Original Article

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The Stages of Change Scale Among Brazilian Alcohol Dependents

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Abstract

The aim of this study was to investigate the reliability and factor structure of the 32-item University of Rhode Island Change Assessment Scale (URICA) by performing confirmatory factor analysis (CFA) on 326 first-referral outpatients with alcohol dependence. Results suggest that the Brazilian version successfully measured the proposed factors while incorporating a correlational structure of the factors (precontemplation, contemplation, action, and maintenance). Internal consistency ranged from 0.77 to 0.79 according to Cronbach's alpha, indicating acceptable reliability for URICA, with the exception of the Maintenance scale (0.63). The results have been compared with previous work, and the reasons for discrepancies are discussed.

Key Words: alcoholism, motivation, factor analysis, validation studies

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One of the most-used questionnaires to assess motivation for change in addiction is the University of Rhode Island Assessment (URICA)—a 32-item assessment with subscales corresponding to 4 of the stages of change that describe the process of change in human behavior.[1] These stages are precontemplation (when an individual believes that he does not have a problem); contemplation (when pros and cons of change are being considered); action (when efforts to change are underway); and maintenance (when efforts are focused on sustaining improvements).

Initially, URICA's psychometric properties were studied using a sample of psychotherapy patients and individuals who reported serious psychiatric problems. Subsequently, it was evaluated again for a variety of substance-related disorders, including nicotine, alcohol, cocaine, and alcohol dependence, polysubstance dependence, eating disorders, and for dually diagnosed populations.[2]

Support for URICA's 4-factor solution has been mixed.[3] To date, the most common analytical strategy used in evaluating the factor structure of the URICA has been principal-components analysis. Pantalon and colleagues[2] evaluated confirmatory factor analysis (CFA) strategy, whereby each of the 4 factors was evaluated independently. These results replicated the original 4-factor structure of the URICA and suggest an acceptable fit.

Although URICA's psychometric data has been questioned, examples drawn from research corroborate URICA's clinical usefulness and stages of change.[4-6]

In a bid to study the stages of change in alcohol dependent outpatients, the goals of the present study were as follows: (1) to develop and investigate the Portuguese version of URICA, with cross-cultural adaptation for Brazil, for alcohol-dependent, first-referral outpatients; and (2) to study the psychometric properties of the Brazilian version of the URICA, including both confirmatory analysis and internal consistency of the factors.

METHODS

Setting

The study was performed at a Federally-funded, public, teaching hospital. A gastroenterology clinic and an alcohol treatment clinic were used. Inclusion criteria were: (i) At the alcohol treatment clinic: all patients who scored mild, moderate, or severe on the SADD.[7] (ii) At the gastroenterology clinic: all patients scoring 8 or more on the AUDIT.[8]

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These same criteria were applied throughout the study period. The exclusion criteria were: poly drug users and women (given there were so few females).

Subjects

A total of 151 patients were interviewed at the gastroenterology clinic and 175 at the alcohol treatment clinic at first appointment and by trained interviewers. Seven patients at the gastroenterology clinic refused to take part in the study.

The study was approved by the Ethics Committee for Medical Research of the Federal University of São Paulo, Brazil. All subjects signed an informed consent form prior to their participation in the study.

Mean age of subjects was 44 years (SD = 11), where 72% were white, 84% were in either part- or full-time employment, and 57% had at least 8 years' schooling while 38% had some form of higher education. On the Severity of Alcohol Dependence scale, 19% scored mild, 34% moderate, and 47% severe. Patients had consumed a mean of 81.5 units of alcohol in the last 30 days and had been drinking at this level for 20 weeks on average.

Measures

(i)   Demographic data;
(ii) University of Rhode Island Change Assessment Scale (URICA)[1];
(iii) Short-Form Alcohol Dependence Data Questionnaire (SADD)[7];
(iv) Pattern of alcohol consumption using the interview schedule developed for the WHO/ISBRA[9].

Translation and Cultural Adaptation Process of the URICA

The scale was first translated into Portuguese by 2 researchers with a good command of English and each version then piloted. Several complex questions required simplifying, as patients tended to answer only one part of the question (questions 6, 9, 16, 20, and 22). A committee of 5 bilingual health care professionals reviewed the questionnaire before re-piloting. Finally, a back-translation of this final draft was made.

Statistical Analysis

To investigate the factor structure of the 32-item, stages-of-change scales, 2 first-order confirmatory factor analyses (CFA) were performed—one using all, and a second only some, of the items corresponding with the subscales proposed by McConnaughy et al,[1] and using independent and correlated factors, respectively.

Item and reliability analysis by SPSS removed those items having low correlation.

The CFA was achieved though the CALIS (Covariance Analysis of Linear Structural Equations) using the SAS procedure. The fits of the models were assessed using 4 indices: (i) the Goodness of Fit Index (GFI), which ranges from 0 to 1, with 0.90 or higher being evidence of a model with a good fit[10]; (ii) χ^2 to under 2 degrees of freedom ratio $(X2/\text{df})$[11]; (iii) root-mean-square error of approximation (RMSEA) of under 0.08.[12]

Descriptive statistics analysis of the stages along with correlation among them was performed, while the reliability of the factors was measured by examining internal consistency using Cronbach's alpha.

RESULTS

Confirmatory Factor Structure of the URICA

A first CFA considering 4 models with independent factors was planned to test the model adjustment, and to examine the factorial structure between the factors, in line with evidence drawn from a number of studies on URICA. The maximum-likelihood solution yielded a χ^2 of 1405.47 (df = 464 $P <$ 0.01); a GFI of 0.785 and RMSEA of 0.079; with a $X2/\text{df}$ ratio of 3.03, demonstrating that the 4 models did not adjust to the data[10-12]. Reliability and item analysis suggested that item 2, 3, and 9 had low correlations with other items. Additionally, after considering observations by Pantalon and colleagues,[2] item 9 was also removed.

A second CFA analysis was carried out, omitting items 2, 3, and 9, and considering a correlated structure between the factors

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wherever evidence of correlation was obtained. The fit statistics were improved following this procedure. The maximum-likelihood solution yielded a χ^2 of 852.06 (df = 371 $P < .0.01$); a GFI of 0.843 and RMSEA of 0.063; and a $X2$/df ratio of 2.29.

The χ^2 statistics showed that the second model did not adjust to the data, although some authors have suggested that this criteria often cannot be met.[13,14] However, other indices, such as the RMSEA, have proved suitable for all models according to Browne and Cudeck,[12] with the value of less than or equal to 0.08 representing reasonable fit. The goodness-of-fit index (GFI) in the second CFA suggested an adequate to good fit, in that the value either exceeded or closely approached this value, yielding a cutoff of 0.9 and a $X2$/df ratio of less than or close to 2.[11]

Reliability and Item Analysis

The items making up factor 1 (precontemplation) showed lower correlations with the other items (Corrected item-total correlation) but were over 0.3; whereas for factor 2 (contemplation), they were all around 0.43, with the exception of item 2 (0.19). The correlations for factor 3 (Action) were all around 0.47, with the exception of item 3 (0.21); while for factor 4 (Maintenance), values stood at about 0.27, with the exception of item 9 (0.15). Exclusion of these items improved the reliability.

Table 1 shows the reliability and CFA analysis of the URICA final version with correlated factors, and with items 2, 3, and 9 omitted. The reliability analysis showed adequate corrected item-total correlation for the item under the corresponding factor. Internal consistency was acceptable according to Cronbach's alpha, which ranged from 0.77 to 0.79 for the URICA subscales, except for the Maintenance factor, which had lower reliability (0.63) compared with the other factors. The CFA showed the factor weights for the items under the corresponding factor along with their level of significance. The items were acceptable under their corresponding factor in all cases.

Correlation Among the Factors

Significant positive and negative estimated correlations among the 4 factors were observed. Negative correlations between precontemplation and other factors were found (contemplation = −0.42, t-value = −7.19; action = −0.29, t-value = −4.65; and maintenance = −0.34, t-value = −4.94), whereas positive correlation between contemplation and action (0.90, t-value = 34.18), contemplation and maintenance (0.56, t-value = 34.18), and maintenance and action (0.53, t-value = 8.64) was seen. These results suggest that the 4 factors are not independent and that highest correlations are observed between contemplation and action.

DISCUSSION

The purpose of this article was to evaluate the psychometric properties of the Brazilian version of the URICA among alcohol-dependent outpatients. The results suggested our data are consistent with a 4-factor structure. The factors are not independent but are in fact strongly correlated with each other. The version obtained does not encompass items 2, 3, and 9, which showed lower correlation with the other items within the factor. These items aside, the internal consistency of the factors is acceptable, excepted for the Maintenance factor. Taking this into account, the URICA scale's psychometric properties were deemed adequate for first-referral outpatients.

In interpreting our results we must also examine the process by which the questionnaire was translated, given this could have affected its performance. A poor translation may affect the internal consistency, reliability, and validity of an instrument originally developed in another language and culture. We followed a meticulous process to ensure that a semantically equivalent, reliable, and valid version was produced; indeed, psychometric analysis showed that our version had good internal consistency. The authors did resort to changing the structure of 5 questions (items 6,

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TABLE 1. Reliability Analysis With Cronbach's Alpha and Confirmatory Factor Analysis With Factor Weight Using the Data from This Study Modeled on the Proposed Correlated 4-Factor Structure of the University of Rhode Island Change Assessment Scale (URICA)

Items	Reliability Analysis (Corrected Item-Total Correlation)				Confirmatory Factorial Analysis (factor weights)			
	PC‡	C§	A¶	M‖	PC‡	C§	A¶	M‖
U1	0.378*				0.412†			
U5	0.603*				0.717†			
U11	0.554*				0.712†			
U13	0.558*				0.623†			
U23	0.321*				0.298†			
U26	0.478*				0.532†			
U29	0.449*				0.500†			
U31	0.469*				0.561†			
U4		0.464*				0.538†		
U8		0.517*				0.588†		
U12		0.607*				0.659†		
U15		0.500*				0.583†		
U19		0.428*				0.505†		
U21		0.621*				0.703†		
U24		0.587*				0.684†		
U7			0.522*					0.654†
U10			0.451*					0.559†
U14			0.599*					0.683†
U17			0.394*					0.474†
U20			0.321*					0.387†
U25			0.490*					0.583†
U30			0.590*					0.717†
U6				0.347*			0.480†	
U16				0.356*			0.369†	
U18				0.431*			0.612†	
U22				0.353*			0.370†	
U27				0.369*			0.530†	
U28				0.299*			0.401†	
U32				0.344*			0.443†	
Chronbach's alpha	0.772	0.798	0.734	0.631				

*Significant at the 0.01 level (2-tailed).
†Significant at the 0.01 level (2-tailed).
‡PC = Precontemplation.
§C = Contemplation.
¶A = Action.
‖M = Maintenance.

9, 16, 20, and 22), which may have altered the performance of the questionnaire. We felt these changes were necessary so as to enable all outpatients to answer all the questions fully, although the solution was not entirely satisfactory. However, of these 5 items, only item 9 was finally removed from the analysis, due to its low internal consistency. It is important to note that this item had also been removed in another study.[2]

The Maintenance scale had a lower internal consistency, and some explanations for this are: (1) the change in the structure of 5 items, 4 being from the Maintenance scale (items 6, 9, 16, and 22), where this change altered the scale; (2) our belief that first-referral outpatients are seldom found at the maintenance stage at a first appointment for treatment. These explanations outline several limitations of this study. Nevertheless, we carried out the modifications because the outpatients tended to answer the complex questions by answering only the first half of the question, without reference to the second

half. We observed that this tendency was influencing the validity and the internal consistency of the scale and that the modifications would improve the instrument.

Another limitation of this study relates to the low internal consistency of 3 items corresponding to contemplation and action stages. These items addressed general questions about self-improvement and resolution of problems, presenting a challenge to devise these items in such a way as to be more meaningful to our culture.

The stages of change offer an integrative framework for understanding changes in human behavior and remain popular with clinicians and researchers in the addiction field, although the validity of the model has been questioned.[15-17] Given this questioning, further work is necessary to investigate the factor structure in different clinical and cultural populations. For this model to be developed, it will have to pass a transcultural test. To date, very few studies have analyzed the URICA outside Anglo Saxon countries. Our study has shown that a substantial part of the URICA was valid and that the psychometric data was sound. Further studies in different cultures will show how this important instrument could be improved, particularly at specific points in the treatment.

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REFERENCES

1. McConnaughy EA, Prochaska JO, Velicer WF. Stages of change in psychotherapy: measurement and samples profiles. *Psychoth*. 1983;20:368-375.

2. Pantalon MV, Nich C, Frankforter T, et al. The URICA as a measure of motivation to change among treatment-seeking individuals with concurrent alcohol and cocaine problems. *Psych Addict Behav*. 2002;16:299-307.

3. Carey KB, Purnine DM, Maisto SA, et al. Assessing readiness to change substance abuse: a critical review of instruments. *Clinic Psych: Scienc Pract*. 1999; 6:245-266.

4. Project MATCH Research Group. Matching alcoholism treatment to client heterogeneity: project MATCH post treatment drinking outcomes. *J Stud Alcohol*. 1997;58:7-29.

5. Carbonari JP, Diclemente CC. Using transtheoretical model profiles to differentiate levels of alcohol abstinence success. *J Consult Clin Psychol*. 2000;68: 810-817.

6. Hernadez-Avila CA, Burleson JA, Kranzler HR. Stage of change as a predictor of abstinence among alcohol-dependent subjects in pharmacotherapy trials. *Subst Abus*. 1998;19:81-91.

7. Jorge MR, Masur J. The use of the Short-Form Alcohol Dependence Data Questionnaire (SADD) in Brazilian Alcoholic Patients. *Br J Addict*. 1985;80: 301-305.

8. Méndez EB. A Brazilian version of the AUDIT (Alcohol Use Disorders Identification Test). Unpublished master dissertation, Universidade Federal de Pelotas—Social Medicine Department Post-Graduate Program, 1999.

9. Tabakoff B. The WHO/ISBRA study on state and trait markers in alcoholism: progress report. *Alcohol Clin Exp Res*. 1996;20(8 Suppl):243A-247A.

10. Byrne BM. *Structural Equation Modeling with EQS and EQS/Windows: Basic Concepts, Applications, and Programming*. Thousand Oaks, CA: Sage; 1994.

11. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*. 3rd ed. New York: Harper Collins; 1996.

12. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: *Testing Structural Equation Models*. Newbury Park, CA: Sage; 1993:136-162.

13. Bentler PM, Bonnet DG. Significance test and goodness of fit in the analysis of covariate structures. *Psych Bull*. 1980;88:588-606.

14. Marsh HW, Balla JR, McDonald RP. Goodness-of-fit indexes in confirmatory factor analysis: the effect of sample size. *Psych Bull*. 1988;103:392-410.

15. Davidson R. Editorial and commentaries: Prochaska and DiClemente's model of change: a case-study? *Br J Addict*. 1992;87:821-835.

16. Davidson R. The Transtheoretical Model—a critical overview. In: *Treating Addictive Behaviors*. New York: Plenum Press; 1998:25-28.

17. Sutton S. Can "stages of change" provide guidance in the treatment of addictions? A critical examination of Prochaska and DiClemente's model. In: *Psychotherapy, Psychological Treatments and the Addictions*. Cambridge, UK: Cambridge University Press; 1996: 189-205.

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