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ORIGINAL PAPER

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RELIABILITY, VALIDITY, AND PSYCHOMETRIC PROPERTIES OF THE GREEK TRANSLATION OF THE CAMBRIDGE DEPERSONALIZATION SCALE (CDS)

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ABSTRACT

Introduction: The Cambridge Depersonalisation Scale is meant to capture the frequency and duration of depersonalisation symptoms over the 'last 6 months'. **Methods:** In order to develop a Greek version of CDS scale, the CDS scale was translated in Greek by 2 psychiatrists. Then, the Greek version of CDS scale was back-translated by a person who did not know the original English version. The back-translated version was reviewed in order to establish whether it is consistent with the original English version. After this procedure we administered the Greek version of CDS scale to a sample of 294 Greeks in order to assess the reliability and the validity of the Greek version of scale. **Results:** The five components solution accounted for 58.204% of the total variation. Initial eigenvalues of the five components were: factor 1=11.555, factor 2=1.564, factor 3=1.356, factor 4=1.247 and factor 5=1.157. Six items did not load on any factor. Correlations between factors were low ranged from 0.134 to 0.314 and no complex variables were found. Cronbach's alpha and Guttman split-half coefficient were used to evaluate interval consistency of CDS scale in 294 individuals. The alpha coefficients and Guttman split-half coefficient of the CDS scale were 0.938 and 0.921, respectively. The test-retest reliability proved to be satisfactory. The intraclass correlation coefficients for the total CDS score was very good and equal to 0.883. The CDS scale correlated highly with the SCL-90 and all subscales (p -value<0.0001). **Conclusion:** The psychometric strength of CDS – Greek is reliable for its future use, particularly for screening for subjects with possible diagnosis of CDS.

Key words: Cambridge depersonalization Scale, CDS, depersonalization, reliability, validity, HIV.

1. INTRODUCTION

The Cambridge Depersonalization Scale (CDS) is a self-rating scale questionnaire constructed to capture the frequency and duration of depersonalization symptoms over the last six months. The instrument has proved to be valid and reliable and can be useful in both clinical and neurobiological research (1).

DSM-IV defines depersonalization as an alteration in the perception of experience of the self so that one feels detached from, and as if one is an outside observer of, one's mental processes or body (2). The precise prevalence of depersonalization disorder in the general population is unknown but some studies indicate prevalence rates of clinically significant depersonalization approximately 1-2

(3). Depersonalization has been described in neurological and organic diseases associated to drug consumption and in different psychiatric disorders. Thus it would be a non-specific and independent phenomenon that sometimes occur predominantly and is sufficiently serious to acquire the category of the disorder (4).

Other useable self-rating scales to estimate depersonalization are the Dixon's scale, Jacob's and Bovazzo's depersonalization scale and the Dissociative Experience Scale (5). The Cambridge Depersonalization Scale that was developed by Sierra and Berrios is a comprehensive instrument containing 29 items addressing the complaints classically associated with the depersonalization syndrome. Its items describe abnormal experiences affecting different sensory

modalities like describing an inability to experience a range of different emotions; heightened self-observation, lack of agency feelings. Other items describe cognitive as 'feelings of thought emptiness', subjective changes in the ability to recall personal events, inability to evoke images, and distortions in the experiencing of time and space (6).

The global score of the scale is the arithmetical sum of all items (range, 0-290) and its item is rated on two likert scales for frequency and duration of experience (range 0-10).

The aim of the current study was to assess the reliability, validity and psychometric properties of the Greek translation Cambridge Depersonalization Scale.

2. METHODS

The Cambridge Depersonalization Scale (CDS) is a scale used to assess the frequency and duration of depersonalization symptoms for a period covering the last 6 months (7). The Cambridge Depersonalization Scale (CDS) is a self-administered questionnaire that is composed by 29 items. Each one of the 29 items is rated on two independent Likert scales, one for frequency (range: 0-4) and another for severity (range: 1-6). A total score is calculated by adding all item scores and we can also calculate an index of intensity for each item by adding the frequency and severity score (range: 0-10).

In order to develop a Greek version of CDS scale, the CDS scale was translated in Greek by 2 psychiatrists. Then, the Greek version of CDS scale was back-translated by a person who did not know the original English version. The back-translated version was reviewed in order to establish whether is consistent with the original English version. After this procedure we administered the Greek version of CDS scale to a sample of 294 Greeks in order to assess the reliability and the validity of the Greek version of scale.

In addition to the CDS Greek scale, subjects were assessed with two other scales useful for assessing validity. For criterion based validity, the SCL-90 and EPQ scales was administered as independent evaluators. Psychometric Personality scale of extraversion, neuroticism, psychoticism (Eysenck Personality Questionnaire, EPQ) (8). The Eysenck personality questionnaire consists of 84 entries evaluated by the patient with a yes or no. The purpose of this questionnaire is to explore four dimensions of personality: psychoticism (P), neuroticism (N) extraversion (E) and lying (L). The scales N and L are of particular clinical interest. The N scale is the best studied and is associated with a clinical diagnosis of neurosis or oral personalities according to psychoanalytic terminology. The E scale corresponds roughly to histrionic personalities. The P scale corresponds to obsessive-compulsive personalities and is unrelated to psychosis. Finally, the L scale controls the degree of hypocrisy of the examined party but can also be high in patients with psychosomatic disorders who are not pretending. A weighted Greek version is available (9). Psychometric general psychosomatic burden scale (SCL-90) (10). The SCL-90 questionnaire is self-completed and measures 9 psychopathology parameters (as many as its subscales), which are: 1) somatisation, 2) depression, 3) anxiety, 4) phobic anxiety, 5) obsessive compulsive, 6) paranoid ideation, 7) psychoticism 8) hostility, 9) interpersonal sensitivity. The questionnaire

includes 90 questions in total. All entries are rated from 0 to 4, giving a total score of 360. The scale is used to extrapolate 3 aggregate indexes: a) the general gravity index, b) the positive symptoms distress index c) the set of positive symptoms. A weighted Greek version is available (11).

The translated questionnaire was administered to 128 HIV outpatients aged 37,1±9,1 (range: 17-64) and 166 controls aged 32,4±13,4 (range: 19-92).

The present study was conducted at the Attikon University Hospital and the sample was randomly selected from Patients came from the Infectious Diseases unit of the Attikon Hospital, Athens, Greece. All subjects complete the

	Descriptives		
	Mean	Std. Deviation	Communalities
1. Feeling unreal or cutoff from the world	1.88	1.98	0.608
2. Things look flat, as if looking at a picture	0.99	1.48	0.471
3. Body feels as if it didn't belong to oneself	0.71	1.40	0.559
4. Not feeling frightened in normally frightening situations	2.27	2.27	0.558
5. Favorite activities no longer enjoyable	2.11	2.38	0.589
6. Feeling of being a detached observer of oneself	1.52	1.92	0.639
7. Flavour of meals no longer gives a feeling of pleasure or distaste	0.80	1.60	0.735
8. Body feels very light, as if it were floating on air	0.54	1.21	0.494
9. No emotions felt when weeping or laughing	0.67	1.43	0.497
10. Feeling of not having any thoughts at all	0.86	1.48	0.545
11. Own voice sounds remote and unreal	0.56	1.26	0.553
12. Feel like hands or feet becoming bigger or smaller	0.39	1.05	0.644
13. Surroundings feel detached or unreal	1.11	1.81	0.575
14. Recently done things feel as if they took place a long time ago	1.53	1.79	0.608
15. See oneself outside, as if looking in a mirror	0.59	1.32	0.528
16. Personal memories feel as if one had not been involved in them	1.45	2.00	0.614
17. When in a new situation, feeling as if it had happened before	1.75	1.68	0.586
18. Unable to feel affection towards family and friends	1.01	1.81	0.576
19. Objects look smaller or further away	0.45	1.13	0.647
20. Unable to feel properly things touched with hands	0.34	1.00	0.554
21. Unable to picture things in mind	1.02	2.00	0.578
22. Feeling detached from bodily pain	0.50	1.26	0.622
23. Feeling of being outside the body	0.62	1.35	0.705
24. Feeling mechanical and 'robotic' when moving	0.87	1.49	0.608
25. Smell of things no longer gives feeling of pleasure or dislike	0.47	1.16	0.735
26. Detached from own thoughts like they have life of their own	0.68	1.36	0.563
27. Urge to touch oneself to be reassured of body existence	0.36	1.02	0.537
28. Unable to feel hunger or thirst	0.70	1.45	0.523
29. Previously familiar places look unfamiliar	0.57	1.17	0.430

Table 1. Means scores (range 0-10), standard deviation and communalities for each item of the scale

	Factors				
	1	2	3	4	5
12. Feel like hands or feet becoming bigger or smaller	0.765	0.050	0.057	0.057	-0.082
22. Feeling detached from bodily pain	0.611	0.080	-0.063	0.351	-0.200
15. See oneself outside, as if looking in a mirror	0.609	0.076	0.046	0.083	0.144
8. Body feels very light, as if it were floating on air	0.579	0.345	0.047	-0.183	-0.094
23. Feeling of being outside the body	0.562	0.164	-0.119	0.093	0.430
19. Objects look smaller or further away	0.545	0.016	0.177	0.058	0.357
27. Urge to touch oneself to be reassured of body existence	0.509	-0.114	0.354	-0.028	0.223
26. Detached from own thoughts like they have life of their own	0.501	0.188	0.210	-0.030	0.220
11. Own voice sounds remote and unreal	0.428	0.181	0.215	0.113	0.213
1. Feeling unreal or cutoff from the world	0.123	0.632	0.139	0.035	0.129
6. Feeling of being a detached observer of oneself	0.102	0.613	0.172	0.119	0.127
4. Not feeling frightened in normally frightening situations	0.010	0.601	-0.045	0.374	-0.127
24. Feeling mechanical and 'robotic' when moving	0.358	0.472	0.142	0.037	0.134
13. Surroundings feel detached or unreal	0.311	0.466	-0.062	0.201	0.171
7. Flavour of meals no longer gives a feeling of pleasure or distaste	-0.018	0.101	0.835	0.010	-0.025
25. Smell of things no longer gives feeling of pleasure or dislike	0.157	0.004	0.749	0.205	-0.158
28. Unable to feel hunger or thirst	0.202	0.101	0.467	0.203	0.116
9. No emotions felt when weeping or laughing	0.180	0.069	0.441	0.057	0.304
17. When in a new situation, feeling as if it had happened before	0.014	0.168	0.025	0.689	0.042
21. Unable to picture things in mind	0.063	-0.092	0.095	0.629	0.289
14. Recently done things feel as if they took place a long time ago	0.118	0.147	0.200	0.587	0.045
18. Unable to feel affection towards family and friends	0.058	0.090	-0.136	0.134	0.709
10. Feeling of not having any thoughts at all	0.092	0.284	0.299	-0.082	0.449
29. Previously familiar places look unfamiliar	0.274	-0.067	0.164	0.301	0.303
3. Body feels as if it didn't belong to oneself	0.443	0.110	0.089	0.124	0.359
20. Unable to feel properly things touched with hands	0.421	-0.062	0.238	0.152	0.344
5. Favorite activities no longer enjoyable	-0.170	0.453	0.358	-0.033	0.360
2. Things look flat, as if looking at a picture	0.351	0.442	-0.094	-0.024	0.214
16. Personal memories feel as if one had not been involved in them	-0.077	0.152	0.106	0.497	0.448

Table 2. Pattern matrix of extract factors.

questionnaires by themselves. All the subjects completed the questionnaires by themselves. The average time completing the questionnaires was 20 minutes.

Statistical Analysis

In order to investigate the factor structure and dimensionality of the 29-item Greek version of CDS scale we contacted explanatory factor analysis by using Promax oblique rotation (12). Five components were extracted, based on Cattell's scree test. Cronbach's alpha (13) and Guttman split-half coefficient (14) were used to evaluate interval consistency of CDS scale and of the five factors extracted for principal component analysis, in 294 subjects. The test-retest reliability was examined by asking, one week later, a subsample of subjects to complete the questionnaire a second time. In order to investigate the consistency between the two measurements we evaluated intra-class correlation coefficients for the total score and for each independent question (15).

Finally, the Spearman's Rho correlation coefficients between the score of CDS-Greek scale and of SCL-90 and EPQ scales and subscales was calculated to assess the criterion based validity. All statistical analyses were carried out with IBM SPSS Statistics V20.0 and for all statistical tests we use 5% significant levels.

3. RESULTS

Factor analysis

A principal components analysis using Promax oblique rotation with a Kappa of 2 was performed on 294 individuals. Factor analysis based on the correlation matrix. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was 0.928 hence suggesting a high factorability for the sample. Bartlett's Test of Sphericity rejected the null hypothesis of an identity matrix ($X^2=4350.252$, $df=406$ and $p\text{-value}\leq 0.0001$) In Table 1, extracted communalities were fairly high with

Factors	1	2	3	4	5
1	1.000	0.262	0.245	0.315	0.194
2	0.262	1.000	0.240	0.220	0.218
3	0.245	0.240	1.000	0.227	0.203
4	0.315	0.220	0.227	1.000	0.134
5	0.194	0.218	0.203	0.134	1.000

Table 3: Correlations between extracted factors.

	items	Cronbach's Alpha	Guttman split-half coefficient
CDS scale	1-29	0.938	0.921
Factors			
1	12, 22, 15, 8, 23, 19, 27, 26, 11	0.881	0.839
2	4, 1, 6, 13, 24	0.811	0.724
3	7, 25, 28, 9	0.778	0.790
4	17, 21, 14	0.724	0.680
5	18, 10	0.474	0.474

Table 4: Consistency of CDS scale and sub-scales.

range 0.430-0.735. This, in combination with the fact that the extracted factors were well determined, suggests that the sample size was adequate. Five components were extracted, based on Cattell's scree test. The five components solution accounted for 58.204% of the total variation. Initial eigenvalues of the five components were: factor 1=11.555, factor 2=1.564, factor 3=1.356, factor 4=1.247 and factor 5=1.157. In Table 2, which item load on the five components, are listed with their loadings. As we can see, the 12, 22, 15, 8, 23, 19, 27, 26 and 11 loading in factor 1. Factor 2 contained the items 4, 1, 6, 13 and 24. Factor 3 contained the items 7, 25, 28 and 9. Factor 4 contained the items 17, 21 and 14. Finally factor 5 contained the items 18 and 10. Six items did not load on any factor. Correlations between factors were low ranged from 0.134 to 0.314 (Table 3) and no complex variables were found.

Validity and Reliability of CDS scale

Interval consistency reliability:

Cronbach's alpha and Guttman split-half coefficient were used to evaluate interval consistency of CDS scale in 294 individuals (Table 4). The alpha coefficients and Guttman split-half coefficient of the CDS scale were 0.938 and 0.921, respectively. The corresponding values for the sub-scales are presented in Table 4. Essentially an alpha coefficient averages the inter-correlations between all the items in a particular test or sub-scale to give some indication of the extent to which a scale hangs together as a measure of a single dimension.

Test-retest

To investigate whether the CDS scale is influenced by external factors, we used the test-retest method in order to evaluate the test-retest reliability. Of the total 294 individuals participated in the study and initially answered the questionnaire, 98 were those who answered the questions of the questionnaire for a second time after one week. For each question we evaluated intraclass correlation coefficients to investigate the consistency between the two measurements.

Questions	Intraclass correlation coefficients	95% confidence interval
CDS total scale	0.883	(0.826-0.922)
1. Feeling unreal or cutoff from the world	0.779	(0.671-0.852)
2. Things look flat, as if looking at a picture	0.686	(0.531- 0.790)
3. Body feels as if it didn't belong to oneself	0.664	(0.498- 0.775)
4. Not feeling frightened in normally frightening situations	0.586	(0.382-0.722)
5. Favorite activities no longer enjoyable	0.603	(0.407- 0.734)
6. Feeling of being a detached observer of oneself	0.583	(0.378-0.721)
7. Flavour of meals no longer gives a feeling of pleasure or distaste	0.778	(0.668-0.851)
8. Body feels very light, as if it were floating on air	0.792	(0.689-0.861)
9. No emotions felt when weeping or laughing	0.791	(0.688-0.860)
10. Feeling of not having any thoughts at all	0.7	(0.552- 0.799)
11. Own voice sounds remote and unreal	0.714	(0.573-0.808)
12. Feel like hands or feet becoming bigger or smaller	0.647	(0.473-0.763)
13. Surroundings feel detached or unreal	0.763	(0.647-0.841)
14. Recently done things feel as if they took place a long time ago	0.717	(0.578-0.811)
15. See oneself outside, as if looking in a mirror	0.741	(0.613-0.826)
16. Personal memories feel as if one had not been involved in them	0.741	(0.613-0.826)
17. When in a new situation, feeling as if it had happened before	0.743	(0.616-0.828)
18. Unable to feel affection towards family and friends	0.694	(0.544-0.795)
19. Objects look smaller or further away	0.722	(0.586-0.814)
20. Unable to feel properly things touched with hands	0.805	(0.709-0.869)
21. Unable to picture things in mind	0.615	(0.426-0.742)
22. Feeling detached from bodily pain	0.839	(0.760-0.892)
23. Feeling of being outside the body	0.795	(0.694-0.862)
24. Feeling mechanical and 'robotic' when moving	0.792	(0.682-0.861)
25. Smell of things no longer gives feeling of pleasure or dislike	0.805	(0.710-0.870)
26. Detached from own thoughts like they have life of their own	0.748	(0.624-0.831)
27. Urge to touch oneself to be reassured of body existence	0.836	(0.755-0.890)
28. Unable to feel hunger or thirst	0.731	(0.599-0.820)
29. Previously familiar places look unfamiliar	0.689	(0.535-0.791)

Table 5. Test-retest reliability.

Values equal to 0.40 give the distinction point between sufficient and insufficient reliability. As we can see in Table 5, the test-retest reliability proved to be satisfactory. Individual items had good intraclass correlation coefficients, higher than the 0.5, which means that all questions have high levels

		Total CDS score		
		N	Spearman's rho	p-value
EPQ scale	Psychoticism	291	0,048	0.411
	Neuroticism	291	0.329**	<0.0001
	Extraversion	291	-0.159**	0.007
	Lie	291	-0.243**	<0.0001
SCL-90 scale	Summarization	291	0.222**	<0.0001
	Obsessive -Compulsive	291	0.416**	<0.0001
	Interper-Sens	291	0.233**	<0.0001
	Depression	291	0.395**	<0.0001
	Anxiety	291	0.342**	<0.0001
	Hostility	291	0.288**	<0.0001
	Phobic Anxiety	291	0.367**	<0.0001
	Paranoic Ideation	291	0.322**	<0.0001
	Psychoticism	291	0.399**	<0.0001
	General Symptomatic Index	291	0.393**	<0.0001
** Correlation is significant at the 0.01 level (2-tailed).				
* Correlation is significant at the 0.05 level (2-tailed).				

Table 6: Correlation of CDS with SCL-90 and EPQ scales.

of external validity. The intraclass correlation coefficients for the total CDS score was very good and equal to 0,883.

Criterion based validity

To measure the criterion validity of CDS scale, we compare it against the SCL-90 and EPQ scale. The CDS scale correlated highly with the SCL-90 and all subscales (p -value<0.0001). As expected the Greek CDS scale correlated highly with N, E and L subscales of EPQ scale (Table 6).

4. DISCUSSION

This study was undertaken to develop a Greek language version of the CDS and to assess its psychometric properties in patients with depersonalization symptoms. The translation process was relatively straightforward with only small differences between the original and the back-translated version of the questionnaire. The present study indicates that the Greek version of CDS scale, has good internal consistency with Cronbach's $\alpha = 0.938$ and Guttman split-half coefficient 0.921, respectively. Test-retest reliability was also satisfactory, with variables presenting high levels of external validity. Criterion base validity was evidenced by significant correlations between the Greek CDS-scale with the SCL-90 and EPQ scale. Simeon, D et. Al. (16) presents a factor analysis of the CDS with depersonalization disorder yielded fine underlying dimensions, in this study we aimed to test this model in a sample of Greek population and found also a five factor structure. One limitation of this study is that we did not assess the questionnaire in several populations, including healthy individuals. The main limitation for this study was that the gold standard for the diagnosis of major depression was not a standardized interview but clinical diagnosis by a psychiatrist.

- **Authors contribution:** Konstantinos Kontoangelos participated in the acquisition of data, analysis and interpretation of data, and wrote the first draft of the manuscript. Sofia Tsiouri Garyfalia Poulakou, Konstantinos Protopapa, Ioannis Katsarolis, Visaria Sakka, Dimitra Kavatha, participated in the study concept and design, interpretation of the data, and drafting and critical revision of the manuscript for important intellectual content. Antonios Papadopoulos participated in the acquisition of data and critical review of the manuscript for important intellectual content. participated in the acquisition and interpretation of data and critical review of the manuscript for important intellectual content. Anastasia Antoniadou participated in the interpretation of data and critical review of the manuscript for important intellectual content. Charalambos Papageorgiou participated in the study concept and design, acquisition and interpretation of the data, and drafting and critical revision of the manuscript and had the overall supervision and corrected the final draft. All authors read and approved the final manuscript.

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