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Original Article

Predicting obsessive-compulsive disorder based on social cognition and cognitive flexibility: The mediating role of cyberchondria

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ABSTRACT

This study investigates the impact of cognitive flexibility and social cognition on obsessive-compulsive behavior, focusing on the mediating role of cyberchondria. The researcher used scales such as; the Cyberchondria Severity Scale (CSS), Yale-Bowren obsessive-compulsive scale, and Cognitive Abilities questionnaire. Related to the data analysis, the research utilized a structural equation model (SEM) to explore direct and indirect relationships between these variables. The sample consisted of 376 participants who live in Tehran and the age range was 18 to 53 years old (120 males, 256 females). Before SEM implementation, assumptions such as multivariate normality, sufficient sample size, and the removal of outliers were verified. Correlation and path analysis were conducted using Pearson's test and the maximum likelihood method. The outcome displayed that social cognition and cognitive flexibility are significantly related to obsessive-compulsive behavior both directly and through cyberchondria. Specifically, cognitive flexibility had a direct influence on intellectual-practical obsessions, while social cognition indirectly affects them through cyberchondria. The final model fit was strong, indicating the reliability of these findings. Overall, the study highlights the significant role of both cognitive flexibility and social cognition in predicting obsessive-compulsive behavior, suggesting that interventions targeting these cognitive functions may reduce symptoms in affected individuals.

Keywords: Social cognition, Cognitive flexibility, Obsessive-compulsive, Cyberchondria, Young adult and adult

Introduction

Obsessive-compulsive disorder (OCD) is a chronic and potentially debilitating mental health disorder characterized by obsessions (eg, intrusive thoughts, images, or urges) and compulsions (eg, repetitive behaviors or thoughts performed in response to obsessions) [1]. The disorder is severely debilitating, affecting an individual's social, occupational, and daily functioning [2]. Known from early clinical models primarily as a disorder sensitive to rewards, it is worth noting the recent research to include the role of broader cognitive and social dimensions (e.g., social cognition and cognitive flexibility) to better understand the underlying mechanisms of the condition.

Social cognition refers to the mental processes by which we perceive, interpret, and react to social information, including the ability to read and interpret the emotions and intentions of others [3]. Cognitive impairments in social cognition have been more recently linked to OCD, associated with interpersonal problems, increased social anxiety, and the prevalence of obsessive-compulsive behaviors [4]. People with obsessive-compulsive disorder may have difficulty reading social cues, which can result in misinterpretations and reinforce obsessive worries, especially those related to social evaluation or harm.

By contrast, cognitive flexibility is the skill to switch between diverse tasks, ideas, or rules according to the changing environments (Zühlsdorff et al., 2023). This flexibility is often impaired in OCD, which leads to inflexible thinking styles and compulsive behavior [5]. Research has found that cognitive

inflexibility maintains compulsive routines and compromises the capacity to detach from intrusive ideas [6]. These deficits support the proposal that cognitive inflexibility is a central characteristic of OCD, part of its clinical presentation and severity.

Cyberchondria and OCD in the Digital Age: In a modern world driven by information, it is common for individuals to search the web for health-related inquiries, leading to a new psychological phenomenon, which is, Cyberhondria. Cyberchondria is the term used for excessive/compulsive searching online for health-related information, which often results in increased health anxiety and distress [7]. Such maladaptive behavior is particularly pertinent in OCD, where individuals with a tendency for obsessive thinking and reassurance-seeking behaviors may be driven to the internet with potentially long-term implications for symptom exacerbation [8]. The cognitive vulnerabilities (intolerance of uncertainty and inability to control anxiety) that have been associated with cyberchondria, overlap with those seen in OCD [9].

Social cognition and OCD

In other words, social cognition that's involved in the theory of mind, emotional recognition, and empathy [3] is critical to how we interact as humans. These can emerge in OCD as deficits in social cognition (for example interpreting the emotional cues of others or their intentions), both of which would influence social anxiety and avoidance behaviors. For instance, contamination fears lead to misinterpretation of benign social interactions as potential sources of threat, enhancing compulsions to clean or avoid contact [10]. In a similar vein, individuals with harm obsessions may have inflated estimates of the likelihood of harming another (e.g) [4] reflecting a poor appreciation of social context and intent.

Empirical evidence supports the association between deficits in social cognition and OCD. Jansen et al. (2020) performed a meta-analysis that assessed the individuals with OCD who have shown marked difficulties in the theory of mind domain (Bora ,(2022) (the ability to know how other people think). Such deficits might also help to explain the maintenance of OCD symptoms through increased interpersonal tensions and exacerbating inflexible obsessive rumination about social evaluation. In addition, deficits in social cognition may contribute to avoidance, limiting opportunities for corrective experiences and reinforcing the cycle of the disorder [11].

Cognitive flexibility and OCD

Cognitive flexibility allows you to adapt to shifting environments and conflicting well-mannered requests. Cognitive flexibility deficits in obsessive-compulsive disorder are associated with rigidity and inflexibility, including excessive reliance on habits [5]. For example, people with OCD tend to get stuck on intrusive thoughts when they occur, making it infinitely harder to switch to more adaptive coping strategies [6] and thus perpetuating their compulsive rituals. The deficits could stem from underlying neurobiological abnormalities, such as hypo- and hyperactivity in the prefrontal cortex and basal ganglia, which also have been associated with both cognitive flexibility and OCD [12].

Numerous studies have indicated a correlation between cognitive rigidity and the severity of OCD symptoms. Chamberlain et al. Found deficits in set-shifting, one of the critical components of cognitive flexibility, in those with OCD (2008) [5]. These findings indicate that cognitive inflexibility is not only a byproduct of OCD, but could contribute to its onset and perseverance. In turn, cognitive inflexibility inhibits the person's capacity to change their views and behaviors according to new ideas and further solidifies the availability of obsessive thoughts and compulsive behaviors.

Cyberchondria as mediator

Access to health information has changed dramatically in line with the proliferation of digital technologies, with implications for mental health. In some cases, we have originated with an obsessive-compulsive response — Cyberchondria, defined in qualitative research as the excessive and distressing use of internet search engines for health-related searches [7], has noted both conceptual and behavioral overlap with obsessive-compulsive disorder. Both conditions are characterized by increased anxiety, intolerance of uncertainty, and the need to seek reassurance, often via repetitive behaviors [8]. In OCD, cyberchondria can be seen as a maladaptive coping mechanism that exacerbates obsessive thoughts and solidifies compulsive health-seeking behaviors.

Multiple studies have shown the correlation of cyberchondria with symptoms of OCD. McElroy and Shevlin (2014) reported that individuals with higher cyberchondria reported significantly higher obsessive-compulsive tendencies in general and in more specific areas related to health and contamination fears [9]. Cyberchondria can also mediate the relationship between cognitive vulnerabilities, like intolerance of uncertainty, and OCD symptoms. Cyberchondria perpetuates these cycles of anxiety and reassurance seeking which only continue the patterns of emotion and cognition that lie at the heart of most OCD, making treatment and recovery even more challenging [8].

Materials and Methods

Participants This cross-sectional study involved 376 Tehranian (Iran) participants aged 18−53 years (120 males, 256 females). “Participants were recruited by means of convenience sampling. To participate, individuals needed to fall into the designated age groups and consent to filling out the questionnaires. Trained consent was obtained from all participants before data collection.

Measurements

Measures To evaluate the variables of interest, the study employed standardized psychometric instruments:

Cyberchondria severity scale (CSS)

The Cyberchondria Severity Scale (CSS) was developed by McElroy and Shevlin (2014) to assess the severity of cyberchondria behaviors. The scale consists of 33 items scored on a 5-point Likert scale (1 = Never to 5 = Always) . Strong evidence supports its construct validity and internal consistency; for instance, Cronbach's α was reported as 0.909 in a Chinese validation study McElroy & Shevlin (2014). A test-retest reliability of 0.82 over two weeks has been established [12].

Yale-brown obsessive compulsive scale (Y-BOCS)

A measure of obsessive-compulsive behaviors and severity. This scale was invented by Goodman et al. (1989) [13]. The aim is to assess the severity and type of obsessive-compulsive symptoms. *Number of Questions:* 10 items. Likert Scale: Evaluated on a 5-point Likert scale (0 = No symptoms, 4 = Extreme symptoms). Validity and Reliability: The Y-BOCS has been well validated with strong convergent validity and a Cronbach's alpha of 0.86–0.91 [13. Test-retest reliability is 0.87 (Woody et al., 1995).

Cognitive abilities questionnaire

Well-known versions have been created in cognitive psychology, but a single standardized version differs in each study. Measures cognitive flexibility, and other cognitive and related abilities. Cognitive Flexibility (Dennis & Vander Wal (2010) This scale aims to assess cognitive flexibility, problem-solving skills, and thinking adaptability. The number of questions is 30 items. Likert answers are Measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Validity and reliability: The questionnaire has shown strong factor structure validity in many studies [14]. The internal consistency is high [Cronbach's α = 0.85 [14]], and the scale has a test-retest reliability coefficient of 0.81 [15].

Population and sample

Participants were allocated to receive the study materials which were either online or in-person. They filled out the questionnaires independently. Missing data, outliers, and normality assumptions were screened before proceeding with the analysis. The content was ceded with the permission of an appropriate institutional review board approval.

Data analysis

Methods Data were analyzed using Structural Equation Modeling (SEM) to assess relationships between cognitive flexibility, social cognition, cyberchondria, and obsessive-compulsive behavior. The following steps were taken: Initial Tests: Assumptions of normality (multivariate normality), adequacy of sample size, and identification of outliers were evaluated. Correlation Analysis: The relationships among the main variables were analyzed using Pearson's correlation test. Path Analysis: Assessing the direct and indirect pathways between cognitive flexibility, social cognition, cyberchondria, and obsessive-compulsive behavior via the maximum likelihood estimation method. The goodness-of-fit of the final model was assessed by the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Chi-square (χ2) test.

Results and Discussion

The required assumptions including sufficient sample size, multivariate normality, the conclusion of outlier data, and no multiple collinearities, etc were examined and then checked before applying the structural equation model for analysis purposes. When the defaults were applied, 8 individuals from the original sample (376 out of 384) were classified as outliers, using the Mahalanobis method, and subsequently excluded. The statistical population included 376 individuals, including 120 (31.9%) males and 256 (68.1%) females. The age of the survey participants is an average of 28.87 (SD = 6.67), and the age of the youngest and oldest was found to be 17 years and 53 years, respectively.

Before introducing the theoretical model, it can be seen in **Table 1** that the descriptive and correlation analysis of the research variables is performed by Pearson test to determine the relations between the variables. It is known that the independent variables and mediator variables correlate with the dependent variable on one percent of the error level. IMPLICATIONS The independent and mediator variables have weak correlations with one another.

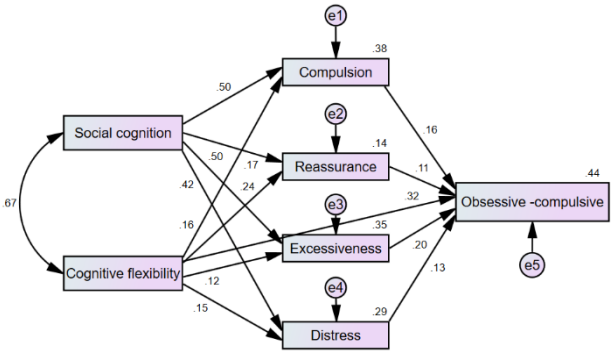
Table 1.Descriptive statistics and Pearson correlation coefficients among study variables

	M (SD)	1	2	3	4	5	6	7
Social Cognition	7.11 (2.11)	1						
Cognitive flexibility	9.48 (2.31)	.669**	1					
Compulsion	15.9 (4.57)	.606**	.492**	1				
Reassurance	27.77 (6.1)	.330**	.354**	.252**	1			
Excessiveness	19.94 (4.63)	.584**	.458**	.394**	.299**	1		
Distress	15.88 (4.57)	.526**	.437**	.350**	.243**	.380**	1	
Obsessive-Compulsive	12.12 (7.15)	.537**	.581**	.465**	.350**	.485**	.421**	1

Path analysis analysis

The maximum likelihood estimation was utilized for path analysis modeling while fit indices were examined as to whether they conform with Hu and Bentler's (1999) recommendation. The modified conceptual model presented in **Figure 1** has been standardized. During the model revision process, the direct path between social cognition and intellectual-practical obsession was deleted in the final model because the indicators of the model embodiment had no quality. The conceptual model showed a good fit to the data x2=11.464, CFI=0.995, TLI=. 986, and

RMSEA=0.041. Results: The results showed that based on the indicators presented, it can be confirmed that the conceptual model of cognitive flexibility and social cognition with the mediation of cyberchondria indicators can predict obsessive-compulsive behavior. In addition, cognitive flexibility has a direct impact on intellectual-practical obsession.



The table shows two standard coefficients of the conceptual model considering the level of significance. It is clear that the path coefficients of all relationships considered in the final model are significant and the impact of each relationship can be analyzed separately.

Table 2. Investigation of direct and indirect effects

Regression Weights: (Group number 1 – Default model)			Estimate	S.E.	P
Compulsion	<---	Social Cognition	0.5	.118	***
Reassurance	<---	Social Cognition	0.17	.186	0.009
Excessiveness	<---	Social Cognition	0.5	.123	***
Reassurance	<---	Cognitive flexibility	0.24	.171	***
Excessiveness	<---	Cognitive flexibility	0.12	.113	0.03
Distress	<---	Cognitive flexibility	0.15	.116	0.009
Distress	<---	Social Cognition	0.42	.127	***
Compulsion	<---	Cognitive flexibility	0.16	.109	0.004
Obsessive-Compulsive	<---	Excessiveness	0.2	.070	***
Obsessive-Compulsive	<---	Reassurance	0.11	.049	0.012
Obsessive-Compulsive	<---	Compulsion	0.16	.071	***
Obsessive-Compulsive	<---	Distress	0.13	.069	0.006
Obsessive-Compulsive	<---	Cognitive flexibility	0.32	.153	***

The effects of X-1 → Y, X-2 → Y, are presented in **Table 3**, where X-1 represents the t1 independent variable of (social cognition) X-2 → Y represents thet2 independent variable of (cognitive flexibility), and Y represents the dependent variable of (intellectual-practical obsession), as shown in **Table 3**. These indirect relationships of independent variables on dependent variables were evaluated using the bootstrap method with a 5000 sample size. Social cognition, which had no direct effect on intellectual and practical obsessions, was able to indirectly have an effect of about 25% on intellectual and practical obsessions via the indicators of cyberchondria. Finally, through the indicators of cyberchondria, cognitive flexibility can indirectly and directly affect intellectual and practical obsessions by about 9.5% and 32%, respectively. Their results show that social cognition and cognitive flexibility can directly affect it by 25% and 41%, respectively, and indirectly by 37% and 42%, respectively.

Table 3.Direct, indirect, and total effects of social cognition and cognitive flexibility on obsessive-compulsive symptoms

Dependent variable	Obsessive-Compulsive				
	Indirect				
	Standardized effect	Lower bound	Upper bound	Direct effect	Total effect
Social Cognition	0.25**	0.17	0.33	0	0.25**
Cognitive flexibility	0.095**	0.05	0.15	0.32	0.416**

This is the first study to address these factors in anticipated COS and reflect the broader impact of these findings as they relate to the possible mechanisms of obsessive-compulsive disorder (OCD) and the social cognition, cognitive flexibility, and cyberchondria that can be affected in OCD. Specifically, the research found that social cognition and cognitive flexibility deficits predicted OCD symptom severity and that these relationships were mediated by cyberchondria. This section addresses these findings and their implications in the context of the wider literature; limits the clinical contributions of the current study; and provides avenues for future exploration.

The findings further confirm the importance of social cognition in OCD, consistent with prior research showing that deficits in social cognition are an important factor influencing the symptomatology of OCD [4]. Deficits in social cognition – for example, theory of mind deficits or emotion recognition deficits – can aggravate interpersonal problems and increase obsessive preoccupations with social judgment or harm. They also can misinterpret neutral social cues as threatening, exacerbating their obsessive fears and avoidance behaviors [3].

Such findings highlight the need to consider social cognition in interventions for OCD. Targeted therapies—such as social cognition training—may provide individuals with tools for more accurate interpretations of social cues, ultimately decreasing interpersonal distress, which contributes to obsessive-compulsive cycles [16]. Furthermore, boosting social cognitive functioning may also alleviate co-occurring conditions, including social anxiety or depression, which are common in individuals with OCD and complicate treatment outcomes further [2].

In line with the evidence in the literature, the study indicates cognitive flexibility deficits as a key constituent of OCD [5]. Cognitive inflexibility creates a barrier toward adapting to new information or willingly shifting focus away from intrusive thoughts, propagating obsessive-compulsive rituals. This inflexibility contributes to the continuation of maladaptive routines, such as excessive checking or cleaning, even after they have ceased to be functional [6].

Cognitive inflexibility in OCD points to possible cognitive remediation therapies targeting flexibility. Cognitive restructuring and exposure and response prevention (ERP) could be supplemented with set-shifting and adaptive problem-solving tasks [12]. Such interventions may reduce cognitive inflexibility and broaden the range of psychological tools available to individuals, facilitating disengagement from themselves and their obsessive thoughts and fostering more effective coping [17].

This novel finding for the mediating role of cyberchondria in the relationship between social cognition and cognitive flexibility concerning OCD symptoms adds to the existing literature on the subject. Cyberchondria, the repeated distressing online health-related search, has been increasingly acknowledged as a maladaptive behavior with important psychological implications [7]. Social and cognitive vulnerabilities translate into measures of obsessive-compulsive symptoms, with cyberchondria being a key mediating mechanism in this study.

Understanding the association between cyberchondria and OCD through reassurance-seeking behavior context. OCD individuals regularly search for reassurance to lower anxiety and the internet is an easy source of, albeit not very substantial, information [8]. Constant searching instead provides no long-term reassurance and increases anxiety, creating a self-reinforcing cycle. Moreover, deficits in social cognition or cognitive flexibility would render some individuals particularly susceptible to cyberchondria, as they are less able to critically appraise information they encounter online, or modify their search strategies in response to ambiguous findings [9].

Such cases have practical implications for the treatment of OCD. Cyberchondria should be considered by clinicians in the diagnostic process, especially in patients with health-related obsessions or compulsions. Psychoeducation regarding the dangers of excessive online searches along with techniques for managing health anxiety may be useful in alleviating distress caused by cyberchondria symptoms on OCD symptoms. Interventions might also include training in digital literacy which would help individuals critically appraise online health information, thus decreasing reliance on internet searches as a means of reassurance (Starcevic,. et al 2020).

Recomendation

Based on these findings, future research should focus on overcoming the limitations of this study and widen the horizon of exploration. Longitudinal studies can investigate whether an intervention focusing on social cognition, cognitive flexibility, or cyberchondria leads to changes in OCD symptoms over time. Experimental design's ability to manipulate the operational characteristics of preventative and remedial approaches would be well-suited to evaluating specific therapeutic components (e.g., digital literacy training, cognitive remediation) that reduce the influence of cyberchondria on OCD.

Furthermore, studies investigating the neurobiological basis of these relationships may help to elucidate the mechanisms by which social cognition and cognitive flexibility might contribute to OCD. Such advances in neuroimaging and neuropsychological assessment may illuminate how the dysfunction of specific brain regions contributes to the interrelationship of these domains.

Lastly, exploring other digital behaviors (eg social media use or gaming) that also contribute to OCD may provide a more holistic comprehension of the disorder in the digital age. They would get a broader study of the impact of technology on mental health, so they could create better treatments giving a reality of the patients with Obsessive-Compulsive Disorder.

Conclusion

The present study underlines the predictive contributions of social cognition and cognitive flexibility in OCD and the mediating effect of cyberchondria. These findings add to a growing literature base that highlights the need for consideration of social, cognitive, and behavioral factors concerning OCD. By targeting these deficits in social cognition and cognitive flexibility while considering the impact of cyberchondria, clinicians may create more efficacious and holistic treatments for those suffering from OCD. Research on the relationship between the internet, social media, and OCD has been limited, and more exploration into these relationships should be a driving interest for future research, perhaps leading to future treatment and interventions reflective of a modernistic view of OCD.

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