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Effect of Gender on the Relationship Between Ruminative Thinking and Depressive Symptoms

Ruminatif Düşünme ve Depresif Belirtiler Arasındaki İlişkide Cinsiyetin Etkisi

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ABSTRACT

Rumination means dealing with one's own feelings and thoughts passively and repetitively. There are two types of rumination: reflection, and brooding. Rumination prepares a suitable ground for many mental disorders, especially depression. The incidence of depressive symptoms in women was reported to be higher than in men. It has been claimed that the frequency and severity of depression may be increasing due to rumination since rumination is also higher in women. Studies in the literature have often progressed on a single type of rumination, brooding. Reflection is often considered a positive coping style and protective because it is related to problem solving, but inconsistent results have been obtained in studies on the effect on depression. In our study, we aimed to examine the effect of gender on depression by considering reflection and brooding separately instead of evaluating rumination only through brooding. Two hundred and twenty-seven university students were invited to the study, and 196 of them agreed to participate in the study. A sociodemographic form, ruminative responses scale, and patient health questionnaire (PHQ-9) were applied to the participants who accepted the study. Correlation analyses and linear regression were applied to the obtained data. Brooding and reflection scores were positively correlated with the PHQ-9 scores. Women got higher scores in brooding and reflection scales than men. Women got higher scores in PHQ-9 than men but it is not significant statistically. In linear regression analyses, brooding and reflection scores positively significantly predicted PHQ-9 scores. Women have higher depressive symptoms and are considered more ruminative, but only ruminative thinking (both brooding and reflection) can predict depressive symptoms. Interventions targeting both brooding and maladaptive reflection are recommended to treat major depression.
Keywords: Rumination, depression, gender, brooding, reflection

ÖZ

Ruminasyon, kişinin kendi duygu ve düşünceleriyle pasif ve tekrarlayıcı bir şekilde ilgilenmesi anlamına gelir. Ruminasyonun iki türü vardır; derin düşünme(refleksiyon) ve kara kara düşünme (brooding). Ruminasyon, başta depresyon olmak üzere birçok ruhsal bozukluk için uygun bir zemin hazırladığı düşünülmektedir. Kadınlarda depresif belirtilerin görülme sıklığının erkeklere göre daha yüksek olduğu bildirilmiştir. Kadınlarda ruminasyonun da daha yüksek olması nedeniyle depresyon sıklığının ve şiddetinin ruminasyon nedeniyle artıyor olabileceği iddia edilmiştir. Literatürdeki çalışmalar genellikle tek bir ruminasyon türü olan kara kara düşünme üzerinden ilerlemiştir. Refleksiyon, problem çözme ile ilişkili görüldüğünden sıklıkla olumlu bir basetme yöntemi gibi ele alınsa da depresyonla ilişkisine dair çalışmalar birbirleri ile çelişen sonuçlar vermiştir. Biz çalışmamızda refleksiyon ve kara kara düşünmeyi ayrı ayrı ele alarak cinsiyetin depresif semptomlar üzerindeki etkisini incelemeyi amaçladık. Çalışmaya iki yüz yirmi yedi üniversite öğrencisi çalışmaya davet edildi, 196 kişi çalışmaya katılmayı kabul etti. Çalışmayı kabul eden katılımcılara sosyodemografik form, ruminatif tepkiler ölçeği ve hasta sağlık anketi (HSA-9) uygulanmıştır. Elde edilen verilere korelasyon analizi ve doğrusal regresyon uygulanmıştır. Kara kara düşünme ve refleksiyon puanları HSA-9 puanı ile pozitif korelasyon göstermiştir. Kadınların kara kara düşünme ve refleksion puanları erkeklere göre anlamlı derecede daha yüksektir. Kadınlar HSA-9'da erkeklerden daha yüksek puan olsa da iki grup arasında istatistiksel olarak anlamlı fark yoktur. Doğrusal regresyon analizlerinde, brooding ve refleksiyon puanları HSA-9 puanlarını pozitif yönde anlamlı şekilde yordamıştır. Kadınlar daha yüksek depresif semptomlara sahiptir ve daha ruminatif olarak kabul edilir, ancak sadece ruminatif düşünce (hem kara kara düşünme hem de refleksiyon) depresif semptomları öngörebilmektedir. Depresif bozukluk tedavisinde hem kara kara düşünme hem de işlevsiz olabilecek refleksiyonu hedefleyen müdahaleler göz önünde bulundurulmalıdır.
Anahtar sözcükler: Depresyon, ruminasyon, cinsiyet, kara kara düşünme, refleksiyon

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Introduction

Gender differences in depression rates have been reported quite frequently in the literature; Beginning in childhood, women have a twofold increased risk of developing depression by the time they are adults compared to men (Kessler 2006). To explain gender variations in depression, a variety of psychological, social, and biological explanations have been put forth (Hankin and Abramson 2001, Boughton and Street 2007, Hyde et al. 2008). The underlying causes include hormonal variations, particularly those connected to the menstrual cycle, pregnancy, and menopause, social standards, and expectations, balancing job and family duties, gender discrimination, and encounters with gender-based violence (Piccinelli and Wilkinson 2000, Kornstein 2001, Kuehner 2017). Rumination is also one of the issues associated with more frequent depression in women (Nolen-Hoeksema 2001).

Ruminative behavior style means dealing with one's feelings and thoughts passively and repetitively (Morrow and Nolen-Hoeksema 1990, Nolen-Hoeksema 1991). This situation is associated with a lack of cognitive flexibility and perseverance in the face of stress (Kuehner and Weber 1999). Rumination is very important in preparing a suitable environment for many psychiatric diseases and being an indicator of the prodrome period. High scores on the rumination scale were associated with many psychiatric disorders, such as major depression, social phobia, post-traumatic stress disorder, generalized anxiety disorder, and eating disorder (Morrow and Nolen-Hoeksema 1990, Nolen-Hoeksema 1991, Kuehner and Weber 1999, Nolen-Hoeksema et al. 2008). According to some theories, depression, and ruminating go hand in hand. While rumination may predispose to depression, depressive individuals deal with more ruminative thoughts. When seen in depression, it affects the prognosis badly (Nolen-Hoeksema 2000, Nolen-Hoeksema et al. 2008, Whisman et al. 2020).

Although there are different opinions about the definition of rumination, Treynor et al. defined two different subtypes; 1- Brooding refers to a maladaptive mechanism that passively compares one's existing situation with an unreached ideal; 2- Reflection is a more adaptive strategy of deliberate introversion for cognitive problem solving (Treynor et al. 2003). Since it is claimed that establishing an endophenotype through brooding would be more consistent for studies rather than measuring rumination scores collectively, studies have often only considered brooding scores. Joormann et al. showed that the tendency to pay attention to negative information (i.e., negative attentional bias) in depression is associated with brooding (Joormann et al. 2006). In their study on healthy individuals, Whitmer and Banich (2007) reported that brooding was associated with disorders in attention-control processes and that there was a problem in preventing previous task sets from changing sets (Whitmer and Banich 2007). It has been shown that there is a correlation between set-shifting impairments and brooding (De Lissnyder et al. 2010). Difficulty in preventing negative information seems to be the main difficulty underlying brooding (Banich 2009, Koster et al. 2011). Although the primary role of emotion regulation is the ability to repress or analyze negative ideas, it has been suggested that it may be linked to personal variations in attention handling of unfavorable information (De Raedt and Koster 2010, Cohen et al. 2014). Reflection has been discussed in the literature as a mechanism that can be relatively positive (Treynor et al. 2003, Watkins 2004, Kross et al. 2005). Reflection is viewed as a deliberate self-focus that fosters self-awareness and self-control and is motivated by intellectual interest and an eagerness to overcome challenges. According to theory, reflection combined with epistatic curiosity can protect against depressed symptoms (Watkins 2008). However, studies in this field have also yielded results that do not support this theory (Burwell 2007, Rude 2007, Roelefs and Huibess 2008, Cox 2012, Soo 2015, Wei- Ting Wang 2020). While brooding and reflection have been conceptually separated, the researchers have produced conflicting results about whether reflection is adaptive or not.

Rumination is also one of the issues associated with more frequent depression in women. It has been argued that women tend to brood more than men about their depressive symptoms and distress, contributing to higher rates of depression. Tamres et al. (2002) conducted a meta-analysis research that included 10 studies that reported gender variations in coping techniques. The results showed that gender had a small but significant effect on rumination ($d = .19$), with women being more prone to rumination than men (Tamres et al. 2002). The studies discussed here are included in the analysis by brooding only. In the meta-analysis, in which Johnson and Whisman also included unpublished studies to rule out publication bias, the variation of both brooding and reflection by gender was discussed, and it was determined that women showed higher scores in both broodings and reflections than men, but the effect of gender was small. In this meta-analysis, they didn't investigate the effect on depression (Johnson and Whisman 2003). Our study's objective was to look at the effect of gender on depression by considering reflection and brooding separately. We hypothesized that brooding and reflection significantly affect depression scores in females. High brooding and reflection scores of women can determine the difference in depressive symptoms between men and women.

Method

Sample

The study was carried out at the Başkent University Psychiatry Department. When the hypothesis tests were kept two-way and the type 1 error level α=0.05, power level ß=0.95, and effect size 0.5 for the independent sample t-test model, the minimum number of participants to be included in the study was found to be 210 people. Başkent University's information technology department was contacted to obtain a list of students who allowed their contact information to be shared for academic studies. The list consisted of 227 students. Since this number was sufficient for the required sample size, invitations were sent only to these individuals for evaluation. 23 people did not return within the 15 days specified as the limit for response to the mail. Four people stated that they could not participate in the study. As a result, 200 people were included in the evaluation interviews. The inclusion criteria were being a university student and continuing the education process, while the exclusion criteria were having a history of severe chronic illness (i.e. renal failure, epilepsy, multiple sclerosis, malignancies), severe head trauma, and severe mental illness (i.e. schizophrenia, alcohol and substance abuse). The participants were evaluated (by YHA and JH) in terms of their compliance with the criteria when they applied. Three people were excluded due to epilepsy and one person was excluded due to a history of active substance use. Clinical assessment scales were applied to the remaining 196 participants (135 women, 61 men). Since the power level was found to be ß=0.89 in the post-hoc power analysis, this sample size was accepted as appropriate. Sample size calculation was performed with the G Power3.1 program.

Procedure

The study was conducted between March 2022 and June 2022 with informed consent. Ethics committee approval was obtained from the Başkent University Research Ethics Committee. (Registration no: KA22/473, date: 2022). The sociodemographic data form was collected during face-to-face interviews conducted by the researchers (YHA and JH). The participants were questioned about their age, gender, whether they had any chronic disease, and their history of psychiatric illness through the socio-demographic data form. The Ruminative Responses Scale the Short Form (RSS-SF) was used to evaluate the ruminative thinking style, and the Patient Health Questionnaire (PHQ-9) scale was used to determine depression symptoms. The participants were asked to fill in all the items in the forms, checked whether any blank items were left or not, and asked to fill in the blank items again. The application of clinical scales took about 15 minutes to complete. Participants received no payment for their involvement in the study.

Measures

Ruminative Responses Scale, Short Form (RrS-SF)

The short form of the 21-item long form of the ruminative responses scale, which evaluates the level of individuals' use of ruminative thinking style, consists of 10 Likert-type items (Treynor et al. 2003). “Brooding”, which involves passively comparing the situation to events you have been through recently; and “reflection”, which involves mental efforts to overcome problems and difficulties has two sub-dimensions. The Turkish RRS-SF's psychometric qualities were studied in part of the study, and it was discovered that the short RRS had a factor structure similar to the original scale. Additionally, the reliability of the overall scale and its sub-dimensions was determined to be satisfactory (internal consistency coefficient 0.85 for the total scale, 0.85 for the total scale, 0.77 for the Reflection factor, and 0.75 for the brooding factor) (Erdur-Baker and Bugay 2010).

Patient Health Questionnaire-9 (PHQ-9)

PHQ-9 was developed in 1999 by Spitzer et al. (Spitzer et al. 1999). The scale was designed for depression screening. It is a nine-item scale that questions the evaluation of depressive symptoms. Each question receives a score ranging from 0 (not at all) to 3 (almost daily). For each question, points are totaled. According to the grading, depression with a score of 1-4 is minor, 5–9 is mild, 10–14 is moderate, 15–19 is moderately severe, and 20–27 is severe. Higher scores on the PHQ-9 indicate increased severity of depressive symptoms. Turkish validity and reliability studies were performed by Sarı et al. Cronbach's alpha was reported as 0.842 (Sarı et al. 2016).

Statistical Analysis

We used Harman's single-factor test to assess the common method variance in this study. The findings indicated

that no single factor could account for most of the variance (the maximum component explained only 31.68% of the total variance), meaning there was no common method bias in this study. Data were analyzed using SPSS Statistics 24.0 (IBM, USA). We used the Kolmogorov-Smirnov (K-S) or and Shapiro-Wilk test for the assumption of normality in the distribution of the data. The independent sample t-test was used for comparisons of brooding, reflection, and PHQ-9 variables between women and men groups. The chi-square test was used to compare categorical variables such as chronic disease, psychiatric disease history, and family history of psychiatric disease according to gender. The Pearson correlation test determined the relationship between brooding, reflection, PHQ-9 scores, and age Linear regression analysis was used to examine the role of brooding and reflection in predicting PHQ-9. P values < 0.05 were considered significant in statistics.

Results

The participants' ages ranged from 18 to 32 years, with a mean age of 20.3 years (±1.7) years. In this study, 135 of the participants were women and 61 were men. The brooding and reflection mean scores were 11.7 ± 3.5 and 11.3 ± 3.2. PHQ-9 mean score was 10.9 ± 5.5. According to the PHQ-9 score, 19 of the participants had minimal, 72 mild, 59 moderate, 30 moderately severe, and 16 severe depressive symptoms. No clinical interview was conducted for the diagnosis of depression.

All variables' gender disparities were investigated. In terms of brooding (t = 1.951, p =.048) and reflection (t = 3.504, p =.001), there were significant differences between men and women. The brooding and reflection scores of women were higher than men. Chronic illness, history of psychiatric illness, and family history of psychiatric illness were not significant for gender. Scores of women were higher in PHQ-9 than men but no significant difference was detected in the PHQ-9 scores between the two groups (t = 1.608, p = .109). Sociodemographic and clinical variables are summarized in Table 1.

Table 1. Demographic variables of participants by gender

Variable		Women n=135)	Men (n=61)	Statistics	p value
Age (Mean ± SD)		20.2±1.7	20.6±1.5	t(194)= -1.411(a)	0.160
Chronic illness (n)	Yes	15 (11.1%)	8(13.1%)	$\chi2(1)=0.163$ (b)	0.687
	No	120 (88.9%)	53(86.9%)		
History of Psychiatric illness(n)	Yes	47(34.8%)	23(37.7%)	$\chi2(1)=0.153$ (b)	0.696
	No	88(65.2%)	38(62.3%)		
Family history of psychiatric illness(n)	Yes	24(17.8%)	7(11.5%)	$\chi2(1)=1.253$ (b)	0.263
	No	111(82.2%)	54(88.5%)		
Brooding scores (Mean ± SD)		12.0±3.5	11.0±3.4	t(194)=1.951(a)	0.048**
Reflection scores(Mean ± SD)		11.9±3.0	10.1±3.3	t(194)=3.504 (a)	0.001**
PHQ-9 scores(Mean ± SD)		11.3±5.6	10.0±5.2	t (194)=1.608 (a)	0.109

PHQ-9: Patient Health Questionnaire-9; SD; Standart Deviation; t= Independent sample t-test; -2 equare; *p<0.05, **p<0.01

Table 2. Correlation analysis between brooding, reflection, PHQ-9, and age

	Brooding	Reflection	PHQ-9
	r	r	r
1. Brooding	-		
2. Reflection	.578***	-	
3. PHQ-9	.638***	.460***	-
4. Age	.029	.007	-.050

PHQ-9: Patient Health Questionnaire-9; r : correlation coefficient; *P< .05 , **. P< .01 . ***P< .001

Correlations for the measured variables are shown in Table 2. Correlation analysis showed that brooding and reflection were positively correlated with PHQ-9. This means that participants' high brooding and reflection scores are associated with depressive symptom severity. However, age did not show a correlation between brooding, reflection, and PHQ-9.

As seen in Table 2, brooding and reflection were found to be positively associated with the PHQ-9 total score. Regression analysis was performed to determine the degree of this relationship and which of the most important independent variables affected the dependent variable. A linear regression was conducted to examine the role of brooding and reflection in predicting PHQ-9. A regression model contained two predictors: brooding and reflection. The two predictors explained 42% of the variance (R2=.420, F(3.192) =69.90, p<.001). Table 3 presents the findings. All predictor variables had adequate tolerance (tolerance = 0.66) and variance inflation factors (VIF = 1.50), according to collinearity diagnostics that were also carried out. As shown in Table 3, brooding and reflection positively significantly predicted PHQ-9 (β=-.88, p<.001; β=-.24, p=.04)

Table 3. Linear regression analyses of brooding and reflection for predicting PHQ-9 scores (n=196)					
	B	**S.E**	**t**	**p**	**95% C.I for Exp (B)**
Brooding	.881	.106	8.331	<.001	[.673- 1.090]
Reflection	.236	.116	2.037	.043	[.007- .467]
Constant	-2.107	1.213	-1.737	.084	[-4.498- .285]
R^2=.420, F(3.192) =69.90, p<.001					

PHQ-9: Patient health questionnaire-9; *p <.05, **p <.01, ***p < .001.; B: regression coefficient; S.E: standard error; CI: confidence intervals; Dependent variable: PHQ-9; Independent variable: Brooding, reflection

Discussion

Even though many studies have explored the function of gender in the association between depression and rumination, in our study it was discussed along with the rumination subtypes, and the impact of brooding and reflection was seen independently. Contrary to our hypothesis, the result of this study showed that although ruminative thinking scores are higher in women, there is no difference between the two genders in terms of depression scores. We concluded that ruminative thinking is a predictor of depressive symptoms.

Previous research has demonstrated that brooding is more closely related to depression than reflection (Treynor et al. 2003, Joormann et al. 2006). In the literature on reflective thinking, the results are inconsistent with each other. While some studies reveal reflective thinking is unrelated or inversely related to depression, other studies report reflective thinking as a risk factor (Burwell and Shirk 2007). Reflective thinking is considered an active coping mechanism related to problem-solving. Marroquin et al. (2010), in their study analyzing the connection among ruminative thinking, coping styles, and depressive symptoms claimed that if coping skills are insufficient during problem-solving, reflective thinking will start to function as maladaptive (Marroquin et al. 2010). By drawing attention to the importance of individual differences, they interpreted it as being functional at least in the beginning and producing good results in case of acute stress but may become associated with depressive symptoms with low coping mechanisms. Reflection inherently includes intellectual curiosity and problem-solving strategies to facilitate self-knowledge and self-regulation (Watkins 2004). Wang et al., in their study on women with breast cancer, stated that reflective thinking has a sensitive task in coping with stress and reported that how a person handles the problem and how long one thinks about the problem will be more effective in predicting depressive symptoms. In the study, they reported that despite the increased stress in women with their first period after the cancer diagnosis, reflective thinking has a protective effect on mental health by causing positive results such as finding meaning and problem-solving. In contrast, its long-term use may result in stuck in the problem (Wang et al. 2013). Reflection without a protective coping style may create a perseverative thinking trap (Koster et al. 2011). In other words, consistent with our study, we can say that thinking for a long time to solve a problem may trigger a depressive mood. In our study, both rumination subtypes were associated with depressive symptoms, consistent with this literature. Based on this result, we can claim that rumination should be considered in the follow-up of depressed patients without differentiating between brooding and reflection.

Two meta-analyses confirmed our findings and found that women exhibit more ruminating tendencies than men. This difference increased from childhood to adolescent samples and was modest in adults (Johnson and Whisman 2003, Rood et al. 2009). Studies investigating why women are more ruminative have reported that women produce more ruminative and self-focusing responses to all problem areas, whereas men use more problem-solving (Broderick 1998). Nolen-Hoeksema claimed that because women face more adverse and uncontrollable occurrences than males do, they are more alert to risk and possible environmental controls. (Nolen-Hoeksema 2001). Also, the limitations experienced by women due to gender roles in transforming their thoughts into action in the problem-solving process may trigger depressive moods. In future studies, the effect of rumination on depression can be examined by considering variables such as childhood traumas, which will show differences between genders and may trigger rumination.

Investigating the causes of high rates of depression in women is important because it will help us understand the nature of depression and improve women's quality of life and productivity for themselves and their families. Our study reveals that the women have higher symptom severity and are more ruminative in brooding and reflective thinking. In the literature, it has been stated that women experience depressive symptoms more frequently and more severely. The underlying causes include more frequent exposure to trauma and abuse, gender roles, biological differences such as ovarian hormones, and cortisol, genetic risk factors, and psychological factors such as temperament, body dissatisfaction, and cultural differences are also discussed (Boggiano and Barrett 1991, Nolen-Hoeksema et al.1999, Piccinelli and Wilkinson 2000, Kornstein 2001, Nolen-Hoeksema 2001, Kuehner 2017). The gender difference in depression rates develops in mid-adolescence and reaches the

typical rate in late adolescence (Jose and Brown 2008, Avenevoli et al. 2015, Hankin et al. 2015). This rate remains constant until old age (Piccinelli and Wilkinson 2000). According to the data obtained from gene-environment interaction, genes show a pleiotropic effect, so internalization and externalization differ between the two sexes (Sharpley et al. 2014, Krueger and Eaton 2015). Teenage girls are especially vulnerable to the sex hormones' activating effects during the pubertal transition. These hormones may combine with external and internal variables to contribute to the development of stress (Nolen-Hoeksema and Hilt 2009). In the period when estrogen is in high concentration, blunted cortisol response to stress also affects the risk of depression (Oldehinkel and Bouma 2011). In addition to biological differences, women are more exposed to serious negativities such as sexual abuse, violence, and structural gender inequality in childhood, which are measured at the macro and social levels (Nolen-Hoeksema and Hilt 2009, Krueger and Eaton 2015,). It has been reported that developing a psychiatric illness after trauma is higher in women than in men, even when exposed to trauma of similar severity (Nolen-Hoeksema 2001). Considering all these, it can be argued that the effect of gender on depression stems from the factors described above rather than the ruminative thinking style. Similarly, Kornstein et al. also found a strong correlation between rumination and depression but reported that it was insufficient to explain the difference between genders (Kornstein et al. 2000). We may highlight that comprehensive studies that examine biological characteristics, personality traits, trauma exposure, and social roles in detail are needed to investigate gender differences in depression.

Although a large number of participants in our study and the analysis of rumination with its subtypes are our strengths, we have certain limitations. First, our study is cross-sectional, so there may not have been a sufficient evaluation of the long-term effect of rumination. In further studies, longitudinal follow-up studies are recommended to understand the relationship more clearly. Secondly, the fact that the participants were university students may have led us to observe the effect of the relationship examined in early adulthood. Investigation of this relationship in a wider age range is recommended. Also, the lack of participants with severe depressive symptoms may affect the results. This relationship should also be investigated in individuals with more severe depressive symptoms. Finally, clinical evaluation by a psychiatrist to assess depressive symptoms was not performed in this study, the data we have is only self-report.

Conclusion

Women have higher depressive symptoms and are considered more ruminative, but only ruminative thinking can predict depressive symptoms. However, given the strong association between depressive symptoms and rumination, an intervention targeting rumination regardless of brooding or reflection is recommended to treat major depression. Comprehensive longitudinal studies that thoroughly explore biological factors, personality traits, trauma exposure, and social roles are required because gender differences in depression may result from the interaction of several diverse variables rather than just rumination.

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