PSYCHOMETRIC PROPERTIES OF THE OBSESSIVE COMPULSIVE INVENTORY-REVISED IN A NON-CLINICAL SAMPLE OF LATE ADOLESCENTS

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Abstract

There is a paucity of instruments for the assessment of obsessive-compulsive symptoms in children/adolescents. The goal of this study was to assess the psychometric properties and factor structure of the Obsessive Compulsive Inventory-Revised (OCI-R) in a non-clinical sample of 269 late adolescents (*M*= 17.04 years old; *SD*= 0.74). A confirmatory factor analysis replicated the original six-factor structure of the OCI-R (Washing, Obsessing, Hoarding, Ordering, Checking and Neutralizing), but the fit indices were generally slightly lower than expected. The OCI-R total and its original subscales showed moderate internal consistency. In general, no significant gender or age differences were found. The OCI-R seems appropriate for its use in adolescent samples. Whether it will also be suitable for even younger people remains to be examined.
KEY WORDS: *Obsessive-compulsive disorder, assessment, symptom dimensions, adolescent.*

Resumen

Existe una carencia de instrumentos para la evaluación de síntomas obsesivo-compulsivos en niños y adolescentes. El objetivo de este estudio fue evaluar las propiedades psicométricas y la estructura factorial del "Inventario obsesivo compulsivo-revisado" (*Obsessive Compulsive Inventory-Revised*, OCI-R) en una muestra no clínica de 269 adolescentes (*M*= 17,04 años; *DT*= 0,74). Un análisis factorial confirmatorio replicó la estructura original del seis factores del OCI-R

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(Lavado, Obsesión, Acumulación, Orden, Comprobación y Neutralización), pero los índices de ajuste fueron ligeramente más bajos de lo esperado. El OCI-R total y sus subescalas originales mostraron una consistencia interna moderada. En general, no se encontraron diferencias significativas en las variables sexo o edad. El OCI-R parece apropiado para su uso en muestras adolescentes. La cuestión de si sería también apropiado para personas incluso más jóvenes requiere ser examinada en futuras investigaciones.
Palabras clave: *Trastorno obsesivo-compulsivo, evaluación, dimensiones de síntomas, adolescente.*

Introduction

Obsessive-compulsive disorder (OCD) frequently starts during childhood or adolescence (e.g., Chowdhury, Frampton, & Heyman, 2004; Farrell, Barret, & Piacentini, 2006; Sánchez-Meca, Gómez y Méndez, 2003) and yet only recently there has been a substantial surge in research into this early onset form of the disorder (Geller et al., 2006, Keeley y Storch, 2008).

In general, there is a paucity of instruments for the assessment of OCD symptoms in children and young people with the disorder. Probably, the most widely used self-administered questionnaire is the Leyton Obsessional Inventory, Child version (LOI-CV; Berg, Rapoport, & Flament, 1986) whereas the most popular clinician-administered instrument is the Children's Yale–Brown Obsessive-Compulsive Scale (CY-BOCS; Scahill et al., 1997). Recently, new self-administered instruments have been developed to help overcome some of the limitations of their predecessors, such as the Children's Obsessional Compulsive Inventory (CHOCI; Shafran et al., 2003; Uher, Heyman, Turner, & Shafran, 2008) or the Children's Yale-Brown Obsessive-Compulsive Scale, Child Report and Parent Report (CY-BOCS, CR/PR; Storch et al., 2006). These are excellent instruments that were designed to assess global OCD severity but they provide limited information on the severity of individual symptoms. This is inadequate since OCD is clearly heterogeneous and consists of several symptom dimensions (see Mataix-Cols, Rosario-Campos, & Leckman, 2005, for a review). The symptoms of OCD are remarkably similar in adults and children/adolescents. Three out of four recent factor analytical studies of the CY-BOCS symptom checklist have shown a comparable factor structure in children/adolescents to that seen in adult samples (Delorme et al., 2006; Mataix-Cols, Nakatani, Micali, & Heyman, 2008; Mckay et al., 2006; Rivas, Planas y Gavino, 2009; Stewart et al., 2007).

The Obsessive-Compulsive Inventory-Revised was developed as a short self-administered measure of obsessions and compulsions in adults (Foa et al., 2002). Its psychometric properties are excellent both in clinical (Abramowitz & Deacon, 2006; Foa et al., 2002; Gönner, Leonhart, & Ecker, 2008; Huppert et al., 2007) and non-clinical (Fullana et al., 2005; Hajcak, Huppert, Simons & Foa, 2004; Smári, Ólason, Eypórsdóttir & Frölunde, 2007) samples and it has been adapted to different

languages and cultural contexts (e.g., Fullana et al., 2005; Hajcak et al., 2004; Smári et al., 2007; Wu and Watson, 2003). The most important contribution of the OCI-R is the comprehensive measurement of the major symptom dimensions of OCD through its six subscales (Washing, Obsessing, Hoarding, Ordering, Checking, and Neutralizing). However, it is currently unclear whether the OCI-R can be used in younger individuals. To fill this gap, we administered the Spanish version of the OCI-R, validated with young college adults (Fullana et al., 2005), to a sample of late adolescents and examined its psychometric properties and factor structure (see Appendix). We predicted that OCI-R would retain its sound psychometric properties, thus paving the way for its use in late adolescent samples and facilitating research on obsessive-compulsive symptom dimensions across the life span.

Method

Sample

304 students from eleventh to twelfth grade of high school and different courses of intermediate levels of professional training from three public centres in the South East of Spain (Murcia) were approached for the study. One of them refused to participate (0.33%) and 34 (11.22%) were excluded for being younger than 16 (N= 1) or older than 18 (N= 33) years old. Thus, the final sample consisted of 269 adolescents. 119 were boys (42.2%) and 150 girls (55.8%). The mean age was 17.04 years (S.D. = 0.74; range: 16-18 years). The majority of the students were Spaniards (95%) and the remainder were of South-American origin (5%). Our participants primarily belonged to urban public high schools. Therefore, it can be considered as middle class, and similar socio-cultural background.

Measures

The OCI-R (Foa et al., 2002) is an 18-item self-administered questionnaire designed to assess distress associated with obsessive–compulsive symptoms. It was developed from the original Obsessive Compulsive Inventory of 42 items by Foa et al. (1998). The items are rated on a five-point Likert scale, ranging from 0 ("Not at all") to 4 ("Extremely"). The OCI-R consists of six subscales (Washing, Obsessing, Hoarding, Ordering, Checking, and Neutralizing), each consisting of three items (score range: 0-12). The total OCI-R score is the sum of all the 18 items and it ranges from 0 to 72. Recent research shows that the OCI-R has good to excellent internal, test-retest reliability and convergent and discriminant validity both in clinical and non-clinical samples (Abramowitz and Deacon, 2006; Foa et al., 2002; Hajcak et al., 2004; Huppert et al., 2007). The Spanish version retains these sound psychometric properties (Fullana et al., 2005).

Procedure

The study was approved by the local ethics committee and written consent was obtained from the participant's parents during the second semester of 2007. The OCI-R was administered to all participants in a group setting during a lecture period. Subjects were invited to participate in a study about types of obsessive thoughts and compulsive behaviors. They got our commitment to inform them individually about their results. Then, two research assistants remained in the classrooms to provide assistance should any problems arise during the administration. The average administration time for the OCI-R was approximately 10 minutes.

Statistical analyses

We carried out a confirmatory factor analysis using the LISREL 8.20 software (Jöreskog & Sörbom, 1993). The fit of our data to different models was evaluated by means of the maximum likelihood estimation method: a one-factor model, a six-factor model with oblique rotation, and a six-factor model with orthogonal rotation were tested. In order to facilitate the comparisons, we considered the same fit indices as previous studies (Foa et al. 2002; Fullana et al. 2005; Hajcak et al. 2004; Smári et al. 2007). According to the criteria by Hu and Bentler (1999), adequate fit indices are GFI (Goodness of Fit Index) and CFI (Comparative Fit Index) of .90 or greater and RMR (Root Mean Square Residual) and RMSEA (Root Mean Square Error of Approximation) values of .06 or lower.

Association between the latent factors was also calculated. We followed Cohen's criteria (1988) to assess the size of correlations. We considered as "large" correlations those higher than .50, as "medium" those between .30 and .49 and as "small" those between .10 and .29. In addition, Cronbach's Alpha was calculated for each subscale to determine internal consistency. Finally, age and gender differences were calculated by ANOVAs and t-test, respectively, using SPSS, version 12 for Windows (SPSS Inc, Chicago, IL, USA).

Results

Factor structure of the OCI-R in a sample of adolescents

Our results indicate the best fit for the six-factor model with interaction between factors (oblique solution), with slightly lower values to those presented by previous studies (Foa et al., 2002; Fullana et al., 2005; Hajcak et al., 2004; Smári et al., 2007) (see table 1). The six-factor model with orthogonal rotation showed a poorer fit. We also tested a one-factor model, as in Hajcak et al. (2004) and Fullana et al. (2005), but most indices suggested a poor fit.

Table 1

Confirmatory factor analysis of the OCI-R in a sample of adolescents

Models	GFI	CFI	RMR	RMSEA	χ^2	df
One factor	0.77	0.54	0.09	0.13	775.68[a]	135
Six factors with orthogonal rotation	0.74	0.54	0.20	0.14	780.71[a]	135
Six factors with Oblique rotation	0.85	0.74	0.08	0.09	478.30[a]	120

Notes: OCI-R= Obsessive Compulsive Inventory-Revised; GFI= Goodness of Fit Index; CFI= Comparative Fit Index; RMR= Root Mean Square Residual; RMSEA= Root Mean Square Error of Approximation; [a]p< 0,0001.

Because the resulting six-factor structure was in agreement with that published for the adult version of the questionnaire, the remaining analyses are based on the six-factor structure proposed in the original validation study (Foa et al., 2002). Table 2 presents the standardized coefficients (factor loadings) for the six-factor model.

Correlations among the sub-scales of the OCI-R

As seen in table 3, significant positive associations between the subscales and the total scale of the OCI-R were found. The inter-correlations among the subscales were in the low to moderate range (between .19 and .46), reflecting a relatively small overlap between them.

Normative data, internal consistency, and sex differences

Table 4 shows the means, standard deviations and Cronbach's α coefficients for the total OCI-R and each of its subscales. For the whole sample, the mean score for the OCI-R was 20.88 (SD = 10.14). Internal consistency for the full scale of the OCI-R was acceptable (α= 0.77). Regarding the OCI-R subscales, internal consistency was moderate and ranged between .43 and .66. Girls showed non-significant higher scores than boys on the Obsessing (t [267] = -2.432, p = 0.016) and the Hoarding (t [267] = -1.864, p = 0.063) subscales.

Concerning age, there were differences between the 16 and 18 year olds on the Washing scale only, with younger individuals having higher scores. Although the difference was not significant and the effect size was positive but small (see table 5).

Table 2
Standardized maximum likelihood estimates for the six-factor model (oblique rotation)

Items	H	C	Or	N	W	Ob	R²
1. I have saved up so many things that they get in the way.	.51						.26
7. I collect things I don't need.	.54						.29
13. I avoid throwing things away because I am afraid I might need them later.	.55						.30
2. I check things more often than necessary.		.56					.32
8. I repeatedly check doors, windows, drawers, etc.		.72					.51
14. I repeatedly check gas and water taps and light switches after turning them off.		.74					.54
3. I get upset if objects are not arranged properly.			.57				.32
9. I get upset if others change the way I have arranged things.			.61				.37
15. I need things to be arranged in a particular order.			.61				.38
4. I feel compelled to count while I am doing things.				.42			.18
10. I feel I have to repeat certain numbers.				.77			.59
16. I feel that there are good and bad numbers.				.59			.34
5. I find it difficult to touch an object when I know it has been touched by strangers or certain people.					.42		.18
11. I sometimes have to wash or clean myself simply because I feel contaminated.					.61		.37
17. I wash my hands more often and longer than necessary.					.80		.64
6. I find it difficult to control my own thoughts.						.45	.20
12. I am upset by unpleasant thoughts that come into my mind against my will.						.91	.82
18. I frequently get nasty thoughts and have difficulty in getting rid of them.						.78	.61

Notes: H= Hoarding; C= Checking; Or= Ordering; N= Mental Neutralizing; W= Washing; Ob.= Obsessing.

Table 3
Correlations among Obsessive Compulsive Inventory-Revised (OCI-R) subscales in a non-clinical sample of adolescents

Subscale	Obsessing	Hoarding	Ordering	Checking	Neutralizing	Total
Washing	.19	.29	.23	.25	.28	.55
Obsessing		.46	.26	.25	.27	.66
Hoarding			.26	.35	.26	.68
Ordering				.28	.37	.68
Checking					.30	.63
Neutralizing						.61

Note: All P-values< .01

Table 4
Normative data, between-sex comparisons, and internal consistency (Cronbach's α) of the OCI-R in a sample of adolescents

Subscales	Males M (SD)	Females M (SD)	Total M (SD)	t_{267}	*p*	*d*	α
Washing	2.12 (2.31)	2.22 (2.31)	2.17 (2.31)	-0.330	.742	-0.04	.53
Obsessing	3.35(2.76)	4.24 (3.16)	3.85 (3.02)	-2.432	.016	**-0.30**	.66
Hoarding	4.47 (2.55)	5.05 (2.53)	4.79 (2.55)	-1.864	.063	**-0.23**	.50
Ordering	5.22 (2.74)	5.74 (3.89)	5.51 (3.43)	-1.217	.225	-0.16	.43
Checking	3.28 (2.63)	2.97 (2.58)	3.11 (2.60)	0.978	.329	0.12	.64
Neutralizing	1.31 (1.86)	1.52 (1.98)	1.43 (1.93)	-0.908	.365	-0.05	.46
OCI-R total	19.77 (9.77)	21.76 (10.66)	20.88 (10.14)	-1.599	.111	-0.19	.77

Note: OCI-R= Obsessive Compulsive Inventory-Revised.

Table 5
Comparison of Obsessive Compulsive Inventory-Revised (OCI-R) scores across 3 age groups

Subscales	16 years (n=69) M (SD)	17 years (n=120) M (SD)	18 years (n=80) M (SD)	$F_{(2, 268)}$	*p*	*d*
Washing	2.65 (2.70)	2.18(2.26)	1.76 (1.93)	2.774	.064	0.38*
Obsessing	4.15 (2.74)	3.43 (2.95)	4.21 (3.29)	2.096	.125	-
Hoarding	4.53 (2.50)	4.68 (2.43)	5.18 (2.77)	1.413	.245	-
Ordering	5.66 (2.67)	5.38 (4.13)	5.57 (2.84)	0.166	.847	-
Checking	3.30 (2.61)	2.80 (2.47)	3.40 (2.75)	1.501	.225	-
Neutralizing	1.49 (2.14	1.39 (1.83)	1.43 (1.91)	0.060	.942	-
OCI-R	21.81 (10.30)	19.88 (10.12)	21.57(10.04)	1.057	.349	-

Note: *Post hoc test: Washing scores 16>18 years.

Discussion

The OCI-R is suitable instrument for the assessment of specific obsessions and compulsions in non-clinical adolescent samples. Overall, the psychometric properties of the scale were comparable to those reported in clinical and non-clinical samples of adults.

Our confirmatory factor analysis suggested a good fit for a six-factor structure, replicating previous results on the OCI-R in both clinical (Abramowitz and Deacon, 2006; Foa et al., 2002; Gönner et al., 2008; Huppert et al., 2007) and non-clinical adult samples (Fullana et al., 2005; Hajcak et al., 2004; Smári et al., 2007). However, our fit indices were somewhat weaker than those obtained in adult studies. We found a better fit for the six-factor model with oblique than orthogonal rotation, indicating that significant correlations between factors exist, which is consistent with the clinical presentation of OCD.

Regarding internal consistency, the results were again comparable to those of previous adult studies, albeit somewhat lower than those found in previous studies (Abramowitz and Deacon, 2006; Foa et al., 2002; Fullana et al., 2005; Gönner et al., 2008; Hajcak et al., 2004; Huppert et al., 2007; Smári et al., 2007). The ordering and neutralizing sub-scales had the lower alphas. Previous studies in adults also suggested that the neutralising subscale tends to have the lowest internal consistency, especially in non-clinical samples (Foa et al., 2002; Gönner et al., 2008; Huppert et al., 2007; Smári et al., 2007; Wu and Watson, 2003).

The mean score of the total OCI-R in our sample was slightly higher than those of studies with non-clinical adult samples (Foa et al., 2002; Fullana et al., 2005; Hajcak et al., 2004; Smári et al., 2007). These small differences could be interpreted as reflecting higher levels of obsessive-compulsive symptomatology among adolescents compared to adult and young university-based samples (e.g., Fullana et al., 2005; Hajcak et al., 2004; Smári et al., 2007).

We also found higher values on several sub-scales of the OCI-R. The subscales means were greater in our study than those reported by Fullana et al. (2005) and Smári et al. (2007), although the order was the same: Ordering > Hoarding > Obsessing > Checking > Washing > Neutralizing. The mean scores of the ordering and hoarding dimensions in our study were also higher than those reported in clinical samples, whereas these clinical samples report much greater scores on Obsessing, Checking and Washing (Abramowitz and Deacon, 2006; Foa et al., 2002; Gönner et al., 2008; Huppert et al., 2007). These results are partially consistent with research showing that one of the most common obsessions in children/adolescents are those relating to contamination/infection, and symmetry/ordering (Farrell et al., 2006; Wicks-Nelson & Israel, 1997).

We did not find an effect of sex or age in OCI-R subscales. This is consistent with previous studies (Fullana et al., 2005; Smári et al., 2007). However, girls displayed marginally higher scores than boys on the Obsessing and the Hoarding subscales. These results are partially congruent with the study by Smári et al. (2007), presenting greater scores for girls in most of the scales.

Some limitations of the present study should be noted. This study was conducted on a small sample of late adolescents, selected by incidental sampling method. Future research should include a wider range of age, such as children, and early-middle teenagers, and a more representative sampling method. In addition, it remains to be seen if this instrument is useful for clinical samples of children and adolescents as a global measure and for the assessment of OCD subtypes. We also should consider to review the level of understanding of each item by adolescents, and to amplify the study including complementary analysis of temporal stability, convergent, divergent, and discriminant validity.

To sum up, the OCI-R is a short and reliable instrument that measures global as well as domain-specific obsessive-compulsive symphomatology in late adolescence. It has proven to be trans-culturally valid and useful in both clinical and non-clinical settings. Our study adds to this literature by further demonstrating the feasibility of its use in adolescent populations. Whether it will retain its psychometric properties in younger and clinical samples of individuals remains to be investigated.

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Appendix

OCI-R

Las siguientes afirmaciones se refieren a experiencias que muchas personas tienen en su vida cotidiana. Ponga un círculo en el número que mejor describa **CUANTO malestar o molestia le ha producido esta experiencia durante el último mes.** Las cifras se refieren a las siguientes categorías:

0= En absoluto/Ninguno/Nada
1= Un poco
2= Bastante
3= Mucho
4= Muchísimo

	Malestar				
	Nada	Un poco	Bastante	Mucho	Muchísimo
1. Acumular cosas hasta el punto que le estorban.	0	1	2	3	4
2. Comprobar las cosas más a menudo de lo necesario.	0	1	2	3	4
3. Que las cosas no estén bien ordenadas.	0	1	2	3	4
4. Sentir la necesidad de contar mientras está haciendo cosas.	0	1	2	3	4
5. Tocar un objeto cuando sabe que lo han tocado desconocidos o ciertas personas.	0	1	2	3	4
6. No poder controlar sus propios pensamientos.	0	1	2	3	4
7. Acumular cosas que no necesita.	0	1	2	3	4
8. Comprobar repetidamente puertas, ventanas, cajones, etc.	0	1	2	3	4
9. Que los demás cambien la manera en que ha ordenado las cosas.	0	1	2	3	4
10. Tener necesidad de repetir ciertos números.	0	1	2	3	4
11. Tener a veces que asearse o lavarse por el mero hecho de sentirse contaminado/a.	0	1	2	3	4
12. Tener pensamientos desagradables en contra de su voluntad.	0	1	2	3	4
13. Sentirse incapaz de tirar cosas por temor a necesitarlas después.	0	1	2	3	4
14. Comprobar repetidamente el gas, el agua y la luz después de haberlos cerrado/apagado.	0	1	2	3	4
15. Tener la necesidad que las cosas estén ordenadas de una determinada manera.	0	1	2	3	4
16. Sentir que existen números buenos y malos.	0	1	2	3	4
17. Lavarse las manos más a menudo y durante más tiempo de lo necesario.	0	1	2	3	4
18. Tener con frecuencia pensamientos repugnantes y que le cueste librarse de ellos.	0	1	2	3	4