

Investigation of Rumination and Cognitive Flexibility Levels in Patients with Depression

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Abstract

Aim: Depression is characterized by continuous depressed mood, anhedonia, loss of interest, and cognitive, behavioral, and physical symptoms. Many psychological factors such as individuals' cognitive processes, high neuroticism, low self-esteem have been reported to play important roles in the etiology, exacerbation, persistence, and treatment of depressive mood. The aim of this study is to compare the levels of rumination and cognitive flexibility in a healthy adult group without any mental disorders and adult patients followed up with depression.

Methods: In this cross-sectional case-control study, patients with depression (n=76, 34.1±9.32) and healthy controls (HG) (n=74, 34.5±10.5) were compared. The Sociodemographic Information Form, Beck Depression Inventory, Ruminative Thinking Scale, and the Cognitive Flexibility Inventory were performed to all participants.

Results: The study showed that depressive patients had higher ruminative thought levels and lower cognitive flexibility levels than healthy individuals. In addition, it was found that cognitive flexibility and ruminative thought severity can explain 35% of the variability of depressive symptom severity in the patient group. In the healthy group, ruminative thought severity can explain 9 % of the variability of depressive symptom severity.

Conclusions: The results of the study showed that ruminative thought and cognitive flexibility are important factors when predicting and preventing depression during the premorbid period and are useful when making formulation and determining treatment goals during the treatment. Therefore, interventions to improve cognitive flexibility and rumination are important. The clinicians should add interventions to cognitive flexibility and rumination into their treatment approach.

Keywords: Depression, Rumination, Cognitive Flexibility

1. Introduction

Depression is characterized by at least 2 weeks of continuous depressed mood, anhedonia, loss of interest, and cognitive, behavioral, and physical symptoms. It has significant societal, economic, and clinical implications because can cause a wide range of problems like sadness, difficulties in interpersonal relationships, occupational performance, and educational performance, impairment in assessing reality, slowing of psychomotor skills and cognitive processes, limitations in thought content, and a decrease in functionality, as well as deterioration of social and family harmony¹⁻³. It was ranked that the prevalence of depressive disorders is 3440 cases per 100.000 people (95% Uncertainty interval 4038.1-5112.4), and 13th

among the top 25 leading causes of DALYs (Disability Adjusted Life Years) in 2019 according to Global Burden of the Disease Study⁴. Similarly, it was reported that 322 million people worldwide, and 3,260,647 people in Turkey suffer from depression according to the World Health Organization's report on Depression and Other Mental Disorders⁴.

Many psychological risk factors which can be called transdiagnostic factors in general, have been identified in the development of depression, such as high neuroticism, low self-esteem, negative repetitive thinking, cognitive reactivity, rumination, automatic thoughts, dysfunctional attitudes, and thought suppression^{5,6}. The cognitive model of depression which suggests focusing on the cognitive content of the person's reactions to events and thoughts has significantly increased the understanding of cognitive processes in major depression⁷. According to the cognitive model, the real world is rebuilt and distorted by the depressed person who has negative and distorted thoughts about oneself, the environment, and the future, this model is also known as Beck's cognitive triad⁸. People who have depression perceive themselves and the environment and the future

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with a biased perspective, and usually report repetitive negative thoughts about themselves. There is a mutual interaction between distorted thoughts⁹. It was reported that there is a high relationship between the onset, relapse, and symptom severity of depression and cognitive distortions, negative thoughts about oneself, cognitive rigidity, and immature defense styles¹⁰⁻¹². These results lead researchers to seek a more comprehensive understanding of depression and focus on cognitive processes and the content of depressive cognition.

Rumination is defined as an attempt to make sense of an upsetting event or to solve a problem. It is very common in the general population. But in substance clinically rumination is conceptualized as repetitive thought on unresolved personal goals and concerns and does not help the progress toward the unattained goal¹³. According to the theory of response styles, it is defined as passive, pervasive, and repetitive thinking patterns about emotional symptoms and the causes and consequences of these symptoms¹⁴. It can also be defined as the experience of being stuck in the head and focusing on the internal state that causes disengage in positive activities, like learning, and enjoying. Typically, ruminators have more focus on the events and passively and less consider their final reactions¹⁵. When prolonged, frequent, and extreme, rumination is problematic, contributes to anxiety and depression, reduces motivation, contributes to perseveration of negative affective states, leads to procrastination, and reduces direct contact with the world. Rumination has been related to severe and persistent depression^{13,16}. Rumination exacerbates depression and other pathological conditions because it causes increased focus and being attached to negative thoughts and memories while trying to make sense of the distressing events, enhancing the content of fatalistic and pessimistic thinking, reducing problem-solving skills, and reducing adaptation to unstable conditions¹⁷. Just and Alloy¹⁸ revealed in their longitudinal study of the relationship between depression and rumination that rumination is effective in the onset and exacerbation of depressive symptoms, and that depression is more common in people who think ruminatively. Similarly, Mor and Winquist¹⁹ concluded in their meta-analysis that rumination is consistently and strongly associated with depressive symptoms. In addition, it was stated that patients with ruminative thinking have more severe depressive symptoms^{16,18,20}.

Cognitive flexibility defines the ability to switch thoughts or to be open to different perspectives²¹. Understanding the options that the individual has, considering difficult life experiences as bearable, and modifying cognitions to adapt to new contexts all are elements of cognitive flexibility²². Cognitive rigidity which means one's difficulty in switching ways of responding is the opposite of this. Rigidity refers to a mindset that is "all or nothing" according to cognitive behavioral therapy. When faced with difficult situations, cognitively flexible people are confident in their ability to behave effectively, aware of their options in the face of a situation, evaluate, and integrate various relevant sources of information, and can produce several scenarios during this process. These are important steps in making the right decision^{23,24}. Cognitive flexibility has been positively related to psychological well-being, interpersonal competence, life satisfaction, and happiness²⁵⁻²⁹, and negatively related to the severity of depressive symptoms^{22,30}. Similarly, Deveney and Deldin³¹ noticed that patients with depression performed worse than healthy controls in cognitive flexibility tasks in the card matching test when the stimuli were negative, according to the Wisconsin Card Sorting Test. It was stated that cognitive rigidity enhances the acceptance of maladaptive beliefs and causes to persist depression³². Moreover, cognitive rigidity which means one's difficulty in switching ways of responding has been related to a worse outcome like enhancement of suicide risk. It has been stated that significant relationship between cognitive rigidity and some transdiagnostic

factors like perfectionism, compulsive behaviors, and impulsivity³³.

The study was designed to compare the ruminative thinking style and cognitive flexibility level of patients with depression who applied to a psychiatry outpatient clinic and a healthy control group. We believe that our findings may provide us to improve our understanding of the cognitive forms of depression and reorganize our treatment approach.

2. Materials and methods

2.1. Participants and Study Design

The ethical principles and permissions were obtained from The University Clinical Research Ethics Committee (Date: 20/02/2019, with decision number 87). After providing detailed verbal and written information about the study and obtaining written consent, the participants were recruited into the study. Data was collected with the sociodemographic Data form, the Beck Depression Inventory, the Ruminative Thinking Style Scale, and the Cognitive Flexibility Inventory from all of the participants who volunteered to participate in the study.

The Patient group (PG) enrolled 100 patients diagnosed with Major Depression based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) who applied to the Ankara University Faculty of Medicine Psychiatry outpatient clinic between January 2019 and November 2019, or who were currently being followed. 24 participants were excluded from the study because of refusing to participate, difficulty understanding the scale forms, missing or incorrect marking. 74 healthy subjects who were not diagnosed with any psychiatric disorder and met the study criteria were enrolled in the hospital and outpatient clinic. All of the participants aged between 18 and 65, were literate, not receiving any specialized psychotherapy intervention (cognitive behavioral therapy, etc.), has no history of substance abuse or use of any drugs, and had no additional psychiatric diagnosis based on DSM-V that affects their cognitive process (neurological disease, severe physical illness, history of brain trauma, or ECT treatment in the previous 6 months), to be able to give consent to participate the study, were recruited in the study.

2.2. Measurement Tools

Sociodemographic Data Form

Information on demographic variables such as age, gender, marital and working status, education level, and data on various clinical characteristics such as psychiatric history, smoking or alcohol consumption, substance use, and general medical history was obtained from all participants using the Sociodemographic Data Form which was prepared by the researchers.

The Beck Depression Inventory (BDI)

Beck Depression Inventory was developed to measure the severity of depressive symptoms by Beck et al.³⁴. It can be evaluated various symptoms of depression, including sadness, hopelessness, somatic symptoms, vegetative symptoms, self-blame, feeling of guilt, fatigue, and loss of appetite with this scale. The test consists of 21 items and the lowest 0 and the highest 63 points can be rated. The cut-off point was determined as 17 points. The Turkish version of the scale has good reliability and validity properties have been stated, with a Cronbach's alpha of $\alpha = 0.80$ ³⁵.

The Ruminative Thought Style Questionnaire (RTSQ)

The scale was developed to assess the general rumination tendency as a thought form, considering ruminative thought as a repetitive, uncontrollable, pervasive, and reversible manner of thinking by Brinker and Dozois (36). It consists of 20 items and is rated every item on a 7-point Likert scale (1 = not at all descriptive of me, 7 = describes me very well). It was not determined cut-off score. Brinker and Dozois developed the original form of the scale. It has been reported the scale presents good convergent validity with the

Response Style Questionnaire, the Global Rumination Scale, and the Beck Depression Inventory, adequate test-retest reliability and high internal consistency with a Cronbach's alpha of $\alpha = 0.94$, and internal consistency coefficient was calculated to be 0.92³⁶. Karatepe, Yavuz, and Turkcan conducted a Turkish validity and reliability assessment of the scale, with an internal consistency coefficient of 0.91³⁷. *The Cognitive Flexibility Inventory (CFI)*

The inventory was developed to assess people's capacity to produce alternatives, recognize appropriate options, and think rationally in tough situations by Dennis and Vander Wal²². It has a 20-item and two-factor structure. The first factor called the Alternatives subscale provides an assessment of people's ability to comprehend that there are alternatives and find solutions in the face of negative situations. The second factor, called Control subscale measures one's adaptability to challenging situations. The questionnaire was designed on a 5-point Likert scale (1= not at all appropriate and 5=completely appropriate). A high score indicates a high level of cognitive flexibility. The Turkish reliability and validity study was carried out by Gülüm and Dağ³⁸. The internal consistency value was found 0.91 for the Alternative subscale and 0.84 for the Control subscale. Cronbach's alpha coefficients were found to be .89 for the Alternatives subscale, 0.85 for the Control subscale, and .90 for the Total scale.

2.3. Statistical Analysis

It was evaluated whether the continuous variables had normal distribution by the Shapiro-Wilk test. The descriptive statistics of the data like the mean, standard deviation, maximum-minimum values, distributions, and ratios were determined. Independent sample t-test and Mann-Whitney U test were used for comparisons between two groups of continuous variables. Pearson Chi-Square Test was used for comparisons between categorical variables. Pearson correlation analysis was used to examine the relationships between the variables. Linear regression analysis was applied to calculate the effect of the main variables of the study. Statistical analyzes were performed with SPSS 26.0 (SPSS Inc, Chicago, IL, USA) package program and the level of significance was accepted as $p < 0.05$. $p < .01$, $p < .001$.

3. Results

In this cross-sectional case-control study, patients with depression (PG, $n=76$, 34.1 ± 9.32) and healthy controls (HC, $n=74$, 34.5 ± 10.5) were compared in terms of ruminative thinking styles and cognitive flexibility levels. There was found no statistically significant difference between the two groups in terms of age, gender, working, and marital status (respectively $p = .80$, $.25$, $.89$, $.19$). The sociodemographic characteristics of the participants are shown in Table 1.

Table 1

Sociodemographic Characteristics of the Patient and Healthy Control Groups

Characteristic	PG (n:76)	HG (n:74)	Statistical Analysis
Age (years)	34.1 ± 9.32 (18-62)	34.5 ± 10.5 (18-62)	$t = -.25$, $p = .80$
S (Female n, %)	52 (68.4%)	44 (59.5%)	$\chi^2 = 1.31$, $p = .25$
Marital status (married n, %)	54 (71.1%)	45 (60.8%)	$\chi^2 = 1.75$, $p = .19$
Working status (unemployed n, %)	45 (59.2%)	43 (58.1%)	$\chi^2 = .019$, $p = .89$

Note; a= Independent Sample t-Test, χ^2 = Chi Square

PG and HC were compared in terms of RTSQ score and CFI there was a statistically significant difference between the groups (both $p < 0.05$). The PG has a higher ruminative thinking level and a lower cognitive flexibility level than the HC (Table 2).

Table 2

The Comparison Between the Groups in terms of the Ruminative Thought Style Questionnaire score and Cognitive Flexibility Inventory Score

	PG			HG			t	p
	N	Mean	SD	N	Mean	SD		
RTSQ	76	101.8	17.9	74	88.2	10.9	9.02	.00*
CFI	76	62.7	8.1	74	68.9	9.0	-9.46	.00**
Alternatives	76	44.4	7.3	74	49.5	8.5	-8.18	.00**
Control	76	18.6	4.6	74	19.9	5.1	-3.34	.00**

Note; * Mann Whitney U; ** Independent Sample t Test

Pearson correlation analysis was performed to examine the relationship between the participants' depressive symptom severity, cognitive flexibility (control, and alternative subscale) ruminative thinking level, and age. It was found a negative relationship between depressive symptom severity and CFI-Alternatives subscale RTSQ score (both $p < 0.01$), and a positive relationship between depressive symptom severity and CFI-Control subscale ($p < 0.01$) for the patients. There was a positive significant relationship between RTSQ and CFI-Control subscale ($p < 0.01$) and a negative significant relationship between RTSQ and CFI-Alternatives subscale ($p < 0.01$). The results were shown in Table 3

Table 3

Correlation between the Patient Group in terms of Various Sociodemographical and Clinical variables

	1	2	3	4	5	6
1-Age						
2-Dep. Sym. Sev. (BDI)	.14					
3-RTSQ		.42**				
4-CFI-total			.08			
5-CFI-Control				.43**		
6-CFI Alternatives					.82**	

Note; ** $p < 0.01$, Dep Sym. Sev.: Depressive Symptom Severity measured by Beck Depression Inventory, RTSQ: The Ruminative Thought Style Questionnaire, CFI: The Cognitive Flexibility Inventory, CFI-Control: The Cognitive Flexibility Inventory Control Subscale, CFI-Alternatives: The Cognitive Flexibility Inventory Alternatives Subscale

Table 4

Correlation between the Control Group in terms of Various Sociodemographical and Clinical variables

	1	2	3	4	5	6
1-Age						
2-Dep. Sym. Sev. (BDI)	.11					
3-RTSQ		.28**				
4-CFI-total			.37**			
5-CFI-Control				.40**		
6-CFI Alternatives					.83**	

Note; ** $p < 0.01$, Dep Sym. Sev.: Depressive Symptom Severity measured by Beck Depression Inventory, RTSQ: The Ruminative Thought Style Questionnaire, CFI: The Cognitive Flexibility Inventory, CFI-Control: The Cognitive Flexibility Inventory Control Subscale, CFI-Alternatives: The Cognitive Flexibility Inventory Alternatives Subscale.

It was found a positive relationship between depressive symptom severity and the CFI-Control subscale RTSQ score (both $p < 0.01$), and a positive relationship between the RTSQ and CFI-Control subscale ($p < 0.01$) for the HC. There was a positive significant relationship between RTSQ and CFI-total and CFI control subscale (both $p < 0.01$) The results were shown in Table 4.

In the study, linear regression analysis examined the variables that predicted the depressive symptom levels of the patient group. ANOVA test was performed to examine whether the regression model was significant. According to the results, the model is statistically significant ($F(2,75) = 9.23$, $p < .001$, $R^2 = 0.35$) and the R^2 value indicated that 35% of the variability of depressive symptom severity is explained by the BDI and RTSQ. When the regression model was examined, it was observed that RTSQ had a positive and significant effect on depressive symptom severity ($t = 6.618$, $p < 0.05$, $\beta = 0.441$), and the level of cognitive flexibility had a negative and significant effect ($t = -6.34$, $p < 0.05$, $\beta = -0.423$). The results were shown in Table 5.

Figure 1

The Effect of Ruminative Thought and Cognitive Flexibility Levels on Depressive Symptom Severity

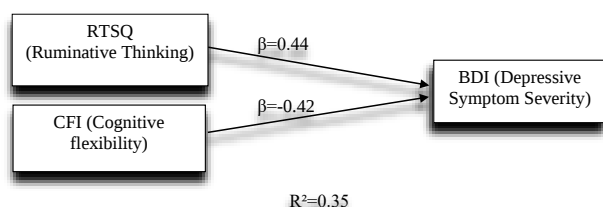


Table 5

Patient Group Linear Regression Analysis Results

	B	SE(B)	B	t	R ²	F
CFI	-0.465	0.073	-0.423	-6.34	0.349	39.39
RTSQ	0.224	0.034	0.441	6.62		

NOTE: SE: Standart Error

Similarly, linear regression analysis examined the variables that predicted the depressive symptom levels of the HC. Before the regression analysis, the relationship between the variables was examined and it was observed that there was only a relationship between depressive symptom severity (BDI) and RTSQ score. ANOVA test was performed to examine whether the regression model was significant.

Table 6

Patient Group Linear Regression Analysis Results

	B	SE(B)	B	t	R ²	F
Ruminative Thinking	0.043	0.02	0.30	2.68	0.09	0.009

NOTE: SE: Standart Error

According to the results, the model is statistically significant ($F(1,73) = 7.2$, $p < .001$, $R^2 = .09$), and the R^2 value indicated that 9% of the variability of depressive symptom severity is explained by the RTSQ. It was observed that RTSQ had a positive and significant effect on depressive symptom severity ($t = 2.68$, $p = 0$, $\beta = 0.30$). The results were shown in Table 6.

4. Discussions

Depression is a common disorder that causes severe social, economic, and social consequences in our country and the world and it affects people's lives very seriously. The results of the study show that depressive patients had higher ruminative thought levels and lower cognitive flexibility levels than healthy individuals. There was found a significant and negative relationship between ruminative thought, cognitive flexibility, and depressive symptom severity in the patient group. In the control group, there was a significant negative relationship between only ruminative thought and depressive symptom severity. In addition, it was found that cognitive flexibility and ruminative thought severity can explain 35% of the variability of depressive symptom severity in the patient group. In the healthy group, ruminative thought severity can explain 9 % of the variability of depressive symptom severity. According to the results, it can be said that the cognitive flexibility and ruminative thinking level have had a significant effect on depressive symptom levels in the patient group and the ruminative thought level has a significant effect in the healthy control group. Even if there are not many studies examining the relationship between depressive symptom levels and ruminative thinking in the clinical population the results from the studies are consistent with the present study. It has been shown in two studies conducted in a non-clinical sample that ruminative thought is related to depressive mood^{39,40}. It was stated that the level of ruminative thinking contributed to the explanation of depressive symptoms both directly and through negative metacognitive beliefs⁴⁰.

The results obtained from the literature review show that healthy individuals with a tendency to ruminative thinking can easily enter a depressive mood, and it increases the severity of the disease in clinical patients diagnosed with depression⁴¹. There were some explanations for this close relationship between depression and rumination. People who experience depressive moods and are faced with negative life events constantly think about the causes and consequences of the negative events and overthinking causes negative events to remain in the memory constantly and creates negative reactions to the current positive situation. For this reason, individuals under the influence of rumination are more likely to encounter diseases that will turn into emotional disorders such as depression and anxiety. For this reason, ruminators have a high risk for depression and anxiety disorders⁴². Besides, rumination facilitates access to negative cognitions and triggers negative emotional states. Even, for this reason, rumination has been described as an emotional magnifier¹³. The negative thought style is cut down people's problem-solving skills and motivation for problem-solving. It was stated that these situations contribute to the development of depression¹⁴. Those results lead clinicians to seek advanced treatment for rumination. It was suggested that a lot of therapy approaches like Rumination Focused-Cognitive Behavioral Therapy, Cognitive Bias Modification, Metacognitive Therapy, Mindfulness-Based-Cognitive Behavioral Therapy, cognitive Control Training, and Self Systems Therapy⁴³.

According to another result of the study, there was a negatively significant relationship between cognitive flexibility levels and depressive symptom levels in the patient group. In other words, the patient who has low cognitive flexibility had higher depressive symptom severity. In the control group, there was no relationship

between cognitive flexibility and the level of depressive symptoms. Similarly in the literature, negative relationships between cognitive flexibility and depressive symptoms were shown in the clinic and non-clinic populations^{30,31,44-46}. A similar relationship has also been shown in caregivers of cancer patients⁴⁷. In another study which is used emotional and neutral stimuli; patients with depression spend more time and attention while performing tasks with emotional stimuli have been reported⁴⁸. This may be due to that high cognitive flexibility provides the person's high belief that they can easily solve problems and change their thoughts in a positive way. While cognitive flexibility has been related to individuals producing different perspectives and solutions against current situations, cognitive rigidity has been related to higher vulnerability to tough life events and in the end, the outcome is increased depression risk⁴⁶. With the results and literature review, thinking about the causes and consequences of events deeply, having difficulties in producing alternative solutions, and not being able to control own negative thoughts may cause enlargement of depressive symptom severity and duration for the patient with depression can be said. In the non-clinical population, those excuses cause a negative mood. As a result of our research and the knowledge from previous research, if cognitive rigidity is one of the causes of depression, treatment of this symptom may be prevented the occurrence of major depression can be said.

Therefore, interventions related to cognitive rigidity are important in the approach to patients with depression. Being able to produce alternative solutions without being stuck on the problems and developing their problem-solving skills should be among the treatment goals. Various studies were shown Cognitive Behavioral Therapy is useful for the remediation of cognitive flexibility^{49,50}, though, Oishi et al.⁵¹ suggested that stress management training on the internet can enhance cognitive flexibility levels. Greenberg et al.⁵² stated that mindfulness practice is beneficial for reducing cognitive rigidity. But the opposite of those results Johnco et al.⁵³ said that CBT couldn't provide significant improvement in cognitive flexibility. However, we think that whatever the final result, the clinicians had to use effective technics to improve cognitive rigidity.

The limitations of the study are including the cross-sectional design which reduces the researchers' interpretation of causality, and it provided self-report data from participants which causes them may not to be honest about their ideas, behaviors, and attitudes when filling out the measurement tools. In addition, the drug treatments currently used by the patients were overlooked. This is an important limitation. Additionally, the data cannot be generalized because of made only in a certain period and group and included only a small number of patients with depression. But, it can be said that the patient and control groups are similar in terms of gender, employment status, marital status, and age. Besides, to exclude factors that may affect the test results it has been taken as a condition that they should not have additional medical, neurological, or psychiatric diagnoses and have no individualized psychotherapeutic interventions in the past and present for the participants. These are advantages for our study, considering the effects of the factors on the tests.

In the literature, it was reported that depressive symptoms are related to executive functions, cognitive rigidity, and ruminative thinking^{14,22}. Recent studies about rumination have been marked the studies' results may change because of study population features, experiment design, various impairments of cognitive functions, intellectual ability, executive functions, problem-solving abilities, and coping strategies^{54,55}. It was not adjusted to these factors in the study and unfortunately, it is a limitation, but Davis and Nolen-Hoeksema⁵⁶ stated that there is a direct relationship between

ruminative thought and cognitive flexibility and depressive symptoms severity in both patients and non-clinic populations.

5. Conclusions

Depression is a common disorder that causes severe social, economic, and social consequences in our country and the world and it affects people's lives very seriously. The results of the study showed that ruminative thought and cognitive flexibility are important factors for the formulation of patient problems, and for determining treatment goals during the treatment. Therefore, interventions to improve cognitive flexibility and rumination are important. Clinicians should combine interventions to cognitive flexibility and rumination into their treatment approach. These interventions would provide to increase the effectiveness of therapies, make shorter the therapy and treatment duration, and reduce the risk of relapse. We hope that this study and future studies which are carefully designed, large-sample, prospective studies will determine the various transdiagnostic factors in depression and other mental disorders to develop targeted prevention and treatment programs.

Statement of ethics

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by The Ankara University Clinical Research Ethics Committee (Date: 20/02/2019, with decision number 87).

Conflict of interest statement

Author declare that they have no financial conflict of interest with regard to the content of this report.

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References

1. Helvacı Çelik F, Hocaoglu Ç. Major Depresif Bozukluk' Tanımı, Etiyolojisi ve Epidemiyolojisi: Bir Gözden Geçirme. *Çağdaş Tıp Dergisi* 2016; 6: 51-66. [CrossRef] <https://doi.org/10.16899/ctd.03180>
2. Oral, M. Majör depresyon tanısı almış kadınlarda kişilerarası ilişkiler terapisi yaklaşımına dayalı grupla sosyal hizmet uygulamasının psikososyal işlevsellik üzerine etkisi. Hacettepe Üniversitesi 2016; Ankara.
3. Irak M, Albayrak EO. Psychometric properties of the expanded version of the inventory of depression and anxiety symptoms in a Turkish population. *Psychological Reports* 2020; 123:517-545. [CrossRef] <https://doi.org/10.1177/0033294118813844>
4. World Health Organization. Depression and other common mental disorder 2017. Access Address: <https://apps.who.int/iris/bitstream/handle/10665/254610/WHO-MSD-MER-2017.2-eng.pdf>
5. Ehring T, Watkins E. R. Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy* 2008; 1: 192-205. [CrossRef] <https://doi.org/10.1521/ijct.2008.1.3.192>
6. Struijs SY, de Jong PJ, Jeronimus BF, van der Does W, Riese H, Spinhoven P. Psychological risk factors and the course of depression and anxiety disorders: A review of 15 years NESDA research. *Journal of Affective Disorders* 2021; 295: 1347-1359. [CrossRef] <https://doi.org/10.1016/j.jad.2021.08.086>
7. LeMoult J, Gotlib IH. Depression: A cognitive perspective. *Clinical psychology review* 2019; 69:51-66. [CrossRef] <https://doi.org/10.1016/j.cpr.2018.06.008>
8. Türkçapar H. Klinik Uygulamalarda Bilişsel-Davranışçı Terapi: Depresyon. 4.Baskı. İstanbul: Epsilon Yayınevi, 2018.
9. Dinç M. Aaron Temkin Beck: Eleştirel düşüncenin peşinden yaratıcı bir psikoterapi kuramına. *Bilişsel Davranışçı Psikoterapi ve Araştırmalar Dergisi* 2012; 1: 70-76. [CrossRef]

10. Batmaz S, Kocbiyik S, Yalçınkaya-Alkar Ö, Turkcapar M. Cognitive distortions mediate the relationship between defense styles and depression in female outpatients. *The European Journal of Psychiatry* 2016; 30: 237-247. [CrossRef]
<https://doi.org/10.1146/annurev-clinpsy.121208.131305>
11. Pothier B, Dobson KS, Drapeau M. Investigating the relationship between depression severity and cognitive rigidity through the use of cognitive errors. *Archives of Psychiatry and Psychotherapy* 2012; 2, 35-40. [CrossRef]
12. Gotlib IH, Joormann J. Cognition and depression: current status and future directions. *Annual review of clinical psychology* 2010; 6: 285-312. [CrossRef]
<https://doi.org/10.1146/annurev-clinpsy.121208.131305>
13. Watkins ER. Rumination-focused cognitive-behavioral therapy for depression. New York: Guilford, 2018.
14. Lyubomirsky S, Layous K, Chancellor J, Nelson K. Thinking about rumination: the scholarly contributions and intellectual legacy of Susan Nolen-Hoeksema. *Annual Review of Clinical Psychology* 2015; 11: 1-22. [CrossRef]
<https://doi.org/10.1146/annurev-clinpsy-032814-112733>
15. Lyubomirsky S, Caldwell ND, Nolen-Hoeksema S. Effects of ruminative and distracting responses to depressed mood on retrieval of autobiographical memories. *Journal of Personality and Social Psychology* 1998; 75: 166-77. [CrossRef]
<https://doi.org/10.1037//0022-3514.75.1.166>
16. Nolen-Hoeksema S. Ruminative coping with depression. Heckhausen. J, Dweck CS (Ed.), *Motivation and self-regulation across the life span* (ss. 237-256). New York: Cambridge University Press 1998.
<https://doi.org/10.1017/CBO9780511527869.011>
17. Nolen-Hoeksema S. Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology* 1991; 100: 569-582. [CrossRef]
<https://doi.org/10.1037//0021-843X.100.4.569>
18. Just N, Alloy LB. The response styles theory of depression: Tests and an extension of the theory. *Journal of Abnormal Psychology* 1997; 106: 221-229. [CrossRef]
<https://doi.org/10.1037//0021-843X.106.2.221>
19. Mor N, Winquist J. Self-focused attention and negative affect: A meta-analysis. *Psychological Bulletin* 2002; 128: 638-662. [CrossRef]
<https://doi.org/10.1037//0033-2909.128.4.638>
20. Nolen-Hoeksema S, Morrow J, Fredrickson BL. Response styles and the duration of episodes of depressed mood. *Journal of abnormal psychology* 1993; 102:20. [CrossRef]
<https://doi.org/10.1037//0021-843X.102.1.20>
21. Stevens AD. Social problem-solving and cognitive flexibility: Relations to social skills and problem behavior of at-risk young children. (Unpublished PhD Thesis) ProQuest Dissertations and Theses database'den reached 2009.
22. Dennis JP, Vander Wal JS. The Cognitive Flexibility Inventory: Instrument development and estimates of reliability and validity. *Cognitive Therapy Research* 2010; 34: 241-253. [CrossRef]
<https://doi.org/10.1007/s10608-009-9276-4>
23. Martin MM, Anderson CM, Thweatt KS. Aggressive communication traits and their relationships with the Cognitive Flexibility Scale and the Communication Flexibility Scale. *Journal of Social Behavior and Personality* 1998; 13: 531-540. [CrossRef]
24. Martin MM, Anderson CM. The cognitive flexibility scale: Three validity studies. *Communication Research Reports* 1998; 11: 1-9. [CrossRef]
<https://doi.org/10.1080/08934219809367680>
25. Cardom RD. The mediating role of cognitive flexibility on the relationship between cross-race interactions and psychological well-being (Doctoral dissertation). Retrieved from 2016. [CrossRef]
26. Fu F, Chow A. Traumatic exposure and psychological well-being: The moderating role of cognitive flexibility. *Journal of Loss and Trauma* 2017; 22(1), 24-35. [CrossRef]
<https://doi.org/10.1080/15325024.2016.1161428>
27. Asıcı E, İkiz F. A pathway to happiness: Cognitive flexibility. *Mehmet Akif Ersoy University Educational Faculty Journal* 2015; 1: 191-211. [CrossRef]
28. Rubin R, Martin M. Development of a measure of interpersonal competence. *Communication Research Reports* 1994; 11:33-44. [CrossRef]
<https://doi.org/10.1080/08824099409359938>
29. Çikrikci Ö. The predictive roles of cognitive flexibility and error oriented motivation skills on life satisfaction. *International Journal of Eurasia Social Sciences* 2018; 9:717-727. [CrossRef]
30. Yu Y, Yu Y, Lin Y. Anxiety and depression aggravate impulsiveness: the mediating and moderating role of cognitive flexibility. *Psychology, Health & Medicine* 2020; 25: 25-36. [CrossRef]
<https://doi.org/10.1080/13548506.2019.1601748>
31. Deveney CM, Deldin PJ. A preliminary investigation of cognitive flexibility for emotional information in major depressive disorder and non-psychiatric controls. *Emotion* 2006; 6: 429-437. [CrossRef]
<https://doi.org/10.1037/1528-3542.6.3.429>
32. Moore RG. It's the thought that counts: The role of intentions and meta-awareness in cognitive therapy. *Journal of Cognitive Psychotherapy: An International Quarterly* 1996; 10:255-269. [CrossRef]
<https://doi.org/10.1891/0889-8391.10.4.255>
33. Morris L, Mansell W. A systematic review of the relationship between rigidity/flexibility and transdiagnostic cognitive and behavioral processes that maintain psychopathology. *Journal of Experimental Psychopathology* 2018, 9(3). [CrossRef]
<https://doi.org/10.1177/2043808718779431>
34. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Archives of General Psychiatry* 1961; 4:561-571. [CrossRef]
<https://doi.org/10.1001/archpsyc.1961.01710120031004>
35. Hisli N. Beck Depresyon Envanteri'nin geçerliliği üzerine bir çalışma. *Psikoloji Dergisi* 1988; 6:118-122. [CrossRef]
36. Brinker JK, Dozois DJA. Ruminative thought style and depressed mood. *Journal of Clinical Psychology* 2009; 65:1-19. [CrossRef]
<https://doi.org/10.1002/jclp.20542>
37. Karatepe HT, Yavuz FK, Türkcan A. Validity and reliability of the Turkish version of the ruminative thought style questionnaire. *Klinik Psikofarmakoloji Bülteni* 2013; 23: 231-241. [CrossRef]
<https://doi.org/10.5455/bcp.20121130122311>
38. Gülüm Vİ, Dağ İ. Tekrarlayıcı düşünme ölçeği ve bilişsel esneklik envanterinin Türkçe uyarlaması, geçerliliği ve güvenilirliği. *Anatolian Journal of Psychiatry* 2012; 13:216-223. [CrossRef]
39. Hong RY. Worry and rumination: Differential associations with anxious and depressive symptoms and coping behavior. *Behaviour Research and Therapy* 2007; 45: 277-290. [CrossRef]
<https://doi.org/10.1016/j.brat.2006.03.006>
40. Yılmaz AE. Depresyonun üstbilişsel modeli'nin Türkiye'deki bir üniversite öğrencisi örnekleminde incelenmesi. *Türk Psikiyatri Dergisi* 2016; 27:100-9. [CrossRef]
41. Takagishi Y, Sakata M, Kitamura T. Influence of rumination and self-efficacy on depression in Japanese undergraduate nursing students. *Asian Journal of Social Psychology* 2013; 16:163-168. [CrossRef]
<https://doi.org/10.1111/ajsp.12000>
42. Chen J, Rapee RM, Abbot MJ. Mediators of the relationship between social anxiety and post-event rumination. *Journal of Anxiety Disorders* 2013; 27:1-8. [CrossRef]
<https://doi.org/10.1016/j.janxdis.2012.10.008>
43. Watkins ER, Roberts H. Reflecting on rumination: Consequences, causes, mechanisms and treatment of rumination. *Behaviour Research and Therapy* 2020; 127. [CrossRef]
<https://doi.org/10.1016/j.brat.2020.103573>
44. Yazar MS, Şenyaşar Meterelliyoğlu K. Klinik olmayan popülasyonda depresif semptomatoloji, bilişsel Esneklik ve umutsuzluk ilişkisinin incelenmesi. *Bilişsel Davranışçı Psikoterapi ve Araştırmalar Dergisi* 2019; 8:155-163. [CrossRef]
45. Goring HJ, Papageorgiou C. Rumination and worry: Factor analysis of self-report measures in depressed participants. *Cognitive Therapy and Research* 2008; 32: 554-566. [CrossRef]
<https://doi.org/10.1007/s10608-007-9146-x>
46. Fresco DM, Rytwinski NK, Craighead LW. Explanatory flexibility and negative life events interact to predict depression symptoms. *Journal of Social and Clinical Psychology* 2007; 26: 595-608. [CrossRef]
<https://doi.org/10.1521/jscp.2007.26.5.595>
47. Karabekiroğlu A, Demir EY, Aker S, Kocamanoglu B, Karabulut GS. Predictors of depression and anxiety among caregivers of hospitalised advanced cancer patients. *Singapore Medical Journal* 2018; 59:572-577. [CrossRef]
<https://doi.org/10.11622/smedj.2018066>
48. Murphy FC, Michael A, Sahakian BJ. Emotion modulates cognitive flexibility in patients with major depression. *Psychological Medicine* 2012; 42:1373-1382. [CrossRef]
<https://doi.org/10.1017/S0033291711002418>
49. Nazarzadeh RS, Fazeli M, Aval MM, Shourch RM. Effectiveness of cognitive-behavior therapy on cognitive flexibility in perfectionist. *Psychology* 2015; 6: 1780. [CrossRef]
<https://doi.org/10.4236/psych.2015.614174>
50. Yasinski C, Hayes AM, Ready CB, Abel A, Görg N, Kuyken W. Processes of change in cognitive behavioral therapy for treatment-resistant depression:

- psychological flexibility, rumination, avoidance, and emotional processing. *Psychotherapy Research* 2020; 30: 983-997. [CrossRef]
<https://doi.org/10.1080/10503307.2019.1699972>
51. Oishi S, Takizawa T, Kamata N, Miyaji S, Tanaka K, Miyaoka H. Web-based training program using cognitive behavioral therapy to enhance cognitive flexibility and alleviate psychological distress among schoolteachers: pilot randomized controlled trial. *JMIR Research Protocols* 2018; 7. [CrossRef]
<https://doi.org/10.2196/resprot.8541>
52. Greenberg J, Reiner K, Meiran N. "Mind the trap": mindfulness practice reduces cognitive rigidity. *PloS one* 2012; 7. [CrossRef]
<https://doi.org/10.1371/journal.pone.0036206>
53. Johnco C, Wuthrich VM, Rapee RM. The influence of cognitive flexibility on treatment outcome and cognitive restructuring skill acquisition during cognitive behavioural treatment for anxiety and depression in older adults: Results of a pilot study. *Behaviour Research and Therapy* 2014; 57: 55-64. [CrossRef]
<https://doi.org/10.1016/j.brat.2014.04.005>
54. Nolen-Hoeksema S, Wisco BE, Lyubomirsky S. Rethinking rumination. *Perspectives on Psychological Science* 2008; 3:400-424. [CrossRef]
<https://doi.org/10.1111/j.1745-6924.2008.00088.x>
55. Wilkinson PO, Croudace TJ, Goodyer IM. Rumination, anxiety, depressive symptoms and subsequent depression in adolescents at risk for psychopathology: a longitudinal cohort study. *BMC Psychiatry* 2013; 13: 1-9. [CrossRef]
<https://doi.org/10.1186/1471-244X-13-250>
56. Davis RN, Nolen-hoeksema S. Cognitive inflexibility among ruminators and nonruminators. *Cognitive Therapy and Research* 2000, 24; 699-711. [CrossRef]
<https://doi.org/10.1023/A:1005591412406>