

BRIEF RESEARCH COMMUNICATION

Mentalizing self and others: A controlled study investigating the relationship between alexithymia and theory of mind in major depressive disorder

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ABSTRACT

Background: Theory of mind (ToM) and alexithymia have been reported to relate with depression in recent studies. However, data regarding the role of alexithymia and ToM in depression remain uncertain.

Aim: The aim of the current study was to determine the levels of alexithymia and ToM abilities as well as their relationship with each other and clinical features in major depressive disorder (MDD).

Materials and Methods: Patients diagnosed with MDD and healthy controls were undergone sociodemographic data, Beck Depression Inventory, Beck Anxiety Inventory, Toronto Alexithymia Scale (TAS-20), and reading the mind in the eyes test (RMET) to determine the depression, anxiety, alexithymia, and ToM abilities.

Results: Depression, anxiety, and alexithymia levels were higher, while ToM abilities were found to be decreased in MDD patients relative to controls. A positive correlation was observed between depression levels and alexithymia levels in terms of difficulty in identifying feelings subscale and total scores of TAS-20 ($P = 0.006$, $P = 0.036$, respectively), while a positive correlation was also observed between anxiety levels and alexithymia levels in terms of difficulty in describing feelings subscale scores of TAS-20 ($P = 0.02$) in depressed group. No correlation was found between depression, anxiety levels, and RMET accuracy scores.

Conclusion: Our results suggest alexithymia and impaired ToM abilities might be prominent but prone to be distinct clinical constructs in MDD patients.

Key words: Alexithymia, anxiety, depression, mentalization, theory of mind

INTRODUCTION

Depression is a debilitating disorder commonly accounted for disabilities in social interaction and functioning.^[1]

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Social cognition, which involved perception, processing, and interpreting social information and engaging in appropriate responses, has been shown to be crucial in social communication and quality of life.^[2] Mentalizing, which refers to the capacity of understanding the processes in mental states of others, including desires, intentions, needs, or goals, and reflectively regulating one's own emotions is one of the key domains in social cognition.^[3] Recent studies support that depression has also impaired

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cognitive domains associated with social cognitive abilities as similar to some other psychiatric conditions.^[4] Theory of mind (ToM) is an important component of social cognitive performance that comprise the ability to adequately interpret other's mental states.^[5] ToM is defined as relatively a more restricted description than mentalization while it is also an important component in the mentalizing of other individuals.^[6] Cognitive and affective components are the two main domains involved in the assessment of ToM.^[7] Cognitive ToM refers to the attribution of thoughts, plans, and knowledge of the other, while affective ToM involves empathic appreciation and attribution of other's internal emotional state.^[7,8] Several studies have shown impairment of ToM in various psychiatric conditions, including autism, obsessive-compulsive disorder, schizophrenia, bipolar disorder, attention deficiency, and hyperactivity disorder and personality disorders such as borderline personality disorder.^[9,10] Studies investigated ToM in depression showed impairment in both cognitive and affective components of ToM while there are also reports yielded contrary data.^[11] There is a number of different tasks used to examine ToM that include reading the mind in the eyes test (RMET), which is one of most commonly used ToM measurement tool, in particular measuring affective domain of ToM.^[12]

As social cognition is a hallmark of mentalization of others, alexithymia, which is defined as the inability to describe and be aware of self-emotional state emerge as an indicator of the impairment in mentalization of self. The alexithymia has particularly been reported as a potential paradigm in psychosomatic medicine while emotional awareness and ToM deficits were found to be prominent in somatoform disorders.^[13,14] With the notion that alexithymia is associated with mentalization and ToM is becoming increasingly an interesting point of research in recent years,^[15] several studies reported contradictory data regarding the relationship between alexithymia and mentalizing as well as ToM.^[15-17] Previous reports showed whether alexithymia consists inability of putting emotions into the words or unawareness of the feelings experienced is yet to be uncertain.^[15] However, some of the current data implies alexithymia includes not only difficulty in the verbalization of the emotions but also impaired self-consciousness in terms of own emotional states, thus an aspect of mentalization problem.^[15] Moreover, alexithymia has also been related to mentalization of others, which indicates impaired ToM abilities.^[15,18,19] Previous reports showed alexithymia is more prevalent in psychiatric conditions, including neurodevelopmental disorders, psychosomatic disorders, anxiety spectrum disorders, and depression.^[15,20-22] Some reports showed depression and alexithymia as distinct but may closely be related phenomenons while data concluded alexithymia is a changeable condition depending on depressive symptom severity is also exist.^[23,24] However, data regarding alexithymia is whether a personality trait and a permanent condition regardless of the psychopathology

or a compensatory situational state accompanied by the psychological disturbance remain debated.^[25] Furthermore, higher anxiety levels are also reported to be related to the significance of alexithymia in various psychiatric conditions such as anxiety spectrum disorders and depression.^[26,27]

In light of the current data, the aim of the present study is to determine the levels of alexithymia and ToM abilities in depression and to investigate the relationship between these phenomenons and clinical measures in individuals diagnosed with major depressive disorder (MDD).

MATERIALS AND METHODS

Subjects

The study enrolled 55 patients diagnosed with MDD based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) and 54 healthy controls. A power analysis calculated a minimum of 16 subjects for each group are required to detect an effect size of 0.50 in the comparison of alexithymia scores between patient and control groups for a significance level of 0.05 and power of 80%, based on data obtained from the study of Marchesi *et al.*^[24] Patients were recruited from psychiatry outpatient clinic consecutively after a clinical assessment of their present psychiatric symptoms by an experienced psychiatrist while controls were selected from other outpatient clinics and had no psychiatric diagnosis or psychiatric treatment history. All participants were between 18 and 65 years old and literate. Individuals diagnosed with mental conditions other than MDD and those who had major depression with psychotic features and bipolarity have been excluded from the study. In addition, intellectual disabilities or cognitive impairments, organic mental disorders have also been accepted as exclusion criteria.

Written informed consent was obtained from all the participants after they had been informed about the study. The study was conducted between September 2017 and May 2018.

This study was performed in accordance with the Declaration of Helsinki and was approved by the local ethics committee of Balıkesir University (Decision no: 2017/30, Date: May 17, 2017).

Measures

Sociodemographic data, Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), 20-item Toronto Alexithymia Scale (TAS-20), RMET have been applied to all participants. BDI is a 21-item self-report scale that measures symptoms and the severity of depression.^[28] Each item is scored on a 4-point continuum (0 = least, 3 = most) based on the symptom severity for a total score range of 0–63. The reliability and validity of the Turkish version of BDI have been reported by Hisli.^[29] BAI is a self-report 21-item scale that each item

scored on 0–3 for a total score range of 0–63 and measures symptoms and the severity of anxiety in adults.^[30] Ulusoy *et al.* have previously reported the reliability and validity of the Turkish version of BAI.^[31] The TAS-20 is a self-report test consist of 20 items and which is one of the most used instruments to measure alexithymia levels.^[32,33] Items are rated on a 5–point Likert scale include 1–5 point range from strongly disagree to strongly agree with a total score range of 20–100. The TAS-20 has three subscales determined as, difficulty identifying feelings (DIF) with 7 items (a sum of 7–35 score), difficulty describing feelings (DDF) with 5 items (a sum of 5–25 score), and externally oriented thinking (EOT) with 8 items (a sum of 8–40 score). Güleç *et al.* reported the reliability and validity of the Turkish version of TAS-20.^[34] The cut-off scoring of TAS-20 was determined as: ≤51 means nonalexithymia, scores of 52–60 means possible alexithymia, and equal or >61 means alexithymia. The RMET is a performance-based ToM task to determine mental state attribution and facial emotion recognition by presenting 36 pictures of the eyes regions of the faces and request participants to choose the most appropriate one between four mental state terms.^[12,35] The reliability for the Turkish version of RMET was studied by Yıldırım *et al.* and found to be adequately equivalent to its original form with the 32-item Turkish form.^[36]

Data analyses

Statistical analyses were conducted using the Statistical Package for the Social Sciences version 20 software (SPSS Inc., Chicago, IL, USA). Distribution of normality with regard to variables was determined using Kolmogorov–Smirnov test. Descriptive data were presented as means and standard deviation. Chi-square test was used when compared to nominal independent variables. Independent samples *t*-test or Mann–Whitney U-test was used when compared to independent continuous variables (age, BDI, BAI, and RMET accuracy scores) between groups based on whether normally or abnormally distributed data. Pearson correlation was used in determining the correlation between TAS-20, RMET accuracy, BDI, and BAI scores. For comparing the means of BDI, BAI, RMET accuracy scores between three groups (non-alexithymic, possible alexithymic, alexithymic) determined with regard to TAS-20 scores, one-way analysis of variance test was used for while Tukey test was used for *post-hoc* analysis of groups. A multiple linear regression model was conducted to investigate a possible relationship between depression levels and sociodemographic variables, anxiety levels, alexithymia, and ToM abilities. A logistic regression model was conducted to determine the predicting variables for alexithymic patients. Statistical significance was accepted as a value of $P < 0.05$.

RESULTS

Sociodemographic data are presented in Table 1. In patient group, 78.2% of subjects were male and 75.9% of controls

Table 1: Descriptive statistics of the groups

	MDD patients (n=55)	Controls (n=54)	<i>t</i>	<i>P</i>
Age (mean±SD)	38±11.9	39.2±12.1	-0.52	0.60
Mean duration of illness, months (95% CI)]	11.6 (8.4-14.7)	-	-	-
Gender, <i>n</i> (%)				
Female	12 (21.8)	13 (24.1)		0.77
Male	43 (78.2)	41 (75.9)		
Marital status, <i>n</i> (%)				
Married	34 (61.8)	39 (72.2)		0.24
Single	3 (5.5)	0		
Divorced/widowed	18 (32.7)	15 (27.8)		
Education, <i>n</i> (%)				
Elementary	17 (30.9)	15 (27.8)		0.88
Secondary	22 (40)	21 (38.9)		
Higher	16 (29.1)	18 (33.3)		
Alcohol use, <i>n</i> (%)				
Yes	8 (14.5)	4 (7.4)		0.23
No	47 (85.5)	50 (92.6)		
Smoking, <i>n</i> (%)				
Yes	25 (45.5)	10 (18.5)		0.003
No	30 (54.5)	44 (81.5)		
Suicide attempt, <i>n</i> (%)				
Yes	18 (32.7)	0		<0.001
No	37 (67.3)	54 (100)		
Familial psychiatric history, <i>n</i> (%)				
Yes	20 (36.4)	3 (5.6)		<0.001
No	35 (63.6)	51 (94.4)		

MDD – Major depressive disorder; CI – Confidence interval; SD – Standard deviation

were male. There was no significant difference in terms of age, gender, marital status, and education level between groups [$P > 0.05$, Table 1]. The mean duration of depression in patient group was 11.6 months [8.4–14.7, 95% confidence interval]. Alcohol use was also not statistically different between groups, while smoking was significantly more prevalent in patients [$P = 0.003$, Table 1]. Reported suicide attempts and familial psychiatric diagnoses were found to more prevalent in patient group [$P < 0.001$, Table 1]. As shown in Table 2, mean depression and anxiety scores were also higher in patients than controls ($z = -9.01, -7.41$; respectively, $P < 0.001$). Alexithymia levels are shown in Figure 1 and significantly higher in patients as mean TAS-DDF scores were 22.4 ± 6.09 for patients, 11.3 ± 4.4 for controls ($t = 10.8, P < 0.001$), mean TAS-DIF scores were 16.4 ± 4.7 for patients, 10.5 ± 5 for controls ($t = 6.3, P < 0.001$), mean TAS-EOT scores were 23 ± 4.2 for patients, 20.9 ± 5.1 for controls ($t = 2.36, P = 0.02$), and total mean TAS scores were 61.5 ± 10.5 for patients and 42.6 ± 10.3 for controls ($t = 9.45, P < 0.001$). There was no significant difference in terms of sociodemographic variables including age, gender, marital status, education level, familial psychiatric history, smoking status, alcohol use and suicide attempt ($P > 0.05$), and depression, anxiety levels as well as RMET accuracy between alexithymic, possible alexithymic and nonalexithymic depressed patients determined with TAS-20 total scores [$F = 0.59, P = 0.55$;

$F = 0.82, P = 0.44; F = 0.55, P = 0.57$; respectively, Table 3]. Comparison of mean RMET accuracy scores showed higher scores in controls than patients [58.6 ± 15 for patients, 70.6 ± 20.2 for controls; $z = -4.19, P < 0.001$, Figure 1]. A correlation analysis in patient group showed that a positive correlation was observed between depression levels and alexithymia levels in terms of TAS-DIF and TAS total scores ($r = 0.368, P = 0.006; r = 0.284, P = 0.036$; respectively), while a positive correlation was also observed between anxiety levels and alexithymia levels in terms of TAS-DDF scores ($r = 0.313, P = 0.02$) [Table 4]. No correlation was found between depression, anxiety levels, and ToM scores, as measured using RMET accuracy scores ($P > 0.05$) [Table 4]. A multiple linear regression

model was conducted within patient group to determine the relationship between BDS score and alexithymia and RMET accuracy scores, in which R^2 was calculated to be 0.12. Regression analysis showed no predicting factor including TAS_20 scores and RMET accuracy scores as well as age, gender, marital status, education level, suicide attempt, alcohol use, and smoking for depression symptom severity within the patient group [$P > 0.05$, Table 5]. A logistic regression model showed no predictor for having alexithymia in depressed population ($R^2 = 0.37, P > 0.05$).

DISCUSSION

The present study showed that alexithymia levels were higher in MDD patients whereas ToM abilities were found to be lower in MDD patients than healthy controls. Previous studies reported depression is closely related to alexithymia; furthermore, some studies suggested it might have been a confounding factor when studying alexithymia in the general population.^[22,27,37] Our results were consistent with the studies supported the relationship between alexithymia and depression. In a meta-analysis investigated the relationship between alexithymia and depression by TAS-20, which was the alexithymia measurement tool we used in our study, concluded depression was closely related with the TAS-DIF, TAS-DDF, and TAS total scores while there was a weak relationship between depression and TAS-EOT scores.^[27] In line with this data, our results showed a significant relationship between depression and alexithymia levels (TAS-DIF and TAS total scores), whereas the relationship between depression and TAS-EOT scores was relatively lower than other alexithymia subscales in MDD patients. These findings may suggest that internally oriented dimensions of alexithymia, including difficulty in identifying and describing own feelings, might be more prominent in depressed people. Besides, a correlation between depression severity and alexithymia levels that our findings showed also strengthen this relationship. However, alexithymia was not a predicting factor for depression in our regression model. In addition, alexithymia levels were not significantly related to other clinical and sociodemographic variables in the depressed population. These findings might point out a complicated relationship between alexithymia and depression, in which other clinical factors such as comorbidities and clinical features might be the confounding factors. In this context, alexithymia has been discussed in several clinical conditions.^[24] As some longitudinal studies reported, alexithymia has been considered as a personality trait rather than a state-dependent phenomenon, relative stability of alexithymia, which implies the change with the severity of depressive symptomatology, has also been reported with the studies.^[37] These findings support the notion that alexithymia may be a phenomenon which is related to both the personality traits and symptom severity in individuals with depression.

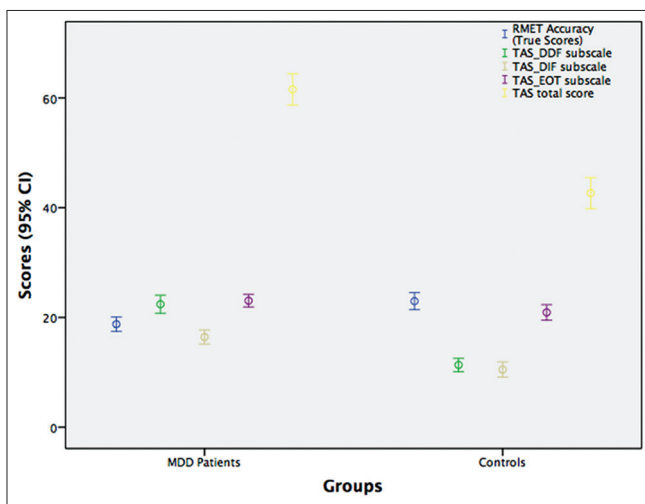


Figure 1: Comparison of alexithymia and theory of mind measures within groups showed a significant difference in terms of all measures. $P < 0.001$ in comparison of TAS_DDF (mean \pm SD scores = 22.4 ± 6.09 for MDD patients, 11.3 ± 4.4 for controls, $t = 10.8$), DIF subscales (mean \pm SD scores = 16.4 ± 4.7 for MDD patients, 10.5 ± 5 for controls, $t = 6.3$) and TAS total scores (mean \pm SD scores = 61.5 ± 10.5 for MDD patients, 42.6 ± 10.3 for controls, $t = 9.45$); $P = 0.02$ in comparison of TAS_EOT subscales (mean \pm SD scores = 23 ± 4.2 for MDD patients, 20.9 ± 5.1 for controls, $t = 2.36$); $P < 0.001$ in comparison of RMET Accuracy scores (mean \pm SD scores = 58.6 ± 15 for MDD patients, 70.6 ± 20.2 for controls; $z = -4.19$). TAS_DDF – Toronto Alexithymia Scale Difficulty Describing Feelings; TAS_DIF – Toronto Alexithymia Scale Difficulty Identifying Feeling; TAS_EOT – Toronto Alexithymia Scale Externally Oriented Thinking; RMET – Reading the mind in the eyes test, MDD – Major depressive disorder; SD – Standard deviation

Table 2: Comparison of depression and anxiety measures within groups

	MDD patients	Controls	Z	P
BDI	31.2±8.7	4±4.2	-9.01	<0.001
BAI	29.1±15.5	7.7±9	-7.41	<0.001

MDD – Major depressive disorder; BDI – Beck depression inventory; BAI – Beck anxiety inventory

Table 3: Comparison of depression, anxiety and theory of mind abilities between three groups determined with regard to alexithymia levels in major depressive disorder patients

	Nonalexithymic	Possible alexithymic	Alexithymic	F	P
BDI	29.1±10.8	30.3±6	32.2±8.6	0.59	0.55
BAI	26.5±16.1	25.1±11.4	31.3±16.3	0.82	0.44
RMET accuracy (%)	59.6±17.9	54±17.7	59.6±13.2	0.55	0.57

BDI – Beck depression inventory; BAI – Beck anxiety inventory; RMET – Reading the Mind in the Eyes Test

Table 4: Correlations of the alexithymia, depression, anxiety scores and Reading the Mind in the Eyes Test accuracy in major depressive disorder patients

Correlations	BDI	BAI	TAS-DDF	TAS-DIF	TAS-EOT	TAS-total	RMET accuracy
BDI							
<i>r</i>		0.209	0.148	0.368	0.147	0.284	-0.217
<i>P</i>		0.126	0.281	0.006	0.284	0.036	0.112
BAI							
<i>r</i>			0.313	0.111	0.062	0.258	0.075
<i>P</i>			0.020	0.421	0.655	0.057	0.585
TAS-DDF							
<i>r</i>				0.468	0.060	0.813	0.157
<i>P</i>				0.000	0.663	0.000	0.251
TAS-DIF							
<i>r</i>					0.081	0.724	0.056
<i>P</i>					0.557	0.000	0.683
TAS-EOT							
<i>r</i>						0.435	-0.077
<i>P</i>						0.001	0.575
TAS-total							
<i>r</i>							0.083
<i>P</i>							0.547

BDI – Beck Depression Inventory; BAI – Beck anxiety inventory; TAS_DDF – Toronto, Alexithymia Scale difficulty describing feelings; TAS_DIF – Toronto Alexithymia Scale difficulty identifying feeling; TAS-EOT – Toronto Alexithymia Scale externally oriented thinking; RMET – Reading the Mind in the Eyes Test

Table 5: A multiple linear regression model for beck depression inventory scores within major depressive disorder patients

Model	Coefficients			
	Predictors	B	Standard error	Significant
BDI	Constant	23.524	8.623	0.009
	TAS_DDF	0.201	0.512	0.696
	TAS_DIF	0.858	0.495	0.090
	TAS_EOT	0.370	0.483	0.447
	TAS_total	-0.188	0.452	0.679
	RMET accuracy	-0.420	0.235	0.079

BDI – Beck Depression Inventory; TAS_DDF – Toronto; Alexithymia Scale Difficulty Describing Feelings; TAS_DIF – Toronto Alexithymia Scale Difficulty Identifying Feeling; TAS-EOT – Toronto Alexithymia Scale Externally Oriented Thinking; RMET – Reading the mind in the eyes test

In our study, another particular finding was the lower accuracy scores in terms of ToM abilities in MDD patients than healthy controls. A vast majority of reports determining the relationship between social cognition and depression investigated the facial emotion recognition domain of social cognition. A meta-analysis concluded that depression was associated with the impairment in facial emotion recognition capacity in depressed population while ToM impairment was significantly associated with the severity of depression and also pointed out some evidence that suggests intact ToM abilities in remitted MDD patients.^[11] Another recent meta-analysis reported depression could be

associated with more complex domains of social cognition, including ToM abilities.^[38] Moreover, in addition to findings yielded impaired ToM abilities in depression, some reports even found increased ToM abilities confirmed by the RMET test in having a history of depression or subthreshold depressed individuals and dysphoria.^[39] These findings were contributed to the condition that the dysphoric individuals are more prone to seek out and interpret information about others with more complex mentalizing strategies.^[39] In addition, as depression is known to be a complex disorder with the impairments in cognitive and executive functions, our results may imply that affective component of ToM abilities, which RMET has been reported to yield rather more accurate information with regard to ToM domains, may be impaired in depression. In our study, anxiety levels were also significantly higher in MDD patients than in healthy controls. Thus, we assume that higher anxiety levels in MDD patients might also have contributed to impaired ToM abilities. Previous studies mentioned that a motivational symptoms, including anhedonia and retardation, which have been found related with decreased social interaction have been considered related to impaired ToM abilities in depression.^[39] In this respect, our results might shed light on the assumption that ToM abilities could provide clinical information regarding depressive symptomatology and clinical course as besides social cognitive capacity in MDD.

Another point that should be considered while interpreting our results is that the mean period of depression was <1 year in patient population. This information might be particular in terms of interpreting ToM abilities in MDD patients. In considering MDD is a chronic condition accompanied by progressive impairments in neurocognitive and executive functions, earlier periods in depression course might be associated with changes in the relatively more affective component of ToM abilities than cognitive domains. Furthermore, concurrent increased alexithymia and decreased ToM abilities in our patient population might be attributed to decreased sensitivity to mental states of self as well as others.

In our study, no correlation was found between alexithymia and ToM abilities in the patient group. This finding implies that in addition to data regarding the relationship between alexithymia and mentalizing capacity is inconsistent, alexithymia and ToM abilities could be different constructs, at least for MDD patients.^[15,16] We again found no correlation between ToM abilities and clinical symptom severity as measured by depression and anxiety levels, which support ToM might be a distinct phenomenon in MDD.

There are some considerable limitations of the study that include its cross-sectional design and limited assessment of ToM abilities and of alexithymia. The measurement tool used in the study was a self-report measure for alexithymia, which might yield disadvantages in terms of determining emotional awareness in alexithymic population who have impaired emotional awareness. Besides, although diagnoses were made by a psychiatrist in accordance with DSM-5 criteria, the contribution of some other confounding factors associated with alexithymia and ToM abilities, such as personality traits and comorbid anxiety, cannot be excluded. Another point was patients included in the study were diagnosed with MDD and not in a remission period, which could be a limitation with considering they have been controlled with a depression-naïve population. Furthermore, a prominent proportion of our samples were male and suicide attempt was determined in 18 subjects of the patient group, which might have been contributing factors in terms of ToM abilities and alexithymia. Finally, another considerable point is that neurocognitive and executive functions which might have an impact on ToM abilities have not been investigated in our study.

A controlled study design, comparing homogeneous groups in terms of sociodemographic variables, investigating the relationship between different dimensions of alexithymia and TOM abilities as well as depression severity, and relatively sufficient sample size when considering power calculation might be the strengths of the study.

CONCLUSION

To best of our knowledge, this is the first study that investigated the relationship between alexithymia and ToM abilities as well as their relationship with the severity of clinical symptoms in MDD patients. In the light of the results provided by the current study, we suggest future studies with more comprehensive and objective clinical assessments including different domains of both alexithymia and ToM abilities might contribute to conceptualize social cognition and interaction difficulties as well as the complexity of mentalizing processes in MDD.

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Conflicts of interest

There are no conflicts of interest.

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Durmaz and Baykan: Alexithymia and theory of mind in depression

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