

REVIEW OF OBSESSIVE AND COMPULSIVE DISORDER (OCD) MEASURES

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The objective of the study was the systematic review of the literature on Obsessive and Compulsive Disorder (OCD) measures. Sixty eight articles were selected after an exhaustive search in SCOPUS and PsycINFO. These papers were those that, as well as including OCD measures, were considered as relevant according to criteria previously established from the analysis of 1066 abstracts. Coding was carried out by means of exhaustive and mutually exclusive ad hoc category systems. Some psychometric properties as well as the neuropsychological evidence employed in the validation of the most frequently used measures were described. Results indicate that social and emotional facets are hardly taken into account; some other limitations of OCD measures are highlighted. The use of advanced psychometric models and the consideration of affective as well as cognitive neuropsychological evidence are suggested in order to improve current OCD measurement instruments.

Key words: Obsessive and compulsive disorder (OCD), Measurement, Rasch model, Review, Item response theory (IRT).

El objetivo de este estudio fue revisar sistemáticamente la literatura especializada con el objetivo de analizar la medición actual del Trastorno Obsesivo-Compulsivo (TOC). Tras una búsqueda exhaustiva en SCOPUS y PsycINFO, se seleccionaron los 68 artículos que incluían medidas del TOC, además de resultar relevantes según los criterios previamente establecidos a partir del análisis de 1066 resúmenes, y se codificaron mediante sistemas ad hoc de categorías exhaustivas y mutuamente excluyentes. Se describieron las características de los instrumentos más frecuentemente empleados y la evidencia neuropsicológica utilizada en su validación. Los resultados permiten concluir que los aspectos sociales y emocionales apenas se tienen en cuenta en las medidas más utilizadas, así como describir otras limitaciones. Para la mejora de las medidas, se sugiere el uso de modelos psicométricos avanzados acompañados de estrategias de validación acompañados de estrategias de validación que tomen en consideración los conocimientos neuropsicológicos sobre el TOC, y en particular la faceta afectiva del mismo.

Palabras clave: Trastorno obsesivo compulsivo (TOC), Medición, Modelo de rasch, Revisión, Teoría de respuesta al ítem (TRI).

According to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders, Text Revision, DSM-IV-TR (APA, 2000), Obsessive-Compulsive Disorder (OCD) is an anxiety disorder characterized by intrusive thoughts, ideas or images that cause anxiety or distress (that is, obsessions) that are subjectively resisted and which the person attempts to neutralize through some type of ritualistic behavior (compulsions). This definition of OCD has led classical tests for its assessment to focus on the cognitive and behavioral aspects of the disorder ignoring other aspects, such as socio-emotional aspects, which are being shown to be relevant for the disorder (Olatunji, Abramowitz, Williams, Connolly and Lohr, 2007; Cisler, Brady, Olatunji and Lohr, 2010).

In spite of this, the study of emotion and its relation to psychopathology has experienced an exponential increase in the last few decades (Woody and Teachman, 2000;

Deacon and Abramowitz, 2006; Olatunji, 2010) and, from this perspective, it has been found that fear and disgust are greatly important in those disorders in which components of contamination and disease are present, as occurs in OCD (Herba and Rachman, 2007). These investigations have motivated the construction of new instruments for the measurement of constructs such as sensitivity to disgust or mental contamination and that can be very useful for OCD measurement (Olatunji, Sawchuk, de Jong and Lohr, 2007; van Overveld, de Jong, Peters, Cavanagh and Davey, 2006; McLaughlin, Stewart and Taylor, 2007).

Having psychometric instruments that provide reliable measures with adequate construct validity evidences is fundamental in any branch of psychology (Prieto and Delgado, 2010). This implies them to be specific and sensitive to the changes that occur in the intensity of symptoms. Although there are many measurement instruments for the symptoms associated to OCD, the majority do not seem to be consistent with the recent empirical findings regarding the nature and structure of

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obsessions and compulsions (Gabrill, Merlo, Duke, Harford, Keeley, Geffken and Storch, 2008); moreover, they present specificity and sensitivity problems (Taylor, 1995; Feske and Chambless, 1997) and ignore the recent associated evidence in psychopathology, especially with regard to the affective facet of OCD, which has also not been taken into account in the validation of the new measures (Chamberlain et al., 2005; Taylor et al., 2007; Suppiger, In-Albon, Hendriksen, Hermann, Margraf and Schneider, 2009). To date, there is no psychometric instrument that covers all OCD dimensions (cognitive, behavioral and socio-emotional) and that allows us to obtain valid and reliable scores. This has led to the absence of a scale that is accepted by all authors, which hinders the comparison between research results (Kaiser, Bouvard and Millierey, 2010).

Therefore, we consider that a systematic review of the tests that measure symptoms associated to OCD would be of interest, paying special attention to the use, if appropriate, of sophisticated psychometric models that could contribute to the improvement of the quality of these measures. Specifically, the Rasch model (Rasch, 1960; Wright and Stone, 1979; Prieto and Delgado, 2003; Lopes, Prieto, Delgado, Gamito and Trigo, 2010; Prieto, Delgado, Perea and Ladera, 2010) constitutes a complementary approach to the Classical Test Theory (CTT), which resolves some of its methodological disadvantages as there is ample consensus that it is metrically superior to CTT (Wilson, 2005). In addition, given the advances in neurosciences and their contribution to the validation of psychological assessment instruments, special attention was also paid to the employment of neuropsychological evidence in the validation of instruments.

METHOD

Materials

In a first phase, the abstracts of a total of 1,066 articles were reviewed. In a second phase, 68 relevant articles for the purpose of our study were selected and reviewed.

Procedure

In the first phase, studies extracted from the PsycINFO and SCOPUS data bases were reviewed. The first sample of abstracts, downloaded on the 9th of March, 2010, was made up in a deductive manner using key words with the following English terms: "OCD and testing", "OCD and validity", "OCD and reliability", "OCD and IRT" and "OCD and Rasch Model".

Following the analysis of the abstracts, which was used for the inductive construction of ad hoc systems of exhaustive and mutually exclusive categories (EME), 68 relevant articles for our objective were selected.

Information analysis

The qualitative analysis of the data in the first phase provided systems of EME categories that allowed us to codify the OCD measures found in the selected studies for the second phase: (1) type of items employed in the OCD measurement (cognitive, behavioral, socio-emotional), (2) type of sample utilized (clinical with a control group, clinical without a control group, subclinical with a control group, subclinical without a control group and non-clinical), (3) neuropsychological relevance (allusion to functional systems or neural structures).

RESULTS

In the first phase of the investigation, the key word search contributed a total of 1,066 abstracts. The PsycINFO and SCOPUS data bases coincided in the obtained results, although SCOPUS provided 26 more studies than PsycINFO. In the case of the search with the term "IRT", four articles were eliminated as they made reference to the English abbreviation of "Intensive Rehabilitation Therapy", and not of "Item Response Theory". The two reviewed articles on OCD and Rasch model were not found to be pertinent to the investigation as they were not directly related to OCD, one of them being the validation of the Danish version of the SCL-90 (Olsen, Mortensen and Bech, 2004), and the second an analysis through the Rasch model of the data of the Bear-Fedio Inventory in patients with a long history of epilepsy in the temporal lobe (Sorensen, Hansen, Andersen, Hogenhaven, Allerup and Bolwig, 1989). With respect to the four articles reviewed regarding OCD and IRT, only one was pertinent to this review, that which the results of the Maudsley Obsessive Compulsive inventory (MOCI) were analyzed in a sample of 1,080 participants (Woods, 2002). The abstracts were categorized into themes and objectives, which allowed us to have a more precise representation of the research studies on OCD and to decide on the relevance or lack of relevance of these studies. Most of the excluded studies were investigations on self-reports which did not make reference or did not make specific reference to OCD. Likewise, a great number of studies were found whose objective was the assessment of the efficacy and effectiveness of different OCD treatments (psychological, psychopharmacological and surgical).



In the second phase, the 68 articles considered to be pertinent to our investigation were analyzed, given that they included OCD measures as well as having neuropsychological relevance. The majority of these articles ($n=61$) describe correlational studies whose objective was to investigate the psychometric quality of scores through convergent validation strategies. The rest were divided up as follows: an experimental study, a quasi-experimental study, an observational study and three theoretical reviews.

In the 68 articles selected, 94 evaluations were conducted on a total of 30 self-reports that measured OCD associated symptoms. The analysis of these evaluations revealed that 60 of these were performed with tests that measured cognitive-behavioral aspects, 14 with socio-emotional type tests, 13 with tests for the assessment of cognitive aspects, and 7 assessments were performed using cognitive-emotional measures.

Table 1 shows the structure of the most used self-reports in OCD measurement according to item content. The most utilized was the Obsessive-Compulsive Inventory- Revised (OCI-R) by Foa et al. (2002) which was used on thirteen occasions, followed by the Structured Clinical Interview for DSM-IV Axis I disorders, SCID-I (APA, 2000), which was employed on nine occasions. From a total of 30 self-reports, Table 1 analyzes those that appeared on more than one occasion. It must be highlighted that all the articles analyzed provided some reliability estimator, with the exception of the case of the Structured Clinical Interview for DSM-IV Axis I disorders, SCID-I (APA, 2000), which was only provided in seven of the nine articles. The most utilized procedure was the estimation of internal consistency, mainly with Cronbach's Alpha () statistic which was used in 96% of the cases. Of this 96%, 45% used other estimators as well, such as test-retest correlation or KR21. Only 4% solely used the test-retest estimation.

The OCI-R scores, the most frequently used measure, obtained reliability values that ranged from .76 to .92. In addition, the lowest reliability values were obtained with the MOCI, with a range of values between .61 and .79, and the highest corresponded to the Disgust Scale, DS (Kleinknecht, Kleinknecht and Thorndike, 1997), with a range between .85 and .93. In the case of the three specific OCD measures for children and adolescents, low reliability values stand out, being the Yale-Brown Scale in its version for children, CY-BOCS (Goodman et al., 1989) the one with the best values, with a range between .60 and .75.

On the other hand, as can be seen in Table 2, the 94 evaluations were codified according to the item type used (cognitive, cognitive-behavioral, socio-emotional or cognitive-emotional) and the sample type employed (clinical, subclinical or nonclinical). The results indicate that the cognitive-behavioral measures were the most usual (they were employed on 60 occasions), coinciding with the DSM and the ICD diagnostic criteria. The measures that used cognitive items were carried out primarily with nonclinical samples, in general university samples. The same occurs in measures with socio-emotional items. There are still few measures that use cognitive-emotional items. The data show that there is a generalized use of control groups in the research: there were two studies that did not include these.

With respect to the Spanish articles reviewed, five were selected. On this occasion, once again, the most utilized questionnaire was the OCI-R, which was used on four occasions, followed by the MOCI, used in three. The Vancouver Obsessive Compulsive Inventory VOCI (Thordarson et al., 2004), the Obsessive Beliefs Questionnaire OBQ (Obsessive and Compulsive Cognitions Working Group, 2005) and the Anxiety Sensibility Index, ASI (Peterson and Reiss, 1992) were employed only on one occasion. It is noteworthy that only one investigation included participants with OCD, the rest using subclinical or university student samples.

As can be seen in Table 3, with respect to the neuropsychological aspects, sixty-four OCD measures (belonging to 29 articles) of the total 94 reported the existence of structural and/or functional anomalies in the frontal-striatal circuits of patients. In all cases, these structural and functional anomalies were proposed as the explanation of the neuropsychological deficits and clinical symptoms of OCD patients. The number of measures that made reference to structural explanations doubled those that referred to functional explanations (42 versus 22). More specifically, our results indicated that the studies with cognitive-behavioral measures used structural-type explanations more frequently as opposed to the studies with cognitive, emotional and socio-cognitive measures that preferred to use explanations of a functional type.

Of the total of the 29 articles with neuropsychological relevance, eight analyzed the neuropsychological profiles of the patients, presenting mixed results in terms of deficits in selective attention and speed of processing. Regarding the executive functions, these articles



concluded that it is very probable that difficulties in switching the focus of attention may be present, as it is repetitively directed to the stimuli related to the obsessive threats and compulsions, in addition to the problems in the inhibition of response and difficulties in generating planning strategies. With respect to memory, it is concluded in these articles that OCD patients present a clear non-verbal memory deficiency, although it is not as clear in verbal memory. They explain this, along with the visual-spatial deficits, by alluding to the reduced

capacity for efficiently applying elaborated strategies, the necessity of excessive exams and the apparition of doubt.

In reference to the neuropsychological profiles in childhood, our review has not found evidence that leads us to believe that it differs from the adult profile. There is only consistent evidence showing deterioration in response suppression and an inhibition of motor skills. Finally, it is suggested that even though the clinical observation seems to indicate that there are problems at

TABLE 1.
FREQUENCY AND COMPOSITION OF THE SELF-REPORTS (TYPE AND NUMBER OF ITEMS)

Adults	f	Item type		
		Cognitive	Behavioral	Socio-emotional
The Obsessive Compulsive Inventory Revised, OCI-R (Foa et al., 2002)	13	3	15	Emotions are not assessed
The Structured Clinical Interview for DSM-IV Axis I Disorders, SCID-I (APA, 2000)	9	3	1	Emotions are not assessed
The Yale-Brown OCD Scale, Y-BOCS (Goodman et al., 1989)	6	5	5	Emotions are not assessed
The Obsessive Compulsive Beliefs Questionnaire, OCQ (Obsessive and Compulsive Cognitions Working Group, 2005)	5	31	Compulsions are not assessed	Emotions are not assessed
The Maudsley Obsessive-Compulsive Inventory, MOCI (Hodgson y Rachman, 1977)	4	14	16	Emotions are not assessed
The Florida Obsessive Compulsive Inventory FOCl (Storch et al., 2007)	4	10	10	Emotions are not assessed
The Vancouver Obsessive Compulsive Inventory, VOCl (Thordarson et al., 2004)	3	30	25	Emotions are not assessed
The Penn Inventory of Scrupulosity, PIOS (Abramowitz et al., 2002).	3	Cognitions are not assessed	Compulsions are not assessed	19
The Disgust Propensity and Sensitivity Scale-Revised DPSS-R (van Overveld et al., 2006).	3	Cognitions are not assessed	Compulsions are not assessed	16
The Disgust Scale, DS (Kleinknecht, Kleinknecht y Thorndike, 1997).	3	Cognitions are not assessed	Compulsions are not assessed	30
The Thought-Action Fusion Scale, TAFS (Shafran, Thordarson and Rachman, 1996)	3	19	Compulsions are not assessed	Emotions are not assessed
The Anxiety Sensitivity Index, ASI (Peterson and Reiss, 1992)	2	5	Compulsions are not assessed	11
Children				
The Obsessive-Compulsive Inventory Revised, Child Version OCI-R-CV (Foa et al., 2002)	4	3	15	Emotions are not assessed
The Children's Yale-Brown Obsessive-Compulsive Scale, CY-BOCS (Goodman et al., 1989)	3	5	5	Emotions are not assessed
The Leyton Obsessional Inventory-Child version LOI-CV (Berg et al., 1986)	3	20	Compulsions are not assessed	Emotions are not assessed



the metamemory and metacognitive capacity levels in children with OCD, said processes have not been adequately investigated in this population due to the lack of adapted measures (Piacentini, Peris, Bergman, Chang and Jaffer, 2007).

DISCUSSION AND CONCLUSIONS

In light of our results, we conclude that the samples that were used primarily in the investigations with emotional-type self-reports are for the most part nonclinical (mainly university samples). In this group, we can also include studies with cognitive and cognitive-emotional tests, which once again use nonclinical samples. In the case of the clinical samples with participants with OCD, the self-reports mainly used for its assessment were the cognitive-behavioral type, coinciding with the guidelines by the APA as well as the ICD diagnostic criteria. This means the omission of OCD aspects of a more purely cognitive and socio-emotional character that, although they may not be relevant for differential diagnosis, may be relevant for a better understanding of the severity of the disorder. On

the other hand, it affects the reliability estimation of scores that, despite falling within an acceptable range, are influenced by the heterogeneity of the samples. Moreover, in Spain this sample-selection bias is more clearly observed, even when cognitive-behavioral self-reports are used.

Obtaining more precise measures that will allow us to scale participants according to their symptoms in a severity continuum would have important practical implications: improvement of treatment adequacy, more valid and reliable follow-up assessments, greater understanding of the effects of the therapies, etc. (Franklin and Foa, in press).

In the case of OCD with a childhood onset, surprisingly, there are only three self-report measures developed that directly assess pediatric obsessive-compulsive disorder (OCD): the Obsessive-Compulsive Inventory Revised Child Version (OCI-R-CV; Foa et al., 2002); the Children’s Yale-Brown Obsessive-Compulsive Scale (CY-BOCS; Goodman et al., 1989); and the Leyton Obsessional Inventory Child Version (LOI-CV; Berg et al., 1986). Reviewing the content of the scales, it was observed that the items are the same as those employed in the adult population versions, only reducing their number in the case of the LOI-CV, and adapting the scales in all three of them. In addition, these scales have been traditionally developed in small samples and do not provide a fast assessment of the symptoms through multiple domains (Merlo, Storch, Murphy, Goodman and Geffken, 2005; Foa, Coles, Huppert, Pasupuleti, Franklin and March, 2010).

After a systematic review of the literature in order to find out how OCD is being measured, we observed that advanced psychometric models such as the Rasch model are not being used. This model would allow us to adequately differentiate unspecific and specific OCD symptoms and would help improve the measurement of symptom severity taking into account the cognitive-behavioral aspects as well as the socio-emotional aspects. In addition, it would also allow us to more easily adapt these tests to the pediatric population. In any case, the utilization of Rasch model in the analysis of the scores of a test presupposes unidimensionality; that is, it requires that all items essentially measure the same attribute. The results of our review of the OCD measures indicate the possible existence of three dimensions that, at least conceptually, are well defined (cognitive, behavioral and socio-emotional).

TABLE 2
FREQUENCY OF OCD MEASURES (N=94) BY
ITEM AND SAMPLE TYPE

Item type	Subject sample				
	Clinical		Subclinical		Nonclinical
	Control Group	No control Group	Control Group	No control Group	
Cognitive	4	0	1	0	
Socio-emotional	3	0	2	0	9
Cognitive-behavioral	46	2	1	0	11
Cognitive-emotional	1	0	2	0	4
Total	54	2	6	0	32

TABLE 3
FREQUENCY OF OCD MEASURES BY ITEM TYPE AND
NEUROPSYCHOLOGICAL RELEVANCE (N=64)

Item type	Neuropsychological relevance	
	Functional	Structural
Cognitive	7	3
Socio-emotional	4	3
Cognitive-behavioral	9	35
Cognitive-emotional	2	1
Total	22	42



Empirically, incorporating distinct types of items according to each dimension may lead to multidimensionality. In that case, the OCD tests would have to be made up of subtests, each of which would be analyzed with Rasch model. Another possibility would be to employ IRT multidimensional models.

Regarding the neuropsychological aspects, our results seem to provide evidence that the orientation of the self-reports may be related to the type of neuropsychological explanation used (structural or functional). This may be due to the fact that in today's neuropsychology functional-type explanations are having greater acceptance than the structural-type, and research has been more interested in the cognitive-socio-emotional aspects of the disorder. On the contrary, the more traditional approaches (linked to classical neuropsychology and neurology) have preferred structural-type explanations, being interested in the more classical behavioral aspects (Saxena and Rauch, 2000). We can conclude that there is a great heterogeneity in the symptoms associated to OCD, as well as important limitations in many studies that do not control the influence of variables such as comorbidity and medication. All of this prevents us from being able to draw more definite conclusions in this sphere (Aycicegi, Dinn, Harris and Erkmen, 2003; Martínez-González and Piqueras-Rodríguez, 2008). Despite all studies seeming to conclude that the most consistent neuropsychological deficit in OCD occurs in the executive functions, the poor construct validity evidence of the tests that measure said functions along with the lack of consensus in the literature regarding its operationalization raises doubts about these results.

Finally, from the point of view of the validation of instruments, it would be important to take into account recent neuropsychological data when constructing new tests or when interpreting the already existing results. In the last two decades, an extensive literature investigating the affective differences among individuals with different psychopathological disorders and their neuropsychological correlates has been developed (Cook, 1999; Grillon and Baas, 2003; Patrick and Bernat, 2006). In the case of OCD, the new neuropsychological models propose an explanation of the ritualistic behavior in terms of an excessive activation of the neuronal system in charge of inferring and detecting menacing situations. This system, closely linked to the emotions of disgust and fear, would include a repertoire of clues for potential danger, as well as the typical precautions for our species.

From an anatomical-functional perspective, this system is located in the limbic regions, especially the corpus striatum (composed of the caudate and lenticular nuclei), amygdala, and the insular posterior lobe, as well as in their connections with each other and with the frontal and prefrontal cortex (Vaidyanathan, Patrick and Cuthbert, 2009). In the case of patients with OCD, this system would not adequately discriminate situations of potential danger, giving way to doubts about the correct compliance with the precautions and the repetition of the action (Boyer and Lienard, 2006). In addition, future research should consider the control of strange variables (uncontrolled effects of medication, patient and/or experimenter bias, type of tests used in the evaluation, etc.), as well as the relationship between cognitive processes and OCD symptoms.

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