The Relationship Between Obsessive Belief Level and Cognitive Flexibility in Patients with Obsessive Compulsive Disorder

Hatice ŞAHİN¹ , Ferdi KÖŞGER² , Altan EŞSİZÖĞLU² , Gökay AKSARAY²

¹Bursa Şevket Yılmaz Education and Research Hospital, Psychiatry Clinic, Bursa, Turkey

²Department of Psychiatry, Eskişehir Osmangazi University Faculty of Medicine, Eskişehir, Turkey

ABSTRACT

Introduction: It is known that dysfunctional beliefs are important in the onset and maintenance of symptoms of Obsessive Compulsive Disorder (OCD) according to the cognitive model of OCD. OCD patients with higher obsessive beliefs would be expected to have greater deficits in cognitive flexibility. In this study, we aimed to examine the relationship between obsessive belief levels and cognitive flexibility in OCD patients.

Methods: Patients with OCD (50) and Panic Disorder (30) as a control group were evaluated and diagnosed using Structured Clinical Interview for DSM-IV Axis I Disorders. A socio-demographic data form, Beck Depression Inventory, Beck Anxiety Inventory and Wisconsin Card Sorting Test (WCST) were administered to all the patients. The Yale-Brown Obsessive Compulsive Scale and Obsessive Beliefs Questionnaire-44 (OBQ-44) were administered to the OCD group. The OCD group was

divided into two subgroups as higher obsessive beliefs (OCD-H) (n=29) and lower obsessive beliefs (OCD-L) (n=21) according to a cluster analytic approach.

Results: When the subgroups were compared according to WCST; the number of completed categories was statistically significantly lower, and the numbers of total errors, perseverative errors and non-perseverative errors were significantly higher in the OCD-H group.

Conclusion: The results of our study show that cognitive flexibility is impaired in OCD patients with higher obsessive beliefs.

Keywords: Obsessive compulsive disorder; cognitive flexibility; obsessive belief

Cite this article as: Şahin H, Köşger F, Eşsizöğlü A, Aksaray G. The Relationship Between Obsessive Belief Level and Cognitive Flexibility in Patients with Obsessive Compulsive Disorder. Arch Neuropsychiatry 2018;55:376-379. <https://doi.org/10.5152/npa.2017.21648>

INTRODUCTION

Neuropsychological deficits have long been suggested to be related with the etiopathology of Obsessive Compulsive Disorder (OCD). Nevertheless, studies investigating cognitive functions in patients with OCD is still unclear. Some studies have been reported impairments in cognitive functions such as set shifting, planning, cognitive flexibility, decision making, spatial working memory, attention, and speed of processing in patients with OCD, whereas other studies reported intact set shifting, response inhibition, verbal memory, attention, cognitive flexibility, cognitive inhibition, verbal fluency, and planning (1-3). Given that studies have detected an OCD subgroup that does not differ from control groups in their level of obsessive beliefs (4, 5), the fact that obsessive belief levels were not taken into consideration in studies comparing cognitive functions is a remarkable absence. Repetitive behavior is a characteristic feature of OCD, related with rigid rituals. Therefore, diminished behavioral flexibility which is the ability to change one's behavior according to contextual cues might be an important etiological factor in OCD (1). OCD patients with higher obsessive beliefs would be expected to have more deficits in cognitive flexibility. Cognitive inflexibility is considered to be a core cognitive deficit to OCD (6). In support of this assumption, a relation between higher obsessive beliefs and neurocognitive inflexibility has reported in a preliminary study with a small sample size (7). Deficits in cognitive flexibility may be a trait marker that is related with clinically significant OCD symptoms.

In order to examine which type of cognitive deficit is related to OCD and which is generally associated with anxiety, comparing cognitive deficits of OCD patients with that of patients affected by another anxiety disorder is recommended. Panic disorder (PD) is a good control group for OCD because it has the anxiety symptoms without obsessions and compulsions (7, 8). There are two aims of this study. First we aimed to examine the relationship between obsessive belief levels and cognitive flexibility in OCD patients, which has not been previously researched in relatively large sample size. Furthermore, we aimed to research the relationship between obsessive belief levels and, sociodemographic and clinical characteristics in patients with OCD.

METHODS

Sample

Patients with OCD (n=50) and PD (n=30) for a control group who consecutively consulted at the Eskişehir Osmangazi University, Faculty of Medicine, Department of Psychiatry, Outpatient Clinic between September 2013 - February 2014 were evaluated and diagnosed using DSM-IV-TR criteria for inclusion in this study. A socio-demographic data form, Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI) and Wisconsin Card Sorting Test (WCST) were administered to all the patients. The

Yale-Brown Obsessive Compulsive Scale (Y-BOCS) and Obsessive Beliefs Questionnaire-44 (OBQ-44) were administered to the OCD group. We distinguished higher obsessive belief (OCD-H) and lower obsessive belief (OCD-L) subgroups using a cluster analytic approach, K-means analyses, which was used successfully in previous studies (4,5,7). Furthermore, there was a high positive correlation between each three subscales of OBQ-44 (for inflated responsibility/over estimation of threat and perfectionism/intolerance of uncertainty $r=0.823$ and $p<0.001$; for inflated responsibility/over estimation of threat and over-importance/over-control of thoughts $r=0.846$ and $p<0.001$; for perfectionism/intolerance of uncertainty and over-importance/over-control of thoughts $r=0.696$ and $p<0.001$) which was an evidence for a clinically meaningful distinction of OCD-H ($n=29$) and OCD-L ($n=21$) subgroups in the current study.

Inclusion criteria consisted of being between 18–65 years old and having completed at least 5 years of education, and the exclusion criteria consisted of having a disease which affects the central nervous system such as mental retardation or epilepsy and being diagnosed with another psychiatric disorder. SCID-I was used for this exclusion criteria.

All participants gave informed consent prior to inclusion in the study. The study was approved by the Eskişehir Osmangazi University, Faculty of Medicine Ethics Committee.

Materials

The socio-demographic data form was developed by researchers to assess patients' socio-demographic (age, sex, education and marital status) and disorder characteristics.

The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) was developed by First et al. (9). The Turkish version of SCID-I's validity and reliability have been measured (10).

The Yale-Brown Obsessive Compulsive Scale (Y-BOCS) is a clinician-administered scale developed to evaluate the type and severity of obsessive compulsive symptoms (11). It includes 19 items, but the first 10 items are used to assess severity. The Turkish version's validity and reliability have been measured (12).

The Beck Depression Inventory (BDI) is a self-measured inventory that assesses the severity of depression symptoms and consists of 21 questions (13). The Turkish version's validity and reliability have been measured (14).

The Beck Anxiety Inventory (BAI) is an inventory developed by Beck et al. (15) that consists of 21 items and assesses the severity of the anxiety symptoms. The Turkish version's validity and reliability have been measured (16).

The Obsessive Beliefs Questionnaire-44 (OBQ-44) assesses non-objective belief domains (17). The instrument is a 44-item self-report scale developed to assess belief domains that play a central role in OCD. Three components (inflated responsibility and overestimation of threat, perfectionism and intolerance of uncertainty, over-importance and over-control of thoughts) were derived as a result of factor analysis, retaining 44 items out of 87 in the initial long version of the OBQ. The Turkish version's validity and reliability have been measured (18).

The Wisconsin Card Sorting Test (WCST) was developed by Heaton (19). It is used to measure frontal lobe functions and is mainly related to dorsolateral prefrontal cortex functions (20). The achievement of a high score depends on the comprehension of the match-up principal. Once the test has been completed, the possibility of failure is quite low, so the test cannot measure problem solving abilities in the same subject once he/she has completed it. Therefore, the test can only be administered one time. However, it could be administered several times if a cerebral accident occurs after the first administration, to measure regression and/or to observe amelioration. The test is administered with two decks of cards that include 4 stimulus card and 64 reaction cards. There is no time

limit. Manual form was used in our study. The adaptation of the WCST into Turkish was conducted by Karakaş et al. (21). The total number of errors, perseverative errors, non-perseverative errors and completed categories were used in our study to assess neurocognitive flexibility.

Statistical Analysis

Data analysis was carried out using the statistical packages IBM SPSS 21.0. Continuous data with normal distribution was assessed with One Way Anova and non-normally distributed data were assessed by Kruskal-Wallis. Chi-square analysis was used for to categorical data. ANCOVA was used to compare the OCD-H and OCD-L subgroups in each normally distributed WCST groups, and potential covariance was controlled. Statistical significance was set at $P<0.05$ for each analysis.

RESULTS

The average age of the patients with OCD was 35.48 ± 10.69 , and the average age of the patients with PD was 37.30 ± 10.85 . The average OBQ-44 score of the OCD-H ($n=29$) group was 206.1; the average score of the OCD-L ($n=21$) group was 105.8. There were no statistically significant differences detected between the OCD-H, OCD-L and PD groups in terms of age, sex and marital status (respectively; $F=0.910$ and $p=0.06$; $\chi^2=0.19$ and $p=0.90$; $\chi^2=5.8$ and $p=0.20$). When the three subgroups were compared in terms of education; the education of the OCD-H group was significantly lower than that of OCD-L group ($H=8.986$ and $p<0.05$). Age of onset was significantly higher in PD group comparing to the OCD groups ($H=16.014$ and $p<0.01$) (Table 1).

There were no significant differences detected between OCD-H and OCD-L groups in terms of Y-BOCS score ($z=-0.897$ and $p=0.76$). The BAI scores of the PD group were significantly higher than those of the OCD-L group ($H=7.042$ and $p<0.05$). There were no significant differences detected between the groups in terms of BDI scores ($H=3.491$ and $p=0.175$) (Table 1).

In the OCD-H group, 12 patients (41.4%) were using antidepressants; 14 patients (48.3%) were using antidepressants with atypical antipsychotics and 3 patients (10.3%) were using antidepressants with atypical antipsychotics and benzodiazepine. In the OCD-L group, 11 patients (52.4%) were using antidepressants; 8 patients (38.1%) were using antidepressants with atypical antipsychotics and 2 patients (9.5%) were using antidepressants with atypical antipsychotics and benzodiazepine. In the PD group, 21 patients (70.0%) were using antidepressants, 5 patients (16.7%) were using antidepressants with atypical antipsychotics and 4 patients (13.3%) were using antidepressants with benzodiazepine. None of the patients were treated with Cognitive Behavioral Therapy.

When the groups were compared according to WCST; the number of completed categories was statistically significantly lower in the OCD-H group, and the numbers of total errors, perseverative errors and non-perseverative errors were significantly higher in this group (respectively; $H=36.196$ and $p<0.001$; $F=21.63$ and $p<0.001$; $F=8.57$ and $p<0.001$; $H=24.679$ and $p<0.001$) (Table 2).

However, a significant difference was observed between OCD-H and OCD-L groups for education ($H=8.986$, $p<0.05$). Hence, covariance analysis (ANCOVA) was performed for correction of the effect of education on the normally distributed WCST parameters. Consequently, the results which founded by pairwise comparison for WCST total errors ($F=37.11$ and $df=1.47$ and $p<0.001$), and WCST perseverative errors ($F=19.20$ and $df=1.47$ and $p<0.001$) did not vary.

DISCUSSION

We aimed to reveal the differences between two subgroups of OCD by comparing cognitive flexibility on the WCST. We did not find any significant differences between OCD-H and OCD-L subgroups in terms of age, sex, marital status and age at disease onset. Accordingly, in a

Table 1. Comparison of demographic and clinical characteristics of patients with OCD-H, OCD-L, and PD

	OCD-H Mean ± sd/n	OCD-L Mean ± sd/n	PD Mean ± sd/n	Statistical analysis	Post hoc
Gender					
Female	15 (% 51.7)	12 (% 57.1)	17 (% 56.7)	$\chi^2=0.19$ p=0.90	-
Male	14 (% 48.3)	9 (% 42.9)	13 (% 43.3)		
Marital status					
single	9 (% 31.0)	11 (% 52.4)	8 (% 26.7)	$\chi^2=5.8$ p=0.20	-
married	19 (% 65.5)	8 (% 38.1)	18 (% 60.0)		
widow/divorced	1 (% 3.4)	2 (% 9.5)	4 (% 13.31)		
Age (years)	38.44±11.69	31.38±7.65	37.30±10.85	F=0.910 p=0.06	-
Education (years)	9.31±4.0	13.61±5.5	10.00±4.21	H=8.986 p<0.05	OCD-H <OCD-L
Age of onset	24.65±9.33	22.09±6.69	30.30±8.22	H=16.014 p<0.01	OCD-L, OCD-H <PD
BAI	18.79±13.32	16.09±14.66	26.80±16.97	H=7.042 p<0.05	OCD-L <PD
BDI	20.34±12.83	16.85±11.79	14.26±9.48	H=3.491 p=0.175	-
YBOCS	22.75±10.22	21.52±10.01	-	z=-0.897 p=0.76	-
OBQ-44			-		-
Total	206.17±34.21	105.80±24.74	-	z=-5.987 p<0.01	
inflated responsibility/overestimation of threat	72.13±11.61	34.38±8.77	-	z=-13.930 p<0.01	
perfectionism/intolerance of uncertainty	83.58±15.34	50.00±16.20	-	z=-7.460 p<0.01	
over-importance/over-control of thoughts	49.93±14.66	21.14±5.46	-	z=-9.683 p<0.01	

OCD-H, obsessive compulsive disorder with higher obsessive beliefs; OCD-L, obsessive compulsive disorder with lower obsessive beliefs; PD, panic disorder; BAI, Beck anxiety inventory; BDI, Beck depression inventory; YBOCS, Yale-Brown obsessive compulsive scale; OBQ-44, Obsessive Beliefs Questionnaire-44; sd: standard deviation.

Table 2. Comparison of WCST scores of patients with OCD-H, OCD-L, and PD

	OCD-H Mean ± sd	OCD-L Mean ± sd	PD Mean ± sd	Statistical analysis	Post hoc
WCST					
Categories Achieved	1.96±1.47	5.57±1.02	3.5±1.83	H=36.196 p<0.001	OCD-H <PD <OCD-L
Total errors	68.41±18.07	29.23±20.04	50.06±23.62	F=21.63 p<0.001	OCD-L <PD <OCD-H
Perseverative errors	35.58±13.63	16.71±12.29	30.06±20.12	F=8.57 p<0.001	OCD-L <OCD-H, OCD-L <PD
Non-perseverative errors	32.82±16.81	12.52±8.14	20.00±11.98	H=24.679 p<0.001	OCD-L <OCD-H, PD <OCD-H

OCD-H, obsessive compulsive disorder with higher obsessive beliefs; OCD-L, obsessive compulsive disorder with lower obsessive beliefs; PD, panic disorder; WCST, Wisconsin Card Sorting Test; sd: standard deviation.

study that evaluated 367 OCD patients' obsessive beliefs using the OBQ-44, there was no significant difference between patients with lower and higher obsessive beliefs in terms of sex, education and age (4). Despite the fact that the education period of the OCD-H subgroup is lower, after the covariance analysis (ANCOVA) for correction of the effect of education; significant difference did not vary in terms of WCST total errors and WCST perseverative errors. Increased perseverative errors on the WCST are indicated by two meta-analyses in patients with OCD (22). However obsessive belief levels did not be assessed on that studies (23, 24).

There were no significant differences in terms of the severity of depression and anxiety between OCD-H and OCD-L patients in our study. Previous studies have reported higher depression and anxiety levels in the OCD-H patients than patients with OCD-L (4,5,7). Although studies have reported that the severity of obsessive compulsive symptoms is higher in patients with OCD-H (4,5,7), in our study, no difference was detected between the OCD-H and OCD-L subgroups in terms of symptom severity. This finding could be due to the fact that these patients were being followed and medically treated for depression, anxiety and obsessive-compulsive symptoms in our clinic for a long time.

We found significant cognitive inflexibility in the OCD-H subgroup compared with the OCD-L and PD groups. The fact that there was no difference between the groups in terms of depression, anxiety and OCD severity and the fact that our sample was larger than in other studies comparing the cognitive flexibility of OCD patients with lower and higher obsessive beliefs demonstrate the importance of cognitive flexibility in the

differentiation of OCD patients with lower and higher obsessive beliefs. Primal threat mode, which was described by Beck and Clark, is based on the fight/flight principle (25). Processing at primal threat mode would be rapid, involuntary, inflexible and primarily stimulus-driven because of the importance of threat-related information processing for the survival of the organism. The aim of this system is to increase security and minimize threat by providing an automatic reflex against threat. Automatic anxious thoughts and biased cognitive processing result from the activation of the primal threat mode. The second processing of the data is prevented by activation of the primal threat mode and the capacity to produce constructive and realistic comments are blocked. Secondary appraisal process, which is different from the primal threat mode, is more flexible and allows us to look at the situation from the outside and to think about it. Cognitive inflexibility which is observed in patients with OCD-H might be directly in consequence of deficits on secondary appraisal process. Moreover, OCD-H patients may not obtain the data which is essential for secondary data processing and therefore may be more likely to have deficits on secondary appraisal process.

Our study suggests that cognitive dysfunctions are not limited to orbitofrontal cortex but disrupted in a wider prefrontal cortex network, particularly including dorsolateral prefrontal cortex (DLPC) as Snyder et al. mentioned in their meta-analysis (24). Furthermore, we may suggest that cognitive dysfunctions on DLPC in patients with OCD may be related with obsessive beliefs. Obsessive belief levels should be taken into consideration in studies that evaluate cognitive functions in OCD patients.

We may support the concept that, as Bradbury et al. emphasized, patients with OCD who report the comparative absence of obsessive beliefs also demonstrate the comparative absence of neurocognitive impairment (7).

This study has some limitations, including the fact that only patients diagnosed with OCD who consulted in our outpatient clinic were included in the study and the fact that our sample does not represent all patients diagnosed with OCD. Additionally, its cross-sectional design, including patients' under-treatment, and the lack of assessment of other cognitive functions, the lack of assessment of the level of obsessive beliefs of patients with panic disorder are other limitations.

In conclusion the findings of our study emphasize that cognitive flexibility is impaired in OCD patients with higher obsessive beliefs. Obsessive belief level is important in terms of OCD's clinical manifestation and its treatment. We may suggest to research the effect of cognitive behavioral therapy, which may decrease obsessive beliefs, on cognitive inflexibility in future studies. New studies with a larger sample size that evaluate obsessive belief levels and cognitive flexibility for the period before and after treatment would also contribute to the literature.

Ethics Committee Approval: The study was approved by the Eskişehir Osmangazi University, Faculty of Medicine Ethics Committee.

Informed Consent: All participants gave informed consent prior to inclusion in the study.

Peer-review: Externally peer-reviewed.

Author contributions: Concept – GA, HŞ; Design – HŞ, FK; Supervision – GA, AE, FK; Resource – HŞ, GA; Materials – HŞ, GA; Data Collection &/or Processing –HŞ, FK, AE, GK; Analysis &/or Interpretation – HŞ, GA, FK, AE; Literature Search – HŞ, GA, FK, AE; Writing Manuscript– HŞ, GA, FK; Critical Review – FK, GA, AE.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: This study received no external funding.

REFERENCES

1. Benzina N, Mallet L, Burguière E, N'Diaye K, Pelissolo A. Cognitive dysfunction in obsessive-compulsive disorder. *Curr Psychiatry Rep* 2016;18:80. [CrossRef]
2. Abramovitch A, Abramowitz JS, Mittelman A. The neuropsychology of adult obsessive-compulsive disorder: a meta-analysis. *Clin Psychol Rev* 2013;33:1163–1171. [CrossRef]
3. Kashyap H, Kumar JK, Kandavel T, Reddy YCJ. Neuropsychological functioning in obsessive-compulsive disorder: are executive functions the key deficit? *Compr Psychiatry* 2013;54:533–540. [CrossRef]
4. Calamari JE, Cohen RJ, Rector NA, Szacun-Shimizu K, Riemann BC, Norber MM. Dysfunctional belief-based obsessive-compulsive disorder subgroups. *Behav Res Ther* 2006;44:1347–1360. [CrossRef]
5. Taylor S, Abramowitz JS, McKay D, Calamari JE, Sookman D, Kyrios M, Wilhelm S, Carmin C. Do dysfunctional beliefs play a role in all types of obsessive-compulsive disorder? *J Anxiety Disord* 2006;20:85–97. [CrossRef]
6. Chamberlain SR, Blackwell AD, Fineberg NA, Robbins TW, Sahakian BJ. The neuropsychology of obsessive compulsive disorder: the importance of failures in cognitive and behavioural inhibition as candidate endophenotypic markers. *Neurosci Biobehav Rev* 2005;29:399–419. [CrossRef]
7. Bradbury C, Cassin SE, Rector NA. Obsessive beliefs and neurocognitive flexibility in obsessive-compulsive disorder. *Psychiatry Res* 2011;187:160–165. [CrossRef]
8. Boldrini M, Del Pace L, Placidi GPA, Keilp J, Ellis SP, Signori S, Placidi GF, Cappa SF. Selective cognitive deficits in obsessive-compulsive disorder compared to panic disorder with agoraphobia. *Acta Psychiatr Scand* 2005;111:150–158. [CrossRef]
9. First MB, Spitzer RL, Gibbon M, Williams JB. Structured Clinical Interview for DSM-IV Clinical Version (SCID-I/CV). Washington DC: American Psychiatric Press; 1997.
10. Özkürkçügil A, Aydemir Ö, Yıldız M, Esen Danacı A, Köroğlu E. DSM-IV Eksen I bozuklukları için yapılandırılmış klinik görüşmenin Türkçe'ye uyarlanması ve güvenilirlik çalışması. *İlaç ve Tedavi Dergisi* 1999;12:233–236.
11. Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, Heninger GR, Charney DS. The Yale-Brown obsessive compulsive scale: development, use and reliability. *Arch Gen Psychiatry* 1989;46:1006–1011. [CrossRef]
12. Tek C, Ulug B, Rezaki BG, Tanriverdi N, Mercan S, Demir B, Vargel S. Yale-Brown Obsessive-Compulsive Scale and US National Institute of Mental Health Global Obsessive Compulsive Scale in Turkish: Reliability and validity. *Acta Psychiatr Scand* 1995;91:410–413. [CrossRef]
13. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561–571. [CrossRef]
14. Hisli N. Beck Depresyon Envanteri'nin üniversite öğrencileri için geçerliği, güvenilirliği. *Psikoloji Dergisi* 1989;7:3–13.
15. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol* 1998;56:893–897. [CrossRef]
16. Ulusoy M, Sahin NH, Erkmen H. Turkish version of the Beck Anxiety Inventory: psychometric properties. *J Cogn Psychother* 1998;12:163–172.
17. Obsessive-Compulsive Cognitions Working Group (OCCWG). Psychometric validation of the Obsessive Beliefs Questionnaire and the Interpretation of Intrusions Inventory: Part II. Factor analyses and testing a brief version. *Behav Res Ther* 2005;43:1527–1542. [CrossRef]
18. Boysan M, Beşiroğlu L, Çetinkaya N, Atli A, Aydın A. The Validity and Reliability of the Turkish Version of the Obsessive Beliefs Questionnaire-44 (OBQ-44). *Arch Neuropsychiatry* 2010;47:216–222. [CrossRef]
19. Heaton RK. Wisconsin Card Sorting Test Manual. Odesa, FL: Psychological Assessment Test Resources, Inc; 1981.
20. Weinberger DR, Berman KF, Zec RF. Physiologic function of dorsolateral prefrontal cortex in schizophrenia. I. Regional cerebral blood flow evidence. *Arch Gen Psychiatry* 1986;43:114–124. [CrossRef]
21. Karakaş S, Irak M, Ersezgin ÖU. Wisconsin Kart Eşleme Testi (WCST) ve Stroop Testi TBAG formu puanlarının test içi ve testler-arası ilişkileri. *X. Ulusal Psikoloji Kongresi özet kitabı*, 1998, s.44.
22. Gruner P, Pittenger C. Cognitive inflexibility in Obsessive-Compulsive Disorder. *Neuroscience* 2017;345:243–255. [CrossRef]
23. Shin NY, Lee TY, Kim E, Kwon JS. Cognitive functioning in obsessive-compulsive disorder: a meta-analysis. *Psychol Med* 2014;44:1121–1130. [CrossRef]
24. Snyder HR, Kaiser RH, Warren SL, Heller W. Obsessive-compulsive disorder is associated with broad impairments in executive function: a meta-analysis. *Clin Psychol Sci* 2015;3:301–330. [CrossRef]
25. Beck AT, Clark DA. An information processing model of anxiety: automatic and strategic processes. *Behav Res Ther* 1997;35:49–58. [CrossRef]