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Theory of Mind Abilities and Insight Dimension in Patients with Obsessive-Compulsive Disorder and Schizophrenia

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Abstract

Background: The present study aims to compare Theory of Mind (ToM) traits and insight among healthy controls, patients with OCD, and patients with schizophrenia.
Methods: Participants were 38 patients with OCD, 37 patients with a schizophrenia diagnosis, and 38 healthy controls. Sociodemographic information of the participants was collected, and Reading Mind in the Eyes Test (RMET), First Order False Belief (FOFB) and Second-Order False Belief (SOFB), Hinting Task (HT) and Strange Stories (SS), Brown Assessment of Beliefs Scale (BABS) and the Hamilton Depression Scale (HAM-D) were administered. All statistical analyzes were performed using IBM SPSS Statistics 24.0 for Windows. All variables were screened for accuracy of data entry, missing values, and homoscedasticity.
Results: The healthy controls were found to be better in cognitive and affective ToM tests compared to OCD and schizophrenia patients. In the same tests, OCD patients scored higher compared to schizophrenia patients. In terms of insight dimension; insight was not found to be significantly correlated with ToM task scores in OCD patients, but negative and statistically significant correlations were found between insight and ToM task scores in patients with schizophrenia.
Conclusions: This cross-sectional study suggested that OCD and schizophrenia patients have different ToM profiles and insight level mainly evident with better ToM abilities in OCD patients compared to schizophrenia patients.. Understanding of ToM abilities-psychopathology relationship will have important implications for assessing and developing treatment strategies in patients with OCD and schizophrenia for clinical psychiatrists.

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INTRODUCTION

Theory of mind (ToM) can be referred as the ability to make inferences on others' mental states (such thoughts, intentions, and beliefs) and attribution of emotions [1]. Most researchers conceptualize ToM in two different categories as cognitive and emotional ToM [2]. In addition to this conceptualization, another line of research focuses on perceptual and cognitive components of ToM [3].

Several studies show that obsessive-compulsive disorder (OCD) patients showed various deficits in different cognitive domains [4]. Also, these cognitive deficits were shown to be strongly related to clinical parameters [5]. Despite this well-known relationship between OCD and neurocognitive functions, only a few studies were conducted on the ToM abilities of this patient group. Sayin et al. reported that patients with OCD did not have significantly different ToM abilities in basic cognitive ToM tasks but showed substantially worse performance with the advanced ToM tasks compared to the healthy controls [6]. This phenomenon is also consistent with Liu et al. 's findings, as they showed a differentiation of first and second-order ToM tasks, and they suggested that this finding could also indicate a disassociation of cognitive and affective ToM components, mainly based on selected ToM tasks [7]. In addition to these studies, it was reported in studies conducted by Altinoz et al. [8] and Yazici et al. [9] that patients with OCD received significantly lower scores in the reading mind in the eyes test compared to healthy individuals. Relatedly Tulaci et al. report limited ToM abilities of OCD patients both in advanced and basic ToM tasks [10] . Moreover, Buhlmann et al. reported that patients with OCD showed better ToM abilities than patients with a social anxiety disorder and did not significantly differ from patients with body

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dysmorphic disorder, but worse than healthy controls [11]. Another interesting finding from Grisham et al. was that in healthy subjects, OCD symptomology was related to lower Reading Mind in the Eyes Test (RMET) scores, a well-known affective ToM task [12].

In developmental psychopathology, the first encounter of psychiatry with ToM mainly consisted of studies on possible ToM impairments in autism spectrum disorders [13] and after more than 30 years, research on ToM and Autism relationship continued further up to recent years [14]. Later on, following Frith and Happe's initial efforts, the ToM abilities of patients with schizophrenia have been studied and have become one of the leading social cognitive research topics in current psychiatry [15] In recent years research on ToM abilities of different patient groups became more extensive and studies on ToM abilities has been conducted on various clinical entities in a very wide range of disorders like specific learning disorders in children [16], eating disorders in adolescents [17] and male sexual dysfunctions in adults [18].

Despite some contradictory findings, most studies showed that ToM difficulties in patients with schizophrenia were independent of acute symptoms and were also evident in remitted patients, bring about the possibility of ToM functions to be regarded as a trait characteristic [19]. These findings have started another line of discussion regarding ToM deficits in schizophrenia as an endophenotype. Studies are concluding that ToM deficits in first-degree relatives of patients with schizophrenia were present [20].

Several studies showed that ToM abilities were depended on various clinical factors. A course of the illness is seen as a decisive factor influencing the ToM abilities of patients with schizophrenia. Their negative [21] and disorganized symptoms are more related to ToM deficits than positive symptoms [22]. Although chronicity and increased illness duration are strongly associated with low ToM scores in patients with schizophrenia, patients with first-episode psychosis [23] and remitted first episode survivors also show ToM deficiencies [24]. However, these latter groups generally have higher ToM scores than chronic patients. In the literature, apart from the relationship of other clinical parameters of psychotic disorders with ToM abilities, paranoid-persecutory delusions of different psychotic states show a distinctive pattern of ToM functioning. As a controversial finding, some studies report paranoid/persecutory symptomatology, both in psychiatric patients and in non-clinical samples, is related to better ToM abilities than other psychotic patients and healthy controls [25]. Moreover, these relationships between better ToM abilities and paranoid delusions seem to be more specifically evident in affective ToM tasks. Some researchers speculate about the possible evolutionary advantage of having some paranoid symptoms in early humans [26].

As a well-known predictor of prognosis, psychosocial functioning, and adherence to treatment in psychotic patients [27], insight is evaluated in two closely related subdomains, known as clinical and cognitive insight [28]. Various clinical studies show a strong positive correlation with ToM abilities and the insight of psychotic patients [29]. Some of these studies suggest that this relationship between insight and ToM abilities are independent of the overall symptom severity and the neurocognitive status of the patients [30]. Zhang et al. reported another intriguing relationship between ToM and insight, as their findings showed that ToM abilities are related to cognitive insight but not with a clinical insight [31]. In contrast to considerable literature on insight and ToM relationship in psychotic disorders, only a few studies focus on ToM abilities in patients with OCD with an insight dimension, which remained less studied. In one of these studies, Tulaci et al. reported better ToM abilities in good insight OCD patients compared to subjects with poor insight OCD [10].

The present study aims to compare ToM traits and insight among healthy controls, patients with OCD, and patients with schizophrenia.

METHODS

Study Participants

The current study was conducted at Marmara University Hospital in Istanbul. Participants were selected among the patients followed in OCD and Related Disorders Unit and Psychosis Unit of Psychiatry Department with the convenience sampling method. The sample consisted of 38 OCD, 37 schizophrenia patients who met the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5) criteria, and 38 healthy controls were not under any medication treatments. The variables in the present study were examined with the Kolmogorov-Smirnov's test of normality. All variables were normally distributed .G*Power program was used to calculate the sample size. Pearson's correlation analysis with the Program; the minimum sample size was calculated as 29 for 0.50 effect size, 5% margin of error, 80% confidence interval. One Way ANOVA with the Program; the minimum sample size was calculated as 159 for 0.25 effect size, 5% margin of error, 80% confidence interval [32]. Independent samples t-test with the program; the minimum sample size was calculated as 144 for 0.50 effect size, 5% margin of error, 80% confidence interval.. The study was approved by the Marmara University's Ethics Committee [IRB Date/Protocol Number: 09.01.2015, 092.014.0240/707.374.36050604], and written informed consents were obtained from all of the participants following the thorough explanation of the study procedure.

All participants who accepted to participate in the study are interviewed with Structural Clinical Interview-1 for DSM IV (Clinical Use) [33]. The inclusion criteria for the control group were being between the ages of 18-65 and being literate with at least five years of education. A sociodemographic form including age, marital and vocational status, education level, and monthly income were administered to collect sociodemographic information of participants.

Exclusion criteria for the patients with OCD were as follows: any current or past history of psychotic disorders, current major depressive disorder diagnosis, any known history of psychotic disorders in the first and second-degree relatives, secondary OCD developed after another medical condition or psychopathology, history of developmental disorders such as autism spectrum disorders and attention-deficit/ hyperactivity disorder, any neurological disorders except for tics disorder, being administered electroconvulsive therapy (ECT) in the last six months, current or past history of substance use disorders, use of antipsychotics in recommended antipsychotic doses in the previous six months, use of clozapine in any dose in the last six months. Following clinical interviews with 71 patients with OCD, 38 were selected to proceed to further clinical tests and ToM tasks after applying the exclusion criteria mentioned above.

Exclusion criteria for patients with schizophrenia were current or past OCD diagnosis or obsessive-compulsive symptomatology, OCD history of first degree relatives, any neurological conditions, having an ECT in the last six months, current or past substance use disorder history, use of clozapine in any dose in the previous six months, current or past substance use disorder history, and use of clozapine in any dose in the previous six months, having a previous history of schizoaffective disorder or bipolar disorder. Before the exclusion criteria, we conducted clinical interviews with 76 patients with schizophrenia, and 37 of these patients were chosen for this study.

Thirty eight healthy subjects without any chronic medical diseases requiring treatment and any history of current and past psychiatric disorders, including first degree relatives, were recruited as our control group.

Psychometric Measurements

Assessing ToM Abilities: Relevant to the current literature, we evaluated the ToM abilities of participants in two related components of ToM, as affective and cognitive ToM tasks.

Affective ToM Tasks: For affective ToM, participants were asked to answer items on Reading Mind in the Eyes Test (RMET) [34]. The test consists of 36 photos of the eyes of different individuals. Participants are expected to choose one of the four options given for each photograph as the option that best describes the person's mental and affective state in the picture. The Turkish validity and reliability study of the test was conducted by Yıldırım et al. [35], and 32 photos were reported to be valid and reliable for use. For RMET, the difference between test-retest scores was between – 10 and +8, with an average of 0.13. Options for each item were classified as correct and incorrect answers and evaluated with Kuder-Richardson. Kuder-Richardson was calculated as 0.72 [35].

Cognitive ToM Tasks: To assess cognitive ToM abilities, four different ToM tasks were used with the translation-back translation method defined by the World Health Organization (WHO) [36]. The WHO recommended a four-step adaptation process for clinical instruments; forward translation, expert panel back-translation, pretesting / cognitive interviewing, and testing of final version . Cognitive ToM tasks used in the study were translated into Turkish by a translator who has a very good command of English and Turkish, and then back-translated by two translators who had never seen the original items before. None of these tests were validated for Turkish at that period.

The first task for cognitive ToM was a picture sequencing test developed by Brune and used in previous similar studies [37]. This task assesses both the first and second orders of false beliefs. For the first-order false beliefs (FOFB), Three of the stories used by Frith and Corcoran [15] were adapted into Turkish. For second-order false beliefs (SOFB), three of the same researchers' stories were adapted to Turkish.

Another task used for cognitive ToM abilities was Hinting Task (HT), which was developed by Corcoran et al. [38], determines the ability to understand the meaning and intention that is tried to be expressed indirectly in interpersonal, verbal dialogues. The correct answer is scored as one, and the second incorrect answer is zero points.

As a third-order or advanced ToM task, five stories from the Strange Stories (SS) task of Happe, which lacked validity and reliability study in Turkish language during the period of study design, were applied to all participants [39].

Brown Assessment of Beliefs Scale (BABS): The Brown Beliefs Assessment Scale is a scale developed by Eisen et al., which does not address a specific psychiatric disorder but determines insight into the belief level [40]. The test consists of seven items questioning the individual's beliefs, and each item is scored between 0-4 scores by the clinician. Interrater reliability and test-retest reliability have been found to be excellent. The Turkish validity and reliability study of the scale was conducted by Ozcan et al. with a group consisted of patients with OCD and schizophrenia (34). In the study conducted by Ozcan et al. [41], Interrater reliability (Kappa =0.54-0.83) and test-retest reliability ($r=0.80-0.96$, $p<0.001$) has been found to be sufficient. Moreover, individual item scores also have been found to be excellent with a Cronbach alfa 0.90.

The Hamilton Depression Scale (HAM-D): The HAM-D was developed by Hamilton to measure the severity of depression [42]. Items are scored between 0-4 and 0-2 in the HAM-D scale. The highest score that can be obtained from the scale is 53. The Turkish validity and reliability study of the scale was conducted by Akdemir et al. [43]. Cut-off scores were determined as "too severe" for scores higher than 23; "severe" for scores between 19-22; "moderately severe" for scores between 14-18; "mildly severe" for scores between 8 – 13; and "normal" for scores less than 7. Test-retest reliability for HAM-D was found to be 0.85; the Cronbach alpha internal consistency coefficient was found to be 0.75. The inter-rater reliability coefficients based on the independent ratings of 4 psychiatrists were found between 0.87 and 0.98.

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics for Windows, version 24.0 (IBM Corp., Armonk, NY, USA). The variables in the present study were examined with Kolmogorov-Smirnov's test of normality. Descriptive statistics were analyzed using the mean, standard deviation, and percentages when necessary. Pearson's correlation analysis was used to assess correlation relationships between continuous variables. One way ANOVA analysis was conducted to determine whether there was a statistically significant difference between the mean scores in terms of the independent variable with more than two groups. For significance, a minimum of $p < 0.05$ is accepted as a reference point.

RESULTS

Sociodemographic Characteristics of Sample

One-way ANOVA was used to determine whether there was a difference between the patient groups and the control group in terms of age and education (year), and an independent samples t-test was conducted to determine the difference between the OCD and schizophrenia groups in terms of onset of the disorder. As demonstrated in Table 1, there is no significant difference between the patient group and healthy controls in terms of age, disorder onset age, education (year), gender, and monthly income ($p > 0.05$). In addition, no significant difference was found between the OCD and schizophrenia groups in terms of the onset of the disorder ($p > 0.05$).

Table 1. Participant information for OCD, schizophrenia, and control groups

		OCD (*n*=38) [Mean (SD)] or n (%)]	Schizophrenia (*n*=37) [Mean (SD)] or n (%)]	Healthy Controls (*n*=38) [Mean (SD)] or n (%)]	F-values (df)/x2-values, effect size η^2
Age		33.47 (8.22)	36.37 (11.41)	34.68 (9.71)	$F_{(2,110)} = 0.82$ $p = 0.443$ $\eta^2 = 0.01$
The Onset of The Disorder		20.66 (7.39)	21.51 (7.73)	N/A	$t_{(73)} = -0.49$ $p = 0.626$ $d = -0.11$
Education (year)		8.97 (3.96)	8.68 (3.35)	9.39 (3.28)	$F_{(2,110)} = 0.39$ $p = 0.678$ $\eta^2 = 0.01$
Gender	Female	24 (63.2)	20 (54.1)	23 (60.5)	$\chi^2 = 0.68$ $p = 0.712$
	Male	14 (36.8)	17 (45.9)	15 (39.5)	
Marital Status	Married	28 (73.7)	9 (24.3)	21 (55.3)	$\chi^2 = 18.64$ $p < 0.001$
	Unmarried	10 (26.3)	28 (75.7)	17 (44.7)	
Monthly Income	< 850	4 (10.5)	5 (13.5)	4 (10.5)	$\chi^2 = 2.09$ $p = 0.720$
	850-3000	25 (65.8)	27 (73.0)	24 (63.2)	
	> 3000	9 (23.7)	5 (13.5)	10 (26.3)	
Psychiatric History in Family Members	Absent	13 (34.2)	12 (32.4)	25 (65.8)	$\chi^2 = 10.79$ $p = 0.005$
	Present	25 (65.8)	25 (67.6)	13 (34.2)	

The mean age was 33.4±8.2 for patients with OCD, 36.3±11.4 for patients with schizophrenia, and 34.6±9.7 for the healthy controls. Mean education year was 8.9 ± 3.9 for the OCD group, 8.6 ± 3.3 for the schizophrenia group, and 9.3 ± 3.2 for the control group.

The age of onset of the disorder was 20.6 ± 7.3 for patients with OCD and 21.5 ± 7.7 for patients with schizophrenia, and these means were not significantly different.

The distribution of marital status x2 (1, N = 110) = 18.64, p <.001) and psychiatric story in family members ($x^2(1, N = 110) = 10.79$, $p = 0.005$) variables showed a statistically significant difference between patient and control groups. However, it was found that there was no significant difference between the patient groups and the control group in terms of gender and monthly income variables ($p > 0.05$).

Comparison of ToM Task Scores between OCD, schizophrenia, and control groups

One way ANOVA analysis was performed to examine the difference between OCD, Schizophrenia, and healthy controls in terms of ToM task scores. The results of the ANOVA are shown in Table 2.

A statistically significant difference was found between the RMET mean scores in terms of study groups [F (2, 110) = 52.11, p <.001]. The Healthy Controls' mean scores were higher than the mean scores of both OCD and Schizophrenia groups. Besides, the RMET mean scores of OCD patients were found to be higher than the mean scores of Schizophrenia patients.

Table 2. The results of One-way ANOVA for comparing ToM scores between OCD, schizophrenia, and control groups

		M	*SD*	*F*	*p*	η^2	Difference
RMET	OCD	20.53	4.41	52.11	<0.001	0.49	OCD>SCH; HC>OCD, SCH
	Schizophrenia	14.68	5.24				
	HC	24.58	2.60				
TC-ToM	OCD	26.89	4.03	111.19	<0.001	0.67	OCD>SCH; HC>OCD, SCH
	Schizophrenia	15.81	6.63				
	HC	31.05	1.74				
SS	OCD	7.61	1.57	90.41	<0.001	0.62	OCD>SCH; HC>OCD, SCH
	Schizophrenia	3.92	2.22				
	HC	8.97	1.08				
HT	OCD	6.95	1.11	44.69	<0.001	0.45	OCD>SCH; HC>OCD, SCH
	Schizophrenia	4.86	1.87				
	HC	7.58	0.60				
SOFB	OCD	5.39	1.28	111.18	<0.001	0.67	OCD>SCH; HC>OCD, SCH
	Schizophrenia	2.70	1.66				
	HC	6.87	0.34				
FOFB	OCD	6.89	0.86	91.19	<0.001	0.62	OCD>SCH; HC>OCD, SCH
	Schizophrenia	4.30	1.71				
	HC	7.68	0.47				

Note. RMET: Reading Mind in the Eyes Test, TC-ToM: Total Cognitive ToM score, SS: Strange Stories, HT: Hinting Task, SOFB: Second-Order False Belief Tasks, FOFB: First-Order False Belief Tasks, SCH: Schizophrenia, HC: Healthy Controls, η^2 = Effect size

Comparing TC-ToM tasks scores, there were a statistically significant difference among groups in terms of total cognitive ToM tasks scores [$F(2, 110) = 111.19$, $p < .001$], SS [$F(2, 110) = 90.41$, $p < .001$], HT [$F(2, 110) = 44.69$, $p < .001$], SOFB [$F(2, 110) = 111.18$, $p < .001$], and FOFB [$F(2, 110) = 91.19$, $p < .001$]. In total TC-ToM mean scores and sub-tasks the mean scores of healthy controls were higher than mean scores of OCD and Schizophrenia patients. In addition, the mean scores of OCD patients were found to be higher than those of Schizophrenia patients.

The Relationship between BABS, HAM-D and ToM scores in OCD and Schizophrenia patients

Two different Pearson correlation analyses were performed to examine the relationship between BABS, HAM-D, and ToM scores in OCD and Schizophrenia patients. The results of Pearson's correlation analysis were shown in Table 3.

According to the results of Pearson's correlation analysis, in OCD patients BABS and HAM-D scores were not found to be correlated with ToM task scores ($p > 0.05$). However, in schizophrenia patients, BABS scores were significantly and negatively correlated with RMET ($r = -0.39$, $p < 0.05$), TC-ToM ($r = -0.47$, $p < 0.01$), SS ($r = -0.34$, $p < 0.05$), HT ($r = -0.45$, $p < 0.01$), SOFB ($r = -0.37$, $p < 0.05$), and FOFB ($r = -0.50$, $p < 0.01$). However, there was no significant correlation between HAM-D scores and ToM task scores in schizophrenia patients ($p > 0.05$).

Table 3. The relationship between BABS, HAM-D and ToM scores in OCD and schizophrenia patients

		RMET	TC-ToM	SS	HT	SOFB	FOFB
OCD Patients	BABS	0.10	-0.02	0.01	0.05	-0.08	0.03
	HAM-D	0.03	-0.15	-0.19	0.03	-0.10	-0.14
Schizophrenia Patients	BABS	-0.39*	-0.47**	-0.34*	-0.45**	-0.37*	-0.50**
	HAM-D	-0.02	-0.15	-0.05	-0.18	-0.11	-0.19

Note. RMET: Reading Mind in the Eyes Test, TC-ToM: Total Cognitive ToM score, SS: Strange Stories, HT: Hinting Task, SOFB: Second-Order False Belief Tasks, FOFB: First-Order False Belief Tasks

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

DISCUSSION

The present study aims to compare ToM traits and insight among healthy controls, patients with OCD, and schizophrenia patients.

As a result of this study, it is seen that there is a significant impairment in both cognitive and affective ToM tests in OCD patients compared to the healthy controls. Furthermore, the present study results revealed that ToM impairment in OCD patients is less severe than ToM impairment in schizophrenia patients. Although a significant deterioration was observed in all ToM evaluations in OCD patients than healthy controls, it was determined that ToM performance in schizophrenia patients was significantly worse than both OCD and healthy controls.

The findings revealed at the end of our study have similar

and differentiated results with a study in the literature on ToM evaluation in OCD patients [6]. According to the findings obtained in this study conducted with 30 OCD patients and 30 healthy controls, ToM impairment is observed in OCD patients. However, two studies differ on whether there is impairment in the basic ToM skills of OCD patients. In the study of Sayin et al., ToM impairment in OCD patients was observed in more advanced ToM tests such as strange stories; in our study, impairment was found in both basic and advanced ToM tests. Therefore, our findings might indicate that ToM impairments in OCD patients may be a global impairment, rather than an extension of neurocognitive impairment, as findings of Sayin et al. indicated. This discordance of the findings may be related to types of first order ToM tasks. In this present study, both basic and advanced ToM tasks were consisted primarily of stories. In contrast, Sayin et al conducted a picture sequencing type of basic ToM task and story type of advanced ToM task. Therefore, it might be suggested that impairments of basic ToM abilities in patients with OCD might be more susceptible to to be detected with a story type of basic ToM task performance.

In the RMET test, we used for the evaluation of affective ToM; it is found that OCD patients showed a worse test performance than healthy controls. In our study, OCD patients got an average score of 20.5 out of 32. In a study by Grisham et al. [12], it is seen that OCD patients have a close average score from the same test. This shows that the findings of the two studies support each other.

In this present study, we compared test performances of OCD patients with both healthy controls and schizophrenia patients to evaluate ToM skills. The study was designed in this way because ToM impairment is a frequently recurring finding in patients with schizophrenia. However, although it is well known that this impairment has a strong relationship with clinical variables [44], ToM can be considered as an endophenotype for schizophrenia [45]. When we look at our results from a broader perspective, we can obtain findings of the severity of ToM impairment in OCD. In the present study, it is revealed that there is a general impairment in ToM skills in OCD patients, but this impairment remains at a milder level than in schizophrenia patients.. Therefore, it is thought that considering ToM impairments in OCD and other disorders as a spectrum with severe and mild extremes in itself, rather than a dichotomous approach in the form of presence or absence, would be a more useful approach to understand the phenomenology of psychopathologies. In this context, the idea that delusions and obsessions are impairments related to the content and the quality of thought, and that symptoms occur according to the meaning given to thoughts by individuals [46]. In the literature, the necessity of discussing OCD with impaired insight under a separate heading is becoming more prominent [47], and in the DSM system, poor insight is considered as a separate category within OCD. While this situation constituted our hypotheses before the study, it was also thought that ToM performance in OCD patients would be negatively affected by poor insight. However, when we evaluated the data we obtained, we found that the correct answers given by OCD patients to ToM tests were independent of their insight level. We think that the poor insight in OCD on two ToM components with other developments is a field that needs to be examined in detail in terms of OCD phenomenology.

According to another result we obtained in our study, there is no significant relationship between depression scores and ToM performances in OCD patients. Although one of the exclusion criteria in our study was diagnosing the major depressive disorder, 17 patients in the OCD group scored higher than 12 on the HAM-D scale. This situation can be interpreted as that our patient group was a depressive population, although they do not meet the diagnostic criteria for major depressive disorder according to DSM 5. Studies conducted on the ToM test have shown that ToM performances are worse in patients with a current depressive episode and individuals in remission after a depressive episode compared to healthy controls [48]. Researchers evaluate this situation as evidence for the negative effect of depression on ToM and interpret the ToM impairment seen in patients in remission as ToM may be a predictive factor for a depressive episode. However, when we evaluate our findings in the light of these studies, we see no significant relationship between HAM-D scores and ToM performance in OCD patients. Therefore, we conclude that ToM impairment in OCD patients may be independent of the depressive mood. Besides, this finding can be evaluated from the perspective of studies showing that ToM skills may be increased adaptively in some depressive situations [49].

We think that the findings of our study showing ToM impairment in schizophrenia patients will also contribute to the literature when schizophrenia is considered from the perspective of the social brain concept. The repeatedly reported finding of relationship between the insight levels of schizophrenia patients and ToM skills [50] also revealed by the findings we obtained in our study. The fact that there was a significant and negative correlation between BABS scores and all ToM tests in our schizophrenia group can be interpreted as the deterioration of insight in the patients' affective and cognitive ToM skills.

The present study has certain limitations. Compared with the current literature, our patient groups, both OCD and schizophrenia, had more severe symptoms and more prolonged illness duration, probably due to conducting the study at a university clinic as a third-level health facility with complex case referrals. Second, it should be noted that the study was carried out with a relatively small sample due to our hospital's outpatient clinic's registered patient pool. This particular difference might affect the results' generalizability, especially in the schizophrenia group, because of the strong relationship between symptom measures and ToM task scores. With the aim of more homogenous sampling practice, we might have excluded the most typical OCD and schizophrenia cases, as these two disorders show high rates of comorbidity. This approach might limit the application of our findings in routine clinical practices. Our study's other limitations are that

personality pathology, schizophrenia subtypes, lifetime tic comorbidity, and subthreshold obsessive symptoms among patients with schizophrenia were not evaluated. Besides, the lack of a separate group with Schizo-obsessive disorder can be counted as another limitation. Another important limitation of our study was that there were no validity and reliability studies for the cognitive ToM tasks during the study period.

In conclusion, this cross-sectional study suggested that OCD and schizophrenia patients have different ToM profiles, mainly evident with better ToM abilities in OCD patients compared to schizophrenia patients and lower ToM abilities compared to healthy population. Understanding of ToM abilities–psychopathology relationship will have important implications for assessing and developing treatment strategies in patients with OCD and schizophrenia for clinical psychiatrists.

REFERENCES

[1] Sprong M, Schothorst P, Vos E, Hox J, van Engeland H. Theory of mind in schizophrenia: meta-analysis. Br J Psychiatry 2007;191:5-13. https://doi.org/10.1192/bjp.bp.107.035899.

[2] Bodden ME, Kubler D, Knake S, Menzler K, Heverhagen JT, Sommer J, et al. Comparing the neural correlates of affective and cognitive theory of mind using fMRI: Involvement of the basal ganglia in affective theory of mind. Adv Cogn Psychol 2013 15;9:32-43. https://doi.org/10.2478/v10053.008.0129-6.

[3] Tager-Flusberg H, Sullivan K. A componential view of theory of mind: evidence from Williams syndrome. Cognition 2000;76:59-90. https://doi.org/10.1016/s0010-0277(00)00069-x.

[4] Chamberlain SR, Menzies L. Endophenotypes of obsessive-compulsive disorder: rationale, evidence and future potential. Expert Rev Neurother 2009;9:1133-46. https://doi.org/10.1586/ern.09.36.

[5] Kuelz AK, Hohagen F, Voderholzer U. Neuropsychological performance in obsessive-compulsive disorder: a critical review. Biol Psychol 2004;65:185-236. https://doi.org/10.1016/j.biopsycho.2003.07.007.

[6] Sayin A, Oral N, Utku C, Baysak E, Candansayar S. Theory of mind in obsessive-compulsive disorder: Comparison with healthy controls. Eur Psychiatry 2010;25:116-122. https://doi.org/10.1016/j.eurpsy.2009.09.002.

[7] Liu W, Fan J, Gan J, Lei H, Niu C, Chan RCK, et al. Disassociation of cognitive and affective aspects of theory of mind in obsessive-compulsive disorder. Psychiatry Res 2017;255:367-372. https://doi.org/10.1016/j.psychres.2017.06.058.

[8] Altinoz AE, Kosger F, Essizoglu A. Relationship between selective attention, cognitive flexibility, response inhibition and theory of mind functions in obsessive-compulsive disorder. Anatolian Journal of Psychiatry 2019;20:47-53.

[9] Yazici KU, Yazici IP. Decreased theory of mind skills, increased emotion dysregulation and insight levels in adolescents diagnosed with obsessive compulsive disorder. Nord J Psychiatry 2019;73:462-469. https://doi.org/10.1080/08039488.2019.1652341.

[10] Tulaci RG, Cankurtaran ES, Ozdel K, Ozturk N, Kuru E, Ozdemir I. The relationship between theory of mind and insight in obsessive-compulsive disorder. Nord J Psychiatry 2018;72:273-280. https://doi.org/10.1080/08039.488.2018.1436724.

[11] Buhlmann U, Wacker R, Dziobek I. Inferring other people's states of mind: Comparison across social anxiety, body dysmorphic, and obsessive-compulsive disorders. J Anxiety Disord 2015;34:107-113. https://doi.org/10.1016/j.janxdis.2015.06.003.

[12] Grisham JR, Henry JD, Williams AD, Bailey PE. Socioemotional deficits associated with obsessive-compulsive symptomatology. Psychiatry Res 2010;175:256-259. https://doi.org/10.1016/j.psychres.2009.01.028.

[13] Baron-Cohen S, Leslie AM, Frith U. Does the autistic child have a "theory of mind"? Cognition 1985;21:37-46. https://doi:.org/10.1016/0010-0277(85)90022-8.

[14] Eyuboglu B, Baykara B, Eyuboglu D. Broad autism phenotype: theory of mind and empathy skills in unaffected siblings of children with autism spectrum disorder. Psychiatry and Clinical Psychopharmacology 2018;28:36-42. https://doi.org/10.1080/24750573.2017.1379714.

[15] Frith CD, Corcoran R. Exploring' theory of mind' in people with schizophrenia. Psychol Med 1996;26:521-530. https://doi.org/10.1017/s003.329.1700035601.

[16] Eyuboglu D, Bolat N, Eyuboglu M. Empathy and theory of mind abilities of children with specific learning disorder (SLD). Psychiatry and Clinical Psychopharmacology 2018;28:136,141. https://doi.org/10.1080/24750573.2017.1387407.

[17] Turan S, Özyurt G, Çatlı G, Öztürk Y, Abacı A, Akay AP. Social cognition and emotion regulation may be impaired in adolescents with obesity independent of the presence of binge eating disorder: a two-center study. Psychiatry and Clinical Psychopharmacology 2019;29:887-894. https://doi:.org/ 10.1080/24750.573.2019.1693727.

[18] Ayribas B and Toprak T. New approach to patients with premature ejaculation: Do social cognition and attachment profiles play a role in premature ejaculation?, Andrologia, 2020; e13882. , Advance online publication. https://doi:.org/10.1111/and.13882.

[19] Bora E, Yucel M, Pantelis C. Theory of mind impairment in schizophrenia: meta-analysis. Schizophr Res 2009;109:1-9. https://doi.org/10.1016/j.schres.2008.12.020.

[20] Montag C, Neuhaus K, Lehmann A, Krüger K, Dziobek I, Heekeren HR, Heinz A, Gallinat J. Subtle deficits of cognitive theory of mind in unaffected first-degree relatives of schizophrenia patients. Eur Arch Psychiatry Clin Neurosci 2012;262:217-226. https://doi.org/10.1007/s00406.011.0250-2.

[21] Akgül Ö, Küçükçoban O, Binbay T, Bora E, Alptekin K, Akdede BB. Do clinical features relate to theory of mind, empathy and 2D:4D in schizophrenia? Psychiatry and

Clinical Psychopharmacology, 2017;27:380–385. https://doi.org/ 10.1080/24750.573.2017.1373725.

[22] Brüne M. Theory of mind' in schizophrenia: A review of the literature Schizophr Bull 2005;31:21-42. https://doi.org/10.1093/schbul/sbi002.

[23] Kettle JW, O'Brien-Simpson L, Allen NB. Impaired theory of mind in first-episode schizophrenia: comparison with community, university and depressed controls. Schizophr Res 2008;99:96-102. https://doi.org/10.1016/j.schres.2007.11.011

[24] Inoue Y, Yamada K, Hirano M, Shinohara M, Tamaoki T, Iguchi H, et al. Impairment of theory of mind in patients in remission following first episode of schizophrenia. Eur Arch Psychiatry Clin Neurosci. 2006;256:326-328. https://doi.org/10.1007/s00406.006.0608-z

[25] Abu-Akel A, Abushua'leh K.' Theory of mind' in violent and nonviolent patients with paranoid schizophrenia. Schizophr Res 2004;69:45-53. https://doi.org/10.1016/S0920-9964(03)00049-5.

[26] Freeman D. Suspicious minds: the psychology of persecutory delusions. Clin Psychol Rev 2007;27:425-457. https://doi.org/10.1016/j.cpr.2006.10.004.

[27] Lincoln TM, Lullmann E, Rief W. Correlates and long-term consequences of poor insight in patients with schizophrenia. A systematic review. Schizophr Bull 2007;33:1324-1342. https://doi.org/10.1093/schbul/sbm002.

[28] Nair A, Palmer EC, Aleman A, David AS. Relationship between cognition, clinical and cognitive insight in psychotic disorders: a review and meta-analysis. Schizophr Res 2014;152:191-200. hhttps://doi.org/10.1016/j.schres.2013.11.033.

[29] Pousa E, Duñó R, Brébion G, David AS, Ruiz AI, Obiols JE. Theory of mind deficits in chronic schizophrenia: evidence for state dependence. Psychiatry Res 2008;158:1-10. https://doi.org/10.1016/j.psychres.2006.05.018.

[30] Konstantakopoulos G, Ploumpidis D, Oulis P, Patrikelis P, Nikitopoulou S, Papadimitriou GN, David AS. The relationship between insight and theory of mind in schizophrenia. Schizophr Res 2014;152:217-222. https://doi.org/10.1016/j.schres.2013.11.022.

[31] Zhang Q, Li X, Parker GJ, Hong XH, Wang Y, Lui SS, Neumann DL, Cheung EF, Shum DH, Chan RC. Theory of mind correlates with clinical insight but not cognitive insight in patients with schizophrenia. Psychiatry Res 2016;237:188-195. https://doi.org/10.1016/j.psychres.2016. 01.044.

[32] Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods 2007;39:175-191. https://doi.org/10.3758/bf03193146.

[33] Ozkurkcugil A, Aydemir O, Yıldız M, Esen Danaci A, Koroglu, E. Adaptation into Turkish and Reliability of Structured Clinical Interview for DSM-IV (SCID). İlaç ve Tedavi Dergisi 1999;12:233–236. [Turkish]

[34] Baron-Cohen S, Wheelwright S, Hill J, Raste Y, Plumb I. The "Reading the Mind in the Eyes" Test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. J Child Psychol Psychiatry 2001;42:241-251

[35] Yildirim EA, Kasar M, Guduk M, Ates E, Kucukparlak I, Ozalmete EO. Investigation of the reliability of the "reading the mind in the eyes test" in a Turkish population. Turk Psikiyatr Derg. 2011;22:177–186. [Turkish]

[36] World Health Organization (WHO). Process of translation and adaptation of instruments. 2017; Retrieved from http://www. who.int/substance_abuse/research_tools/translation/en/

[37] Brüne M. Theory of mind and the role of IQ in chronic disorganized schizophrenia. Schizophr Res 2003;60:57-64. https://doi.org/10.1016/s0920-9964(02)00162-7.

[38] Corcoran R, Mercer G, Frith CD. Schizophrenia, symptomatology and social inference: investigating "theory of mind" in people with schizophrenia. Schizophr Res 1995;17:5-13. https://doi.org/10.1016/0920-9964(95)00024-g.

[39] White S, Hill E, Happe F, Frith U. Revisiting the strange stories: revealing mentalizing impairments in autism. Child Dev 2009;80:1097-117. https://doi.org/10.1111/j.1467-8624.2009.01319.x.

[40] Eisen JL, Phillips KA, Baer L, Beer DA, Atala KD, Rasmussen SA. The Brown Assessment of Beliefs Scale: reliability and validity. Am J Psychiatry 1998;155:102-108. https://doi.org/10.1176/ajp.155.1.102.

[41] Ozcan T, Kuru E, Safak Y, Karadere ME, Yavuz F, Turkcapar, MH. Brown Assessment of Beliefs Scale: a study of reliability and validity. J Cogn Behav Psychother Res 2013;2:25–33. [Turkish]

[42] Hamilton M. The Hamilton Rating Scale for Depression. In: Sartorius N, Ban, TA, eds. Assessment of Depression. Berlin, Heidelberg: Springer; 1986. p. 143-152.

[43] Akdemir A, Turkcapar MH, Orsel SD, Demirergi N, Dag I, Ozbay MH. Reliability and validity of the Turkish version of the Hamilton Depression Rating Scale. Compr Psychiatry 2001;42(2):161-165. https://doi.org/10.1053/comp.2001.19756.

[44] Ventura J, Ered A, Gretchen-Doorly D, Subotnik KL, Horan WP, Hellemann GS, et al. Theory of mind in the early course of schizophrenia: stability, symptom and neurocognitive correlates, and relationship with functioning. Psychol Med 2015;45:2031-2043. https://doi.org/10.1017/S003.329.1714003171.

[45] Pentaraki AD, Stefanis NC, Stahl D, Theleritis C, Toulopoulou T, Roukas D, et al. Theory of Mind as a potential trait marker of schizophrenia: a family study. Cogn Neuropsychiatry 2012;17:64-89. https://doi.org/10.1080/13546.805.2011.568289.

[46] J Eisen JL, Phillips KA, Rasmussen SA. Obsessions and delusions: The relationship between obsessive-compulsive disorder and the psychotic disorders. Psychiatric Annals, 1999;29: 515-522. https://doi.org/10.3928/0048-5713.199.90901-08.

[47] Solem S, Hagen K, Wenaas C, Haland AT, Launes G, Vogel PA, et al. Psychotic and schizotypal symptoms in non-psychotic patients with obsessive-compulsive disorder.

BMC Psychiatry 2015;15:121. https://doi.org/10.1186/s12888.015.0502-1.

[48] Inoue Y, Tonooka Y, Yamada K, Kanba S. Deficiency of theory of mind in patients with remitted mood disorder. J Affect Disord 2004;82:403-409. https://doi.org/10.1016/j.jad.2004.04.004.

[49] Harkness KL, Jacobson JA, Duong D, Sabbagh MA. Mental state decoding in past major depression: Effect of sad versus happy mood induction. Cognition and Emotion 2010;24, 497-513. https://doi.org/10.1080/026.999.30902750249.

[50] Ng R, Fish S, Granholm E. Insight and theory of mind in schizophrenia. Psychiatry Res 2015;225:169-174. https://doi.org/10.1016/j.psychres.2014.11.010.