

# Schizotypal traits, obsessive-compulsive symptoms, and social functioning in adolescents

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## Abstract

The relationship between self-reported social functioning, schizotypal traits, and obsessive-compulsive symptoms (OCS) was studied in a sample of 508 adolescents, of which 49.8% were male adolescents, with a mean age of 14.9 (SD, 1.6). The Schizotypal Personality Questionnaire–Brief, Maudsley Obsessive-Compulsive Inventory and Social Adaptation Self-evaluation Scale was administered. The results showed that schizotypal personality in adolescents consists of 4 factors (Interpersonal, Disorganized, Paranoia and Magical Ideation) which are associated with OCS in nonclinical populations. The canonical correlation analysis showed that schizotypal traits and OCS shared 18% of the variance. Social functioning was negatively related to schizotypal personality traits; however, no relationship was found between social functioning and OCS. The data highlight the overlap between schizotypal traits and OCS, as well as the deficits in self-reported social functioning in schizotypal subjects. Future studies should focus on the link between these 2 constructs and study in depth the role that social functioning may be playing.

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## 1. Introduction

Schizotypal personality disorder (SPD) and schizotypal traits have been related to schizophrenia and obsessive-compulsive disorder (OCD) in certain respects. Schizotypal subjects usually present cognitive, behavioral, social, psychophysiological, and neurobiochemical impairments [1–3], as well as a multidimensional structure akin to that found in schizophrenia patients [4]. Basically, 3 schizotypal personality traits (SPT) were described: cognitive-perceptual, interpersonal, and disorganization factors [5]; although some researchers have also found another paranoid factor [6]. Schizotypal personality traits have barely been studied in adolescent populations, mainly because of the lack of self-reports for their assessment. Likewise, the structure of SPT appears to be slightly different to that found in clinical

and nonclinical adult samples finding other factors such as Paranoid Ideation and Magical Ideation [4,6,7]. Adolescence is a stage of interest for studying SPT owing to its temporal proximity to the onset of schizophrenia, as well as to crucial neurodevelopment [8]. The study of schizotypal features in nonclinical adolescents allows progress in the comprehension of the underlying mechanisms of schizophrenia-spectrum disorders, as well as a deeper understanding of the relationship between these kinds of diseases and other psychological constructs [9] without the side effects of medication or stigma. Empirical findings seem to support the hypothesis that the vulnerability for schizophrenia is expressed across the continuum of schizotypy [10]. Within this approach of continuity, schizotypy can be defined as a dimensional trait ranging from normal to clinical levels of psychosis [11,12].

At the same time, there is growing empirical evidence which highlights the possible link between OCD and schizophrenia and/or SPD [13]. As Poyurovsky and Koran [14] point out, there are overlapping areas at both neurobiological and phenomenological levels, to wit, equivalent prevalence rates in men and women, long-term course, and similar distribution in the age of disorder onset.

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Accordingly, the relationship found between both constructs seems to support the idea of the existence of a continuum between psychosis and neurosis [15].

The lines of convergence in the study of the relationship between these 2 entities are based on a series of findings. Researchers and clinicians have noticed either obsessive-compulsive symptoms (OCS) in schizophrenic patients and/or schizotypal symptoms in OCD patients [14]. A high rate of OCS was observed in patients with schizophrenia [16,17]; patients with schizophrenia and OCS show important psychosocial malfunction, poor clinical course, and impairments in executive functioning and other deficits [18,19]. Some authors have also proposed the existence of a subtype of schizophrenia with OCS [20,21], and in nonclinical and outpatient populations, a relationship between OCS and SPT (positive symptoms) has also been found [13,22–26]. On the other hand, high rates of SPT and SPD are found in patients diagnosed with OCD [27–30]. Particularly, positive symptoms (eg, magical ideation) of schizotypy seem to predict poor treatment results in OCD [31]; having been associated to certain types of obsessions such as the thought-action fusion (likelihood type) [25] and to OCS [32]. Among the different groups of OCD patients, the hoarding type seems to have higher levels of SPT [33]; therefore, some authors consider a schizotypy subtype within OCD [30].

Social functioning is an important criterion for the diagnosis of OCD and SPD [34], and previous research indicates that patients with schizophrenia [35], OCD [36], SPD [37], and individuals scoring high on schizotypy self-reports [38,39] show some social impairment. Recently, Aguirre et al [40] found that individuals high in psychometric schizotypy were impaired in 3 aspects of social functioning: peer relationship, family relationship, and academic functioning.

Research on the nature of SPT in adolescents and their relation to OCS and social functioning is still a controversial matter either in clinical or in nonclinical populations and is not yet well understood. On the one hand, there are few studies focused on the structure and content of SPT in adolescent populations and, at the same time, on their relation to OCS. Finally, the relationship between the possible impact that schizotypal traits and OCS have on social functioning in adolescents is also scarcely researched. In the present study, an analysis of the nature and structure of SPT was carried out using a Likert version of the Schizotypal Personality Questionnaire–Brief Form (SPQ-B) [41]. In addition, the relationship between SPT and OCS and their relationship with self-reported social functioning in adolescents was studied.

## 2. Method

### 2.1. Participants

The initial sample consisted of 578 adolescents residing in the Principality of Asturias, a region located in northern

Spain. Questionnaires with incomplete data or errors in demographic variables were discarded, leaving a total of 508 secondary school students in the study; 253 (49.8%) were male adolescents. The ages ranged from 12 to 19 years (mean, 14.9; SD, 1.6). Table 1 provides a distribution of the sample, according to sex and age. Participants were recruited from schools, selected to cover rural and urban areas as well as different socioeconomic statuses. Subjects with an intellectual handicap or a psychiatry history were excluded from the study.

### 2.2. Measures

The Schizotypal Personality Questionnaire–Brief Form (SPQ-B) [41] is a 22-item self-report based on the SPQ and designed for measuring schizotypal traits according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria [34]. In this study, a Spanish version previously validated in college students was used [42], with a 5-point Likert-type response format (1 = completely disagree; 5 = completely agree). The Likert-type format has already been used in other studies on schizotypal personality [43]. The final total score ranges from 22 to 110, although a score based on the different subscales—cognitive-perceptual (ideas of reference, magical thinking, suspiciousness, and unusual experiences), disorganized (odd speech and behavior) and interpersonal (constricted affect, no close friends, and social anxiety)—was also obtained. It has been studied using schizophrenic patients and first-order relatives of patients with schizophrenia spectrum disorders [44], nonclinical [45], and adolescent outpatients [46]. The internal reliabilities for the total score ranged from 0.75 to 0.83 (0.58 and 0.87 for the subscales). Test–retest reliability ranged from 0.70 to 0.95 and has been found to have good criterion validity [47].

The Maudsley Obsessive-Compulsive Inventory (MOCI) [48] is a classic questionnaire widely used for measuring OCS. It consists of a total of 30 statements in a dichotomous true/false response format. The total score ranges from 0 to 30 points. The MOCI is made up of 4 subscales: Cleaning, Checking, Slowness, and Doubting [48]; it has been studied in different populations [49], particularly used in adolescents [50] and in studies regarding SPT [13,23,51]. The MOCI has

Table 1  
Sample distribution according to sex and age

Years	Male adolescents	Female adolescent	Total
12	22	17	39
13	28	38	66
14	54	49	103
15	65	47	112
16	48	59	107
17	28	34	62
18	6	9	15
19	2	2	4
total	253	255	508

also been used in clinical and nonclinical Spanish populations [52]. The internal reliabilities for the total score range from 0.70 to 0.80. This scale also has acceptable concurrent, discriminant, and predictive validity [48,49,53].

The Social Adaptation Self-evaluation Scale (SASS) [54] is a 21-item scale with 4 response levels which allows the assessment of social functioning in a fast and simple manner. The items explore aspects such as family relationships, leisure activities, intellectual interests, and hobbies. Scores on the SASS range from 0 to 60; the first 2 items are exclusive, where the subject answers one of them depending on whether he/she has or not a remunerated job. Values below 25 indicate social maladjustment, and those above 55 points indicate pathologic scores of “superadaptation.” The SASS has been shown to be a useful instrument in patients with depression [55], its relation to other social functioning scales has been studied [56], and it has been used in schizotypy research [40] and translated to other cultures [57]. In this study, a validated version using a Spanish population has been used [58]. A reliability index of 0.83 was found in the Spanish psychiatric population [58], whereas in the original version, it was 0.74 [54].

### 2.3. Procedure

The administration of the questionnaire was conducted in a collective manner in groups of 15 to 25 participants. They were at all times reminded of the confidentiality of their answers and of the voluntary character of their participation. Written informed consent to participate in the study was obtained from the subjects. For underaged subjects, parents were asked to give their written informed consent to their children’s participation in the study. Participants did not receive any type of incentive for their participation in the study. The application took place under the supervision of the researchers, with a view to minimizing errors.

### 2.4. Data analysis

A descriptive statistical analysis of the scales used was carried out, once participants with extreme values (outliers) were removed. Secondly, to study the dimensionality of the SPQ-B, a principal components analysis (PCA) with

subsequent Varimax rotation was carried out. The extraction of components was done according to the Kaiser criterion (Eigenvalues above 1), the Cattell criterion (Scree plot), and its interpretability. Subscales were made up based on the PCA. Items with equivalent factorial weights were assigned to the subscales according to the author’s proposal in the original study. Finally, to study the associated percentage of variance between SPQ-B and MOCI subscales, a canonical correlation analysis was used; this multivariate technique indicates the degree of association between 2 groups of variables. The contribution of each variable to the canonical correlation was carried out using the standardized weights. The square canonical correlation shows the proportion of associated variance between both groups of variables.

## 3. Results

### 3.1. Descriptive statistics

Table 2 shows descriptive statistics indicating the number of items, means, SDs and values of asymmetry, kurtosis, range of scores, and Cronbach  $\alpha$  in the original subscales. Values of asymmetry and kurtosis ranged approximately from  $-1$  to  $+1$ , indicating normality of the distributions.

### 3.2. Factorial analysis of the SPQ-B

A PCA of the items with subsequent Varimax rotation of the SPQ-B was carried out. The results of the factor analyses solutions are shown in Table 3. The Kaiser-Meyer-Olkin measure of sampling adequacy is 0.91, and the Bartlett sphericity index is 3084.5 ( $P < .001$ ). A total of 4 factors showed Eigenvalues above 1 explaining 48.28% of the total variance. The first factor corresponds to the Interpersonal dimension. The 8 items which compose this factor correspond to those proposed by Raine and Benishay [41], but with slight differences. This factor measures aspects related to “excessive social anxiety,” “constricted affect,” and “no close friends.” Item 18 saturates equally in the first 2 factors—item 7 which should be in the interpersonal factor weighs more in the second factor and item 20 which

Table 2  
Descriptive statistics for the original scales

	Item no.	Mean	SD	Skewness	Kurtosis	Range	Cronbach $\alpha$
SPQ-B total	22	46.71	14.26	0.68	0.29	22-97	0.88
SPQ-B Interpersonal	8	18.71	6.28	0.58	0.00	8-40	0.79
SPQ-B Disorganized	6	12.18	4.63	0.89	0.60	6-29	0.74
SPQ-B Cognitive-Perceptual	8	15.82	5.91	0.82	0.24	8-37	0.75
MOCI total	30	9.08	4.52	0.52	-0.10	0-26	0.75
MOCI Checking	9	2.49	2.04	0.79	0.03	0-9	0.67
MOCI Cleaning	11	3.48	1.70	0.65	0.97	0-11	0.42
MOCI Doubting	7	2.37	1.54	0.25	-0.85	0-6	0.45
MOCI Slowness	7	2.89	1.19	0.29	0.03	0-6	0.50
SASS total	21	37.78	7.54	-1.09	1.59	6-53	0.82

Table 3  
Factor analysis for items of the SPQ-B form

Item	Component			
	I	II	III	IV
21. Very uneasy talking to people	0.76	0.07	−0.04	0.08
11. Discomfort with unfamiliar people	0.75	−0.01	0.12	0.16
20. Hard to communicate clearly	0.58	0.38	0.11	0.08
22. Tend to keep my feelings to myself	0.56	0.19	0.18	0.01
14. Not let people know about you	0.55	0.29	0.19	0.14
15. Tend to keep in the background	0.53	0.25	0.17	0.04
1. People find me aloof and distant	0.44	0.25	0.27	−0.19
19. I am an odd, unusual person	0.01	0.77	−0.01	0.27
6. People think I am very bizarre	0.16	0.76	0.18	0.20
17. Stops people from taking advantage	0.27	0.53	0.26	0.15
18. Unable to get close to people	0.50	0.51	0.03	0.09
3. Unusual mannerisms and habits	0.12	0.47	0.45	−0.01
7. On my guard even with friends	0.28	0.47	0.19	0.26
9. Often pick up hidden threats	0.02	0.22	0.70	0.00
4. People can tell what you are thinking	0.05	−0.11	0.55	0.39
13. I use words in unusual ways	0.27	0.16	0.50	0.21
16. Distracted by distant sounds	0.14	0.01	0.49	0.38
10. People are taking notice of you	0.27	0.01	0.47	0.28
8. People find me vague and elusive	0.25	0.34	0.34	0.03
12. Astrology, UFOs, ESP, sixth sense	−0.07	0.22	0.08	0.74
5. Noticed special signs for you	0.13	0.16	0.13	0.70
2. Sense some person or force	0.15	0.18	0.21	0.64
Eigenvalues	6.42	1.87	1.27	1.06
Explained accumulated variance	29.2	37.7	43.5	48.3

should be in the second factor has a greater load in the first. The second factor with 6 items corresponds to the Disorganized dimension. This dimension measures aspects related to “odd speech” and “odd or eccentric behavior.” Item 13 which should be in this factor loads more in the third factor, and item 17 which should be in the cognitive-perceptive factor weighs more in this one. Items 8 and 3 equally saturate in both factors. The remaining factors correspond to Raine’s Cognitive-Perceptual dimension, although they appear now divided: The third factor, with 5 items, corresponds to a dimension of Paranoid Ideation, whereas the fourth factor, with 3 items, corresponds more to a Magical Ideation dimension.

Table 4  
Correlation matrix for the MOCI, SPQ-B, and SASS

	MOCI Checking	MOCI Cleaning	MOCI Doubting	MOCI Slowness	SPQ Interpersonal	SPQ Disorganized	SPQ Paranoid	SPQ Magical Ideation
MOCI Checking								
MOCI Cleaning	0.47**							
MOCI Doubting	0.43**	0.36**						
MOCI Slowness	0.05	0.33**	0.15**					
SPQ Interpersonal	0.25**	0.18**	0.34**	0.03				
SPQ Disorganized	0.27**	0.20**	0.32**	0.04	0.61**			
SPQ Paranoid	0.29**	0.19**	0.25**	0.00	0.45**	0.54**		
SPQ Magical Ideation	0.19**	0.11*	0.17**	0.05	0.30**	0.47**	0.50**	
SASS total	−0.06	−0.04	−0.01	−0.01	−0.27**	−0.27**	−0.17**	−0.17**

\*  $P < .05$ .

\*\*  $P < .01$ .

### 3.3. Relationship among the SPQ-B, MOCI, and SASS subscales

Table 4 shows the correlations among the resulting subscales of the PCA of the SPQ-B, the subscales of the MOCI, and the total score in SASS. Significant statistical correlations were found between the subscales composing the MOCI; the values range from 0.47 to 0.15, with the exception of the relationship between the Slowness scale and the Checking scale, whose correlation was not statistically significant. With respect to the SPQ-B, the relation between the resulting subscales showed statistically significant values, ranging from 0.30 to 0.61.

The results show a high relationship between SPQ-B and MOCI subscales. All correlations between the subscales of both questionnaires proved statistically significant, except for the Slowness subscale of the MOCI. The values that were statistically significant ranged from 0.11 for the relationship between the Magical Ideation subscale of the SPQ-B and the Cleaning subscale of the MOCI to 0.34 for the relation between the Interpersonal subscale of the SPQ-B and the Doubting subscale of the MOCI.

Two aspects stand out in the study of the relationship between SPQ-B and MOCI, and social SASS—on the one hand, the statistically significant negative relationship between the total score of the SASS and all the SPQ-B subscales, with values ranging from  $-0.27$  to  $-0.17$  and, on the other hand, the null relationship found between social functioning and the MOCI subscales, not having found any statistically significant correlations (Table 4).

The canonical correlation coefficient among SPQ-B and MOCI subscales was 0.424, which represents 18% of associated variance (Wilks = 0.80,  $F < 0.001$ ). The subscales standardized coefficients for the canonical correlation are shown in Table 5. In the case of MOCI, the 2 subscales with the greatest coefficients were Doubting ( $-0.67$ ) and Checking ( $-0.38$ ). In the case of the SPQ-B, these were the Interpersonal ( $-0.48$ ) and Disorganized ( $-0.39$ ) subscales. When a canonical correlation analysis was performed using

Table 5  
MOCI and SPQ-B standardized coefficients in the canonical correlation analysis canonical correlation: 0.424

Set 1: MOCI scales		Set 2: SPQ-B scales	
Checking	−0.38	Interpersonal	−0.48
Cleaning	−0.19	Disorganized	−0.39
Doubting	−0.67	Paranoid	−0.29
Slowness	0.25	Magical Ideation	−0.04

only the 2 subscales of each group of variables with the greatest weight, a canonical correlation of 0.394 was obtained, which means share 15.5% of associated variance.

#### 4. Discussion and conclusions

The study of schizotypal traits in adolescent populations allows progress in the comprehension of their nature and structure, as well as its relationship with other constructs without medication side effects or stigma. In addition, the study of links between SPT and OCS across early developmental periods is relevant to delimit the boundaries between these 2 phenomena at a subclinical level and for studies on comorbidity. Furthermore, it is important to study the possible impact that SPT and OCS have on social functioning in nonclinical adolescents. The objective of the present study was to carry out a study of the structure and nature of SPT using the Likert version of SPQ-B in adolescent populations, as well as to study the relationship between SPT, OCS, and self-reported social functioning.

The structure of SPT found in this study is similar to that found in the previous research [4,6]. The resulting dimensions of the components analysis are similar to those originally proposed by Raine and Benishay [41], although with some nuances. In this study, the original Cognitive-Perceptual factor appears to be divided into 2 factors: Paranoid and Magical Ideation. These data are in accordance with the results found in the study of SPT in adolescent populations and young adults, where the importance of the dimensions Paranoid Ideation and Magical Ideation stand out [6,7]. An interesting fact, which has not been replicated in many research studies, is the high percentage of variance explained by the Interpersonal dimension, which may indicate 2 questions: the importance of the negative symptoms in this age group and its relevance in the premorbid and prodromic phases of schizophrenia-spectrum disorders. The results show that the Likert-type version of the SPQ-B seems to be an adequate screening tool to assess schizotypal traits in nonclinical adolescents.

With respect to SPT and OCS, the data show some relationship between both groups of variables. The most consistent relationship was the one found between the Interpersonal subscale of the SPQ-B and the Doubting subscale of the MOCI, clearly showing their overlapping nature. The relationship between the remaining scales, with the exception of the Slowness subscale, are statistically

significant, finding the lowest values in the Magical Ideation subscale and the Cleaning subscale of the MOCI. The Slowness subscale seems to not work very well, so that future studies should continue to explore its psychometric characteristics. The relationships found between OCS and SPT are similar to those found in other studies [22,23,26]. The correlations between the Positive symptoms and Interpersonal with OCS seem to be equivalent. None of the SPT are particularly more associated to a type of OCS, although other studies have found an association of schizotypy with the checking [23] or hoarding subtypes [33,59]. The null correlation found between the Slowness subscale and SPT has been replicated in other studies [23].

Schizotypal personality traits were found to be negatively associated with social functioning; however, this did not happen with OCS. The relationship between SPT and the reduction in self-reported social functioning has been found in previous studies [38–40], although this is a field which requires more extensive research with other types of measures [60]. Similar data are found when the relationship between social functioning and schizophrenia [35,61,62] and/or SPD [37] is studied. Contrary to previous expectations, the data of our study showed that OCS, measured with the MOCI, and social functioning were not negatively linked; which could be possibly due to a low sensitivity of the SASS to measure the impact on social functioning of adolescents with OCS. Some authors point out that subjects with OCD show deficits in their social functioning and quality of life [63,64], whereas there are also studies that show that outpatients with schizophrenia with OCS do not present differences in their social functioning with respect to patients without OCS [16], so it would be necessary to compare these results with those from samples with different demographic characteristics and with other measurement instruments different from paper-and-pencil tests.

Finally, canonical correlation studies showed that SPQ-B and MOCI shared a considerable percentage of the total variance. The subscales that seem to be playing a more predominant role when explaining the associated variance between OCS and SPT were the Doubting and Checking subscales of the MOCI and the Interpersonal and Disorganized subscales of the SPQ-B. Furthermore, if only the canonical correlation between these groups of scales is performed, the results show that they share almost the same percentage of associated variance than if the canonical correlation were performed on the 2 groups of subscales proposed in the first analysis. This fact is a clear indication that these 2 subscales, Doubting and Checking and Interpersonal and Disorganized, are the most relevant when explaining the existing relationship between OCS and SPT in nonclinical adolescents. The use of canonical correlation for studying the relationship between SPD and OCS is novel and infrequent. Future studies should use it as a powerful and pertinent multivariate technique for clarifying the relationship between groups of variables as well as for replicating these findings.

The resulting data in the study are not free from limitations which should be kept in mind for their interpretation. First, it is questionable whether any of these findings can be generalized to clinical samples. Second, the use of self-report instruments has been applied with the sources of error associated to this type of assessment method. On the one hand, completing self-report measures requires a high degree of self-awareness and awareness of how one is perceived by others. On the other hand, self-report inventories do not allow the distinction between differential diagnoses or whether some symptoms are better accounted for by another disorder. Accordingly, an interview in conjunction with self-reports would have been interesting, although the effort, time, and costs associated to the application of interviews in large samples of nonclinical populations are of considerable importance. Third, there was no control for valid responding (ie, social desirability), particularly frequent in this age group.

The role of SPT in OCS and OCS in schizophrenia-spectrum disorders, as well as their relationship with measures of social functioning, still requires more extensive research. It would be necessary to clarify the nature and boundaries between the different dimensions of both entities as well as their relation to other constructs and other psychological disorders. In addition, future research should carry out longitudinal studies to specify which type of SPT, neurocognitive, neurobiological, and social functioning variables may play an important role in the studies which associate SPD and OCS.

## References

- [1] Raine A. Schizotypal personality: neurodevelopment and psychosocial trajectories. *Annu Rev Clin Psychol* 2006;2:291-326.
- [2] Siever LJ, Davis K. The pathophysiology of schizophrenia disorders: perspectives from the spectrum. *Am J Psychiatry* 2004;161:398-413.
- [3] Yon V, Loas G, Monestès JL. Relationships between schizotypy and subjective experiences in a sample of 399 university students. *Compr Psychiatry* 2009;50:142-50.
- [4] Fonseca-Pedrero E, Muñiz J, Lemos-Giráldez S, García-Cueto E, Campillo-Álvarez A, Villazón García U. Multidimensionality of schizotypy under review. *Pap Psicol* 2007;28:117-26.
- [5] Raine A, Reynolds C, Lencz T, Scerbo A, Triphon N, Kim D. Cognitive-perceptual, interpersonal, and disorganized features of schizotypal personality. *Schizophr Bull* 1994;20(1):191-201.
- [6] Stefanis NC, Smyrnis N, Avramopoulos D, Evdokimidis I, Ntzoufras I, Stefanis CN. Factorial composition of self-rated schizotypal traits among young males undergoing military training. *Schizophr Bull* 2004;30(2):335-50.
- [7] Fonseca-Pedrero E, Lemos-Giráldez S, Muñiz J, García-Cueto E, Campillo-Álvarez A. Schizotypy in adolescence: the role of gender and age. *J Nerv Ment Dis* 2008;196(2):161-5.
- [8] Walker E, Bollini A. Pubertal neurodevelopmental and the emergence of psychotic symptoms. *Schizophr Res* 2002;54:17-23.
- [9] Daneluzzo E, Stratta P, Rossi A. The contribution of temperament and character to schizotypy multidimensionality. *Compr Psychiatry* 2005; 46(1):50-5.
- [10] Kwapił TR, Barrantes Vidal N, Silvia PJ. The dimensional structure of the Wisconsin schizotypy scales: factor identification and construct validity. *Schizophr Bull* 2008;34:444-57.
- [11] Yeon Yung H, Seung J, Seo Ji J, Hwang S, Shin HK, Hoon Kim J, et al. Measuring psychosis proneness in nonclinical Korean population: is the Peters et al. Delusions Inventory useful for assessing high-risk individuals? *Compr Psychiatry* 2008;49:202-10.
- [12] van Os J, Linscott RJ, Myin-Germeys I, Delespaul P, Krabbendam L. A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness-persistence-impairment model of psychotic disorder. *Psychol Med* 2008;8:1-17.
- [13] Suhr JA, Spitznagel MB, Gunstad J. An obsessive-compulsive subtype of schizotypy: Evidence from a nonclinical sample. *J Nerv Ment Dis* 2006;194(11):884-6.
- [14] Poyurovsky M, Koran LM. Obsessive-compulsive disorder (OCD) with schizotypy vs. schizophrenia with OCD: diagnostic dilemmas and therapeutic implications. *J Psychiatr Res* 2005;39(4):399-408.
- [15] Freeman D, Garety PA. Connecting neurosis and psychosis: the direct influence of emotion on delusions and hallucinations. *Behav Res Ther* 2003;41:923-47.
- [16] Byerly M, Goodman W, Acholonu W, Bugno R, Rush AJ. Obsessive compulsive symptoms in schizophrenia: frequency and clinical features. *Schizophr Res* 2005;76:309-16.
- [17] Rajkumara RP, Janardhan Reddy YC, Kandavel T. Clinical profile of "schizo-obsessive" disorder: a comparative study. *Compr Psychiatry* 2008;49:262-8.
- [18] Lysaker PH, Marks KA, Picone JB, Rollins AL, Fastenau PS, Bond GR. Obsessive and compulsive symptoms in schizophrenia: clinical and neurocognitive correlates. *J Nerv Ment Dis* 2000;188:78-83.
- [19] Berman I, Merson A, Viegner B, Losonczy MF, Pappas D, Green AI. Obsessions and compulsions as a distinct cluster of symptoms in schizophrenia: neuropsychological study. *J Nerv Ment Dis* 1998;186: 150-6.
- [20] Berman I, Chang HH, Klegon DA. Is there a distinctive subtype of obsessive-compulsive schizophrenia? *Psychiatr Ann* 2000;30:649-52.
- [21] Reznik I, Mester R, Kotler M, Weizman A. Obsessive-compulsive schizophrenia: a new diagnostic entity? *J Neuropsychiatry Clin Neurosci* 2001;13:115-6.
- [22] Norman RMG, Davies F, Malla AK, Cortese L, Nicholson IR. Relationship of obsessive-compulsive symptomatology to anxiety, depression and schizotypy in a clinical population. *Br J Clin Psychol* 1996;35(4):553-66.
- [23] Roth RM, Baribeau J. The relationship between schizotypal and obsessive-compulsive features in university students. *Pers Individ Differ* 2000;29:1083-93.
- [24] Dinn WM, Harris CL, Aycicegi A, Greene P, Andover MS. Positive and negative schizotypy in a student sample: neurocognitive and clinical correlates. *Schizophr Res* 2002;56(1):171-85.
- [25] Lee HJ, Cogle JR, Telch MJ. Thought-action fusion and its relationship to schizotypy and OCD symptoms. *Behav Res Ther* 2005;43(1):29-41.
- [26] Chmielewski M, Watson D. The heterogeneous structure of schizotypal personality disorder: Item-level factors of the Schizotypal Personality Questionnaire and their associations with obsessive-compulsive disorder symptoms, dissociative tendencies, and normal personality. *J Abnorm Psychol* 2008;117:364-76.
- [27] Enright SJ, Claridge GS, Beech AR, Kemp-Wheeler SM. A questionnaire study of schizotypy in obsessional states and the other anxiety disorders. *Pers Individ Differ* 1994;16(1):191-4.
- [28] Rossi A, Daneluzzo E. Schizotypal dimensions in normals and schizophrenic patients: a comparison with other clinical samples. *Schizophr Res* 2002;54(1):67-75.
- [29] Torres A, Moran P, Bebbington P, Brugha T, Brugha D, Coid JW, et al. Obsessive-compulsive disorder and personality disorder. *Soc Psychiatry Psychiatr Epidemiol* 2006;41:862-7.
- [30] Sobin C, Blundell ML, Weiller F, Gavigan C, Haiman C, Karayiorgou M. Evidence of schizotypy subtype in OCD. *J Psychiatr Res* 2000;34(1):15-24.
- [31] Moritz S, Fricke S, Jacobsen D, Kloss M, Wein C, Rufer M, et al. Positive schizotypal symptoms predict treatment outcome in obsessive-compulsive disorder. *Behav Res Ther* 2004;42(2):217-27.

- [32] Einstein DA, Menzies RG. The presence of magical thinking in obsessive compulsive disorder. *Behav Res Ther* 2004;42(5):539-49.
- [33] Frost RO, Steketee G, Williams LF, Warren R. Mood, personality disorder symptoms and disability in obsessive compulsive hoarders: a comparison with clinical and non clinical control. *Behav Res Ther* 2000;38:1071-81.
- [34] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington (DC): American Psychiatric Association; 1994.
- [35] Addington J, Addington D. Social and cognitive functioning in psychosis. *Schizophr Res* 2008;99:176-81.
- [36] Sukhodolsky DG, do Rosario-Campos MC, Scahill L, Katsovich L, Pauls DL, Peterson BS, et al. Adaptive, emotional, and family functioning of children with obsessive-compulsive disorder and comorbid attention deficit hyperactivity disorder. *Am J Psychiatry* 2005;126:1125-32.
- [37] Dickey CC, McCarley RW, Niznikiewicz MA, Voglmaier MM, Seidman LJ, Kim S, et al. Clinical, cognitive, and social characteristics of a sample of neuroleptic-naïve persons with schizotypal personality disorder. *Schizophr Res* 2005;78:297-308.
- [38] Fonseca-Pedrero E, Muñiz J, Lemos-Giráldez S, García-Cueto E, Campillo-Álvarez A. Lateralidad manual, problemas emocionales y esquizotipia en adolescentes (Handedness, emotional problems, and schizotypy). *Psicothema* 2007;19:467-72.
- [39] Jahshan CS, Sergi MJ. Theory of mind, neurocognition, and functional status in schizotypy. *Schizophr Res* 2007;89(1-3):278-86.
- [40] Aguirre F, Sergi MJ, Levy CA. Emotional intelligence and social functioning in persons with schizotypy. *Schizophr Res* 2008;104:255-64.
- [41] Raine A, Benishay D. The SPQ-B: a brief screening instrument for schizotypal personality disorder. *J Personal Disord* 1995;9:346-55.
- [42] Mata I, Mataix-Cols D, Peralta V. Schizotypal Personality Questionnaire–Brief: factor structure and influence of sex and age in a nonclinical population. *Pers Individ Differ* 2005;38(5):1183-92.
- [43] Wuthrich V, Bates TC. Reliability and validity of two Likert versions of the Schizotypal Personality Questionnaire (SPQ). *Pers Individ Differ* 2005;38(7):1543-8.
- [44] Compton MT, Chien VH, Bollini A. Psychometric properties of the Brief version of the Schizotypal Personality Questionnaire in relatives with schizophrenia-spectrum disorders and non-psychotic control. *Schizophr Res* 2007;91:122-31.
- [45] Hergovich A, Schott R, Arendasy M. On the relationship between paranormal belief and schizotypy among adolescents. *Pers Individ Differ* 2008;45:119-25.
- [46] Axelrod SR, Grilo MC, Sanislow C, McGlashan TH. Schizotypal Personality Questionnaire–Brief: factor structure and convergent validity in inpatient adolescent. *J Personal Disord* 2001;15(2):168-79.
- [47] Fonseca-Pedrero E, Paino M, Lemos-Giráldez S, García-Cueto E, Campillo-Álvarez A, Villazón-García U, et al. Schizotypy assessment: state of the art and future prospects. *Int J Clin Health Psychol* 2008;8:577-93.
- [48] Hodgson RJ, Rachman S. Obsessional-compulsive complaints. *Behav Res Ther* 1977;15:389-95.
- [49] Thomas J, Turkheimer E, Oltmanns TF. Psychometric analysis of racial differences on the Maudsley Obsessional Compulsive Inventory. *Assessment* 2000;7(3):247-58.
- [50] Li CSR, Chen SH. Obsessive-compulsiveness and impulsivity in a non-clinical population of adolescent males and females. *Psychiatry Res* 2007;149:129-38.
- [51] Spitznagel MB, Suhr JA. Executive function deficits associated with symptoms of schizotypy and obsessive-compulsive disorder. *Psychiatry Res* 2002;110(2):151-63.
- [52] Berrocal C, Ruiz Moreno MA, Montero M, Rando MA, Rucci P, Cassano GB. Social anxiety and obsessive-compulsive spectra: validation of the SHY-SR and the OBS-SR among the Spanish population. *Psychiatry Res* 2006;147:241-51.
- [53] Emmelkamp PM, Kraaijkamp HJ, van den Hout MA. Assessment of obsessive-compulsive disorder. *Behav Modif* 1999;23(2):269-79.
- [54] Bosc M, Dubini A, Polin V. Developmental and validation of social functioning scale, the Social Adaptation Self-evaluation Scale. *Eur Neuropsychopharmacol* 1997;7(suppl1):S57-70.
- [55] Bosc M. Assessment of social functioning in depression. *Compr Psychiatry* 2000;41:63-9.
- [56] Weissman MM, Olfson M, Feder A, Fuentes M. A comparison of three scales for assessing social functioning in primary care. *Am J Psychiatry* 2001;158:460-6.
- [57] Tse WS, Bond AJ. Psychometric analysis of the Chinese version of Social Adaptation Self-evaluation Scale (S-SASS). *Psychiatry Res* 2007;153:277-81.
- [58] Bobes J, González MP, Bascarán MT, Cornominas A, Adan A, Sánchez J, et al. Validación de la versión española de la Escala de Adaptación Social en pacientes depresivos (Validation of the Spanish version of the Social Adaptation Scale in depressive patients). *Actas Esp Psiquiatr* 1999;27(2):71-80.
- [59] Grisham JR, Brown TA, Savage CR, Steketee G, Barlow DH. Neuropsychological impairment associated with compulsive hoarding. *Behav Res Ther* 2007;45(7):1471-83.
- [60] Preti A, Rocchib MB, Sistib D, Muraa T, Mancaa S, Siddia S, et al. The psychometric discriminative properties of the Peters et al Delusions Inventory: a receiver operating characteristic curve analysis. *Compr Psychiatry* 2007;48:62-9.
- [61] Voges M, Addington J. The association between social anxiety and social functioning in first episode psychosis. *Schizophr Res* 2005;76:287-92.
- [62] Caqueo Urizar A, Lemos Giráldez S. Calidad de vida y funcionamiento familiar de pacientes con esquizofrenia en una comunidad latinoamericana (Quality of life and family functioning in schizophrenia patients). *Psicothema* 2008;20:577-82.
- [63] Eisen JL, Mancebo MA, Pinto A, Coles ME, Pagano ME, Stout R, et al. Impact of obsessive-compulsive disorder on quality of life. *Compr Psychiatry* 2006;47:270-5.
- [64] Valderhaug R, Ivarsson T. Functional impairment in clinical samples of Norwegian and Swedish children and adolescents with obsessive-compulsive disorder. *Eur Child Adolesc Psychiatry* 2005;14:164-73.