

Psychometric properties of the Peer Mental Health Stigmatization Scale-Revised (PMHSS-R) in adolescents and young adults

Running Title: Psychometric properties of the PMHSS-R

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This is the peer reviewed version of the following article: Nearchou, F, O'Driscoll, C, McKeague, L, Heary, C, Hennessy, E. Psychometric properties of the Peer Mental Health Stigmatization Scale-Revised in adolescents and young adults. *Early Intervention in Psychiatry*. 2020; 1– 5, which has been published in final form at <https://doi.org/10.1111/eip.12933>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions.

Abstract

Aim: This study aimed to examine the factorial validity and reliability of the Peer Mental Health Stigmatization Scale (PMHSS) in adolescents and young adults.

Methods: Young people (N = 963) aged 12-25 years (M = 16.1, SD = 3.08) were recruited across two studies. [Study 1 included adolescents \(n = 776\) recruited from secondary schools](#) and [Study 2 included young adults \(n = 187\) recruited from universities](#). All participants completed the PMHSS.

Results: Exploratory Factor Analysis resulted in a bi-factorial solution of the PMHSS by retaining 11 items out of the original 16 that loaded on the latent factors of stigma agreement and stigma awareness. Confirmatory Factor Analysis established the factor structure of the tool in adolescents and young adults.

Conclusions: This shorter version of the PMHSS remains the only validated tool that measures stigma awareness and stigma agreement in youth. We recommend that this version is used in future research.

Keywords

Adolescents; young adults; factorial validity; stigma; mental health

Introduction

Most mental disorders initially present during adolescence (De Girolamo, Dagani, Purcell, Cocchi & McGorry, 2012). Efficient interventions for a range of mental disorders in adolescence and early adulthood are associated with better clinical outcomes (Das et al., 2016). However, research suggests that this population group is less likely to seek professional help than older populations (Reavley, Cvetkovski, Jorm, & Lubman, 2010). Stigma is repeatedly recognised as a potent barrier against help-seeking behaviour (Clement et al., 2015; Gulliver, Griffiths, & Christensen, 2010; Nearchou et al., 2018; Schnyder, Panczak, Groth, & Schultze-Lutter, 2017) and yet stigma is a barrier that can be dismantled through intervention (Economou et al., 2012; Vila-Badia et al., 2016). Evaluation of interventions requires psychometrically valid instruments to assess the nature and extent of different types of stigma.

Research has increasingly focused on investigating the validity of stigma measures in order to facilitate and advance research that aims to reduce stigma and promote help-seeking. Indeed, a recent systematic review highlighted the need for further testing on the validation of stigma measures (Wei, McGrath, Hayden & Kutcher, 2018). The Peer Mental Health Stigmatization Scale (PMHSS; McKeague, Hennessy, O'Driscoll & Heary, 2015) is one such measure. Although McKeague et al. (2015) highlighted the PMHSS's utility and acceptability with children and adolescents, the authors did not examine its factorial validity. The PMHSS consists of two subscales that measure stigma agreement and stigma awareness. Stigma agreement refers to young people's own beliefs about stereotypes, prejudices and discriminatory behaviour, while stigma awareness refers to their perception of such stigmatizing attitudes held by most members of the society. The present study aimed to

examine the factorial validity of the PMHSS by employing a more sophisticated and robust methodological testing approach in a wider age range of young people than previously investigated. Specifically, the present study overcomes the methodological limitations of the original study by exploring the factor structure of the PMHSS using Exploratory Factor Analysis (EFA) instead of Principal Component Analysis (PCA) that was previously employed (see McKeague et al., 2015). PCA is a data reduction method, while Factor Analysis is a method appropriate for capturing the structure of latent factors underlying data (Ford, MacCallum, & Trait, 1986). Furthermore, because research indicates that manifestations of mental health stigma may differentiate across age groups (e.g. Swords, Hennessy, & Heary, 2011; Wahl, 2002), the present study sought to examine the factorial validity of the PMHSS in young adults as well. Thus, Confirmatory Factor Analysis (CFA) was applied to examine the proposed factor structure in two different age cohorts, adolescents and young adults.

Methods

Participants

Participants were 963 young people aged 12-25 years ($M = 16.1$, $SD = 3.08$) recruited for the purposes of two studies in Ireland. Study 1 formed two sub-samples and consisted of 776 adolescents recruited from secondary schools. Study 2 consisted of 187 young adults recruited from universities. Demographics for the two studies are presented in Table 1.

[Table 1 about here]

Measures

The PMHSS (McKeague et al., 2015) is a self-report instrument that assesses stigma agreement and stigma awareness with two subscales. The stigma agreement subscale

assesses participants' own attitudes/beliefs towards youth with mental health problems (e.g. *I believe that teenagers with emotional or behavioural problems are not as trustworthy as other teenagers*). The stigma awareness subscale assesses participants' perceptions about the extent to which most members of the society hold stigmatizing attitudes towards young people with mental health problems (e.g. *Most people believe that teenagers with emotional or behavioural problems are not as trustworthy as other teenagers*). Each subscale includes eight items rated on a 5-point Likert scale (1 = disagree completely, 5 = agree completely). An individual score is generated by adding up all items of each subscale, which ranges from 8 to 40. Higher scores indicate higher levels of stigma agreement and stigma awareness, i.e. higher levels of mental health related stigmatizing attitudes.

Procedure

Data for school students (Study 1) were collected through self-report pen-and-paper questionnaires during a 40-minute class period. Informed written consent was obtained from parents and informed written assent was obtained from school students before they participated. Data for university students (Study 2) were collected online using the Qualtrics software. Informed consent from adult participants was obtained electronically. Ethical approval for this research was obtained from the Human Ethics Committee-Humanities affiliated with the Institution related to the implementation of this research.

Data analysis

We randomly split the Study 1 sample into two sub-samples with each consisting of 388 participants. Exploratory Factor Analysis (EFA) was applied to examine the factor structure of the PMHSS in the first sub-sample (n=388). Principal Axis Factoring (PAF) with oblimin rotation was used as the extraction and rotation methods respectively. Confirmatory Factor

Analysis (CFA) was then applied to test the proposed factor structure of the PMHSS in the second sub-sample of school students of Study 1 (n = 388) and in the Study 2 young adult sample (n = 187). The model fitting adequacy was determined by using the following indices and criteria: a non-significant chi square and/or a ratio $\chi^2/df < 2.5$; the comparative fit index (CFI) and Tucker-Lewis index (TLI) with values > 0.90 indicating a good fit and with values around 0.95 indicating an excellent fit; the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) with values < 0.08 indicate a good model fit, while values < 0.05 indicate an excellent model fit (Kline, 2011). Analyses were conducted using IBM SPSS version 24 and Amos software version 24.

Results

Exploratory Factor Analysis

Using one of the sub-samples of Study 1 (n = 388) the 16 items of the PMHSS were subjected to EFA using PAF as the extraction method and oblique rotation allowing the factors to be correlated. Following a number of trials, we removed five items with high cross-loadings (> 0.30) or low loadings (< 0.30) to achieve the best factor solution, which included 11 items loading on two factors explaining in total 49% of the variance in scores of the PMHSS. The two factors had eigenvalues > 1 and reflected the latent dimensions of stigma agreement (five items) and stigma awareness (six items). Item loadings ranged from 0.54 to 0.68 and the reliability coefficient was satisfactory for both factors. The two factors were significantly correlated ($r = 0.30$, $p < 0.001$). Table 2 presents item loadings, Cronbach's alpha and corrected item-total correlations for the two factors.

[Table 2 about here]

Confirmatory Factor Analysis

Study 1

CFA results showed that the two-solution model derived from the EFA has a very good fit to data using the second sub-sample of school students ($n = 388$). All items demonstrated statistically significant regression paths to the two latent factors ranging from $\beta = 0.39 - 0.69$ (see Figure 1). This indicates that the items reflected the dimensions of stigma agreement and stigma awareness. Reliability coefficients were satisfactory both for stigma awareness ($\alpha = 0.73$) and stigma agreement in this sample ($\alpha = 0.70$).

[Table 3 about here]

[Figure 1 about here]

Study 2

The CFA results confirmed the bi-factorial solution derived from the EFA in the sample of university students. The model had excellent fit to data. However, because Item 3 (see Appendix) demonstrated a quite low loading ($\beta = 0.21$, $p = 0.013$) on the stigma awareness factor, we removed the item and re-ran the CFA. This resulted in a more parsimonious and improved fitting model. Table 3 shows the model fit indices before and after removing Item 3 from the CFA. All other items showed statistically significant regression paths to the two latent factors ranging from $\beta = 0.51 - 0.70$ (see Figure 1). Corrected Item-Total correlation analysis further supported this decision as Item 3 had a low correlation coefficient ($r = 0.20$). Reliability coefficients indicated satisfactory internal consistency for both stigma awareness after removing Item 3 ($\alpha = 0.78$) and stigma agreement ($\alpha = 0.70$) for young adult participants.

Discussion

Validated self-reported tools [that measure stigma](#) may help us further understand this debilitating phenomenon, highlight target areas for intervention and accurately measure

intervention change. The present study advances our knowledge on the conceptualisation of mental health stigma in youth cohorts aged 12-25 years by offering a more parsimonious factor structure of stigma awareness and stigma agreement scales within the PMHSS. We refer to this version of the PMHSS as the Peer Mental Health Stigmatization Scale-Revised (PMHSS-R). Currently the PMHSS-R remains the only validated tool that measures mental health stigma in youth that explores both [awareness and agreement](#) of stigma and thus we recommend that this measure is used in future research. The PMHSS-R is a shorter version of the original PMHSS that retains the core theoretical components of stigma. Thus, this [shorter version](#) of the tool may reduce participant research burden without compromising theoretical integrity.

Based on the findings from Study 2 we suggest the removal of Item 3 (see Appendix) from the stigma awareness factor when administering the scale to young adult cohorts. However, we suggest retaining this item when administering the scale to adolescent cohorts. It is possible that young adults who are likely to have more experience of part-time work than the younger cohort, have differing interpretations of other people's perceptions of the relevance of mental disorders for employability. This, however, is speculation. What the findings clearly demonstrate, is the importance of examining the factorial validity of instruments in different age groups because of differing levels of experience and awareness of stigma.

Although the factorial validity of this measure has been greatly improved, in addition [to further replication of this study, we recommend further exploration of convergent and divergent validity](#) of the PMHSS-R. Given that the severity of stigma tends to be disorder specific (Ebnetter & Latner, 2013; O'Driscoll, Heary, Hennessy & McKeague 2012), further research should explore the utility of this measure in relation to specific mental health presentations and not just general terms such as emotional and behavioural disorders.

Furthermore, the items of the scale administered both to adolescents and young adults refer to 'teenagers with emotional or behavioural problems'. However, young adult participants were asked to indicate their stigma awareness and stigma agreement perceptions regarding members of an age group younger than their own. Although no measurement issues were identified in our study, this may affect measurement in other young adult cohorts. Thus, we propose that the term 'teenagers' may be replaced by the term(s) 'youth/young adults' when the tool is administered to young adults. Future research should also explore the utility of this measure to determine stigmatising behaviour and help-seeking behaviour.

Conflict of Interest

Authors declare no conflict of interest.

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Figure Legend

Figure 1 presents the results of the final Confirmatory Factor Analysis (CFA) of the PMHSS-R in adolescents (Study 1) and young adults (Study 2). All factor loadings are standardized. The value outside the parenthesis presents CFA results of the adolescent sample and the value in the parenthesis presents CFA results of the young adult sample. Item 3 was included only in the adolescent sample (Study 1) CFA.

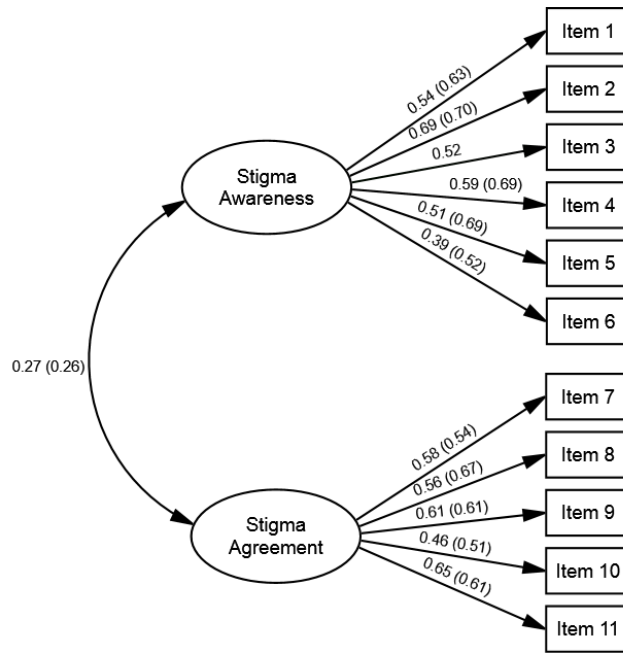


Table 1

Demographic characteristics about age, gender and year in school for Study 1 and Study 2

	Study 1 sub-sample (n = 388)	Study 1 sub-sample (n = 388)	Study 2 (n = 187)
Age [†]	14.8 ± 1.57	14.9 ± 1.62	21.4 ± 1.94
	N (%)	N (%)	N (%)
Males	134 (34.5%)	223 (57.5%)	43 (23.0%)
Females	249 (64.2%)	163 (42.0%)	143 (76.5%)
Do not identify [‡]	5 (1.3%)	2 (0.6%)	1 (0.5%)
School year			
9 th (age 12/13) §	129 (33.2%)	128 (57.5%)	n/a
11 th (age 14/15)	129 (33.2%)	111 (28.6%)	n/a
13 th (age 16/17)	130 (33.5%)	149 (38.4%)	n/a

[†] Mean in years, Standard Deviation, [‡] Participants who did not identify as either male or female; § Year 9 is the first year of secondary school

Table 2

Summary of Exploratory Factor Analysis and reliability analysis of the PMHSS[†] in the sub-sample of pupils from Study 1 (n = 388)

	Stigma Awareness	Stigma Agreement
Item 2	0.68	
Item 6	0.65	
Item 3	0.62	
Item 4	0.61	
Item 5	0.57	
Item 1	0.55	
Item 8		0.64
Item 11		0.60
Item 10		0.57
Item 7		0.55
Item 9		0.54
Eigenvalue	3.51	1.85
Variance explained by factor (%)	32.0	17.0
Cumulative variance explained (%)	32.0	49.0
Corrected Item-Total Correlations (Min-Max)	0.47-0.61	0.47-0.49
Cronbach's α	0.79	0.72

[†] PMHSS: Peer Mental Health Stigmatization Scale

Table 3

Confirmatory Factor Analysis of the PMHSS† in the second sub-sample of school students

(Study 1) and university students (Study 2)

CFA Fit indices	χ^2	χ^2/df	P-value	CFI‡	TLI‡	RMSEA‡	SRMR‡
Study 1	85.4	2.19	<0.001	0.94	0.92	0.05	0.04
Study 2 with Item 3	63.1	1.46	0.03	0.95	0.93	0.05	0.05
Study 2 without Item 3	39.5	1.16	0.24	0.98	0.98	0.03	0.04

† PMHSS, Peer Mental Health Stigmatization Scale

‡ CFI, Comparative fit index; TLI, Tucker-Lewis index; RMSEA, root mean square of approximation; SRMR, standardized root mean square residual.

Appendix

Peer Mental Health Stigmatization Scale-Revised (PMHSS-R)

The following statements are about what most people believe:

1. Most people are afraid of teenagers who visit a counsellor because they have emotional or behavioural problems. [Stigma awareness]
2. Most people believe that teenagers with emotional or behavioural problems are dangerous. [Stigma awareness]
3. Most employers believe it is a bad idea to give a part-time job to a teenager with emotional or behavioural problems. [Stigma awareness]
4. Most people believe that teenagers with emotional or behavioural problems are not as trustworthy as other teenagers. [Stigma awareness]
5. Most people believe that teenagers with emotional or behavioural problems are to blame for their problems. [Stigma awareness]
6. Most people believe that teenagers with emotional or behavioural problems are not as good as other teenagers at taking care of themselves. [Stigma awareness]

The next statements are about what you believe:

7. I believe that teenagers with emotional or behavioural problems are not as trustworthy as other teenagers. [Stigma agreement]
8. I look down on teenagers who visit a counsellor because they have emotional or behavioural problems. [Stigma agreement]
9. I believe that teenagers with emotional or behavioural problems are to blame for their problems. [Stigma agreement]
10. I believe that it is not a good idea for employers to give part-time jobs to teenagers with emotional or behavioural problems. [Stigma agreement]
11. I would be afraid of someone if I knew that they had emotional or behavioural problems. [Stigma agreement]