

Factor Structure of the Perceived Stress Scale (PSS) in a Sample from Mexico

Mónica Teresa González Ramírez and René Landero Hernández
Universidad Autónoma de Nuevo León

The aim of this study was to analyze the cultural adaptation of the European Spanish version of the Perceived Stress Scale (PSS; Cohen, Kamarak, & Mermelstein, 1983), for its use in Mexican samples. Using a random sample of students, internal consistency was analyzed and the factor structure of the Spanish version of the PSS was compared with the factor structure found in the English version. Internal consistency was adequate ($\alpha = .83$) and confirmatory factor analysis corroborated the factor structure. Factor 1 explained 42.8% of the variance and Factor 2 accounted for 53.2%. The goodness-of-fit measures also revealed an adequate fit. The cultural adaptation of the PSS was also evaluated with satisfactory results.

Keywords: PSS, psychometric properties, Spanish, Mexico, perceived stress

El estudio tiene como propósito valorar la adaptación cultural realizada a la versión española de la Escala de Estrés Percibido (Cohen, Kamarak y Mermelstein, 1983), para ser utilizada en muestras de México. Se analizó la consistencia interna y la estructura factorial de la versión en español del PSS y se comparó con la estructura factorial encontrada para la versión en inglés, utilizando una muestra aleatoria de estudiantes. Los resultados indican una adecuada consistencia interna ($\alpha = .83$) y se confirma la estructura factorial al utilizarse análisis factorial confirmatorio; con el Factor 1 explicando un 42.8% de la varianza y el Factor 2, un 53.2%, así como estadísticos de ajuste aceptables en el AFC. Asimismo, se evaluó, con resultados satisfactorios, la adaptación cultural realizada para el PSS.

Palabras clave: PSS, propiedades psicométricas, español, México, estrés percibido

Taking the above into consideration, González (2006) conducted exploratory and confirmatory factor analysis of Remor and Carrobles' (2006) Spanish version of the PSS with a sample of 283 women from Mexico. The factor structure reported by Cohen and Williamson (1988) was confirmed, with the exploratory factor analysis yielding two factors that conjointly accounted for 48.5% of the variance. In the confirmatory factor analysis, an estimated variance of 50% was found for Factor 1, and of 70% for Factor 2, as well as adequate goodness-of-fit statistics. The distribution of the PSS items in both factors matched the initial outline of positive or negative items. Taking this into account, Cohen and Williamson indicated that, for purposes of measuring the perception of stress, the distinction

pensado sobre las cosas que no has terminado [pendientes de hacer]?”). The comprehension of the entire scale was also evaluated, comparing it with the English version, concluding that the remaining items were adequate.

The participants were informed of the aim of the investigation and their written consent was obtained before administering the instruments. Administration of the PSS, the BDI, and the ECE was carried out with other instruments, as the present work is a phase of a more extensive investigation.

Statistical Analyses

For the purpose of this investigation, the factor structure of this adapted version of the PSS was examined and compared with the factor structure found in the study of Cohen and Williamson (1988) and with that of González (2006). In addition, the reliability (internal consistency) of the scale was evaluated with Cronbach’s alpha, and its convergent validity by comparing it with the BDI with Spearman’s correlation, because of the lack of normality in the distribution of the variables. Likewise, the levels of stress as a function of sex were compared, using the Mann Whitney *U* test.

The exploratory factor analyses were performed with the SPSS, version 12.0, and principal components and oblimin rotation were used to extract the factors. Principal components is the most frequently used and the most

Regarding the number of factors, the scree plot (Figure 1), the criterion of Eigenvalue higher than 1, and the MAP method all suggested two factors. These two factors accounted for 48.02% of the variance (32.61% by Factor 1). The correlation between the two factors was $-.27$.

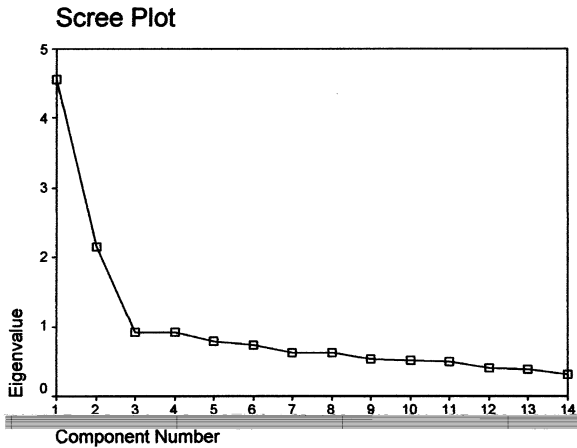


Figure 1. Scree plot of the PSS.

In Table 1 is presented the factor structure of the PSS, which confirms the one reported for the English version of the PSS (Cohen & Williamson, 1988), and the one detected in the study of González (2006), where item 12 did not have an adequate correlation with the rest of the items. The items are grouped in the factors according to their original wording, as positive or negative items. The value of Cronbach's alpha for Factor 1 was $.83$ and that of Factor 2 was $.78$. No item presented a negative correlation with the rest, so the adaptation of the scale was considered adequate.

Confirmatory factor analysis was used to confirm the factor structure presented in Table 1. The model with standardized results is presented in Figure 2. All the parameters were significant. The indicators of the fit of the model (see Table 2) indicated that the model is adequate; only NFI presented a value that suggests that the model could be improved; the NSC indicated a good fit ($\chi^2/df = 2.64$). The correlation between the factors was $-.46$; the estimated variance for Factor 1 was 42.8% and that of Factor 2 was 53.2%. Therefore, it was concluded that this model is adequate.

Table 1
Factor Structure of the PSS

How often.....	Factor 1 ($\alpha = .83$)	Factor 2 ($\alpha = .78$)
E1. have you been upset by something that happened unexpectedly?	.100	.749
E2. have you felt that you were unable to control the important things in your life?	-.282	.630
E3. have you felt nervous and "stressed"?	-.075	.684
E4. have you dealt successfully with day to day problems and annoyances?	.792	.073
E5. have you felt that you were effectively coping with important changes that were occurring in your life?	.789	.031
E6. have you felt confident about your ability to handle your personal problems?	.828	.019
E7. have you felt that things were going your way?	.610	-.222
E8. have you found that you could not cope with all the things that you had to do?	-.147	.452
E9. have you dealt successfully with irritating life hassles?	.731	-.021
E10. have you felt that you were on top of things?	.543	-.162
E11. have you been angered because of things that happened that were outside of your control?	.060	.724
E12. have you found yourself thinking about things that you have to accomplish?	.193	.629
E13. have you been able to control the way you spend your time?	.518	.074
E14. have you felt difficulties were piling up so high that you could not overcome them?	-.188	.583

Table 2
Goodness-of-fit Indexes for the PSS

Model	χ^2	df	Absolute fit indexes				Incremental fit indexes			
			GFI	AGFI	RMR	RMSEA	NFI	TLI	CFI	IFI
Model with 2 correlated factors	200.979	76	.925	.897	.053	.067	.873	.900	.916	.917

To examine convergent validity, the correlation between the PSS, the BDI, and the ECE was calculated. As expected, both the latter scales correlated positively with the PSS ($r_s = .553, p = .001$ and $r_s = .521, p = .001$, for BDI and ECE, respectively).

Lastly, we calculated the PSS scores as a function of sex, finding that the women's mean was higher than the men's ($M = 22.3, SD = 7.2$ and $M = 20.6, SD = 6.18$, for women and men, respectively). However, this difference did not reach statistical significance ($p = .079$).

Discussion

The Stress Perceived Scale (PSS) has been shown to have good internal consistency in Spanish samples (Remor &

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Annex

Adaptation of the PSS (14 items) for Mexico [in Spanish]

E1. ¿Con qué frecuencia has estado afectado/a por algo que ha ocurrido inesperadamente?	0	1	2	3	4
E2. ¿Con qué frecuencia te has sentido incapaz de controlar las cosas importantes de tu vida?	0	1	2	3	4

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