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Treatment-Resistant Obsessive-Compulsive Disorder: Neurocognitive and Clinical Correlates

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Abstract

There are a number of studies examining clinical and comorbidity profiles among patients with treatment-resistant obsessive-compulsive disorder (TR-OCD); however, there have been far fewer investigations of neurocognitive function among such patients. Five patients with treatment-refractory obsessive-compulsive symptoms underwent neurocognitive and clinical/personality testing. A number of TR-OCD patients met diagnostic criteria for major axis I disorders (particularly mood and anxiety disorders) as well as clusters A, B, and C personality disorders. TR-OCD patients demonstrated significant performance deficits on neurocognitive tests of visuospatial working memory, visuoconstructive ability, and executive control as well as one test of processing speed, but not a second, relative to healthy normative controls. TR-OCD patients and normative controls did not differ significantly on measures of verbal working memory, sequencing, figure copy organization, inhibitory control, and odor identification. In addition, TR-OCD patients were directly compared to five healthy controls evaluated in our laboratory for a separate unpublished study. TR-OCD patients demonstrated significant performance deficits on tests of visuospatial working memory, information processing speed, and executive control, and obtained substantially higher scores on dimensional measures of social anxiety and depressive symptom severity, but not schizotypal personality features. Group differences of tests of verbal working memory, inhibitory control, and additional tests of executive function were not significant. In summary, patients with TR-OCD presented with comorbid axis I conditions (primarily mood and anxiety disorders) and personality disorders. TR-OCD patients demonstrated deficits on some, but not all, tests of working memory and executive control. Neurocognitive test findings lend partial support to the hypothesis that right hemisphere (particularly dorsolateral-prefrontal, but not orbitofrontal) dysfunction is associated with TR-OCD, and a number of TR-OCD patients met diagnostic criteria for major axis I disorders (particularly mood and anxiety disorders) as well as cluster A, B, and C personality disorders further complicating treatment.

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*Keywords:*treatment-resistant obsessive-compulsive disorder (TR-OCD); comorbidity; neurocognitive testing; personality disorders.

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1. Introduction

There are a number of studies examining clinical and comorbidity profiles among patients with treatment-resistant obsessive-compulsive disorder (TR-OCD). TR-OCD is associated with a broad spectrum of psychiatric syndromes. However, there have been far fewer investigations of neurocognitive function among such patients. In the present study, patients with longstanding treatment-refractory obsessive-compulsive symptoms underwent neurocognitive and clinical/personality testing.

The principal objective of the present study was to establish a neurocognitive/clinical profile for patients with TR-OCD in order to more fully understand the phenomenon of treatment resistance. We will also test the hypothesis that TR-OCD patients will demonstrate performance deficits on frontal executive control tasks and a task considered to be a sensitive indicator of orbitofrontal dysfunction (e.g., an odor identification task).

2. Methods

Five right-handed patients (2 male, 3 female) with treatment-refractory obsessive-compulsive symptoms underwent neurocognitive and clinical/personality testing. Study inclusion criteria were: a primary diagnosis of OCD; history of psychotherapy and medication treatment failure; and the ability to provide informed consent.

All five TR-OCD patients were screened by psychiatrists at a major psychiatric hospital in Istanbul, Turkey and had a primary diagnosis of OCD. All patients had demonstrated treatment resistance and were receiving medication at the time of testing. Medications included clomipramine, fluvoxamine, sertraline, fluoxetine, aripiprazole, quetiapine, buspirone, and hydroxyzine. Informed consent was obtained from all patients and control subjects. The present study was approved by the Institutional Review Board at the Istanbul University School of Medicine.

2.1. Clinical measures

Clinical measures included Turkish versions of the Mini International Neuropsychiatric Interview (MINI) (Ornek & Keskiner, 1998), SCID-II-PQ (Sorias et al., 1990), Obsessive-Compulsive Inventory (OCI) (Turkish translation), Beck Depression Inventory (BDI) (Hisli, 1988), Liebowitz Social Anxiety Scale (LSAS)(Soykan, Ozguven, & Gencoz, 2003), Schizotypal Personality Questionnaire-B (SPQ-B) (Aycicegi, Dinn, & Harris, 2005), and the Frontal Lobe Personality Scale(Aycicegi, Dinn, & Harris, 2003).

Turkish translations of the aforementioned measures were based on the original English-language instruments including the Frontal Lobe Personality Scale (Grace & Malloy, 1992), Obsessive-Compulsive Inventory (Foa et al., 1998), Schizotypal Personality Questionnaire-B (Raine & Benishay, 1995).

2.2. Neurocognitive tests

The neurocognitive test battery included measures of information processing speed (Digit Symbol Coding and Symbol Search tests from the Wechsler Adult Intelligence Scale-IV, Wechsler, 2008), visuoconstructive ability (Rey Complex Figure Test (RCFT) copy accuracy), verbal working memory (Turkish version of the Letter-Number Sequencing Test based on) and visuospatial working memory (Spatial Span from the Wechsler Memory Scale-III, Wechsler, 1997), executive and inhibitory control (Turkish version of the Trail Making Test based on Reitan & Wolfson 1985;Turkish translation of Color-Word Interference Testfrom the Delis-Kaplan Executive Function System (D-KEFS), Delis, Kaplan, & Kramer, 2001; Design Fluency Test from the D-KEFS, Delis et al., 2001; Rey Complex Figure Test copy organization), and an odor identification task (Brief Smell Identification Test-Turkish version, Doty, 2001). The scoring protocol described by Savage and coworkers (1999) was used to determine whether the subject copied the Rey complex geometric figure in an organized fashion (6-point copy organization

scoring system). The Ishihara Test for Color Blindness was also administered to TR-OCD patients and healthy controls since the Color-Word Interference Test requires intact color vision. The 3rd and 4th conditions of the Color-Word Interference Test assess inhibitory control.

2.3. Data analysis plan

TR-OCD patients' scores on dimensional measures of psychiatric symptoms and related personality characteristics as well as performance on neurocognitive tests were compared to healthy Turkish normative controls (i.e., community-dwelling healthy controls).It is important to note that several different normative control groups were used for different neurocognitive tests and, in our analyses of covariance, degrees of freedom vary according to how many healthy control subjects completed the test.

The Mann-Whitney U-test was to determine whether groups differed on the aforementioned clinical measures. For a number of measures, TR-OCD patients were directly compared to five right-handed healthy controls (2 male, 3 female) evaluated at Istanbul University for a separate unpublished study. Healthy controls were free of neurologic (based on screening interview) and psychiatric (as determined by the MINI) disorders including substance abuse, did not report a history of traumatic head injury, and were not medicated at the time of testing. TR-OCD and healthy control groups did not differ significantly on age, educational level, handedness, or gender composition; however, mean age of control subjects was approximately three years younger than TR-OCD patients (see Table 3). Age and educational level were controlled during direct comparisons (analysis of covariance-ANCOVA). Comparisons of patients with TR-OCD and normative controls are presented in Tables 1 and 2, while comparisons of TR-OCD patients and five healthy controls are shown in Tables 3 and 4.

3. Results

Mean age of the patient sample was 37.8 years (*SD* = 13.2) ranging from 26 to 60. TR-OCD patients had completed 9.4 years of formal education (*SD* = 4.9) ranging from 5 to 16 years. Mean duration of OCD symptoms was 16.2 years (*SD* = 10.9).

3.1. Axis-I disorders

Structured psychiatric interview (MINI) at the time of testing revealed that TR-OCD patients met diagnostic criteria for obsessive-compulsive disorder (5 / 5), major depression current (2 / 5), major depression lifetime (3 / 5), dysthymic disorder current (2 / 5), agoraphobia current (3 / 5), agoraphobia lifetime but not current (1 / 5), substance abuse (alcohol) (1 / 5), generalized anxiety disorder current (4 / 5), and psychotic disorder current (1 / 5). TR-OCD patients did not fulfill criteria for panic disorder (current or lifetime), social anxiety disorder, post-traumatic stress disorder, or non-alcohol substance abuse.

3.2. Personality disorders

A self-report measure of axis-II disorders (SCID-II-PQ) revealed that TR-OCD patients met criteria for the following personality disorders: schizotypal (3 / 5), paranoid (3 / 5), schizoid (3 / 5), avoidant (5 / 5), dependent (2 / 5), obsessive-compulsive (3 / 5), narcissistic (2 / 5), borderline (3 / 5), histrionic (3 / 5), and antisocial (1 / 5).

3.3. Dimensional measures of psychiatric symptoms

TR-OCD patients obtained significantly higher scores on dimensional self-report questionnaires assessing OCD (U = 31.5, p= .001), depressive (U = 75.0, p< .001), and social anxiety symptoms relative to healthy community-dwelling normative controls free of psychiatric and neurologic disease (see Table 1 for group means and SD). Mean Beck Depression Inventory (BDI) score among TR-OCD patients was 27.8 (*SD* = 12.9), a moderate-to-severe level of symptom intensity. Groups differed on OC symptom clusters (i.e., symptom frequency over the past month) including obsessional thinking (U = 12.5, p< .001), compulsive washing (U = 46.5, p = .004), checking (U = 72.0, p = .03), mental neutralizing (U = 36.5, p = .001), doubting (U = 34.5, p = .001), hoarding (U = 73.5, p = .032), and

total OCI frequency (U = 31.5, p= .001). However, group differences on the ordering subscale did not reach significance (U = 89.0, p = .078).

TR-OCD patients also scored higher on a measure of schizotypal personality features (SPQ-total); however, group differences were not significant (U = 126.0,p = .35). Interestingly, 3 of 5 TR-OCD patients had markedly elevated scores on the SPQ-B, while the remaining two obtained low scores well below the general population mean.

Table 1. Dimensional Measures of Psychiatric Symptoms: Group Means (SD)

Measure	TR-OCD	Normative Control
OCI-Total Frequency	87.0 (27.0)	37.9 (22.7)
OCI-Obsessional Thinking	16.8 (5.2)	5.2 (4.4)
OCI-Compulsive Washing	18.6 (8.0)	7.6 (5.6)
OCI-Checking	17.0 (7.8)	8.7 (6.2)
OCI-Mental Neutralizing	10.6 (3.8)	4.6 (3.1)
OCI-Ordering	12.0 (5.1)	7.6 (4.4)
OCI-Doubting	6.0 (1.7)	2.3 (2.4)
OCI-Hoarding	6.0 (4.7)	1.6 (1.9)
SPQ-B-Total	11.4 (8.3)	7.3 (4.0)
BDI-Total	27.8 (12.9)	7.1 (4.4)

Note. OCI =Obsessive-Compulsive Inventory; SPQ-B = Schizotypal Personality Questionnaire-B; BDI = Beck Depression Inventory.

3.4. Neurocognitive tests

Although TR-OCD and normative control groups did not differ significantly on age or education (normative control age range was 26-60), the TR-OCD patients were somewhat younger (non-significant difference). Therefore, age was controlled during comparisons of neurocognitive task performance (analysis of covariance-ANCOVA).

TR-OCD and normative control groups did not obtain significantly different scores on instruments assessing of verbal working memory (Letter Number Sequencing, F(1,354) = 2.9, p = .08), visuospatial working memory (Spatial Span forward and total, F(1,349)= 0.25, p = .61 and F(1,349) = 3.04, p = .08). TR-OCD patients did obtain significantly lower scores on Spatial Span backwards (F(1,349) = 5.27, p = .022), the task which places greater demands on visuospatial working memory.

TR-OCD patients did differ significantly from normative controls on one measure of processing speed (WAIS-IV Symbol Search, F(1,21) = 17.03, p< .001), but not a second (WAIS-IV Digit Symbol Coding, F(1,21) = 2.81, p = .108), with patients obtaining lower scores relative to normative controls on both tasks (see Table 2 for group means and SD). TR-OCD patients obtained significantly lower scores on a measure of visuoconstructive ability (RCFT copy accuracy, F(1,354) = 4.51, p = .034); however, group differences on visuoconstructive organization did not reach significance (RCFT copy organization, F(1,354)= 3.62, p = .058) (see Table 2). Group differences on a test of inhibitory control (3rd and 4th conditions of the Color-Word Interference) were not significant with F(1,16) = 0.29, p = .59 and F(1,16) = 0.43, p = .51, respectively.

Relative to healthy normative control subjects, TR-OCD patients demonstrated performance deficits on a test of executive control. Groups did not differ on Trails part A completion time ($F(1,66) = 1.5$, $p = .21$) and Trails part A number of sequencing errors ($F(1,66) = 0.6$, $p = .44$), a task that draws on visuospatial scanning, graphomotor, and sequencing skills. Group differences on Trails part B were striking (Trails B completion time, $F(1,66) = 33.2$, $p < .001$ and Trails B sequencing errors, $F(1,66) = 38.8$, $p < .001$). Groups did not, however, differ on Trails B loss set errors ($F(1,66) = 0.02$, $p = .86$). In addition to the aforementioned skills, Trails B also draws on working memory and set-shifting skills.

TR-OCD patients did not demonstrate impaired task performance (mean percentile rank = 55^{th}) on the odor identification task, a measure considered to be a sensitive indicator of orbitofrontal dysfunction. Indeed, no patient obtained a score in the impaired range using published normative data (Doty, 2001). Since Turkish normative data were not available for this task, we employed published normative data.

Table 2. Neurocognitive Tests and Self-Report Measures of Dysexecutive Behavior: Group Means (SD)

Measure	TR-OCD	Normative Control
Spatial Span Forward	7.2 (1.3)	7.5 (1.7)
Spatial Span Backward	4.2 (2.5)	6.0 (2.0)
Spatial Span Total	11.4 (3.0)	13.5 (3.1)
Letter-Number Sequencing	7.8 (4.4)	10.4 (3.9)
Digit Symbol Coding	43.0 (19.6)	54.7 (13.9)
Symbol Search	15.0 (9.1)	28.1 (5.6)
Trail Making Test (part A) Time	48.8 (16.8)	39.3 (18.0)
Trail Making Test (part A) Seq. Errors	0	0.2 (0.5)
Trail Making Test (part B) Time	188.5 (89.7)	85.2 (37.6)
Trail Making Test (part B) Seq. Errors	3.4 (1.6)	0.6 (0.9)
Trail Making Test (part B) LOS Errors	0.4 (0.5)	0.3 (0.7)
RCFT copy accuracy	25.9 (5.9)	30.8 (5.6)
RCFT copy organization	2.6 (1.5)	4.0 (1.7)
Color-Word Interference Test 1 Time	32.1 (9.2)	32.9 (7.6)
Color-Word Interference Test 2 Time	22.9 (6.3)	25.8 (7.6)
Color-Word Interference Test 3 Time	58.2 (12.7)	65.9 (22.0)
Color-Word Interference Test 4 Time	64.4 (19.3)	76.7 (28.2)
FLPS-Executive Dysfunction	48.0 (2.7)	29.7 (7.5)
FLPS-Disinhibition	31.2 (8.3)	26.6 (5.7)
FLPS-Apathy	39.0 (5.7)	22.9 (6.2)

Note. Time = time to completion; Seq. Errors = sequencing errors; LOS Errors = loss of set errors; RCFT = Rey Complex Figure Test; FLPS = Frontal Lobe Personality Scale.

3.5. Self-report measures of dysexecutive behavior (Frontal Lobe Personality Scale)

TR-OCD patients obtained significantly higher scores on self-report measures of executive dysfunction ($U = 18.5$, $p < .001$) and apathy ($U = 48.5$, $p < .001$) associated with frontal lobe syndromes relative to normative controls. Interestingly TR-OCD patients did not differ from controls on the measure of behavioral disinhibition ($p = .17$) (see

Table 2). Group differences remained significant even after controlling for age.

3.6. Direct comparisons to five healthy controls

For a number of measures, TR-OCD patients were directly compared to five right-handed healthy controls (2 male, 3 female) evaluated in our laboratory for a separate unpublished study. TR-OCD patients and healthy controls were matched for gender and handedness and matched as closely as possible for age and educational level. Mean age of the healthy control sample was 34.6 years (*SD* = 12.0) and healthy controls had completed 9.6 years of formal education (*SD* = 5.1) ranging from 5 to 16 years.

TR-OCD and healthy control groups did not differ significantly on age, educational level, handedness, or gender composition; however, mean age of the five control subjects was approximately three years younger than TR-OCD patients and one control subject had one additional year of formal education relative to the matched TR-OCD patient. Therefore, age and educational level were controlled during analyses of neurocognitive test performance described below.

Groups differed significantly on self-report measures of social anxiety ($U = 2.0$, $p = .032$) and depressive ($U = 0.0$, $p = .008$) symptom severity with TR-OCD patients demonstrating substantially higher scores; however, group differences on schizotypal personality features were not significant ($U = 10.0$, $p = .69$). TR-OCD patients obtained significantly higher scores on OCI subscales assessing symptom frequency over the past month for obsessional thinking ($U = 0.0$, $p = .008$), compulsive washing ($U = 0.5$, $p = .008$), checking ($U = 1.0$, $p = .016$), mental neutralizing ($U = 1.5$, $p = .016$), doubting ($U = 1.0$, $p = .016$), and total OCI frequency (past month) ($U = 0.0$, $p = .008$). However, group differences on the ordering and hoarding subscales did not reach significance ($U = 5.0$, $p = .15$ and $U = 5.5$, $p = .15$).

Group differences tests of executive control, visuospatial working memory, and information processing speed were significant with TR-OCD patients demonstrated performance deficits relative to controls (see Tables 3 and 4 for group means and SD). Group differences on Spatial Span backwards ($F(1,6) = 8.35$, $p = .028$), Trail Making Test part B (Trails B completion time, $F(1,6) = 10.8$, $p = .016$ and Trails B sequencing errors, $F(1,6) = 9.55$, $p = .021$) were significant. Groups did not, however, differ on Trails B loss set errors ($F(1,6) = 0.00$, $p = .98$). Groups also differed on Digit Symbol Coding ($F(1,6) = 9.4$, $p = .022$) and Symbol Search ($F(1,6) = 9.2$, p = .023).

Group differences of tests of verbal working memory (Letter-Number Sequencing, $F(1,6) = 3.5$, $p = .10$), inhibitory control (Color-Word Interference conditions 3 and 4, with $F(1,6) = 0.17$, $p = .69$ and $F(1,5) = 0.002$, $p = .96$, respectively), visuoconstructive accuracy (RCFT copy accuracy, $F(1,6) = 0.99$, $p = .35$) and organization (RCFT copy organization, $F(1,6) = 0.42$, $p = .53$) were not significant. Groups did not demonstrate significant performance differences on the Design Fluency Test condition one (number correct, $F(1,6) = 1.7$, $p = .23$; loss of set errors, $F(1,6) = 0.006$, $p = .93$; repetition errors, $F(1,6) = 0.93$, $p = .37$). Group differences on Design Fluency condition two were significant for number of correct responses ($F(1,6) = 9.6$, $p = .021$) with TR-OCD patients generating fewer correct designs. TR-OCD patients did not make significantly more loss of set or repetition errors during condition two with $F(1,6) = 0.36$, $p = .57$ and $F(1,6) = 4.2$, $p = .086$, respectively. Note that subjects must inhibit a previously learned response pattern during condition two. During the 3rd Design Fluency condition (i.e., the "switching" condition), group differences for number of correct responses ($F(1,6) = 1.0$, $p = .33$), loss of set errors ($F(1,6) = 0.005$, $p = .94$), and repetition errors ($F(1,6) = 5.1$, $p = .064$) were not significant. Note that, contrary to expectation, TR-OCD patients made fewer repetition errors during all three Design Fluency conditions.

It is important to note that non-significant group differences were in expected directions for most neurocognitive tests with TR-OCD patients obtaining lower scores and slower response times relative to healthy controls (see Table 4).

Table 3. Dimensional Measures of Psychiatric Symptoms: Group Means (SD)

Measure	TR-OCD	Healthy Control
n	5	5
OCI-Total Frequency	87.0 (27.0)	21.8 (14.6)
OCI-Obsessional Thinking	16.8 (5.2)	3.6 (2.5)
OCI-Compulsive Washing	18.6 (8.0)	2.4 (2.7)
OCI-Checking	17.0 (7.8)	3.2 (3.5)
OCI-Mental Neutralizing	10.6 (3.8)	3.6 (2.9)
OCI-Ordering	12.0 (5.1)	6.0 (4.4)
OCI-Doubting	6.0 (1.7)	1.4 (1.6)
OCI-Hoarding	6.0 (4.7)	1.6 (1.8)
SPQ-B-Total	11.4 (8.3)	8.6 (1.1)
BDI-Total	27.8 (12.9)	1.4 (1.1)
LSAS-Total	106.0 (26.2)	73.0 (16.9)

Note. OCI =Obsessive-Compulsive Inventory; SPQ-B = Schizotypal Personality Questionnaire-B; BDI = Beck Depression Inventory; LSAS = Liebowitz Social Anxiety Scale.

Table 4.Neurocognitive Tests: Group Means (SD)

Measure	TR-OCD	Healthy Control
n	5	5
Spatial Span Forward	7.2 (1.3)	8.0 (1.2)
Spatial Span Backward	4.2 (2.5)	7.6 (2.0)
Spatial Span Total	11.4 (3.0)	15.6 (3.2)
Letter-Number Sequencing	7.8 (4.4)	10.2 (3.8)
Digit Symbol Coding	43.0 (19.6)	56.6 (23.0)
Symbol Search	15.0 (9.1)	19.8 (10.8)
Trail Making Test (part A) Time	48.8 (16.8)	42.5 (16.4)
Trail Making Test (part A) Seq. Errors	0	0.6 (0.8)
Trail Making Test (part B) Time	188.5 (89.7)	95.0 (42.1)
Trail Making Test (part B) Seq. Errors	3.4 (1.6)	0.6 (0.5)
Trail Making Test (part B) LOS Errors	0.4 (0.5)	0.4 (0.8)
RCFT copy accuracy	25.9 (5.9)	29.2 (4.7)
RCFT copy organization	2.6 (1.5)	2.0 (1.0)
Design Fluency Trial 1 Correct	7.2 (4.1)	10.4 (5.5)
Design Fluency Trial 1 LOS Errors	0.4 (0.5)	0.4 (0.5)
Design Fluency Trial 1 Repetition Errors	2.0 (2.0)	3.6 (3.2)
Design Fluency Trial 2 Correct	6.8 (4.9)	10.4 (5.3)

Design Fluency Trial 2 LOS Errors	0.6 (0.8)	0.4 (0.8)
Design Fluency Trial 2 Repetition Errors	1.6 (0.8)	4.8 (3.3)
Design Fluency Trial 3 Correct	5.6 (2.9)	7.6 (3.7)
Design Fluency Trial 3 LOS Errors	1.2 (1.3)	1.4 (1.5)
Design Fluency Trial 3 Repetition Errors	0.6	2.6 (1.8)
Color-Word Interference Test 1 Time	32.1 (9.2)	29.2 (7.1)
Color-Word Interference Test 2 Time	22.9 (6.3)	22.7 (5.5)
Color-Word Interference Test 3 Time	58.2 (12.7)	54.8 (19.5)
Color-Word Interference Test 4 Time	64.4 (19.3)	58.1 (15.5)

Note. Time = time to completion; Seq. Errors = sequencing errors; LOS Errors = loss of set errors; RCFT = Rey Complex Figure Test.

4. Discussion

A number of TR-OCD patients met diagnostic criteria for major axis I disorders (particularly mood and anxiety disorders) as well as a broad range of personality disorders. The latter finding is consistent with prior studies that showed that patients with OCD frequently present with personality disorders, particularly cluster A and C disorders (Aycicegi, Dinn, & Harris, 2004; Bejerot, Ekselius, & von Knorring, 1998; Diaferia et al., 1997; Matsunaga et al., 1998; Mavissakalian, Hamann, & Jones, 1990; Rodrigues-Torres & Del Porto, 1995).

TR-OCD and normative control and healthy control group differences on the SPQ-B were not significant. Interestingly, 3 of 5 TR-OCD patients had markedly elevated scores on the SPQ-B, while the remaining two obtained low scores well below the general population mean, a noteworthy finding given that early studies reported associations between treatment resistance and comorbid schizotypal personality.

TR-OCD patients demonstrated significant performance deficits on neurocognitive tests of visuospatial working memory, visuoconstructive ability, and executive control as well as one test of processing speed, but not a second, relative to normative controls. TR-OCD patients obtained substantially higher scores on two FLPS subscales assessing executive dysfunction and apathy relative to normative controls.

TR-OCD patients and normative controls did not differ significantly on measures of verbal working memory, sequencing (Trails A), figure copy organization, inhibitory control, odor identification, and a self-report measure of disinhibition (FLPS). The finding that TR-OCD patients did not demonstrate impaired performance on the odor identification test was unexpected given that such tasks are considered to be sensitive indicators of orbitofrontal dysfunction and a substantial body of work (both neurocognitive testing and neuroimaging findings) has revealed that aberrant orbitofrontal function is associated with OCD.

TR-OCD patients were directly compared to five healthy controls evaluated in our laboratory for a separate unpublished study. TR-OCD patients demonstrated significant performance deficits on tests of visuospatial working memory, processing speed, and executive control, and obtained substantially higher scores on dimensional measures of social anxiety and depressive symptom severity, but not schizotypal personality features. Group differences of tests of verbal working memory, inhibitory control, visuoconstructive accuracy and organization, and additional tests of executive function were not significant. One seemingly counterintuitive finding was that healthy controls made a greater number of repetition errors during the Design Fluency Test across all three conditions. This may represent greater level of adherence to rules among patients with OCD, which is consistent with the clinical presentation of the disorder.

The principal limitation of the present study is, of course, TR-OCD sample size.

4.1. Conclusions

TR-OCD patients demonstrated performance deficits on some, but not all, measures of working memory and executive control. Neurocognitive test findings lend partial support to the hypothesis that right hemisphere (particularly dorsolateral-prefrontal, but not orbitofrontal) dysfunction is associated with TR-OCD. Interestingly, in a separate unpublished study we found that TR-OCD patients obtained significantly higher verbal intelligence scores (VIQ) relative to non-verbal intelligence (PIQ) scores. In the present study, patients with TR-OCD fulfilled criteria for a broad range of comorbid axis I conditions (primarily mood and anxiety disorders) and personality disorders further complicating treatment.

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