 2.26]
Gender	-.06	.02	.008	[-0.10, -0.01]	-.04	.02	.02	[-0.08, -0.01]
Self-esteem	-.16	.03	<.001	[-0.21, -0.10]	-.13	.03	<.001	[-0.18, -0.07]
Self-Compassion	-.27	.03	<.001	[-0.25, -0.14]	-.10	.05	<.001	[-0.16, -0.05]
Avoid./Anxiety	.06	.02	.01	[0.01, 0.11]	.21	.02	<.001	[0.15, 0.26]
Interaction 1	.02	.03	.40	[-0.03, 0.07]	.01	.03	.68	[-0.04, 0.06]
Interaction 2	-.05	.03	.07	[-0.10, 0.01]	-.03	.02	.19	[-0.08, 0.02]
R ²	0.36				0.41			
F	47.03				61.15			

Note. Analyses conducted using PROCESS Model 2, N = 510. Gender was dummy coded (1 = Female, 2 = Male). Interaction 1: Avoidance x self-esteem for avoidance, anxiety x self-esteem for anxiety. Interaction 2: Avoidance x self-compassion for avoidance, anxiety x self-compassion for anxiety

Fig. 1 Effects of self-compassion on the relationship between attachment avoidance and reflection. Self-compassion as a moderator of the relationship between attachment avoidance and reflection. The moderating effect is graphed for two levels of self-compassion: 1 standard deviation above the mean and 1 standard deviation below the mean. *Note.* SD: Standard deviation



in reflection. In the second analysis attachment anxiety was replaced with attachment avoidance. Results showed that gender ($\beta = -.07, SE = .03, p < .01, 95\% CI = [-.12, -.02]$), self-esteem ($\beta = -.14, SE = .03, p < .001, 95\% CI = [-.20, -.07]$), and attachment anxiety ($\beta = .21, SE = .03, p < .001, 95\% CI = [.15, .28]$) predicted reflection significantly. However, self-esteem and self-compassion did not moderate the association between reflection and anxiety. The results indicated that avoidance, self-esteem, and gender contributed significantly to the model, [$F(6, 503) = 26.26, p < .001$] and accounted for 24% of the variation in reflection (see Table 3).

Finally, the predictors of co-rumination were examined in two separate analyses. In the first one, gender ($\beta = -.13, SE = .03, p < .001, 95\% CI = [-.20, -.06]$), self-compassion ($\beta = -.25, SE = .04, p < .001, 95\% CI = [-.33, -.16]$), and avoidance ($\beta = -.10, SE = .04, p < .01, 95\% CI = [-.17, -.02]$) predicted co-rumination significantly. However, self-esteem and self-compassion did not moderate the association between co-rumination and avoidance. The results revealed that avoidance, self-compassion, and gender contributed significantly to the model, [$F(6, 503) = 9.23, p < .001$] and accounted for 10% of the variation in reflection.

In the final regression analysis, gender ($\beta = -.13, SE = .03, p < .001, 95\% CI = [-.19, -.06]$), self-esteem ($\beta = .11, SE = .05, p < .05, 95\% CI = [.03, .20]$), self-compassion ($\beta = -.13, SE = .05, p < .01, 95\% CI = [-.22, -.03]$), and attachment anxiety ($\beta = .22, SE = .04, p < .001, 95\% CI = [.13, .30]$) predicted co-rumination significantly. There were no significant moderation effects. The results demonstrated that attachment anxiety, self-esteem, self-compassion, and gender contributed significantly to the model, [$F(6, 503) = 12.67, p < .001$] and accounted for 13% of the variation in co-rumination (see Table 4).

After examining the unique and moderating effects, Process macro Model 4, which employs the bootstrapping method to calculate the indirect effects was used to test the mediating role of self-compassion in predicting brooding and co-rumination after controlling for the effect of gender. Model 4 tests simple mediation with a single mediator (Hayes, 2013). Significance was tested with the bootstrapped 95% confidence intervals (CI) for the standardized indirect effects (*ab*) constructed with 5000 resamples.

First, mediating role of self-compassion on the association between self-esteem and brooding was tested, as presented in

Table 3 The moderating role of self-compassion and self-esteem in the associations between attachment insecurity and reflection

Predictors	Attachment avoidance predicting reflection				Attachment anxiety predicting reflection			
	β	SE	p	95% CI	β	SE	p	95% CI
Constant	2.25	.02	<.001	[2.20, 2.31]	2.25	.03	<.001	[2.20, 2.31]
Gender	-.08	.03	.01	[-0.13, -0.03]	-.07	.03	.01	[-0.12, -0.02]
Self-esteem	-.17	.03	<.001	[-0.24, -0.10]	-.14	.03	<.001	[-0.20, -0.07]
Self-Compassion	-.07	.03	.052	[-0.13, 0.01]	.03	.04	.48	[-0.04, -0.09]
Avoid./Anxiety	.07	.03	.01	[0.02, 0.13]	.21	.03	<.001	[0.15, 0.28]
Interaction 1	.03	.03	.35	[-0.03, 0.09]	.02	.03	.47	[-0.04, 0.09]
Interaction 2	-.09	.03	.01	[-0.15, -0.03]	-.05	.03	.14	[-0.11, 0.02]
R ²	0.34				0.24			
F	19.94				26.26			

Note. Analyses conducted using PROCESS Model 2, $N = 510$. Gender was dummy coded (1 = Female, 2 = Male). Interaction 1: Avoidance x self-esteem for avoidance, anxiety x self-esteem for anxiety. Interaction 2: Avoidance x self-compassion for avoidance, anxiety x self-compassion for anxiety

Table 4 The moderating role of self-compassion and self-esteem in the associations between attachment insecurity and co-rumination

Predictors	Attachment avoidance predicting co-rumination				Attachment anxiety predicting co-rumination			
	β	SE	p	95% CI	β	SE	p	95% CI
Constant	3.02	.04	<.001	[2.95, 3.09]	2.99	.04	<.001	[2.92, 3.07]
Gender	-.13	.03	.0<01	[-0.20, -0.06]	-.13	.03	<.001	[-0.19, -0.06]
Self-esteem	.03	.05	.52	[-0.06, 0.12]	.11	.05	.01	[0.03, 0.20]
Self-Compassion	-.25	.04	<.001	[-0.33, -0.16]	-.13	.05	.01	[-0.22, -0.03]
Avoid./Anxiety	-.10	.04	.01	[-0.17, -0.02]	.22	.04	<.001	[0.13, 0.30]
Interaction 1	.01	.04	.77	[-0.07, 0.10]	-.04	.04	.39	[-0.13, 0.05]
Interaction 2	.01	.04	.77	[-0.07, 0.09]	.01	.04	.95	[-0.08, 0.08]
R ²	0.10				0.13			
F	9.32				12.67			

Note. Analyses conducted using PROCESS Model 2, $N = 510$. Gender was dummy coded (1 = Female, 2 = Male). Interaction 1: Avoidance x self-esteem for avoidance, anxiety x self-esteem for anxiety. Interaction 2: Avoidance x self-compassion for avoidance, anxiety x self-compassion for anxiety

Fig. 2. Results showed that self-esteem had a positive effect on self-compassion ($\beta = .63$, $SE = .03$, $p < .001$, 95% CI [.56, .70]) and negative effect on brooding ($\beta = -.30$, $SE = .02$, $p < .001$, 95% CI [-.35, .26]). Self-compassion also had a direct effect on brooding ($\beta = -.20$, $SE = .03$, $p < .001$, 95% CI [-.25, -.15]), after controlling for self-esteem. Further mediation analysis based on the bootstrapping method showed that the effect of self-esteem on brooding is mediated by self-compassion ($\beta = -.13$, $SE = .02$, 95% CI [-.17, -.09]).

Second, mediating role of self-compassion on the relationship between attachment anxiety and brooding was tested. As seen in Fig. 3, results showed that anxiety had a negative effect on self-compassion ($\beta = -.61$, $SE = .04$, $p < .001$, 95% CI [-.68, -.54]) and positive effect on brooding ($\beta = .34$, $SE = .02$, $p < .001$, 95% CI [.30, .38]). Self-compassion also had a direct effect on brooding ($\beta = -.17$, $SE = .03$, $p < .001$, 95% CI [-.21, -.12]), after controlling for anxiety. Further mediation analysis based on the bootstrapping method showed that the effect of anxiety on brooding is mediated by self-compassion ($\beta = .10$, $SE = .01$, 95% CI [.07, .14]).

Lastly, self-compassion mediated the link between self-esteem and co-rumination. As demonstrated in Fig. 4, results showed that self-esteem had a positive effect on self-compassion ($\beta = .63$, $SE = .03$, $p < .001$, 95% CI [.56, .70]) and negative effect on co-rumination ($\beta = -.09$, $SE = .04$, $p < .01$, 95% CI [-.29 to -.04]). Self-compassion also had a direct effect on co-rumination ($\beta = -.23$, $SE = .04$, $p < .001$, 95% CI [-.32, -.14]), after controlling for self-esteem. Further mediation analysis based on the bootstrapping method showed that the effect of self-esteem on co-rumination is mediated by self-compassion ($\beta = -.15$, $SE = .03$, 95% CI [-.21, -.09]).

These results suggest that in addition to its strong direct effects, self-esteem has also a positive effect on brooding and co-rumination via self-compassion. Furthermore, attachment anxiety had a significant mediated effect suggesting that a higher level of attachment anxiety is related to lower levels of self-compassion, which in turn is related to lower levels of brooding.

Fig. 2 Self-compassion as a mediator of the relationship between self-esteem and brooding controlling for gender. Hypothesized mediation model. Self-compassion mediates the relationship between self-esteem and brooding. Note: Dashed line refers to the indirect effect of self-esteem on brooding (all coefficients were standardized), *** $p < .001$

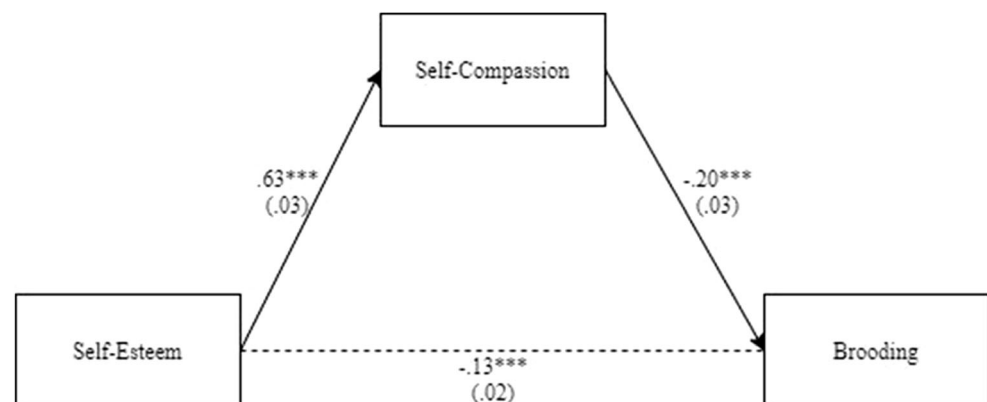
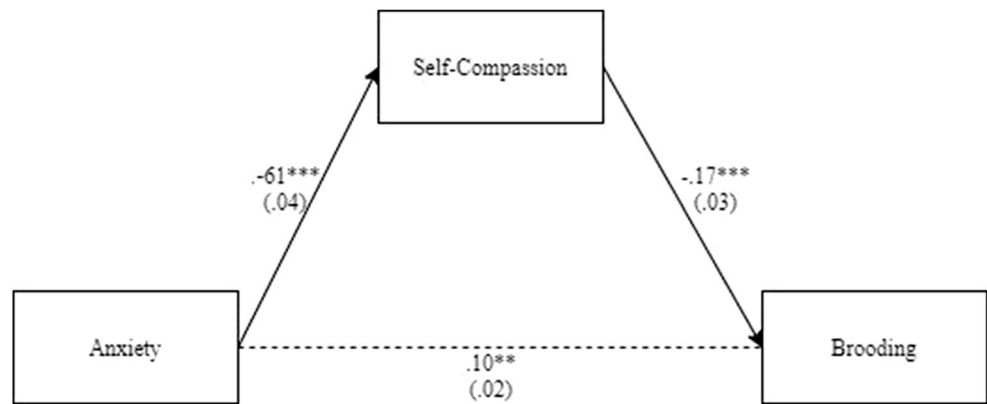


Fig. 3 Self-compassion as a mediator of the relationship between attachment anxiety and brooding controlling for gender. Hypothesized mediation model. Self-compassion mediates the relationship between attachment anxiety and brooding. *Note:* Dashed line refers to the indirect effect of anxiety on brooding (all coefficients were standardized), *** $p < .001$



Discussion

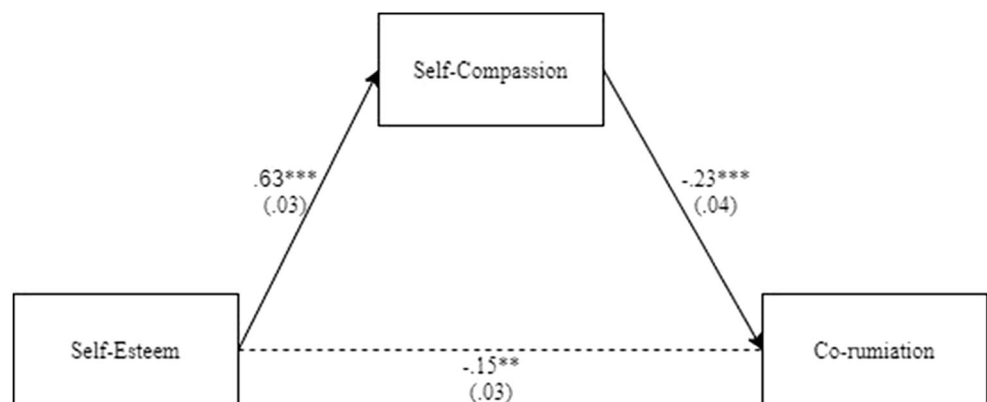
The current study investigated the unique, mediating, and moderating roles of self-esteem, attachment (in)security, and self-compassion in predicting two components of rumination (brooding and reflection) and co-rumination. The results obtained were largely in line with our expectations. When the unique effects are considered, there is a marginally negative unique effect of self-compassion on the reflection dimension of rumination, above and beyond the effects of self-esteem and attachment anxiety, and also there is a marginally significant unique effect of self-esteem on co-rumination above the effects of self-compassion and attachment avoidance. As hypothesized, attachment avoidance negatively predicted co-rumination. As the only moderating effect, Self-compassion moderated the relationship between avoidance and reflection.

Particularly, because brooding is a maladaptive type of rumination in which individuals are persistently preoccupied with the details of a particular event in the past, we expected a positive association between attachment anxiety and brooding. Indeed, attachment anxiety is the strongest predictor of brooding, compared to the other major predictors. This finding is also consistent with the past research which revealed that attachment anxiety is significantly linked to higher levels of brooding (e.g., Garrison et al., 2014; Saffrey & Ehrenberg, 2007a). In the same line, our results showed that attachment avoidance weakly, but

significantly predicted brooding. As expected, self-compassion was found as negatively associated with brooding, and it did not moderate the association between attachment (in)security and brooding. There is limited research examining the direct association between brooding and self-compassion and the current research fills this gap. Furthermore, a significant interaction effect of self-compassion was found in the relationship between avoidance and reflection. Particularly, attachment avoidance was not related to reflection for those with high self-compassion. However, those with low self-compassion had high reflection if they also had a high level of attachment avoidance compared to the low level of avoidance. This interaction effect suggests the conditional role of attachment avoidance that should be explored more in further studies to better understand why attachment avoidance enhances individuals' reflection capacity when they have low self-compassion.

Moreover, the positive association between attachment anxiety and reflection suggests that a high level of reflection may be maladaptive due to hyper activating strategies of anxiously attached individuals (Lanciano et al., 2012). However, this finding contrasts with past research showing a negative association between attachment anxiety and reflection (Saffrey & Ehrenberg, 2007b). The inconsistent results and paucity of research regarding the relationship between reflection and attachment anxiety need reexamination of this association in future research.

Fig. 4 Self-compassion as a mediator of the relationship between self-esteem and co-rumination controlling for gender. Hypothesized mediation model. Self-compassion mediates the relationship between self-esteem and co-rumination. *Note:* Dashed line refers to the indirect effect of self-esteem on co-rumination (all coefficients were standardized), *** $p < .001$



Whereas co-rumination was negatively predicted by attachment avoidance, it was positively predicted by attachment anxiety. These results are indeed in line with attachment theory (Mikulincer & Shaver, 2007), as avoidantly attached individuals display less of an inclination to share their distress with others as compared to individuals with low attachment avoidance. This finding is also consistent with past research showing that attachment avoidance is negatively associated with co-rumination at the actor and partner level (Homa & Chow, 2014). The positive association between attachment anxiety and co-rumination is not surprising since anxiously attached individuals are more likely to engage in co-rumination in times of distress. However, in Homa and Chow's (2014) study, it was revealed that attachment anxiety is associated with co-rumination only at the partner level but not at the actor level. Co-rumination is engaged only if there are available individuals in the environment. Thus, longitudinal daily diary research in dyadic relationships may help clarify the mixed findings and minimizes retrospection bias.

Besides, it was found out that self-compassion mediated three associations, specifically the links between (1) self-esteem and brooding, (2) anxiety and brooding, and self-esteem and co-rumination, confirming the strong role of self-compassion on rumination. In other words, self-compassion decreases rumination, particularly brooding, not only with its direct effects but also with its mediating (indirect) effects.

Because there is little known about the unique and moderating role of the critical predictors of rumination and co-rumination, the current study has systematically tested these associations. It was demonstrated that attachment dimensions, self-esteem, and self-compassion had significant unique effects on the rumination dimensions though the magnitude of the effect sizes varies. Besides the obtained divergent effects of attachment anxiety and attachment avoidance in predicting co-rumination, this study is the first showing that, unlike its strong role in rumination, self-esteem plays no or weak role in predicting co-rumination.

Furthermore, this study has contributed to the literature by showing the unique role of self-compassion. As hypothesized self-compassion was found to be negatively associated with both reflection and brooding above and beyond the effects of self-esteem and attachment dimensions. With its well-documented characteristics including a non-judgmental perspective and emotional flexibility, self-compassion seems to be a potential intervention medium to cope with rumination. As expected, self-compassion was also negatively associated with co-rumination.

Despite the discussions on adaptive sides of rumination and co-rumination, rumination itself has serious negative consequences on human functioning, such as decreased social support, impaired recovery, damaged problem-solving skills, and psychological disorders (Aldao et al., 2010; Nolen-Hoeksema et al., 2008). Therefore, exploring the causes as well as

mitigating factors in rumination has critical implications for both researchers and practitioners working in the treatment of rumination as well as the intervention programs. Our findings suggest that strengthening attachment security, and self-compassion in the prevention and intervention programs may buffer the detrimental effects of ruminative thinking.

Limitations

Despite its strengths, the caveats of the present study should be mentioned. First, the study was correlational and findings do not indicate causal relationships. Future studies can use experimental and longitudinal methods to establish causal associations between the variables. Moreover, the generalizability of our findings may be problematic since we used university students only. Future studies should employ more representative community samples. Furthermore, all variables were assessed via self-report within a cross-sectional design, which is open to common method variance bias. Although measures of the constructs selected for this study are reliable and well-validated, future studies should test the proposed associations via longitudinal studies to avoid problems with retrospective self-reports. Differences in demographic characteristics, socioeconomic status, and cultural backgrounds may also have effects on the obtained results. We only tested the gender differences and confirmed the previous findings that women have higher rumination and co-rumination tendencies than men. However, the role of other demographic and cultural characteristics on rumination should be explored in future studies. Finally, since attachment dimensions were measured with five items only, reliability for attachment avoidance was relatively low (Cronbach's $\alpha = .66$). Future studies may consider using the longer version of this measure.

In conclusion and notwithstanding the limitations mentioned above, these results underscore the importance of differentiating subtypes of rumination and highlight that more research is needed to understand whether the reflection is an adaptive or maladaptive type of rumination. Moreover, there is limited research exploring the association between distinct types of rumination and self-compassion (e.g., Raes, 2010) that should be examined in further studies.

Declarations

Ethical Approval Ethical approval was obtained from the Applied Ethics Research Center of Middle East Technical University, Turkey.

Informed Consent Informed consent was individually taken from all participants included in the study.

Conflict of Interests The authors of the study declare that they have no conflict of interest.

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