CLINICAL SCALES, CRITERIA AND TOOLS

Factor structure and psychometric properties of the Dispositional Resilience Scale among Brazilian adult patients

Estrutura fatorial e propriedades psicométricas da Escala de Resiliência Disposicional para pacientes brasileiros adultos

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ABSTRACT

Objective: Verifying the psychometrics of a Brazilian version of the Dispositional Resilience Scale (DRS-15). **Methods:** Cross-cultural adaptation was done interviewing 65 adult patients. Validation was evaluated by application of the Lipp Brazilian Stress Symptoms Inventory (ISSL), Self-Report Questionnaire (SRQ), and other measures to 575 participants from the psychiatric ambulatories (for borderline personality, anxiety or post-traumatic stress disorders) and non-psychiatric ambulatories (chronic pain, pre-anesthetic consultation and companions for the latter). Temporal stability was verified with 123 participants. **Results:** Exploratory factor analysis yielded a three-factor solution. Psychometrics were acceptable (alpha coefficient, 0.71; intraclass correlation coefficient, 0.81). Correlations with the ISSL, SRQ and other measures were noted except for factor 3. In the psychiatric sample, hardiness scores of borderline patients were lower than those of patients with anxiety disorders. **Conclusion:** This version of the DRS-15 exhibited good reliability in a sample of Brazilian patients; validity was confirmed in two of the scale factors.

Keywords: resilience, psychological; scales; cross-cultural comparisons; validation studies; borderline personality

RESUMO

Objetivo: Verificar as propriedades psicométricas da versão brasileira da Escala de Resiliência Disposicional (DRS-15). **Métodos:** A adaptação transcultural foi feita com 65 pacientes. A validação foi estudada pela aplicação do Inventário de Sintomas de Stress para Adultos de Lipp (ISSL), Self-Report Questionnaire (SRQ) e outros instrumentos a 575 participantes de ambulatórios psiquiátricos (transtorno borderline de personalidade, ansiedade ou transtorno de estresse pós-traumático) e não-psiquiátricos (dor crônica, avaliação pré-anestésica ou acompanhantes). A estabilidade foi verificada com 123 participantes. **Resultados:** A análise exploratória revelou três fatores, com propriedades aceitáveis (alfa de 0,71; coeficiente de correlação intraclasse de 0,81). Notaram-se correlações com o ISSL, SRQ e demais instrumentos, exceto para o fator 3. Na amostra psiquiátrica, a resiliência disposicional dos pacientes borderlines foi menor que a dos pacientes com transtornos de ansiedade. **Conclusão:** Esta versão da DRS-15 apresentou boa confiabilidade numa amostra de adultos; a validade foi confirmada para dois fatores da escala.

Palavras-chave: resiliência psicológica; escalas; comparação transcultural; validação; transtorno da borderline personalidade.

Resilience is a construct associated with the ability to adapt when challenged by stressors or adversities, or to strive despite the toughness of an experienced circumstance[1]. The concept is rooted in other fields of science – physics, engineering and dentistry – where it relates to the resistance of materials[2]. Resilient people are able to adjust rapidly to life adversities, thus keeping their trajectories of wellness.

Since the allegoric translation of resilience as a psychological construct, some features usually displayed by resilient people have been reported: hardiness (also named dispositional resilience), self-esteem, realistic optimism, high positive emotionality, spirituality, sense of purpose in life, and so forth[3].

On the stress-health interface, some investigators emphasized that hardiness may be protective to some individuals who

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maintain (or regain) stability when faced with stressors or adversities[4,5]. Theoreticians on the hardiness construct tend to conceptualize it as a personality dimension composed of the confluence of three facets: control, commitment and challenge[6]. A hardy person would be one who perceives him/herself as being in control of their life trajectory, keeps an inner commitment to his/her endeavors, and has the tendency to see stressors as challenges or opportunities to change. Hardiness has been considered a predictor of adaptation to stress/trauma and mental health[1,5] and some studies have indicated that the lower the individual's hardiness the higher the scores on self-reported measures of physical and psychological symptoms[7,8].

Although seminal research on psychological resilience focused on children in unfavorable conditions (poverty, maltreatment)[9,10], more recent studies have also focused on (a) the traumatic experience of both children and adults and (b) the interrelationships between resilience and chronic stressors[11]. Among chronic stressors, attention has been paid to people enduring chronic illnesses and ailments[12,13]. In a country like Brazil where the population is rapidly growing older, the resilience/hardiness of people facing chronic diseases is of concern[14].

There has been a remarkable interest in developing assessment tools to measure individual resilience. A review by Windle, Bennett, and Noyes analyzed 15 measures[15]. One of these, the Dispositional Resilience Scale (DRS) was developed by Bartone to cover the three facets of dispositional resilience (control, commitment and challenge)[6]. The objective of the present study was to verify the reliability and validity of a culturally adapted Brazilian Portuguese version of the Dispositional Resilience Scale (DRS-15) in a convenience sample of adult psychiatric and non-psychiatric patients.

METHODS

This study was approved by the Ethical Review Board of a tertiary teaching hospital (*Comissão de Ética para Análise de Projetos de Pesquisa*). Cultural adaptation procedures were made in accordance with guidelines proposed by Beaton et al.[16]

Participants

For the cross-cultural adaptation phase, adult patients (18 years or older) were approached in the waiting rooms of either the general ambulatory of anxiety disorders or ambulatory of pre-anesthetic consultation for elective surgeries of the school of medicine teaching hospital. For the validation phase, patients from the waiting rooms of the programs for borderline personality disorder, post-traumatic stress disorder, chronic pain ambulatory and adult companions to the pre-anesthetic consultation patients were also approached. All participants consented to become subjects of the study, signing an informed consent prior to the interview initiation in both study phases. In both phases all participants answered the questionnaires by themselves in the presence of the interviewer who previously had read each study

item and response options to the participant (assisted application). The interviewers were equally trained to approach each potential participant and to ascribe their eligibility for becoming a participant. Reading and hearing disabilities and cognitive impairment halted the interview or led to its exclusion (exclusion criteria of the study protocol). Psychiatric patients were interviewed only after the consultant psychiatrist had stated that her/his diagnosis was one of those pre-specified in the inclusion criteria of the study protocol (borderline personality, post-traumatic stress disorder or other anxiety disorder).

Measures

The Dispositional Resilience Scale (DRS-15)

The DRS-15 was developed by Bartone as a means to assess relatively stable traits of dispositional resilience (control, commitment and challenge). The DRS-15 tries to determine those constructs by means of 15 items (five in each of them). The scale used in the present study is its first version, where there are four items that are code-reverted (items 3, 4, 11 and 14). The response options are "not at all true", "a little true", "quite true", and "completely true". Its original validation study was done with a sample of 700 military men and women. Internal consistency was found to be 0.83 for the entire scale and varied from 0.70 to 0.77 in the three subscales[6].

The Lipp Stress Symptoms Inventory (ISSL)

The ISSL was locally developed and validated by Lipp[17] in a community sample of adults (Cronbach's alpha, 0.91). It pools physical (37 items) and psychological (19 items) symptoms related to stress, with yes/no responses. The ISSL comprises six subscales, addressing physical and psychological symptoms occurring during the last 24 hours, week and month.

The Self-Report Questionnaire (SRQ)

The SRQ is a widely-used screening tool for detecting common mental disorders (depression, anxiety and somatoform ailments). In Brazil it was validated by Mari & Williams[18].

The Sheehan Disability Scale (SDS)

The SDS comprises three subscales to assess the extent to which the symptoms and/or stressors experienced by the individual are disturbing his family routines, work performance and social relations. Respondents qualify such limitations on visual analogical scales from zero (no limitation) to ten (maximum limitation)[19].

The Chronic Pain Grade (CPG)

The CPG was developed and validated on a clinical sample of patients with back pain, migraine and/or facial pain[20]. The CPG displays to the respondent six visual analogical scales (0-10), the first three addressing pain intensity and the others addressing severity of limitation due to pain. The CPG has been adapted and validated for the Brazilian culture[21].

Cross-cultural adaptation phase

For the cultural adaptation phase, two specialists in English-Portuguese translations independently prepared Portuguese versions of the DRS-15. A synthesis of the two versions was obtained by consensus agreement. A cultural adaptation committee (CAC) was then created, including both specialists in English-Portuguese translations, a psychologist, a psychiatrist, an epidemiologist and a physical medicine and rehabilitation doctor. Comprehension of the Portuguese version was verified through interviews with subjects of the target population, during which the respondents were asked about their understanding of each question and invited to offer suggestions for words or expressions that might clarify their meaning. At three successive meetings, the CAC discussed the ongoing results of the interviews and suggested changes in the Portuguese version, aiming at comprehension improvement while maintaining the equivalence with the original instrument. The final version was defined after 60 patients had been interviewed. Two independent back-translations of the final version were made by native English speaking professional translators, and a synthesis was agreed upon by consensus. The author of the original instrument was contacted, and agreed that conceptual equivalence had been maintained between the back-translation and the original instrument. The Figure presents a flowchart with the cross-cultural adaptation process.
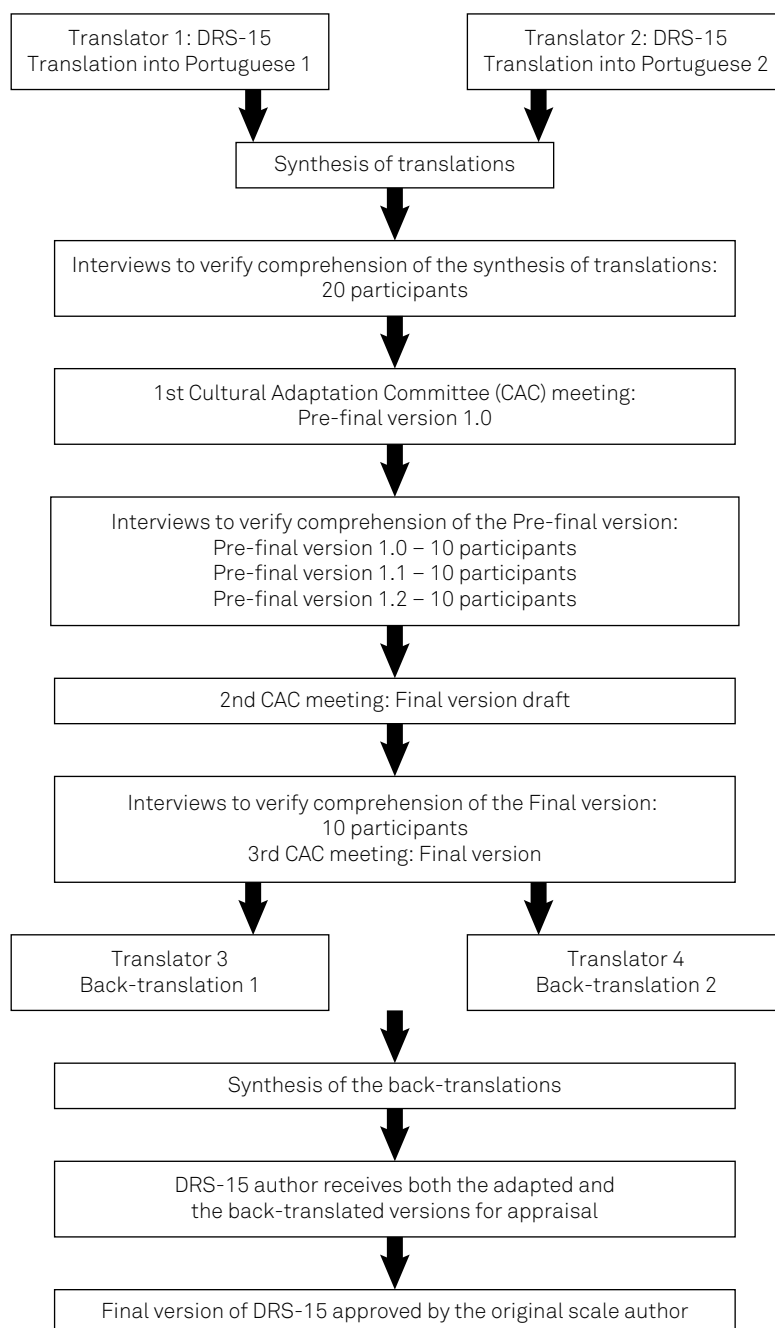

Figure. Dispositional Resilience Scale cross-cultural adaptation phase.

Validation phase

Validation studies included the concurrent application of the DRS-15, ISSL, SRQ, SDS and CPG to 575 participants from the hospital ambulatories.

We hypothesized an inverse relationship between hardiness and self-report of distressing symptoms as measured by the ISSL, SRQ and the subscale of pain intensity of the CPG; we also hypothesized an inverse relationship between hardiness and the self-reported negative impact of those symptoms (as measured by the SDS) and the two subscales of activity limitation due to pain of the CPG (severity and days of limitation). In other words, lower hardiness was expected to be associated with higher scores in those instruments. We also expected that patients enduring chronic pain would probably display greater hardiness scores, and that the borderline patients would have the lowest ones.

Test-retest reliability was determined by a second interview between seven and 14 days after the first encounter.

Data analysis

Descriptive analysis established the demographic and clinical characteristics of the sample. Cronbach's alpha coefficient was used to assess internal consistency among the items. Exploratory factor analysis was performed over the validation phase data (n = 575). Principal components with eigenvalues above 1.0 were selected for oblique (direct oblimin) rotation. The distribution of the DRS scores was checked for normality using the Kolmogorov-Smirnov test.

A first exploratory factor analysis yielded three components accounting for 48% of the total variance of the scale. It was noted that the first component covered ten items of the DRS-15, leaving the second and third components with only three and two items, respectively. Furthermore, the content domains of those ten items were somewhat disparate; for example, "most of life gets spent doing things that are worthwhile" (item 1) and "by working hard you can nearly always achieve your goals" (item 6). It was also noted that an item (the fourth) presented some problems: firstly, its wordings elicited a negative affect, instead of positive ones like all other scale items ("working hard doesn't matter much, since only others profit from it"); secondly, it had a low item-total correlation (0.127 compared to the mean item-total of the other items, 0.317; and thirdly, the Cronbach's alpha coefficient of the scale could be improved from 0.701 to 0.709 by removing the item. Such considerations led the CAC to proceed to a second exploratory factor analysis after dropping item 4. The second factor analysis again resulted in a three-factor solution, though with items conceptually related to each other in ways that interpreting the factors would be feasible on the grounds of the hardiness theoretical framework.

The intraclass correlation coefficient was calculated with a subsample of the interviewees (n = 123). Spearman's coefficient correlations were used to assess construct validity. The mean scores of hardiness across the six subsamples of the validation phase were tested for differences by ANOVA and the Dunn's test for multiple comparisons.

RESULTS

Descriptive statistics

The subjects were mostly women (428; 74%), with an average of 44 years of age (18–81) and 10 years of formal schooling. There was a predominance of married people (56%) and of socioeconomic levels B or C (92%) on an A to E scale. Table 1 shows the distribution of the sample according to socio-demographic characteristics.

Factor structure and reliability

Principal component analysis of the scale yielded three components, with eigenvalues of 3.68, 1.99 and 1.04. Those values accounted for, respectively, 26.3, 14.3 and 7.4% of the total variance. Oblique rotation was done with this three-factor solution, and the resulting factors were named in accordance with the original scale: *control*

Table 1. Demographic characteristics of participants in the validation phase.

Variable	Number	Percentage
Age		
18–25	50	8.7
25–35	112	19.5
35–45	139	24.2
45–55	153	26.6
55–65	83	14.4
> 65	38	6.6
Sex		
Female	428	74.4
Male	147	25.6
Years of formal schooling		
0–3	10	1.7
4–7	112	19.5
8–10	88	15.3
11–15	365	63.5
Self-rated ability to read		
Can read very well	186	32.3
Can read well	262	45.6
Can read reasonably well	116	20.2
Can read badly	11	1.9
Group		
(1) Pre-anesthetic consultation	129	22.4
(2) Chronic pain	120	20.9
(3) Anxiety general	96	16.7
(4) Anxiety - PTSD	44	7.7
(5) BPD	42	7.3
(6) Group (1) patients' companions	144	25.0

PTSD: post-traumatic stress disorder; BPD: Borderline personality disorder.

(items 2, 6, 7, 13, 15), *commitment* (items 1, 8, 9, 10, 12), and *challenge* (items 3, 5, 11, 14) (Table 2).

The scale was completed a second time by 123 participants (interval 7-14 days, median 10 days). Psychometrics related to intraclass correlation coefficients are shown in Table 2.

Construct validity

Thirteen subscales were used as a means of testing construct validity: the six subscales of the ISSL, the SRQ, the three subscales of the SDS and the three indices derived from the CPG. Correlations were calculated between each of these items against the total score and the three factors of the DRS (Table 3). Significant negative correlations were observed between the DRS total score and all but one of the six subscales of the ISSL, and as well as with the SRQ and the SDS subscales. Spearman correlation coefficients varied from -0.402 to -0.176 ($p < 0.001$). Overall, such correlations were stronger for factor 2 than for factor 1. Factor 3 did not correlate with the other two factors.

Stronger correlations were observed with ISSL psychological rather than physical dimensions of stress symptoms of both the previous week and month. Of the three dimensions of SDS, the one of social impairment had a stronger correlation with the DRS and its factors 1 and 2. Weak correlations were found between the DRS (and its factor 1) and the ISSL dimension of psychological stress symptoms of the previous 24 hours. Of the dimensions of the CPG, there was a significant although modest negative correlation between pain intensity and DRS factor 1 (-0.193 at $p < 0.05$).

Table 4 comparatively shows the mean resilience scores within the six subgroups. The three groups of psychiatric patients presented with lower hardiness scores. These were further compared by means of Dunn's test for multiple comparisons. The DRS scores of borderline patients were lower than those of PTSD patients ($p < 0.001$) and those of anxious patients in general ($p = 0.013$). The difference between the hardiness scores of PTSD and anxious patients in general was not significant ($p = 0.166$).

DISCUSSION

This paper reports the cross-cultural adaptation and validation of a version of the DRS in clinical samples of adult psychiatric and non-psychiatric patients. The version has shown adequate reliability. A three-factor solution seemed to fit well with the theoretical framework of dispositional resilience.

Table 3. Spearman correlations between the dispositional resilience scale (DRS), its factors and the comparison with external variables.

Variable	DRS	Factor 1	Factor 2	Factor 3
DRS	1			
Factor 1	0.709**			
Factor 2	0.744**	0.530**		
Factor 3	0.463**	-0.094*	0.003	
Lipp-mb	-0.255**	-0.202**	-0.244**	-0.068
Lipp-mp	-0.355**	-0.270**	-0.402**	-0.069
Lipp-wb	-0.259**	-0.191**	-0.248**	-0.067
Lipp-wp	-0.286**	-0.219**	-0.321**	-0.051
Lipp-db	-0.237**	-0.176**	-0.247**	-0.049
Lipp-dp	0.096*	0.104*	0.026	0.051
SRQ	-0.370**	-0.298**	-0.393**	-0.070
Sheehan-f	-0.261**	-0.204**	-0.293**	-0.035
Sheehan-w	-0.225**	-0.179**	-0.293**	-0.016
Sheehan-s	-0.336**	-0.266**	-0.383**	-0.038
CPG-i	-0.112	-0.193*	-0.175	0.105
CPG-l	-0.010	0.015	-0.171	0.096
CPG-d	0.090	0.150	-0.075	0.107

*$p < 0.05$; **$p < 0.01$; wb: body symptoms of last week; wp: psychological symptoms of last week; mb: body symptoms of last month; mp: psychological symptoms of last month; db: body symptoms of last day; dp: psychological symptoms of last day; SRQ: Self-Reporting Questionnaire; Sheehan-f: symptoms affect family relations; Sheehan-w: symptoms affect work activities; Sheehan-s: symptoms affect social/leisure activities; CPG-i: pain intensity; CPG-l: activity limitation due to pain; CPG-d: number of days of limitation.

Table 2. Items associated with each Brazilian dispositional resilience scale (DRS) factor.

Variable	Eigenvalue	%Var Explained	Alpha	ICC	Items
DRS complete scale			0.71	0.81	
Factor 1: Control	3.68	26.3	0.66	0.70	2, 6, 7, 13, 15
Factor 2: Commitment	1.99	14.3	0.72	0.78	1, 8, 9, 10, 12
Factor 3: Challenge	1.04	7.4	0.64	0.69	3, 5, 11, 14

Var: variance; ICC: Intraclass correlation coefficient.

Table 4. Dispositional resilience scale (DRS), DRS factor 1, and DRS factor 2 cross-groups means and means ranks on a Kruskal-Wallis test.

Group	N	DRS		DRSF1		DRSF2	
		Mean	MR*	Mean	MR**	Mean	MR***
P-A	129	29.8	338	11.8	328	11.9	340
Pain	120	28.4	296	11.5	315	11.4	313
Anxiety	96	24.8	210	9.3	211	9.5	215
PTSD	44	26.5	252	10.7	277	10.2	248
BPD	42	20.0	134	7.6	136	6.9	118
Companions	144	29.9	344	11.8	329	11.8	331

P-A: pre-anesthetic consultation; PTSD: post-traumatic stress disorder; BPD: borderline personality disorder; DRS-F1: factor 1 (Control); DRS-F2: factor 2 (Commitment); MR: mean rank on the Kruskal-Wallis test; *Chi-square 88.11, $p < 0.001$; **Chi-square 76.38, $p < 0.001$; *** Chi-square 90.79, $p < 0.001$.

This version of the DRS-15 exhibited an inadequacy in one of its items (the fourth), which led us to factor analyze a version without it. With the exclusion of the item, the factor structure of the DRS turned out to be more resonant with the proposed theoretical grounds of control, commitment and challenge as facets of the hardiness construct. Factor 1, *control*, covered three out of five items of the control dimension of the original English scale (items 2, 6 and 15). Factor 2, *commitment*, also covered three out of five items of the commitment dimension of the original scale (items 1, 10 and 12). Finally, factor 3, *challenge*, covered four out of five items of the challenge dimension of the original scale (items 3, 5, 11 and 14).

It must be pointed out that factor 3 did not show correlation with the other two factors. This might be due to a response-set bias, since these items have inverted polarity (and therefore must be code-reverted before computing). It is possible that the respondents did not recognize the inverted polarity while giving their answers. In fact, functional illiteracy is a reality in our country as well as being reported elsewhere[22]. A report from the same hospital identified that functional illiteracy among our patients was as high as 47%[23].

This contamination of factor 3 by a response-set bias is also likely to explain the absence of correlations between factor 3 and the external variables used to explore construct validity. Table 3 shows that there were significant correlations for factors 1 and 2 against those variables. If a response-set biased the answers to the code-reverted items of factor 3 in a subset of respondents, a possible correlation between factor 3 and the external variables may have been diluted. A sensible recommendation would be to avoid assessing our population with code-reverted items. Refinements of resilience scales have already been proposed. Campbell-Sills and Stein proposed a ten-item version of the 25-item Connor-Davidson resilience scale[24]. An 11-item version of the Resilience Scale (from Wagnild and Young, with 25 items) has also been cross-culturally adapted and validated[25].

An alpha coefficient of 0.71 demonstrates good internal consistency for the scale. Another way of establishing reliability is searching for stability and adequate intraclass correlation coefficients testifying good temporal stability either of the entire scale (0.81), or of its subscales (0.70, 0.78 and 0.69, factors 1 to 3, respectively). For Cicchetti and Sparrow[26], intraclass correlation coefficients between 0.60 and 0.74 are good and those above, excellent ones.

As expected on theoretical grounds, hardiness scores correlated negatively with the SRQ, with the three SDS subscales and the majority of the ISSL dimensions. The lack of correlation between the DRS-14 and the ISSL dimension of psychological symptoms of the last 24 hours can be attributed to the fact that these ISSL dimensions aggregate only three items, all of them with antagonistic values in relation to all other ISSL items – the three evoke "positive" feelings ("sudden urge to start new projects; feeling excitement; having increased motivation") instead of "negative" distressing symptoms ("dry mouth; dizziness; tiredness")[17].

This study did not demonstrate correlation between chronic pain and hardiness, with only one modest negative correlation arising from factor 1 (control) and pain intensity (0.193, p < 0.05) (Table 3). Nevertheless, the CPG has shown appropriate psychometrics in its validation study[21]. It is possible that in our sample of chronic pain outpatients, a response-set may have biased the participant's answers to endorse high levels of symptoms, regardless of their inner dispositional resilience, since those responses would assure them of the continuity of care in our chronic pain ambulatory clinic. In the CPG validation study, data on chronic pain were collected from the community. Indeed the chronic pain sample exhibited a tendency to score higher in the CPG (pain assessment) than on the other measures in which the word *pain* was not mentioned – which can indicate the presence of a response-set bias.

Significant differences in resilience scores were found when a Kruskal-Wallis ANOVA compared the means across the six study groups. The psychiatric groups presented with significantly lower scores (Table 4). There have been indications that hardiness is a predictor of mental health, and low hardiness is associated with psychiatric conditions (particularly anxiety disorders)[27,28]. Of note, the borderline patients had the lower resilience scores. As expected, such BPD patients performed even worse in a self-reported measure of resilience than the PTSD patients, perhaps because their inner sense of self incoherence causes them to become distress-intolerant individuals[29,30]. Current psychiatric literature provides plenty of studies on resilience and PTSD, and none on resilience and BPD. Borderline patients should also become a paradigmatic source of information regarding the hardiness/resilience constructs.

This study has limitations. Firstly, it is not population based. The absence of a sample from the community precludes any inference about the dispositional resilience of our population. Secondly, no rigid criteria for participant accrual were adopted. Nevertheless, the six study subsamples were all derived from the same population (clients of the same hospital), which can have some degree of restricted selection bias. Thirdly, misclassification is of concern since psychiatric diagnoses were ascertained on clinical grounds and not by the concurrent application of diagnostic assessment tools. It is worth noting, however, that the three psychiatric subsamples were identical regarding demographic and socioeconomic characteristics and the patients were all interviewed in the same way. Therefore, despite the potential for a non-differential misclassification bias, significant differences were found between the hardiness scores of the three subsamples of psychiatric patients. If this misclassification is absent (or lessened by the use of diagnostic assessment tools), the difference yielded could have been even greater.

The objective of making available to local researchers an instrument to measure dispositional resilience among adults in clinical settings seems to have been attained, after some refinements were done on the original instrument. After excluding item 4, the DRS showed adequate reliability, temporal stability and partial construct validity. Construct validity was not totally confirmed because the code-reverted items of Factor 3 (challenge) seemed not to have been understood by the sample. Up until now, local researchers have been trying to assess if the construct of hardiness would better work with factors 1 and 2 generated from the present adaptation study. In other words, a refined ten-item version of the DRS should be used locally.

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