

## BRIEF REPORT

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# The peer mental health stigmatization scale-revised (PMHSS-R): Psychometric properties and cross-cultural factorial invariance in university students in Ireland and Argentina

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## Abstract

**Introduction:** The study aimed to assess the psychometric quality of the Peer Mental Health Stigmatization Scale – Revised (PMHSS-R), by examining its factorial structure among young adults in Ireland and Argentina.

**Method:** A total of 429 participants aged between 18 and 25 years old were recruited ( $n = 187$  Ireland,  $n = 242$  Argentina). The PMHSS-R was completed by Irish participants and was translated, pilot-studied, and subsequently completed by Argentinian participants.

**Results:** A Confirmatory Factor Analysis demonstrated optimal factor loadings for an eight-item solution and acceptable internal consistency for both scale dimensions in the Argentinian sample. Satisfactory levels of partial scalar invariance were achieved between countries, indicating that the scale measures mental health stigma consistently across cultures.

**Discussion and Conclusions:** Our findings highlight the PMHSS-R as a cross-culturally valid and reliable psychometric instrument to evaluate interventions targeting stigma. In conclusion, the PMHSS-R can be used in cross-cultural research to compare levels of mental health stigma and investigate the interplay between stigma and other psychologically relevant constructs between different countries and cultural contexts.

## KEYWORDS

confirmatory factor analysis, measurement invariance, mental health stigma, PMHSS-R, young adults

## 1 | INTRODUCTION

Early intervention within mental health has been highlighted as predictor of positive outcomes, yet it depends upon individuals seeking help (e.g., McGorry & Mei, 2018). However, young adults are less likely to seek assistance (Reavley & Jorm, 2011), with

mental health stigma being a main impediment (Gaiha et al., 2020; Nearchou et al., 2018). A relevant aspect is that stigma can be reduced through intervention (Vila-Badia et al., 2016), however, to assess the effectiveness of interventions, access to valid and reliable psychometric instruments must be continually ensured (Nearchou et al., 2021). This element is crucial considering the

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need to fulfil more stringent validity requirements on stigma measurement (Wei et al., 2018).

The Peer-Mental-Health-Stigmatization-Scale (PMHSS; McKeague et al., 2015) is a measure that assesses stigma towards mental health across two dimensions: awareness and agreement. Awareness pertains to the perception of individuals of stereotypes, discrimination, and prejudices regarding mental health held by society while agreement assesses individuals' personal beliefs on these stigmatizing aspects (Nearchou et al., 2021). While the PMHSS-R initially devised for children and adolescents (McKeague et al., 2015), Nearchou et al. (2021) provided further internal validity and reliability evidence of its use among the young adult population and developed the revised version of the tool.

Mental health stigma is a culturally determined phenomenon (e.g., Bracke et al., 2019; Crowe et al., 2016). Thus, when facing the need to validate stigma measures, these should exhibit cross-cultural measurement invariance to ensure the construct is assessed similarly (Van De Schoot et al., 2015). In this vein, cross-cultural validation involves more than just language translation; it requires an examination of whether the construct holds the same meaning across different cultural contexts (Van de Vijver & Leung, 2021). The PMHSS-R has shown initial promise in diverse population cohorts such as adolescents and young adults, but further research is needed to confirm its cross-cultural applicability beyond mere translation (He & van de Vijver, 2012).

Thus, the present study aimed to further expand on the work of Nearchou et al. (2021) by first translating the PMHSS-R scale to Argentinian Spanish and subsequently analysing the suitability of its factorial structure within Argentinian young adults. Moreover, to ensure increasingly stringent validity testing—and more so considering reports of the influence of culture on mental health stigma—the present study also aimed to examine the factorial invariance of the PMHSS-R's structure across Ireland and Argentina. Drawing from Nearchou et al. (2021), a Confirmatory Factor Analysis (CFA) was employed to assess the fit of the theoretical structure to the Argentinian data. Subsequently, cross-cultural measurement invariance was examined via a multigroup-CFA (MGCFAs) with respective young adult samples from Ireland and Argentina (Brown, 2015).

## 2 | MATERIALS AND METHODS

### 2.1 | Participants

Participants were recruited through a convenience sampling strategy. Participants included 429 young adults (18 to 25 years old) from Ireland and Argentina recruited from universities. The Irish sample included 187 participants ( $M_{\text{age}} = 21.40$ ,  $SD_{\text{age}} = 1.94$ , 76.5% female, 23.0% male, 0.5% non-disclosed gender); the Argentinian sample was comprised of 242 individuals ( $M_{\text{age}} = 21.49$ ,  $SD_{\text{age}} = 2.19$ , 81.0% female, 18.6% male, 0.4% non-binary). The sample size was assessed to be adequate, as the estimated models had approximately

80 parameters, above the recommended minimum  $N$ :parameter ratio (i.e., 5 individuals per parameter; Kline, 2015).

### 2.2 | Measures

Participants completed the PMHSS-R scale (Nearchou et al., 2021). The Argentinian young adults completed the Spanish version of the scale, whereas the Irish participants completed the scale in English. The PMHSS-R assesses stigma related to mental health in two dimensions—stigma awareness and stigma agreement. The instrument comprises 10 items in its young adult version—five items per subscale – rated on a five-point Likert response scale (1 = *disagree completely*, 5 = *agree completely*). The agreement and awareness individual scores are calculated by summing the responses of their respective items, ranging from 5 to 25 (with higher scores indicating higher mental health stigma awareness and agreement levels). The instrument has shown satisfactory psychometric quality evidence in its Irish version (Nearchou et al., 2021).

### 2.3 | Procedure

Initially, the back-translation process to Argentinian Spanish was carried out (Van de Vijver & Hambleton, 1996). A pilot study was conducted with a subsample of Argentinian young adults ( $n = 5$ ) to ensure optimal comprehension of the translated expressions within the target population. Participants in both samples (Ireland/Argentina) completed the PMHSS-R scale and a brief sociodemographic questionnaire. Informed consent was obtained prior to data collection. Ethics approvals were obtained from the relevant ethics committees in Ireland and Argentina.

### 2.4 | Data analyses

Regarding the Argentinian CFA, an initial oblique model was specified following Nearchou et al. (2021). Two latent variables (Awareness/Agreement) were modelled, each explaining five items. Due to the ordinal response format, the Weighted Least Squares Mean-and-Variance-adjusted (WLSMV) estimator and polychoric correlation matrices were employed (Flora & Curran, 2004). Examined fit indexes were the Comparative Fit Index (CFI), Tucker-Lewis Index TLI, Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Moreover, subscale reliability was examined with model-based-ordinal- $\omega$  coefficients ( $\omega > .70$ : acceptable reliability; Savalei & Reise, 2019). Possible improvements in the model were examined via modification indexes and Standardized Expected Parameter Change (SEPC) values (i.e., the standardized estimated value of fixed parameters if they were added to the model; Whittaker, 2012).

An MGCFAs was conducted (Brown, 2015) in Ireland and Argentina to test for the scale invariance. Invariance was examined in

**TABLE 1** PMHSS-R: Argentinian CFA.

	CFI	TLI	RMSEA	SRMR
Original Model (Model 1)	.922	.897	.103	.120
Original Model without Item 5 (Model 2)	.943	.922	.089	.116
Original Model without Item 5 and 8 (Model 3) <sup>a</sup>	.989	.984	.046	.058

Note: Model fit indices.

Abbreviations: CFA, confirmatory factor analysis; CFI, comparative fit index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual; TLI, Tucker-Lewis Index.

<sup>a</sup>Final model.

**TABLE 2** PMHSS-R: Argentinian CFA.

	$\lambda$	$p$
Awareness ( $\omega = .806$ )		
PMHSS-R-1	.710	<.001
PMHSS-R-2	.897	<.001
PMHSS-R-4	.786	<.001
PMHSS-R-6	.564	<.001
Agreement ( $\omega = .708$ )		
PMHSS-R-7	.577	<.001
PMHSS-R-9	.532	<.001
PMHSS-R-10	.755	<.001
PMHSS-R-11	.725	<.001
	$\psi$	$p$
Awareness ~ Agreement	.090	.291

Note: Final model parameters and reliability (Model 3).

Abbreviations:  $\lambda$ , factor loading matrix;  $\psi$ , variance-covariance matrix.

four nested models: configural (assumes no restrictions), metric (assumes restricted factor loadings), scalar (assumes restricted factor loadings/intercepts), and strict (assumes restricted factor loadings/intercepts/residual variances) (Sekercioglu, 2018). Invariance was analysed by calculating the difference between CFI and RMSEA indexes across the models ( $\Delta$ CFI and  $\Delta$ RMSEA;  $\Delta$ CFI  $\leq$ .01 and  $\Delta$ RMSEA  $\leq$ .015 between levels indicate factorial invariance; Putnick & Bornstein, 2016). Statistical analyses were conducted with *R* packages *lavaan*, *psych*, and *BifactorIndicesCalculator*.

### 3 | RESULTS

#### 3.1 | Confirmatory factor analysis—Argentina

As Table 1 shows the original model exhibited poor fit. However, examination of modification indices alongside SEPC values led to removing item 5 (Awareness subscale). When the model was subsequently refit, the CFI and TLI remained below acceptable thresholds. Thus, modification indices and SEPC values were examined, and item 8 was removed (Agreement subscale). The third model showed optimal fit on all four fit indexes and thus was selected as final. Moreover, acceptable internal consistency reliability levels for both PMHSS-R

dimensions (both  $\omega > .70$ ) and optimal factor loadings were verified (all  $\lambda > .50$ ). Table 1 details the model fit indices for all Argentinian CFA models analysed, whereas Table 2 details model parameters and reliability estimates of the final model.

#### 3.2 | Multi-group CFA: Cross-cultural measurement invariance

Full metric invariance was obtained between countries after fitting the MGCFA. However, no evidence of full scalar invariance was found. Differential item functioning searches were conducted ( $\chi^2$ -model-improvement should a specific parameter be freely estimated across countries). Through adjustments to the model, partial scalar invariance was achieved. This involved addressing differential item functioning for item thresholds: item 1:t3/t4, item 2:t2/t3/t4, item 4:t2, and item 6:t1/t2. Invariance across countries was achieved, with less than 20% non-invariant parameters within the partial scalar model (see Table 3 and Figure 1 for model information; Brown, 2015; Dimitrov, 2010).

### 4 | DISCUSSION

The present study aimed to examine the psychometric properties of the PMHSS-R in Argentinian young adults as well as its cross-cultural factorial invariance between the two samples.

Initially, a CFA was conducted on a sample of young adults from Argentina. After reducing the instrument to four items on each subscale, satisfactory evidence of internal validity and reliability was found. These results suggest that the PMHSS-R is now available to assess levels of mental health stigma and effectively address the construct in its two proposed dimensions in young adults from Argentina. This ensures that the PMHSS-R offers a comprehension level appropriate for use in Argentinian young adults, and that quality scores are available. The removal of two items (PMHSS-R-5, “Most people believe that teenagers with emotional or behavioural problems are to blame for their problems.” and PMHSS-R-8, “I look down on teenagers who visit a counsellor because they have emotional or behavioural problems.”) may reduce social desirability bias and thus improve psychometric properties; moreover, it allows a focus on more relevant aspects of stigmatization in the Argentinian context, improving model fit.

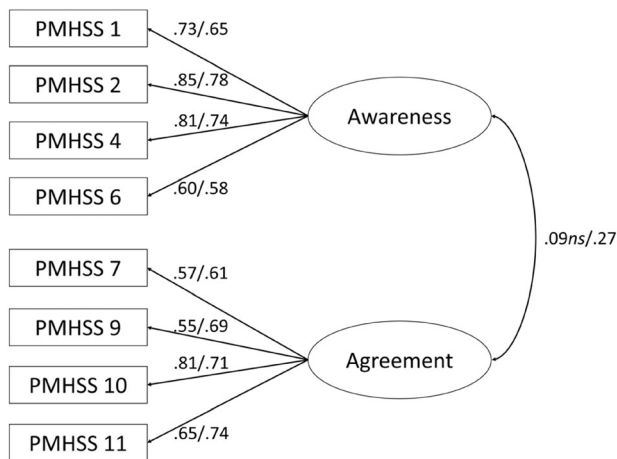
Model	CFI	RMSEA	$\Delta$ CFI	$\Delta$ RMSEA	$\Delta\chi^2$	$\Delta\chi^2$ : df	$\Delta\chi^2$ : p
Configural	.998	.020	-	-	-	-	-
Metric	.997	.021	-.001	+.001	6.743	6	.345
Partial Scalar <sup>a</sup>	.995	.024	-.002	+.003	16.744	13	.211
Partial Strict <sup>a</sup>	.942	.077	-.053	+.051	75.861	8	<.001 ***

**TABLE 3** PMHSS-R: Invariance across countries.

Note: Final sequential MGCFA models. Fit indices and differences.

Abbreviations: CFI, comparative fit index; MGCFA, multi-group confirmatory factor analysis; RMSEA, Root Mean Square Error of Approximation.

<sup>a</sup>Differential Item Functioning in Item 1 t3/t4; Item 2 t2/t3/t4; Item 4 t2; Item 6 t1/t2.



**FIGURE 1** Argentina/Ireland PMHSS-R Multi-Group Confirmatory Factor Analysis. Partial Scalar Invariance Model. Standardized Factor Loadings and Covariance. Argentina: Lefthand Side; Ireland: Righthand Side.

Following, an MGCFA was conducted with young adults from Ireland and Argentina. While evidence of full strict invariance was not obtained, partial scalar invariance was established, with less than 20% of non-invariant parameters between Ireland and Argentina. Thus, this finding highlights evidence of invariance for the PMHSS-R to be employed to assess mental health stigma in Ireland and Argentina under sufficiently equal measurement (Brown, 2015; Dimitrov, 2010; Van De Schoot et al., 2015).

Although mental health stigma is a construct measured both validly and reliably with the PMHSS-R in both Irish and Argentinian populations, the way the two mental health stigma dimensions, stigma awareness and stigma agreement, are inter-correlated exhibits inter-cultural differences. Specifically, whereas in Argentinian young adults these are non-significantly related, moderate positive associations exist in the Irish counterparts. This suggests that stigma awareness and stigma agreement could operate differently between the Argentinian and Irish populations above-and-beyond discrepancies in measurement.

The gender composition of samples may influence findings, as gender differences in stigma perception have been reported (Shechtman et al., 2018). In light of the gender imbalance regarding both the Ireland and Argentina samples, this could be viewed as a limitation of the present research. Additionally, while this study may

support the tool's use in diverse cultural contexts, broader claims of cross-cultural appropriateness warrant further research across various languages and within same-language cultures to further and more coherently establish measurement invariance (He & van de Vijver, 2012).

## 5 | CONCLUSION

Several implications and conclusions can be drawn from the present study. First, the PMHSS-R has been shown to be a valid and reliable tool to assess mental health stigma in young adults from Argentina. This provides researchers and practitioners with a valuable instrument to measure and address stigma in this population. Additionally, the establishment of satisfactory invariance between Ireland and Argentina suggests that the PMHSS-R can be used in cross-cultural research to compare levels of mental health stigma, as well as the interplay between stigma and other psychologically relevant constructs between different countries. Lastly, the observed intercultural differences in the intercorrelation of stigma dimensions may inform mental health intervention and policy implementation; for instance, stigma perceptions operating differently between cultures could signal the need to monitor the adherence and effectiveness of interventions adapted from different cultural contexts. Overall, the present study is considered to contribute to the understanding of mental health stigma and provide valuable insights to address this issue in diverse cultural contexts.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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