العنوان:	Psychometric Properties of the Clinician-Rated Dimension of Psychosis Symptom Severity "CRDPSS" in Patients with Schizophrenia
المصدر:	المجلة المصرية للدراسات النفسية
الناشر:	الجمعية المصرية للدراسات النفسية
المؤلف الرئيسي:	أبو العطا، محمد أحمد حسنين
المجلد/العدد:	مج27, ع96
محكمة:	نعم
التاريخ الميلادي:	2017
الشهر:	يولية
الصفحات:	1 - 17
رقم MD:	1010973
نوع المحتوى:	بحوث ومقالات
اللغة:	English
قواعد المعلومات:	EduSearch
مواضيع:	الاضطرابات الذهانية، الأمراض النفسية، علم النفس الإكلينيكي
رابط:	http://search.mandumah.com/Record/1010973

Psychometric Properties of the Clinician-Rated Dimension of Psychosis Symptom Severity (CRDPSS) in Patients with Schizophrenia

Mohammad A. Aboul-ata

Department of Psychology, Faculty of Arts, Kafrelsheikh University, Egypt

E-mail: mohammad_aboulata@art.kfs.edu.eg

Abstract

In the present study, I aimed to estimate the psychometric properties of the "Clinician-Rated Dimension of Psychosis Symptom Severity" (CRDPSS) on an Egyptian sample. The sample consisted of 388 participants: 193 schizophrenic patients ageing between 17 and 65 years (M = 35.82, SD = 10.88), and 195 normal participants ageing between 17 and 69 years (M = 35.94, SD = 11.09). The Positive and Negative Syndrome Scale (PANSS), The Brief Psychiatric Rating Scale (BPRS), and the CRDPSS were used to rate the symptoms severity of Schizophrenia. Using CFA, the results showed that the CRDPSS had a significant one factor model of schizophrenia; $\chi 2$ (20, N = 193) = 28.28, p = .103, and root mean square error of approximation (RMSEA) = 0.046 with a 90% confidence interval [.000, .083]. furthermore, the model fit indices ranged between 0.944 and 0.983. Regarding convergent validity, the CRDPSS had a high correlation with the PANSS, r (193) = .87, p=.01, and the BPRS, r (193) = .85, p =.01. Using Cronbach's alpha, inter-item correlation, and item-total correlation, the CRDPSS had a modest consistency. The results showed that Alpha = .686, Cohen's Kappa = .995 ($p < .001$), the correlations among the eight items of CRDPSS was 0.20, and the item-total correlations was 0.51. Moreover, the ROC curve statistic showed that the CRDPSS had a high ability to discriminate between patients and normal control group.

Keywords: Schizophrenia, Psychometric properties, rating scale, DSM-5, CFA.

Psychometric Properties of the Clinician-Rated Dimension of Psychosis Symptom Severity (CRDPSS) in Patients with Schizophrenia

Mohammad A. Aboul-ata

Department of Psychology, Faculty of Arts, Kafrelsheikh University, Egypt

Introduction:

Several studies have established, examined, and utilized many rating scales for assessing the symptoms severity of schizophrenia. Among the most commonly used rating scales for evaluating the severity of the symptoms of schizophrenia, there are (a) The Positive and Negative Syndrome Scale (PANSS). (b) The Brief Psychiatric Rating Scale (BPRS). (c) The Scale for the Assessment of Positive Symptoms (SAPS). (d) The Scale for the Assessment of Negative Symptoms (SANS) (Ventura, & Marder, 2012). The most common aim of creating and developing these rating scales is for research purposes such as pharmacological effectiveness, and for following up therapy interventions (Macfadden et al., 2011; Voisey et al., 2010).

Regarding the PANSS, numerous studies have investigated the PANSS for evaluating the psychometric properties (Anderson et al., 2015; Kelley, White, Compton, & Harvey, 2013; Khan et al., 2014; Langeveld et al., 2013; Stochl et al., 2014). Other studies have investigated cultural adaptation and psychometric evaluation of the PANSS in various cultures such as Swedish (Lindström & Knorring, 1993), French (Lançon, Reine, Llorca, & Auquier, 1999). Moreover, the researchers evaluated the scale in cultures such as Polish (Rzewuska, 2002), Mexican (Fresán et al., 2005), Chinese (Jiang, Sim, & Lee, 2013), and Russian populations (Ivanova, Reznik, Opler, Khan, & Gao, 2014). Furthermore, a previous cross-cultural study has investigated the PANSS across many regions such as Eastern Asia, Northern Europe, Russia, Ukraine, Southern Europe, and United States (Khan et al., 2013). Also, a previous study has evaluated the PANSS between European and Japanese raters (Rothman, Khan, Opler, & Bhargava, 2012). Moreover, two studies have developed further constructs of the PANSS for covering the heterogeneity of schizophrenia psychopathology such as mania-like excitement (Lindenmayer et al., 2004; Montoya et al., 2011).

The BPRS has been published before the PANSS to achieve a rapid and economic assessment for schizophrenia (Overall & Gorham, 1962). Recently, many researchers have evaluated the psychometric properties of the BPRS (Biancosino, Picardi, Marmai, Biondi, & Grassi, 2010; Sawamura, Morishita, & Ishigooka, 2010; Shafer, 2013; Zanello, Berthoud, Ventura, &

Merlo, 2013). The researchers have investigated the psychometric properties of the BPRS in consideration of samples (Burger, Yonker, Calsyn, Morse, & Klinkenberg, 2003) raters (Crippa, Sanches, Hallak, Loureiro, & Zuardi, 2001), and items (Velligan et al., 2005). Moreover, other researchers have evaluated the BPRS regarding comparing with other rating scales (Mogge, LePage, Del Ben, & Murphy, 2002; Morlan & Tan, 1998). Also, several studies have estimated the BPRS correlation with other measurements (Czobor, Bitter, & Volavka 1991; Dingemans, 1990; Faustman, Jr., Csernansky, & White, 1989). Furthermore, many researchers have modified numerous versions of the BPRS for assessing schizophrenia in childhood (Henderson, McIlhaney, & Wasser, 2010; Lachar et al., 2001; McIlhaney, Henderson, Gunn, & Wasser, 2008), and in aged people (Seno et al., 1998).

Regarding the evaluating of schizophrenia symptoms, the researchers developed SAPS and SANS. The SAPS was created for evaluating the positive symptoms of schizophrenia, whereas, the SANS was created for evaluating the negative symptoms of schizophrenia (Blanchard & Cohen, 2005; Levine & Leucht, 2013; Lindström & Lindström, 1996; Lyne et al., 2013).

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) contains a section for measurements (section III; Emerging Measures and Models), that serves as a dimensional assessment method beside the old categorical one (5th ed.; DSM-5; American Psychiatric Association [APA], 2013). To assess psychosis symptoms severity, section 3 contains a rating scale titled "Clinician-Rated Dimension of Psychosis Symptom Severity" (CRDPSS) (online; DSM-5/psychiatry.org; American Psychiatric Association [APA], 2015). Regarding the CRDPSS, there is no study in the Arabic-Egyptian culture has examined the psychometric properties of the scale. Accordingly, many purposes have required translation, cultural adaptation, and psychometric evaluation for the CRDPSS such as (a) DSM-5, section 3 assumed further research for assessing mental disorders to enhance diagnostic procedures and to reduce the variation of the cultural interpretations of these disorders. (b) The CRDPSS is directly derived from the DSM-5 diagnostic criteria. (c) Most of the researchers used the dimensional method in diagnosis besides the categorical one (APA, 2013). Regarding the Egyptian context, the present study aimed to conduct translation, cultural adaptation, and psychometric evaluation for the CRDPSS on an Egyptian sample, that could serve as an assessment of the primary symptoms of psychosis (in the present study for schizophrenia definitely), and to act as a valid decision-making tool.

Method

Sample

The sample of the present study consisted of 388 participants: 193 schizophrenic patients (151 males and 42 females) ageing between 17 and 65 years ($M = 35.82$, $SD = 10.88$), and 195 normal participants (152 men and 43 women) ageing between 17 and 69 years ($M = 35.94$, $SD = 11.09$). I selected the schizophrenic patients from inpatients and outpatients from four hospitals across four governorates in Egypt (Al Khankah, Beni-Suef Hospital for Mental Health, El Minia Hospital for Mental Health and Addiction Treatment, and from The Department of Psychiatry at Fayoum City General Hospital). Furthermore, I selected regular participants from the general population. I selected the regular participants during the systematic interviews at the Public Service Unite, Fayoum University, Egypt to match with the schizophrenic patients in demographic characteristics. I screened both groups using the structured clinical interview for the *DSM-5*diagnostic criteria. This structured interview contained disorders listed under the classification "Schizophrenia and other psychotic disorders" in *DSM-5*. The inclusion criterion for the schizophrenic patients was the existence of the *DSM-5* diagnostic criteria for schizophrenia, and the exclusion criterion was a history or current existence of other psychotic disorders. The inclusion criterion for the regular participants was the absence of any psychotic disorders, and the exclusion criterion was the existence of any psychotic disorders. To explore any significant difference between the study groups regarding ages, I used a *t*-test statistic. The result showed that there was no significant difference between the two groups regarding ages, $t\ (387) = .113$, $p = .910$. Moreover, there was no significant difference between the two groups in gender (male: male ratio and female: female ratio) $\chi 2\ (1, N = 388) = .002, p = .967$.

Instruments

Positive and Negative Syndrome Rating Scale (PANSS)

The PANSS is a rating scale for assessing the symptoms severity of schizophrenia. The scale consists of 30 items with the 7-point Likert-type scoring key. The first seven items assess the positive symptoms of schizophrenia and the second seven items assess the negative symptoms of schizophrenia. Furthermore, the remaining items of the scale assess the general psychopathology.

Brief Psychiatric Rating Scale (BPRS)

The BPRS is a rating scale for evaluating the symptoms severity of

schizophrenia. The original scale consists of 16 items (Overall & Gorham, 1962) with the 7-point Likert-type scoring key. The primary purpose of developing the BPRS was to achieve rapid and efficient assessment to follow up the treatment progress in psychiatric patients.

Clinician-Rated Dimension of Psychosis Symptom Severity (CRDPSS)

The CRDPSS is a rating scale for assessing the severity of psychosis symptoms in general. The scale consists of eight items with the 5-point Likert-type scoring key. The assessment on this scale based on the behavior of the patient in his/her last seven days.

Translation and cultural adaptation for CRDPSS

According to Guillemin's (1993) guidelines, I conducted following three steps. Step 1 (forward translation): I selected two Arabic native-speaking translators who were aware of the study purpose to perform the forward translation. This action resulted in two versions of the CRDPSS into the Arabic language. Step 2 (backward translation): I selected another two translators who were not aware of the study purpose to perform the back-translation of the Arabic versions of the CRDPSS into the language of origin. This step resulted in two versions of the CRDPSS into the source language. Step 3: I gathered a committee who were multidisciplinary and aware of schizophrenia psychopathology. The committee produced a reviewed version of the scale which contained eight items. To achieve cultural adaptation for the CRDPSS, I worked with the committee to investigate the semantic, idiomatic, experiential, and conceptual equivalencies. Finally, all previous steps yielded the final version of the CRDPSS into the Arabic language.

Procedures

From 240 schizophrenic patients, I selected 193 according to the inclusion and the exclusion criteria mentioned above. I rated schizophrenic patients using the PANSS, BPRS, and the CRDPSS. The rating procedures were conducted in the formal structured interview. The formal interview duration for every patient ranged between 30 and 45 minutes. Then, I selected the regular participants from the general population using the structured interview for the *DSM-5*. The interview for the regular group consisted of the *DSM-5* diagnostic criteria for schizophrenia and other psychotic disorders.

Results and discussion

In the present study, I aimed to translate the CRDPSS into the Egyptian-Arabic culture. Furthermore, I aimed to evaluate the psychometric

properties of the CRDPSS on an Egyptian sample. Using SPSS 18 and Amos 16, I conducted statistical analysis to address the structure, diagnostic accuracy, and the reliability of the CRDPSS.

Confirmatory Factor Analysis (CFA)

APA offered the CRDPSS as a rating scale for assessing the dimensions of psychosis symptom severity. In the present study, I aimed to investigate the psychometric properties of the CRDPSS in schizophrenia specifically. In this case, there is a question should be addressed "Does the CRDPSS reflects the schizophrenia construct?". According to the purpose of the present study, I tested the one-factor model for the CRDPSS (Schizophrenia factor, n= 193 schizophrenic patients) with CFA (see table 1).

TABLE 1
STANDARDIZED REGRESSION WEIGHTS

			Estimate	S.E.	C.R.	P	Label
i1	<---	Schizophrenia	.196				
i2	<---	Schizophrenia	.548	.683	2.540	.011	par_1
i3	<---	Schizophrenia	.746	.783	2.609	.009	par_2
i4	<---	Schizophrenia	.782	.650	2.622	.009	par_3
i5	<---	Schizophrenia	.287	.142	2.224	.026	par_4
i6	<---	Schizophrenia	.947	.978	2.621	.009	par_5
i7	<---	Schizophrenia	.476	.171	2.490	.013	par_6
i8	<---	Schizophrenia	.528	.227	2.529	.011	par_7

Note: SE= Standard Error, CR= Critical Ratio, and P= Probability.

Because of the ordinal/categorical type of the data in the present study (Likert-type scoring method), I used the Bayesian estimation method to prepare the data for the CFA (Arbuckle, 2007; Byrne, 2010). CFA results showed that there was no significant difference between the one-factor model and the observed data, $\chi 2$ (20, N = 193) = 28.28, p = .103. In addition, the model fit indices showed that; goodness of fit index (GFI) = 0.965, normed fit index (NFI) = 0.944, incremental fit index (IFI) = .983, comparative fit index (CFI) = .983, and root mean square error of approximation (RMSEA) = 0.046 with a 90% confidence interval [.000, .083]. The CFA results indicated that the CRDPSS reflected the one factor model of schizophrenia (see Figure 1).

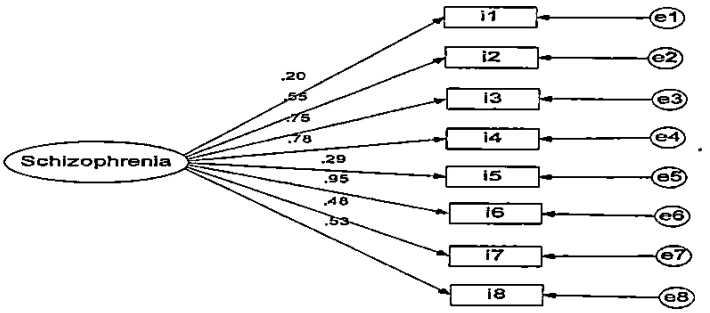

Figure 1. The one factor model and the standardized regression weights for the 8 items of CRDPSS.

Diagnostic Accuracy

To estimate the diagnostic accuracy of the CRDPSS, I used the nonparametric Receiver Operating Characteristic (ROC) curve (n = 388; 193 schizophrenic patients and 195 regular participants). The result showed that the scale had a high sensitivity and high specificity; the area under the curve (AUC) was 1.000 (p < .001) with a 95% confidence interval (see Figure 2), and with cutoff point ≥ 9.5 (see Table 2). These results showed that the CRDPSS was significantly able to correctly discriminate between those who are positive disordered and those who are negative disordered.

TABLE 2
CUT-OFF POINTS OF CRDPSS

Cut-off points	Sensitivity	Specificity
.50	1.000	.538
1.50	1.000	.677
2.30	1.000	.892
2.80	1.000	.897
3.50	1.000	.979
9.50	**1.000**	**1.000**
15.50	.995	1.000
16.50	.979	1.000
17.50	.969	1.000

Note. The row in bold is the cut-off point with the highest sensitivity and specificity.

Convergent validity

To estimate the concurrent validity of the CRDPSS, I investigated the

correlation of the CRDPSS with the PANSS and the BPRS. The results showed that the CRDPSS had a high correlation with the PANSS, r (193) = .87, p=.01. Furthermore, the CDRPSS had a strong correlation with the BPRS as well, r (193) = .85, p =.01. These results indicated that the CRDPSS had a convergent validity as there was a high correlation among different rating scales assessed the same construct (schizophrenia).

Inter-rater reliability

Two researchers rated 388 participants (n= 193 schizophrenic patients and195 normal individuals) using the CRDPSS. I estimated the agreement between the two researchers' assessment using Cohen's Kappa = .995 ($p <$ .001). This result indicated that the CRDPSS was reliable between the two raters.

Internal consistency

I estimated the internal consistency of the CRDPSS (n= 193 schizophrenic patients) using Cronbach's alpha, inter-item correlations, and item-total correlations. The results showed that Alpha = .686 for the 8-item of the CRDPSS. Results of Cronbach's alpha were acceptable for the whole scale as the low number of items reduced the result of the Cronbach's alpha and vice versa (Tavakol & Dennick, 2011). The modest result of Cronbach's alpha may occur due to the heterogeneity nature of the CRDPSS. Furthermore, results of inter-item correlation revealed that the average of the correlations among the eight items of CRDPSS was 0.200 and ranged between 0.041 and 0.660. According to the literature review, the acceptable percentage of inter-item correlation is between .2 and .4 (Piedmont, 2014). Moreover, these results indicated that the items were not redundant but were homogenous, and they were representative of the same content. Also, the average of the item-total correlations was 0.516 and ranged between 0.114 and 0.795. Regarding reliability and as a whole scale, the 8-item CRDPSS had an acceptable internal consistency on the Egyptian sample of the schizophrenic patients.

Conclusion

I aimed to evaluate the psychometric properties of the CRDPSS. The CFA showed that the CRDPSS significantly reflected the one factor model of schizophrenia. Furthermore, the CRDPSS had a high convergent validity with both of the PANSS and the BPRS. The inter-rater reliability showed a high agreement between two experienced raters using the CRDPSS. Cronbach's alpha, inter-item, and item-total correlations results revealed that the CRDPSS had a modest consistency. The ROC curve statistics showed that the CRDPSS had a high ability to discriminate between the patients and the control group.

Limitations and recommendations

In the present study, the items of the CRDPSS only covered the essential symptoms of schizophrenia that affected the internal consistency of the scale. Furthermore, the items of the CRDPSS contained two symptoms (Depression and Mania) that were related to the affective symptomology which increased the heterogeneity of the scale nature. Accordingly, it is recommended to increase the number of items to cover depression, mania, and negative symptomology. Finally, the CRDPSS according to the present study findings was significantly able to assess schizophrenia with high validity and modest reliability.

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الخصائص السيكومترية لمقياس "التقييم الإكلينيكي لشدة أعراض الذهان" على عينة من مرضى الفصام

محمد أحمد حسنين أبوالعطا
مدرس علم النفس، كلية الآداب، جامعة كفرالشيخ

ملخص الدراسة

هدفت الدراسة الحالية إلي فحص الخصائص السيكومترية لمقياس التقييم الإكلينيكي لشدة أعراض الذهان " Clinician-Rated Dimension of Psychosis Symptom Severity (CRDPSS)"، و ذلك علي عينة مصرية من مرضي الفصام. تكونت العينة من ٣٨٨ مشارك: ١٩٣ مريضاً فصاميا، تراوحت أعمارهم بين ١٧، ٦٥ عاماً (م= ٣٥.٨٢، و ع= ١٠.٨٨)، و ١٩٥ فرداً من العاديين تراوحت أعمارهم بين ١٧، و ٦٩ عاماً (م= ٣٥.٩٤، ع= ١١.٠٩). تم استخدام المقاييس التالية ١- مقياس الأعراض الموجبة و السالبة للفصام " Positive and Negative Syndrome Rating Scale (PANSS) ". ٢- مقياس الطب النفسي المختصر " Brief Psychiatric Rating Scale (BPRS)". ٣- مقياس التقييم الإكلينيكي لشدة أعراض الذهان (CRDPSS)، وذلك لتقييم شدة أعراض اضطراب الفصام. أشارت نتائج التحليل العاملي التوكيدي إلي الصدق البنائي للعامل الواحد (عامل الفصام) للمقياس. أيضاً، أن المقياس يتسم بالصدق التقاربي مع المقاييس الأخرى المستخدمة في الدراسة حيث وجود ارتباط إحصائي دال و مرتفع. كما أشارت النتائج إلي قدرة المقياس علي التمييز الدقيق بين المرضي و الأسوياء. فيما يتعلق بثبات المقياس، و باستخدام معامل ألفا، أظهر المقياس اتساق داخلي مقبول بالنسبة لعدد بنوده المحدود. و أظهرت نتائج ارتباط كل بند بالبنود الأخرى، و أيضاً ارتباط كل بند بالدرجة الكلية علي المقياس اتساق مقبول. و فيما يتعلق باستخدام الثبات بين الملاحظين، أشارت النتائج إلي وجود ثبات مرتفع.

كلمات مفتاحية: *الفصام؛ الخصائص السيكومترية؛ مقياس تقدير؛ الدليل التشخيصي الخامس؛ التحليل العاملي التوكيدي.*