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ORIGINAL ARTICLE

Two systems for empathy in obsessive-compulsive disorder: mentalizing and experience sharing

Maria C. Pino,[1] Domenico De Berardis,[2,3] Melania Mariano,[4] Federica Vellante,[3] Nicola Serroni,[2] Alessandro Valchera,[5] Marco Valenti,[4,6] Monica Mazza[4]

[1]*Dipartimento di Medicina Clinica, Sanità Pubblica, Scienze della Vita e dell'Ambiente, Università degli studi dell'Aquila, L'Aquila, Italy.* [2]*Dipartimento di Salute Mentale, U.O.S. Servizio di Diagnosi e Cura, Teramo, Italy.* [3]*Dipartimento di Neuroscienze, Imaging e Scienze Cliniche, Chieti, Italy.* [4]*Dipartimento di Scienze Cliniche Applicate e Biotecnologiche, Università degli studi dell'Aquila, L'Aquila, Italy.* [5]*Casa di Cura villa San Giuseppe, Ascoli Piceno, Italy.* [6]*Centro di Riferimento Regionale per l'Autismo, ASL 1, L'Aquila, Italy.*

Objective: To investigate empathic abilities in patients with obsessive-compulsive disorder (OCD) compared to control subjects. OCD is characterized by persistent obsessions and compulsions. Previous studies have proposed specific emotion recognition deficits in patients with OCD. The ability to recognize emotion is part of the broad construct of empathy that incorporates mentalizing and experience-sharing dimensions.
Methods: Twenty-four subjects with a diagnosis of OCD and 23 control subjects underwent empathic measures.
Results: Patients with OCD compared to control subjects showed deficits in all mentalizing measures. They were incapable of understanding the mental and emotional states of other people. On the other hand, in the sharing experience measures, the OCD group was able to empathize with the emotional experience of other people when they expressed emotions with positive valence, but were not able to do when the emotional valence was negative.
Conclusion: Our results suggest that patients with OCD show a difficulty in mentalizing ability, whereas the deficit in sharing ability is specific for the negative emotional valence.

Keywords: Obsessive-compulsive disorder; empathy; mentalizing; experience sharing

Introduction

Obsessive-compulsive disorder (OCD) is a frequent and debilitating anxiety disorder with a fluctuating course, characterized by obsessions or compulsions that cause severe distress and interfere with the cognitive functioning of patients.[1,2]

A growing body of research has implicated emotion recognition proneness in the etiology and maintenance of OCD.[3-5] However, results from these studies are inconsistent with the findings of other studies,[6-8] which showed that patients with OCD were not impaired in the perception of emotion. Recently, Daros et al.[4] showed that patients with OCD have deficits in recognizing facial displays of emotion. Emotional recognition capacity is part of the complex construct called social cognition.[9-11] Social cognition refers to a relatively large number of psychological constructs that range from complex concepts, such as theory of mind (ToM), to more elementary concepts, such as emotion perception, processing of social cues or social perception, and empathic ability.[9] The latter capacity allows one to understand and share the emotional states of others in reference to oneself and plays a critical role in social interaction, from bonding between mother and child to understanding others' feelings and subjective psychological states.[12-15] Empathy is a fundamental component of human nature across cultures.[14] The ability to empathize reflects an innate ability to perceive and be sensitive to the emotional states of other people.[14] Several definitions of empathy have been proposed, but only two are consistent across numerous conceptualizations[15]: cognitive ability to take the perspective of the other people and affective response to emotions of others.[15] For this reason, empathy has recently been considered a multifaceted concept that includes at least two dimensions: explicitly considering others' internal states (mentalizing) and sharing those states (experience sharing).[11,16-19] According to the recent literature,[11,16] mentalizing ability examines ToM capacity by asking subjects to draw explicit inferences about the mental states of others and their ability to represent those states outside of the "here and now" including the future, past, counterfactuals, and targets' perspectives. Experience sharing is the tendency to take on, resonate with, or "share" the emotions of others, and it is often tied to a mechanism known as "neural resonance."[10] Several neuropsychiatric disorders, including schizophrenia,[13,20,21] autism spectrum disorders,[11,22-25] psychopathy,[26] brain injury,[27] and frontotemporal lobe degeneration,[28] feature different subprocesses of empathy deficits.[13] Accordingly, assessment of the recognition and processing

Correspondence: Maria Chiara Pino, Department of Life, Health and Environmental Sciences, University of L'Aquila, Via Vetoio, Località Coppito, 67100, L'Aquila.
E-mail: mariachiara.pino@graduate.univaq.it
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of emotion in individuals with OCD would provide a more comprehensive evaluation of these subjects and could explain many social and interpersonal aspects of their disease.[29]

Only two studies have researched the relationship between OCD and empathy.[13,30] In these studies,[13,30] the authors found that patients with OCD exhibited significantly higher levels of affective empathy (i.e., empathic concern and personal discomfort), as evaluated with the interpersonal reactivity index (IRI) as a measure of empathic ability. Jolliffe & Farrington[31,32] highlighted at least two serious limitations of the IRI: the first is that empathy is confused with sympathy, a distinct, albeit closely linked construct.[33-35] Second, using the IRI to assess the cognitive components of empathy mostly focuses on the respondent's ability to take another person's perspective, and overlooks ability to recognize and understand the emotions felt by another. Given that the emotional aspect of empathy has consistently been considered a fundamental component of empathy since its earliest theorizations, this oversight is puzzling.[36-39]

For this reason, in this study, we investigated the empathic ability of subjects with OCD by dividing the tests into mentalizing and experience-sharing abilities. Our goals were: (1) to compare patients with OCD and healthy individuals in terms of empathic abilities; and (2) to evaluate the relationship between OCD symptoms and empathic dimensions (mentalizing and sharing). The study of social skills in patients with OCD is also crucial for the construction of rehabilitation paradigms to improve empathic capacities and, consequently, social interactions.

Materials and methods

Participants

The study included 47 participants. Twenty-four subjects with a diagnosis of OCD (mean age, 39.05±12.85 years) were recruited from the Psychiatric Diagnosis and Treatment Service at Hospital G. Mazzini, ASL 4, Teramo, Italy. The remaining 23 subjects (control group; mean age, 38.65±11.88 years) were recruited to match the OCD group with respect to age, sex, and education.

Diagnoses were made by clinical assessment following the Structured Clinical Interviews for DSM-IV Axis I Disorders (SCID-I).[40] All participants enrolled in the OCD group had a Yale-Brown Obsessive Compulsive Scale (Y-BOCS)[41] total score of at least 16 within the first 10 items.

The exclusion criteria were any concomitant axis I disorder or organic mental disorder, intelligence quotient (IQ) $\leqslant$ 70 as measured by the Wechsler Adult Intelligence Scale-Revised (WAIS-R), and past or current substance abuse.

Each patient had to understand the nature of the study and sign an informed consent form prior to administration of rating scales. Sociodemographic and clinical information for all participants is summarized in Table 1.

Instruments

Clinical measures

All rating scales were administered by psychiatrists with at least 5 years' clinical experience and who were supervised by senior psychiatrists.

Yale-Brown Obsessive Compulsive Scale (Y-BOCS). Severity of OCD was assessed with the first 10 items of the Y-BOCS,[41] a clinician-administered scale developed to assess the severity of obsessions and compulsions, independent of the number and type of obsessions or compulsions present. In general, the items depend on the patient's report; however, the final rating is based on the clinical judgment of the interviewer.

Multidimensional health locus of control (MHLC).[42] Health locus of control (HLC) refers to individual beliefs regarding potential causes of health outcomes. It is an adaptation of the locus of control concept that stems from Rotter's social learning theory, where it was introduced as a personality construct. Applied to health and health

Table 1 Sociodemographic and clinical profile of patients with OCD and controls

	OCD	Controls	F (df = 15)	p-value
Age (years)	39.05±12.85	38.65±11.88	0.011	0.917
Gender, male/female	12/11	13/11	1.270	0.269
Education (years)	12.50±2.94	12.57±2.74	0.006	0.940
Y-BOCS total	33.35±2.95	0	1,550.86	< **0.001**
Y-BOCS obsessions subscale	16.75±2.95	0	742.41	< **0.001**
Y-BOCS compulsions subscale	16.60±2.47	0	1,034.77	< **0.001**
MHLC total	69.47±12.16	55.65±13.41	11.76	**0.001**
Internal HLC	24.68±6.81	19.30±6.11	7.27	**0.010**
Powerful other HLC	20.89±6.12	19.30±6.66	0.637	0.430
Change HLC	23.89±5.38	17.04±5.23	17.36	< **0.001**
BDI	16.90±14.56	7.83±9.14	6.151	**0.010**
MOCI total score	10.82±2.12	3.54±1.81	160.01	< **0.001**
Checking	6.57±0.59	2.38±1.13	248.93	< **0.001**
Cleaning	0.96±1.06	0.25±0.44	45.171	< **0.001**
Doubting/ruminating	3.30±1.55	0.92±0.77	8.95	**0.004**

Data presented as mean ± standard deviation, unless otherwise specified.
BDI = Beck Depression Inventory; df = degrees of freedom; HLC = health locus of control; MHLC = multidimensional health locus of control; MOCI = Maudsley Obsessional-Compulsive Inventory; OCD = obsessive-compulsive disorder; Y-BOCS = Yale-Brown Obsessive Compulsive Scale.

behavior, the locus of control means that individuals attribute particular health outcomes to either internal or external sources. Internally oriented individuals generally hold the belief that events are a consequence of their own actions, whereas externally oriented persons believe events occur due to factors beyond their control. The MHLC contains three subscales[43]: internal HLC (IHLC), powerful other HLC (PHLC), and change HLC (CHLC). Each subscale measures an individual's tendency to believe that health outcomes are due mainly to one's own behavior (IHLC), to powerful others such as medical professionals or family (PHLC), or to change (CHLC). PHLC and/or CHLC are classified as external beliefs, and IHLC, as internal belief.[42]

Beck Depression Inventory (BDI).[44] The BDI is a measure of severity of self-reported depression in adults. In the Italian adaptation of the BDI was used in this study,[45] it is scored by adding the ratings for each of the 24 symptoms. Each symptom is rated dichotomously and the total score can range from 0 to 24. The scale has shown good psychometric qualities (Cronbach's α: 0.87).

Maudsley Obsessional-Compulsive Inventory (MOCI).[46,47] The MOCI-R is a self-report questionnaire contained in the Cognitive Behavioral Assessment (CBA-2.0) battery.[47] This version is a 21-item questionnaire that evaluates OCD. It employs a dichotomous response format, and total scores range from 0 to 21. The 21 items are classified into three subscales: 1) checking (nine items); 2) cleaning (nine items); and 3) doubting/ruminating (four items).

Empathy measures

The measures of empathic ability were divided into mentalizing and sharing measures, as described below.

1) Mentalizing measures

Basic Empathy Scale (BES), cognitive subscale.[32,33,38] The BES comprises 20 items, which are scored by participants on a five-point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). In the two-factor model,[32] nine items assess cognitive empathy (items 3, 6, 9, 10, 12, 14, 16, 19, 20), and 11 items assess affective empathy (items 1, 2, 4, 5, 7, 8, 11, 13, 15, 17, and 18). In the two-factor conceptualization, the BES included seven reversed items, and scores could range from 20 (empathy deficit) to 100 (high level of empathy).

The BES has demonstrated good validity.[32,33,38] Cronbach's α coefficient was calculated to examine the internal consistency of the scale, considered globally and in its two dimensions, as yielded by the confirmatory factor.

Empathy Quotient (EQ).[48,49] The EQ is a questionnaire that largely focuses on cognitive empathy and is composed of 60 questions, split into two types: 40 questions tapping empathy and 20 filler items, which were included to distract the participant from a relentless focus on empathy. Each item scores one point if the respondent records the empathic behavior mildly, or two points if the respondent records the behavior strongly. Approximately half of the items were formulated to produce a disagreement response, and the other half to produce an agreement response for the empathic feeling, in order to avoid a response bias either way. The EQ has a forced choice format, so it can be self-administered.

2) Experience-sharing measures

Eyes Task.[50] In brief, in this revised version of the Reading the Mind in the Eyes Test, participants are given 36 photographs depicting the ocular area in an equal number of different actors and actresses. At each corner of every photo, four emotional descriptors, e.g., dispirited, bored, playful, or comforting, are printed, only one of which (the target word) correctly identifies the depicted person's mental state, while the others are included as foils. The test is scored by adding the number of items (photographs) correctly identified by the participant; therefore, the maximum total score is 36.

Emotion Attribution Task.[51] This task assesses ability to represent the emotions of others. In this task, the participant is presented with 58 short stories describing an emotional situation and is required to provide an emotion describing how the main character might feel in that situation. The sentences were designed to elicit attributions of positive and negative emotions.

This task assesses ability to identify and represent seven emotions: happiness, anger, disgust, sadness, embarrassment, envy, and fearfulness. The task is scored according to the number of correct attributions.

BES, affective subscale.[32,33,38] The affective subscale of the BES comprises 11 items designed to measure emotional congruence with another person's emotions. Example items include "I get caught up in other people's feelings easily." Each item asks participants to express their own degree of agreement on a five-point, Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The α coefficient was 0.86.[33]

Statistical analysis

SPSS version 22 was used. One-way ANOVA was conducted to identify significant differences among the two groups (OCD and control) in sociodemographic, mentalizing (EQ, BES cognitive subscale), and experience-sharing measures (Eyes task, Emotion Attribution Task, BES affective subscale). Moreover, Pearson correlation coefficients were calculated between clinical measures and mentalizing and sharing measures.

Results

Clinical results

The OCD sample scored higher on several clinical measures as compared to controls: Y-BOCS total score ($F_{1,45}$ = 1,550.86; $p < 0.001$), obsessions subscale ($F_{1,45}$ = 742.41; $p < 0.001$), and compulsions subscale ($F_{1,45}$ = 1,034.77;

Table 2 Mentalizing and experience-sharing measures for patients with OCD and controls

	OCD	Controls	F (df = 45	p-value
Mentalizing measures				
Empathy Quotient	24.42±20.56	34.70±7.70	15.33	< **0.001**
BES cognitive subscale	20.08±17.78	35.35±5.85	5.06	**0.020**
Experience-sharing measures				
Emotion attribution task				
Happiness	7±0	6.85±0.48	2.16	0.148
Sadness	8.76±1.91	10.47±1.53	11.07	**0.002**
Disgust	3±0	2.88±0.33	3.14	0.083
Anger	3.70±4.36	7.29±3.95	8.78	**0.005**
Embarrassment	9.39±1.11	10.20±1.28	5.391	**0.025**
Fearfulness	7.69±1.29	9.41±1.24	21.53	< **0.001**
Envy	1.34±0.71	2.83±0.56	62.87	< **0.001**
Eyes Task	22.54±6.69	24.35±6.33	0.901	0.348
BES affective subscale	38.28±6.10	41.35±6.46	2.39	0.130

Data presented as mean ± standard deviation, unless otherwise specified. Values in bold are statistically significant.
BES = Basic Empathy Scale; df = degrees of freedom; OCD = obsessive-compulsive disorder.

$p < 0.001$). In the MHLC scale, OCD patients scored higher only on the CHLC subscale (mean scores: 21.65±7.66 vs. 17.04±5.23; $F_{1,45} = 5.66$; $p = 0.020$). These analyses are reported in detail in Table 1.

Mentalizing measures

The OCD sample scored lower than controls both in the EQ ($F_{1,45} = 15.33$; $p < 0.001$) and BES cognitive ($F_{1,45} = 5.03$; $p = 0.020$) measures. Mentalizing performance scores (means and standard deviation) are reported in Table 2.

Experience-sharing measures

In the experience-sharing measures, the OCD group scored lower on emotion recognition compared to the control group in all negative emotions, except disgust. There were no differences in happiness scores (Table 2).

The OCD group did not show significant differences compared to the control group in the BES affective subscale ($F_{1,45} = 2.39$; $p = 0.130$) or the eyes task ($F_{1,45} = 0.901$; $p = 0.348$).

Correlation analysis

We performed a Pearson correlation analysis in the OCD group between clinical measures (Y-BOCS and BDI) and mentalizing and experience-sharing measures. The analysis showed a significant negative correlation between the BES cognitive subscale and two Y-BOCS subscales: obsessions ($r = -0.462$; $p = 0.001$) and compulsions ($r = -0.392$; $p = 0.005$).

Moreover, experience-sharing ability for sadness also correlated negatively with the Y-BOCS subscales obsessions ($r = -0.423$; $p = 0.002$) and compulsions ($r = -0.420$; $p = 0.003$). Sharing ability for the disgust emotion correlated positively with BDI. Other correlations did not show significant effects (Table 3).

Discussion

In the present study, we explored the ability to represent one's own and others' mental states (mentalizing ability) and to share in the internal states of others (experience sharing) in OCD subjects compared to a control group.

We found that patients with OCD exhibited a deficit in mentalizing ability (cognitive empathy) compared to the

Table 3 Correlation analysis (Pearson coefficient) between clinical measures (Y-BOCS, BDI and MOCI-R) and mentalizing and sharing measures in the OCD group

	Y-BOCS obsessions	Y-BOCS compulsions	BDI	Checking	Cleaning	Doubting/ ruminating
Mentalizing measures						
BES cognitive subscale	**-0.462***	**-0.392***	0.184	0.079	-0.281	0.219
Empathy Quotient	-0.215	-0.225	0.346	0.101	-0.213	0.168
Sharing measures						
Sadness	**-0.423***	**-0.420***	-0.194	0.006	-0.169	0.217
Happiness	0.233	0.235	-0.112	0.280	-0.003	0.027
Disgust	0.079	0.347	**0.415***	-0.010	-0.194	0.123
Anger	-0.057	0.140	-0.634	0.118	0.089	-0.020
Embarrassment	-0.220	-0.294	-0.231	-0.161	0.008	-0.006
Fearfulness	0.087	-0.043	-0.052	-0.065	-0.061	-0.004
Envy	-0.161	-0.04	0.176	-0.002	0.02	0.019
Eyes task	-0.176	-0.164	-0.108	0.250	0.211	-0.101
BES affective subscale	-0.284	-0.226	-0.242	0.101	-0.213	0.165

BDI = Beck Depression Inventory; BES = Basic Empathy Scale; MOCI = Maudsley Obsessional-Compulsive Inventory; OCD = obsessive-compulsive disorder; Y-BOCS = Yale-Brown Obsessive Compulsive Scale.
*$p < 0.01$.

control subjects. Interestingly, our results for mentalizing abilities reveal that persons with OCD have trouble understanding the meaning of what others are saying and doing, and typically struggle to take the other person's perspective (BES cognitive subscale and EQ). An impaired capacity to understand mental states and to comprehend interpersonal relations could affect self-appraisal and adaptation capacities in subjects with OCD.[51] In agreement with a study by Giovagnoli et al.,[52] we support the idea that mentalizing ability deficits predict self-rated cognitive functioning, strategies for coping with stressful events, and overall quality of life perception. The mentalizing ability deficit in OCD may have psycho-behavioral implications. In particular, impairment in mentalizing ability jeopardizes correct estimation of one's own social and behavioral functioning. Indeed, an important characteristic of intact mentalizing ability is the comprehension that minds can take different perspectives of the world. A correct solution for ToM tasks requires participants to distinguish between mental representations held by the self and by others.[53] Moreover, an individual who understands real mental states should also maintain good self-awareness.[53] Adequate comprehension of real mental states and interpersonal dynamics could help one avoid redundant thoughts or actions, make behavior fluid, or enhance feelings of belonging to a social group.[52] Several studies have shown that the association between ToM and psycho-behavioral alterations may reflect damage to common neural substrates that underlie ToM and emotional-behavioral control.[53,54] Regarding experience-sharing measures, OCD subjects did not differ from controls in the experience-sharing dimension (affective empathy) when other people expressed emotions with positive valence. Fontenelle et al.[13] note that their OCD sample displayed greater levels of affective empathy. With the exception of the disgust emotion, in our study, the difficulty of these patients to empathize with the emotional experience of others was linked to sharing of emotions with negative valence. A robust association between disgust and OCD has not been consistently observed in the literature.[55] In fact, individuals with OCD have been reported to be more prone to disgust.[56] Isolation of affect[30] (disconnecting feelings from thoughts) for negative emotion could be a defense in OCD. The isolation mechanism can help OCD patients control intolerable and negative emotions by detaching affective elements from the situation.[30,57] In addition, previous neuroimaging studies of empathy have also suggested associations between OCD and emotional processing.[56] The neural correlates of empathy involve temporal and frontal lobe regions including the cingulate, insula, medial prefrontal cortex,[18,58,59] and orbitofrontal cortex.[60] Interestingly, these regions are related to the pathophysiology of OCD.[61] We hypothesize that difficulty in negative emotion processing could affect quality of life in persons with OCD. Indeed, Calkins et al.[62] showed that engaging in compulsions (e.g., saying a prayer) or avoidance behaviors (e.g., refusing to pick up one's baby) may serve to assuage negative emotions and, in the long term, these rituals serve to maintain the vicious cycle of OCD. The results of our correlation analysis showed that, in the OCD group, Y-BOCS scores (on both the obsessive and the compulsive subscales) correlated negatively with the BES cognitive subscale, a mentalizing measure that demonstrated impairment in the OCD group. Both the obsessive and compulsive subscales of the Y-BOCS also correlated negatively with ability to recognize the emotion of sadness. This means that the higher the Y-BOCS score, the lower the performance of individuals with OCD on the BES cognitive subscale and the lower their ability to recognize negative emotions.

Interestingly, the disgust emotion correlated positively with BDI. Zahn et al.[63] hypothesized that disgust is of particular relevance to major depressive disorder because it entails the devaluation of one's character,[64] such as shame, but is related to violations of internalized moral duties,[65] such as guilt. These characteristics are also present in subjects with OCD. In fact, OCD has been found to have a profound impact on mood, with feelings of depression and overwhelming anxiety states being a common phenomenon among those with OCD.[66]

This result confirms a relationship of difficulty in the cognitive dimension of empathy and recognition of negative emotions with symptom severity in OCD. A negative influence of mentalizing ability deficit in patients with OCD causes bad mood, stigma, low self-esteem, and poor social integration. These difficulties compound the symptoms typically found in this patient population.

Given the recent literature on empathy as a multidimensional process and new paradigms of evaluation of empathic abilities, the development of a clinical profile based on cognitive and social processes may be more informative for treatment than an OCD diagnosis alone. Moreover, social and empathic features may provide an important perspective for research to redraw the diagnostic frontiers of different neuropsychiatric disorders.

The small sample size is an important limitation of our study. Another potential limitation is the lack of measures to evaluate the prosocial concern, according to the empathy model of Zaki & Ochsner.[19] Recently, empathy was suggested to have three facets, but we assessed only two (mentalizing and experience sharing), as the majority of neuroscience research in empathy has focused on these two empathic processes. The proposed third aspect of empathy (prosocial concern) has only begun to receive increasing neuroscientific attention in the last few years.[19] Neuroscientific data concerning other empathic subprocesses are the subject of debate.[19] One line of research suggests that overlapping self-other representations (experience sharing) underlie perceivers' decisions to help targets (prosocial concern).[67] In contrast to this view, another line of research suggests that other-oriented perspective-taking (mentalizing) drives prosociality.[68] This debate bolsters a model of prosociality as flexibly supported by both mentalizing and experience sharing, and raises questions about whether each of these processes could induce forms of prosociality that are similar on the surface but nonetheless differ in phenomenology and behavioral characteristics.[19] For this reason, we did not consider the prosocial concern ability in our study. Future neuroscientific studies using large samples of subjects with OCD should evaluate the role of all putative subcomponents of empathy ability and their effect on OCD symptoms.

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Disclosure

The authors report no conflicts of interest.

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