Dysfunctional Metacognitive Beliefs, Experiential Avoidance,and Behavioral Inhibition System in Depressive Disorder

ABSTRACT

Background: Dysfunctional metacognitive beliefs form the basis of the formation and maintenance of psychopathologies. In our study, we planned to examine the common aspects of the concepts of dysfunctional metacognition, experiential avoidance, and behavioral inhibition system in depressed patients compared to healthy individuals and their effects on each other.

Methods: Fifty-five depressed patients and as a control group 54 healthy volunteers participated in the study. Beck Depression Inventory, Beck Anxiety Inventory, Metacognitions Questionnaire 30, Acceptance and Action Questionnaire II, and Behavioral Inhibition and Behavioral Activation Scale were used in the study.

Results: Median (minimum–maximum) Acceptance and Action Questionnaire II score was 9 (7-35) points in the control group and 30 (9-46) points in the depressed patient group ($P < .001$). A statistically significant difference between the groups was observed only in the Behavioral Activation Scale—reward responsiveness subscale, with 20 (14-30) points in the control group and 23 (13-36) points in the patient group. A statistically significant difference was observed between the groups in all Metacognitions Questionnaire 30 subscale scores ($P < .001$). A statistically significant positive correlation was found between depression scores and experiential avoidance ($r = 0.751$; $P < .001$), reward responsiveness ($r = 0.329$; $P < .001$) and metacognition subscale scores. In addition, a positive correlation was found between experiential avoidance and metacognition subscale scores ($P < .001$).

Conclusion: The data we obtained support the fact that as the severity of depression increases, the patients more strongly stick to dysfunctional metacognitive beliefs, exert more frequently experiential avoidance and less often impulsive behaviors. Considering these clinical features may contribute favorably to the individualized psychotherapy process.

Keywords: Dysfunctional metacognitive beliefs, avoidance, behavioral inhibition system, depression

Introduction

Thanks to the acceleration of the research of cognitive processes in psychopathologies in the middle of the 20th century; metacognitive theory, which focuses on the process of evaluating, monitoring and controlling cognitions, has also started to be emphasized.[1] According to metacognitive theory, dysfunctional beliefs about cognitions underlie the formation and maintenance of psychopathologies. Therefore, the study of metacognition has begun to take its place in the treatment procedures of psychopathologies such as depressive disorder, obsessive-compulsive disorder, and anxiety disorders.[2] The metacognitive model of depression was developed by Papageorgiou and Wells.[3] The main features of this model consist of positive metacognitive beliefs requiring rumination so as to find answers to emotions and problems when depressed, and negative metacognitive beliefs about the uncontrollability

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of rumination and the danger of depressive experiences, decreased cognitive awareness of rumination, and false coping behaviors.

Longitudinal studies investigating the relationship between metacognitive beliefs and depression have shown that positive metacognitive beliefs about rumination predict the severity of depressive symptoms.[4] Studies conducted in different non-clinical samples support the positive relationship between cognitive insecurity and depressive symptoms.[5] In addition, a significant relationship has been found between the need to control thoughts and the severity of depression along with the metacognitive belief of uncontrollability and danger.[6-10] Cognitive attentional syndrome (CAS), a concept used in metacognitive therapy to explain psychopathology is characterized with rumination and worry, self-focused attention processes resistant to change attentional bias towards any threat or danger, trying to suppress thoughts, experiential avoidance, and dysfunctional coping approaches. Experiential avoidance mentioned in the CAS is defined as the unwillingness of individuals to experience emotions, thoughts, memories, bodily sensations, and events that they evaluate negatively.[11] Although strategies to avoid negative experiences are used by many people from time to time, the rigidity and inflexibility of experiential avoidance paves the way for psychopathologies.[12] Another system that plays a mediating role in maintaining experiential avoidance is the Behavioral Inhibition–Activation System. Gray stated that there are 2 dimensions of personality in the Reinforcement Sensitivity Theory, one of which is a tendency to anxiety and the other is impulsivity. Behavioral Inhibition System (BIS) and Behavioral Activation System (BAS), which are 2 different motivational systems, shape these 2 dimensions of personality.[13] According to the theory, BIS is related to sensitivity to punishment and nonreward. Those with BIS sensitivity are more prone to anxiety in the presence of environmental clues. Behavioral Activation System is associated with reward and impunity.[14] There are studies showing that symptoms of depression have a positive relationship with BIS sensitivity and a negative relationship with BAS sensitivity. It has also been stated that being unresponsive to positive and reward-promising stimuli in the environment may be one of the factors that maintain the depressive episode.[15]

As summarized above, although dysfunctional metacognitive beliefs, experiential avoidance and behavioral inhibition systems have been studied in many psychiatric pathologies, studies examining the coexistence of these 3 systems in major depressive disorder have not been encountered in the literature. Therefore, in this study, we hypothesized that the change in these 3 concepts which have common aspects in depressed patients may differ from healthy individuals. We hope that the results obtained from the study will contribute to the techniques that can be used in the psychotherapy of depression.

MAIN POINTS

- *While the severity of depression increases, the use of dysfunctional metacognitions and experiential avoidance increases.*
- *The data we obtained support that as the severity of depression increases, impulsivity decreases.*
- *It has been evaluated that considering these clinical features in the therapy process may contribute to the individualized psychotherapy process.*

Material and Methods

A cross-sectional study was conducted between January 2019 and June 2019. Fifty-five patients followed up with the diagnosis of Depressive Disorder in Balıkesir University Medical Faculty Hospital Psychiatry Polyclinic were selected as the case group of this study. Fifty-four age- and gender-matched healthy volunteers were included in the control group. Literate patients aged 18-69 years with the diagnosis of depressive disorder according to *Diagnostic and Statistical Manual of Mental Disorders-5* (*DSM-5*) criteria without any accompanying neurological, systemic, or psychiatric disorder (psychotic disorder, bipolar affective disorder, anxiety disorders, alcohol and substance abuse) were included in the patient group. Literate participants without any current or past psychiatric disease, alcohol and substance abuse, and neurological or systemic disorders that would affect brain functions were included in the control group. Ethical permission for the study was obtained from the Ethics Committee of Balıkesir University Faculty of Medicine (Decision No: 2017/107). After giving general information about the purpose of the research to all participants, their written and verbal consents were obtained.

Data Collection Tools

All participants filled out the sociodemographic data form inquiring marital status, duration of complaints, number of attacks experienced, family history of psychiatric disease, history of suicidal attempt(s), and clinical evaluation scales after they had given their informed consent.

Beck Depression Inventory

This inventory consists of 21 items and each item is scored between 0 and 3 points. The total score ranges between 0 and 63 points. The scale score ranging between 0 and 9 points indicates that there is no depression. A score between 10 and 16 points defines mild depression, between 17 and 24 points moderate depression, and a score of 25 points and above defines severe depression. The BDI has shown good concurrent validity when compared to psychiatric ratings of severity of depression in clinical populations ($r = 0.79$, N = 226).[16] The Turkish adaptation of the scale was made by Hisli in 1989.[17]

Beck Anxiety Inventory

It is a Likert-type self-rating scale consisting of 21 items, each item scores between 0 and 3 points. The high total score indicates the high level of anxiety experienced by the person. It was developed by Beck et al[18] and Turkish validity and reliability study was made by Ulusoy et al.[19] Ulusoy et al determined the Cronbach's alpha internal consistency score of the scale as 0.93.

Metacognitions Questionnaire 30

The Metacognitions Questionnaire 30 (MCQ-30) was developed by Wells and Cartwright (2004) to evaluate metacognitive beliefs and processes in psychological disorders.[20] Each item in the scale is graded on a 4-point Likert scale, and the scores that can be obtained from the scale vary between 30 and 120 points. An increase in the score indicates an increase in pathological metacognitive activity. The MCQ-30 consists of 5 subscales: (1) Positive beliefs, (2) Uncontrollability and danger, (3) Cognitive insecurity, (4) The need to control thoughts, (5) Cognitive awareness. The Turkish validity and reliability study of MCQ-30 was performed by Tosun and Irak.[21]

Behavioral Inhibition System/Behavioral Activation System Scale

The scale developed by Carver and White consists of 24 questions and 4 subdimensions.[22] One of these subdimensions measures behavioral inhibition, and the other 3 measure behavioral activation. Fun seeking, reward responsiveness, and drive are 3 subdimensions that measure behavioral activation. In the BIS subdimension, there are questions about the avoidance system and anxiety level. It is assumed that as the scores obtained from the scale increase, the BIS or BAS sensitivity increases. The Turkish adaptation of the scale was made by Şişman in 2012.[23]

Acceptance and Action Questionnaire-II

Acceptance and Action Questionnaire II (AAQ-II) is a 7-item Likert-type scale developed by Bond et al[24] to measure the concepts of acceptance, experiential avoidance, and psychological inflexibility. Higher scores obtained from the scale indicate higher degrees of experiential avoidance. The Turkish adaptation of the scale was made by Meunier et al.[25]

Statistical Analysis

The data obtained in the study were analyzed using the Statistical Package for the Social Sciences version 21.0 (IBM SPSS Corp.; Armonk, NY, USA) package program. In the comparison of continuous variables in independent groups, the Mann–Whitney U-test or Student's t-test was used, taking into account the assumption of normality of distributions.

The normality of the distributions was determined by using visual graphics (histogram, etc.) and appropriate statistical methods (Kolmogorov–Smirnov test etc.). In the evaluation of categorical data, the Pearson's chi-square test was performed by creating cross-tables. Pearson's or Spearman's correlation test was applied considering the distribution patterns in determining the relationship between continuous variables. $P < .05$ was accepted as the level of statistical significance.

The sample size of the study was calculated using the G*Power, version 3.1.9.7, program. Accordingly, the minimum sample size to be reached for the 2 groups was calculated as 102 at $d = 0.5$ effect size, 0.80 power, and $a = 0.05$ error probability.

Results

The control group consisted of 76% (41/54) female and 24% (13/54) male, and the patient group comprised of 80% (44/55) female and 20% (11/55) male volunteers ($P = .608$). The mean (SD) age of the study population was 39.3 (SD = 12.1) years in the control group and 38.1 (SD = 12.0) years in the patient group without any statistically significant difference between the groups in terms of age of the participants ($P = .603$). Considering the clinical features of the cases, 31% (17/55) of patients had their first episode of depression. The complaints of 36% (19/55) of them persisted for less than 6 months, and 35% (19/55) of the cases attempted suicide in the past.

The median (minimum–maximum) BDI scores were 3 (0-18) points in the control and 29 (20-59) points in the patient group with a statistically significant difference between the groups ($P < .001$). The median (minimum–maximum) BAI scores were 4.5 (0-37) points in the control and 26 (3-74) points in the patient group with a statistically significant difference between the groups ($P < .001$).

The median (minimum–maximum) AAQ-II scores were 9 (7-35) points in the control group and 30 (9-46) points in the depressed patients ($P < .001$). A statistically significant intergroup difference was observed only in terms of median (minimum–maximum) BAS—reward responsiveness subscale scores that were 20 (14-30) points in the control and 23 (13-36) points in the patient group ($P = .001$). Statistically significant difference was observed between the groups in terms of all MCQ-30 subscale scores ($P < .001$). The Cronbach's alpha measure of Metacognitions Questionnaire subscales was 0.90. The Cronbach's alpha measure of BIS/BAS subscales was 0.65. The Cronbach's alpha measure of BDI, BAI, and AAQ-II were 0.76, 0.848, and 0.803, respectively. The scale scores of the groups are shown in Table 1.

When the patient and control group participants were evaluated in combination (n = 109), a statistically significant positive correlation between depression scores and BAI ($r = 0.741$; $P < .001$), AAQ-II

Table 1. Comparison of the Scale Scores of the Groups

	Control Group (N = 54)			Patient Group (N = 55)			
	Median (Minimum–Maximum)	Q1	Q3	Median (Minimum–Maximum)	Q1	Q3	P
BDI	3 (0-18)	1	5	29 (20-59)	24	38	<.001
BAI	4.5 (0-37)	1	9.5	26 (3-74)	17	36	<.001
AAQ-II	9 (7-35)	7	14.25	30(9-46)	23	38	<.001
BAS-RR	20 (14-30)	19	23	23 (13-36)	20	25	.001
BAS-FS	19 (9-20)	17	19.25	18 (5-30)	16	19	.594
BAS-Drive	10.5(5-15)	8.5	13	11 (4-16)	8	13	.656
BAS-Total	49 (33-59)	46	53	51(22-68)	47	56	.050
BIS	10 (4-15)	7.75	12	11(4-30)	8	14	.057
MCQ-1	7 (5-21)	6	11	11(6-21)	9	14	<.001
MCQ-2	8 (5-22)	6	10	16 (7-23)	13	19	<.001
MCQ-3	9.5 (5-16)	7	12	13 (6-23)	10	16	<.001
MCQ-4	9 (5-18)	7	11	16 (8-24)	13	19	<.001
MCQ-5	10 (5-21)	7	12	14 (7-22)	12	17	<.001

AAQ-II, Acceptance and Action Form; BAI, Beck Anxiety Inventory; BAS, Behavioral Activation System; BAS-FS, Behavioral Activation System—fun seeking; BAS-RR, Behavioral Activation System—reward responsiveness; BDI, Beck Depression Inventory; BIS, Behavioral Inhibition System; MCQ, Metacognitions Questionnaire.

Table 2. Results of the Correlation Analysis Between the Total Scale Scores of the Groups

		BDI	BAI	AAQ-II	BAS-RR	BAS-FS	BAS-Drive	BIS	MMCQ-1	MMCQ-2	MMCQ-3	MMCQ-4	MMCQ-5
BDI	r	1.000	.741	.751	.329	-0.112	-0.030	0.115	.399	.671	.524	.711	.542
	P		<.001	<.001	<.001	.245	.756	.236	<.001	<.001	<.001	<.001	<.001
BAI	r		1.000	.708	.413	-0.015	-0.020	0.093	.332	.650	.431	.609	.439
	P			<.001	<.001	.838	.874	.338	<.001	<.001	<.001	<.001	<.001
AAQ-II	r			1.000	.402	-0.033	0.076	0.178	.524	.769	.533	.793	.647
	P				<.001	.733	.435	.064	<.001	<.001	<.001	<.001	<.001
BAS-RR	r				1.000	0.109	-0.003	-0.040	.305	.465	.279	.430	.336
	P					.258	.973	.681	.001	<.001	.003	<.001	<.001
BAS-FS	r					1.000	.278	0.155	0.080	0.038	-0.095	-0.127	0.071
	P						.003	.107	.410	.698	.327	.188	.463
BAS-Drive	r						1.000	.507	0.154	0.068	-0.058	-0.021	0.092
	P							<.001	.110	.485	.547	.831	.339
BIS	r							1.000	.287	0.151	-0.089	0.088	0.187
	P								.002	.117	.358	.360	.052
MCQ-1	r								1.000	.613	.487	.566	.746
	P									<.001	<.001	<.001	<.001
MCQ--2	r									1.000	.635	.848	.771
	P										<.001	<.001	<.001
MCQ--3	r										1.000	.627	.639
	P											<.001	<.001
MCQ-4	r											1.000	.722
	P												<.001
MCQ-5	r												1.000
	P												

AAQ-II, Acceptance and Action Questionnaire; BAI, Beck Anxiety Inventory; BAS, Behavioral Activation System; BAS-FS, Behavioral Activation System—fun seeking; BAS-RR, Behavioral Activation System—reward responsiveness; BDI, Beck Depression Inventory; BIS, Behavioral Inhibition System; MCQ, Metacognitions Questionnaire.

($r=0.751$; $P<.001$), BAS-reward ($r=0.329$, $P<.001$), and metacognition subscale scores was detected. In addition, a statistically significant positive correlation was found between experiential avoidance and BAS-reward responsiveness scale ($r=0.402$, $P<.001$) and all subscales of metacognition. The results of the correlation analysis between the scale scores are given in Table 2.

In the patient group, positive correlation between depression and experiential avoidance scores was maintained ($r=0.348$; $P=.009$), while depression and MCQ-3 and MCQ-4 scores were also positively correlated ($r=0.287$; $P=.033$) ($r=0.330$; $P=.014$). In addition, a negative correlation was found between the depression and the BAS-drive subscale scores ($r=-0.308$; $P=.022$). We also observed that the correlation between depression and BAS-reward responsiveness scores in the patient group lost its statistical significance.

In the control group per se, we determined that depression scores showed a positive and statistically significant correlation only with experiential avoidance and MCQ-2 subscale scores ($r=0.289$, $P=.034$), ($r=0.302$, $P=.026$).

Discussion

The metacognitive system contributes to the adaptation of cognitive processes, so any deviation that may occur in this system is thought to be an important factor in the development and persistence of many psychopathologies.[20] In our study, we found that dysfunctional metacognitive beliefs had been entertained more frequently in patients with depression and metacognitive beliefs showed a positive correlation with the severity of depression.

We also evaluated the subdimensions separately. The "Positive belief" subdimension in MCQ-1 inquires whether worrying is a positive or saving situation for oneself. Similar to our study, Özsoy et al[26] found a positive correlation between depression and positive belief subdimension scores. Since the severity of disease increases in major depressive disorder (MDD), it can be thought that patients consider worrying as a way of escape or getting rid of problems, in other words, patients' positive beliefs regarding worrying develop.

The subdimension "Uncontrollability and danger," which we evaluated in the subscale of MCQ-2, includes the beliefs that the person should control their worries in order to stay safe and that the anxiety cannot be controlled. These beliefs may cause pessimistic thoughts in MDD and cognitive errors such as exaggerating minor setbacks may be observed. Similarly, Özsoy et al[26] found that the scores obtained from subdimensions of uncontrollability and danger were significantly higher in MDD patients compared to the control group.

The subdimension called "cognitive confidence" in the MCQ-3, which assesses individuals' distrust of their own memories, was evaluated to be significantly higher in MDD patients. This result may be related to the insecurity of memory and the forgetfulness often experienced by depressed patients. In addition, in our study we found a positive correlation between the severity of depression and the cognitive confidence subdimension. This finding made us think that with the increase in the severity of the disease, memory problems increased and the confidence of the patients in their memory decreased. Lee et al[27] stated that memory problems in MDD patients were accompanied by deterioration in neuropsychological tests from the moment

they were diagnosed. Age might be a confounding factor when it comes to evaluating cognitive functions since advancing age might have a negative impact on these processes. Only 2 of the patients were over the age of 60 years, so this issue could not be evaluated in this study.

In the subdimension called "Need for control" in MCQ-4, beliefs that thoughts need to be controlled constantly in order to keep things going and that it is bad to think about certain issues are questioned. The individual believes that if he/she cannot control his/her thoughts, he/she will be responsible for the harmful consequences and will be punished.[21] In our study, a correlation existed between the severity of depression and the need for control in support of this data.

The "Cognitive awareness" subdimension questioned in MCQ-5 refers to the individual's constant preoccupation with his/her own thought processes. This ruminative cycle, which the person uses to cope with negative feelings and thoughts, is an unhealthy coping strategy because it is repeated for a long time, but it reduces awareness about rumination and the problem. Metacognitive beliefs are also associated with avoiding thoughts or attempting to suppress thoughts in order to cope with a stressful situation.[28] However, this avoidance pattern causes persistence of these beliefs. In this respect, it can be said that experiential avoidance strategies have similar functions with metacognitive control strategies. In 2019, Yıldırım et al[29] examined the mediating role of experiential avoidance strategies in the relationship between metacognitions and psychological symptoms, and stated that as negative beliefs about anxiety, cognitive insecurity, and the need to control thoughts increase, experiential avoidance strategies are used more frequently and resilience to distress decreases. In addition, they concluded that experiential avoidance predicted psychological symptoms beyond metacognitions. Similarly, in our study, the severity of experiential avoidance was found to be correlated with all dysfunctional metacognitions. According to these findings, it can be said that individuals who have negative, repetitive beliefs about their thought processes more frequently use experiential avoidance strategies in the face of negative internal and personal experiences. Sexton and Dugas showed that negative metacognitive beliefs about anxiety were positively related to cognitive avoidance strategies such as suppression of thoughts.[30] These people may avoid negative experiences instead of encountering them, or they may take initiatives to delay the possibility of encountering them. In another study, cognitive insecurity was associated with avoidance-focused dysfunctional coping strategies.[31] Unless the individuals trust their own memory processes, they can benefit from procrastination, suppression, and denial strategies. The decrease in positive reinforcers due to avoidance behavior also plays a role in the emergence and maintenance of depressive symptoms.[32] The positive correlation between experiential avoidance and BDI in our study supports this finding. In summary, the increase in metacognitive beliefs was significantly associated with the increase in experiential avoidance strategies and both were also positively associated with depressive symptoms. In the light of all this information, the importance of both of these predisposing factors in the explanation of depression deserves meticulous attention.

Another issue that we evaluated in relation to avoidance strategies is the BIS/BAS system. Studies have shown that low BAS and high BIS sensitivity are risk factors against depression. It has been stated

that people's lack of response to positive and reward-promising stimuli in their environment may be one of the factors that maintain the depressive episode. People with low BAS sensitivity may have had less positive experiences and less motivation to gain new positive experiences.[15-33] In a study conducted in the elderly, Sun et al[34] stated that participants with high BIS sensitivity were more likely to use maladaptive cognitive emotion regulation strategies which were associated with an increase in depression and anxiety levels. Arfaie et al[35] evaluated the BIS/BAS system in mood disorders and found a negative correlation between the severity of depression and the BIS, BAS and BAS subscale scores, and a positive correlation with mania symptoms. In our study, although a negative correlation was found between depression and BAS-drive subscale scores in the patient group, no difference was found between the 2 groups in terms of BIS sensitivity. In the literature, Biuckians et al[36] also found no relationship between low BAS sensitivity scores and depression symptoms in their study. This finding made us think that it is necessary to investigate comorbid conditions such as personality disorders, alcohol and substance abuse that may affect the BIS/BAS system.

In conclusion, in our study, 3 systems that could be related to each other were evaluated in combination and as the severity of depression increased, the use of dysfunctional metacognitions and experiential avoidance increased, while impulsivity in the BAS subheading decreased. Growing body of evidence is indicating involvement of metacognitive processes in depression. Hence, this study could contribute to current literature in terms of understanding cognitive processes manifesting themselves in depressed population. However, we can say that the cross-sectional nature of the study and comorbid anxiety found in our patients were the major limitations of the study. Individuals with anxiety disorder show dysfunctional metacognition and reduced metacognitive awareness and regulation.[37] Furthermore, it is thought that prospective studies investigating other comorbid conditions that may affect these 3 systems and clinical features such as longevity of mental illnesses, ongoing treatment status, history of hospitalization, suicidal attempts, and family history should be conducted. We have concluded that considering these clinical features in the treatment of these challenging cases will contribute to the betterment of the individualized psychotherapy process to be applied to the patients.

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