

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_568_23

Translation and validation of Persian version of resilience evaluation scale (RES): A cross-cultural methodological research

Hamidreza Aghababaeian^{1,2,3}, Abbas Ostadtaghizadeh^{3,4}, Armin Zareian⁵, Miranda Oloff^{6,7}, Christianne van der Meer⁸, Ladan Araghi Ahvazi²

¹Department of Health in Emergencies and Disasters, Dezful University of Medical Sciences, Dezful, Iran, ²Center for Climate Change and Health Research (CCCHR), Dezfoul University of Medical Sciences, Dezfoul, Iran, ³Department of Health in Emergencies and Disasters, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran, ⁴Climate Change and Health Research Center (CCHRC), Tehran University of Medical Sciences, Tehran, Iran, ⁵Group of Community Health Nursing, Faculty of Nursing, AJA University of Medical Sciences, Tehran, Iran, ⁶Department of Psychiatry, Amsterdam UMC, University of Amsterdam, Amsterdam Neuroscience, Amsterdam Public Health, The Netherlands, ⁷ARQ National Psychotrauma Centre, Diemen, The Netherlands, ⁸ARQ National Psychotrauma Centre, Oegstgeest, The Netherlands

Address for correspondence:

Dr. Abbas Ostadtaghizadeh, Department of Health in Emergencies and Disasters, School of Public Health, Tehran University of Medical Sciences, Poorsina Ave, Tehran, Iran.
E-mail: ostadtaghizadeh@gmail.com

Received: 27-04-2023
Accepted: 27-07-2023
Published: 11-07-2024

Abstract:

BACKGROUND: The Resilience Evaluation Scale (RES) is a new, free and short self-report questionnaire for measuring psychological resilience. This study aims to translate and assess the psychometric properties of the RES.

MATERIALS AND METHOD: In the present methodological study, after the translation process, face and content validity were conducted through qualitative and quantitative methods. To determine the construct validity, exploratory and confirmatory factor analysis (CFA) was used, and for the reliability, Cronbach's α test and inter-counter coefficient test were calculated. Persian version of the Connor-Davidson Resilience Scale was used to determine the convergent validity of the questionnaire.

RESULTS: Results show that the face and content validity of 9 items of RES were acceptable and they were all approved [Impact scores (IS) >1.5, S-CVI/Ave = 0.97, I-CVI = 0.93]; the Internal consistency of the scale was confirmed by the Cronbach's α coefficient (0.82) and McDonald's omega (0.83). The reliability of the scale also was confirmed by the Spearman's correlation coefficient and intra-group correlation coefficient (ICC), with results obtained above 0.8 for all items. The factor analysis identified two factors that accounted for about 56% of the variance. Also, the CFA model fitted well according to the results of the fitting indices (RMSEA = 0.084, CFI = 0.98, SRMR = 0.064, and TLI = 0.97). In addition, the convergent validity of the scale was equal to 0.65 ($P < 0.001$).

CONCLUSION: Development of a valid and reliable psychological resilience scale may bring great benefits to the Persian society. Our findings suggest that the Persian RES has good psychometric properties, and it may serve as a valuable instrument in research and clinical practice.

Keywords:

Disaster, Emergencies, Health, Injuries, Persian, Resilience

Introduction

The prevailing view on the potential outcome of traumatic events is to focus on adverse psychological outcomes. However, there is increasing attention for resilience.^[1-11] Resilience has been defined as the process wherein an individual maintains a relatively stable, healthy level of psychological and physical functioning when confronted with potentially traumatic

events (PTEs).^[3,9,12,13] However, due to the nature of the concept of resilience, there are different definitions of resilience.^[13-16] And this multidimensional nature of resilience is a challenge when practicing and measuring this concept.^[17-20] Therefore, in order to establish resilience as a meaningful concept in clinical research and practice, we need to identify its distinguishing factors and measure these factors in a valid way.^[9] In this regard, researchers stated that factors

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Aghababaeian H, Ostadtaghizadeh A, Zareian A, Oloff M, van der Meer C, Araghi Ahvazi L. Translation and validation of Persian version of resilience evaluation scale (RES): A cross-cultural methodological research. J Edu Health Promot 2024;13:227.

that determine a resilient outcome after a PTE include internal capacities and external factors.^[13-17] Psychological resilience (meaning the extent to which someone evaluates themselves as being resilient) is an essential aspect of an internal capacity that determines a resilient outcome. Therefore, it is a distinctive factor that affects mental health outcomes after incidents.^[9,21] Recent studies have found positive associations between some internal capacity factors like hardiness, internal locus of control, cognitive flexibility, religious beliefs, altruism, and positive emotionality. There are currently several scales for measuring resilience, but it is not clear which of these scales measure which aspect of resilience^[21-23] and whether these scales are cross-culturally valid. For example, the Conner-Davidson resilience scale examines and evaluates internal and external factors affecting resilience.^[21] Some other scales show different results from different cultures,^[24] such as the adult resilience scale,^[25] which is a combination of factors influencing resilience including those insecure relationships, spiritual influences, family cohesion, and social support.^[26-28] There are also similar problems for the Resilience Scale,^[29] which measures resilience factors such as stability, self-esteem, and meaningfulness.^[29-36] With the increasing number of natural and man-made disasters and their consequences, psychological resilience becomes more and more relevant to assess.^[37,38] In order to measure psychological resilience accurately, we need a valid and reliable tool that can assess this important construct quickly and accurately.^[9,21]

The innovation of this study is that Resilience Evaluation Scale (RES) is the world's first brief, freely available non-commercial scale to measure psychological resilience, developed and introduced by van der Meer *et al.*^[9] in 2018 in English and Dutch. After determining the purpose of assessing psychological resilience, they concluded that both versions had good psychometric properties for the Dutch and English RES. This 9 items scale was based on two underlying constructs of psychological resilience, namely, self-confidence and self-efficacy. As they can simultaneously be measured, both self-confidence and self-efficacy as underlying constructs of psychological resilience, can also have both general population applications and specialized applications in psychiatric clinics.^[9] In Iran, Connor Davidson's questionnaire is used to measure resilience, which measures resilience in several general areas.

Given the importance of more accurately estimating people's resilience up to now, there is no Persian scale to measure psychological resilience. In this study, after a careful translation process we aimed to assess the psychometric properties of the Persian version of the RES.

Materials and Methods

The present study is a cross-cultural methodological research^[39] that translated and investigated the psychometric properties of the Persian RES scale in 300 healthy participants in two phases – including tool translation and psychometric properties (Supplementary APPENDIX A). In this study, steps introduced by Guillemin 1993 were used to translate the scale [Supplementary Figure 1].^[39,40]

Translation

Produce several translations

The questionnaire was translated into Persian by two translators whose first language was Persian. The first translator was informed about the objectives and concepts of the questionnaire, while the second translator was not aware of the objectives and concepts of the questionnaire. Both translators then presented their final written version, specifying the controversial points of translation and the reasons for choosing the words adopted in these cases.

Back-translation

At this stage, two translators, whose mother tongue is English and whose second language is Persian translated the two Persian versions into two separate English back translations. Then, a final translator who was familiar with the concept of the questionnaire's content examined the two Persian versions and two English back translations. Next, the two back translations were sent to the original author for further assurance. After consulting the original author to get her comments, two English translated versions and the comments of the original author were matched with the Persian version. Then, the first proofread of the translated Persian version of the questionnaire was prepared by a final translator by comparing and combining all versions in accordance with the agreement, opinion, and consent of all translators.

Committee review

The translated versions and the first proof of Persian RES along with reports from translators were sent to an expert group, which included a professor of psychiatry, an expert on disaster resiliency, an expert on health in emergencies and disaster, and a professor and expert in psychometrics and linguistics for consideration. Then, each member was asked to draw up a final draft for each item individually. Also, the committee tried to ensure that the translation is fully comprehensible, and they reached an agreement on the points on which they had disagreed, in accordance with the principle of consensus. At this stage, the following four topics were carefully considered in the expert panel: semantic equivalence, idiomatic equivalence, experiential equivalence, and

conceptual equivalence.^[39] Finally, the first tentative Persian RES entitled “Persian Resilience Evaluation Scale” was provided to consider for validity and reliability assessment.

Validity assessment

After ensuring the Persian translation, face validity, content validity, and concurrent and construct validity were conducted. At first, the quantitative face validity was assessed and then, using the same individuals who participated in the quantitative face validity section, the items were assessed using the item impact assessment method.^[41]

Qualitative and quantitative face validity assessment

At this stage, quantitative face validity was performed for the first tentative Persian RES. To determine the impact of each item, the item IS was used with the help of 15 participants (healthy participants, Bachelor’s degree and higher, 7 females and 8 males, aged between 28 and 59). (Participants were invited to complete an online form via social media and email).

The IS was based on a 5-point Likert scale^[40]: quite suitable (score 5), somewhat suitable (score 4), moderately suitable (score 3), slightly suitable (score 2), and not suitable at all (score 1). The researcher then calculated the IS of each item separately based on the following formula: $Impact\ Score = Frequency\ (\%) * Suitability$. Frequency refers to the number of people who scored 4 and 5 for each item, and the goal of suitability is the mean score on the Likert scale. The condition for accepting each item in this section is to obtain a minimum score of 1.5.^[40]

To obtain qualitative face validity when translating the scale, 10 participants (healthy volunteers between 20 and 60 years old, after inviting them to complete the online form) were asked to read the scale and answer questions about the difficulty level (difficulty understanding words and phrases), irrelevancy of questions (existence of appropriate proportion and relation of the main purpose and scale dimensions), and ambiguity (the likelihood of misinterpretations of expressions or inaccuracies in word meanings). After reviewing the answers, the needed changes were made if necessary.^[42]

Content validity assessment

In this stage, and as a first step, Content Validity Index (CVI) based on kappa statistic was used to confirm the relevance of items due to changes in expressions. For this purpose, the opinions of 15 experts were used, including four disaster health experts, two psychiatrists, and nine faculty members with a background in resilience and Scale Development in the health system research. To perform content validity, experts were asked to indicate the relevance of each of the nine tool

phrases with a Likert score of one to four, ranging from (give answer options...), in such a manner that higher scores indicated greater relevance. To obtain CVI, the percentage of those who scored 3 or 4 for each of the relevant options was modified by Kappa’s method based on the opinion of Paulit and Beck (2007) on the I-CVI and S -CVI/Ave approaches.^[42] In order to be certain about content validity, the researchers asked the team of experts involved in the CVI calculation to give their opinion after careful study of the scale, observing the grammar, proper word placement, allocation of appropriate words, and appropriate scoring. And then scales were corrected by summing up their comments.

Construct validity assessment

Construct validity addresses the question of whether a given structure of the scale is capable of measuring the intended purpose.^[42,43] Here we used exploratory factor analysis (EFA) and CFA, to determine construct validity. For EFA, the sample size was equal to 300 individuals. Also, according to CFA based on observable and hidden variables, the sample size was equal to 300 individuals. Participants were selected from a healthy general population ranging from 18 to 60 years old. Factor analysis was performed by DWLS (Diagonally Weighted Least Squares) model using R version 3.6.3 software with Package lavaan 0.6–7 to evaluate the construct validity and confirm the factor structure regarding the number of factors.

Sampling strategy

This research used the multi-stage random sampling method. First, using stratified sampling, the target society was divided into three main regions based on municipal areas. Moreover, sampling was done from each floor in a cluster (from several main streets of each area) and by visiting people’s homes in the main streets of each area.

Sampling was done on all days of the week (including holidays) and in the evening hours (3 pm to 9 pm).

Convergent validity

Persian version of the Connor-Davidson Resilience Scale was used to determine the convergent validity of the questionnaire.

Reliability Assessment

Internal consistency assessment

Cronbach’s alpha coefficient and omega-McDonald coefficient were calculated for each factor (self-confidence and self-efficacy) as well as the whole instrument.

Reliability assessment

A test-retest method was used to assess the reliability of the scale. The scale was completed by 30 individuals in two steps over a 15-day period. (If there were significant changes in the life of the participants during the period

between the two evaluations, which could affect their resilience, that person was excluded from the study).

Spearman and intra-group correlation coefficient (ICC) were used to calculate the reliability coefficient. The ICC is an estimate of the degree of agreement between two or more referees ranging from 0 to 1, with good scores ranging from 0.61 to 0.8, and more than 0.8 is excellent.

Results

Validity assessment

Qualitative and quantitative face validity assessment

After approving the face validity of Persian RES by a quantitative method, quantitative face validity was conducted by assessment of the Impact Score of the Persian version of RES [Table 1].

Participants were asked to rate the difficulty level, the degree of irrelevance and the ambiguous questions in order to obtain qualitative face validity. Then corrections were made based on comments. In quantitative face validity, the item impact index was used to correct inappropriate phrases and determine the significance of each phrase, and since all item ISs were greater than 1.5, the study entered the content validity phase.^[42,43]

Content validity assessment

The CVI was calculated numerically based on kappa statistics. Evaluation criteria for kappa are the values above 0.74, between 0.60 and 0.74, and the ones between 0.40 and 0.59 are considered excellent, good, and fair, respectively [Table 1].

Interpretation of I-CVIs: If the I-CVI is higher than 79%, the item will be appropriate. If it is between 70 and 79%, it needs revision. If it is less than 70%, it is eliminated. S-CVI/Ave = 0.977. Number of items considered relevant by all the panelists = 7, Number of terms = 9, and S-CVI/UA = 7 ÷ 9 = 0.78.

Construct validity assessment

Exploratory factor analysis: we used EFA to achieve the well-construct model of Persian version of RES. First, we selected 300 individuals, (i.e. healthy adults) for EFA. To explore the factorial structure of RES Questionnaire, all nine items of the instrument were subjected to an EFA with Varimax rotation. The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy for the analysis. The results of that is (KMO = 0.833. Bartlett's test of sphericity χ^2 (36) = 854.8, $P < .001$) that indicate that correlation structure is appropriate for factor analysis. The Principal Component Analysis and the Kaiser's criterion of eigenvalues greater than 1 yielded a two-factor solution as the best fit for the data. These two factors explained 55.9% of the variance. The result of factor analysis and Scree plot have shown in Table 2 and Figure 1.

Confirmatory factor analysis: In order to measure the construct validity, 300 individuals (i.e. healthy adults) were selected. The mean age of the participants was 34.43 (SD = 11.81) years, of which 53.2% (N = 159) were males and 46.8% (N = 140) were females. About 43% of the subjects were single and 54% were married and 2.7% were divorced. In terms of education level, 11.7% were undergraduates, 41% had diploma and postgraduates, 35.7% had bachelor degrees, and 11.7% had master's degrees and above. About 26% of the samples were employed in government's, 18% were housewives, 9.7%

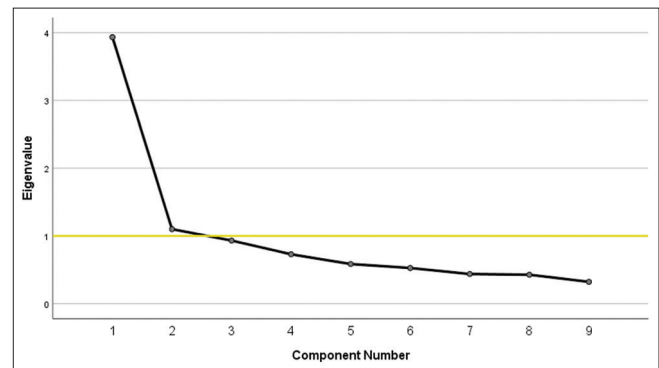


Figure 1: The scree plot

Table 1: The results of Impact Score and content validity index (CVI), I-CVIs, S-CVI/Ave, and Modified Kappa

Question number	Impact Score	CVI n=15				CVI	I-CVIs	Interpretation	PC	K*
		Not relevant	Partly relevant	Relevant	Completely relevant					
1	6.2	0	0	3	12	100	1	Appropriate	0.0000305	1
2	6.2	0	0	6	9	100	1	Appropriate	0.0000305	1
3	5.7	0	2	4	9	0.86	0.86	Appropriate	0.0032043	0.859
4	6.6	0	0	1	14	100	1	Appropriate	0.0000305	1
5	6.6	0	0	1	14	100	1	Appropriate	0.0000305	1
6	6.6	0	0	2	13	100	1	Appropriate	0.0000305	1
7	5.3	0	0	2	13	100	1	Appropriate	0.0000305	1
8	6.6	0	0	1	14	100	1	Appropriate	0.0000305	1
9	5.7	0	1	6	8	0.93	0.93	Appropriate	0.0004578	0.93

Number of items considered relevant by all the panelists=7, Number of terms=9, S-CVI/UA=7÷9=0.78. CVI: CONTENT VALIDITY INDEX. S-CVI/Ave: scale content validity index. I-CVIs: item content validity index. K: Modified Kappa

were freelancers, 18.4% students, and about 28% of the samples were classified as “other jobs” likes unemployed or semi-governmental [Table 3].

CFA was used to evaluate the construct validity. The fit indices of the model are shown in Table 4.

According to Table 4, the Chi-square value was calculated to be 81.0 and the Chi-square ratio on the degree of freedom was less than 5. The RMSEA index was 0.084, which is a small deviation from the acceptable value. In addition, the values of CFI and TLI indices were estimated to be 0.98 and 0.97, respectively, which is higher than 0.90 (Polit, 2010).

Table 2: Factor structure of the RES using principal component analysis with oblique rotation solution

RES Items	Factor 1	Factor 2
I have confidence in myself	-----	0.649
I can easily adjust in a difficult situation	0.603	-----
I am able to persevere	0.606	-----
After setbacks, I can easily pick up where I left off	0.630	-----
I am resilient	0.818	-----
I can cope well with unexpected problems	0.657	-----
I appreciate myself	-----	0.863
I can handle a lot at the same time	0.658	-----
I have confidence in myself	-----	0.757

The conceptual model of the relationships between hidden variables (components) and explicit variables (component-related questions) is shown in Figure 2. This is the result of fitting the model to standard estimation, which shows the numbers on the arrows representing the factor loadings. The larger the value of factor load and the closer to the value of 1 means that the observed variable (items) can better explain the hidden variable (construct). If the factor load is less than 0.3, the relationship is considered weak and ignored. A factor load of between 0.3 and 0.6 is acceptable, and if it is more than 0.6 it is desirable. The value of T statistic for all variables was greater than 1.96 and significant at a level of 0.05 [Table 5].

To evaluate convergent validity, the average of the questions on the Persian RES and Connor Davidson Resilience scale were calculated first. And then the correlation coefficients of the two scales were estimated using Spearman’s rho; the results showed that the correlation coefficient between the two scales is 0.65 (*P* value < 0.001, *N* = 300), which is positive and significant.

Reliability Assessment

Internal consistency assessment

Cronbach’s alpha coefficient and Omega-McDonald’s alpha coefficient were used to assess the reliability of the questionnaire by internal consistency [Table 4].

Table 3: Demographic characteristics of participants

Demographic characteristics							
Gender	Male	Female	Total				
Number (%)	159 (53.2)	140 (46.8)	299 (100)				
Age	Male	Female	Total				
Mean (standard deviation)	34.18 (12.34)	34.78 (11.11)	34.43 (11.81)				
Marital status	Single	Married	Divorced	Total			
Number (%)	128 (43.1)	161 (54.2)	8 (2.7)	297 (100)			
Level of education	Undergraduate	Diploma and Postgraduate	Bachelor’s degree	Master’s degree and above	Total		
Number (%)	35 (11.7%)	123 (41%)	107 (35.7%)	35 (11.7%)	300 (100%)		
Employment status	government’s employee	Housewife	Freelance	Student	Others	Total	
Number (%)	78 (26.1%)	54 (18.1%)	29 (9.7%)	55 (18.4%)	83 (27.8%)	299 (99.7%)	
Ethnicity –	Persian	Turkish	Lur	Kurdish	Arab	Other	Total
Number (%)	147 (49)	9 (3)	90 (30)	17 (7.5)	8 (7.2)	29 (7.9)	300 (100%)

Table 4: Goodness of fit indices of confirmatory factor analysis

Fit Index Name	Abbreviation	Calculated Value	Acceptable Fit
Chi-square	χ^2	81.00	--
Chi-square degree of freedom	DF	26	–
Chi-square ratio to degree of freedom	χ^2/df	3.11	$5 \chi^2/df < \leftarrow 5$
Likelihood value for Chi-square	<i>P</i>	0.001	<i>P</i> ≤ 0.05
Mean squared error of model error	RMSEA	0.084	RMSEA < 0/1
Adaptive Fit Index	CFI	0.984	CFI > 90
Standardized Root Mean Squared Residual	SRMR	0.064	SRMR < 0.09
Tukey Lewis	TLI	0.977	TLI > 90

In this study, based on credible sources for content validity considering that the clarity of questions was investigated in the translation stage, only the relevance measure was evaluated, and ultimately the content CVI and Modified Kappa were approved and accepted by I-CVI and S-CVI/Ave methods. Cronbach's alpha coefficient for self-confidence, self-efficacy, and for the whole questionnaire were 0.72, 0.78, and 0.83, respectively, which is higher than 0.7. Also, the results of the McDonald's Omega coefficient are similar to the Cronbach's alpha coefficient.

Reliability assessment

Spearman non-parametric correlation test was used to investigate the reliability of the Persian version of the

RES. Due to the non-normality of the data, intra-class correlation coefficient (ICC) was also reported. The results of Table 6 show that the Spearman correlation coefficient and intra-group correlation coefficient are above 0.8 for all questions.

Discussion

In this study, the RES was adapted and translated into the Persian language to develop the first Persian version of the RES. This study examined the psychometric properties of the Persian RES. Polite, Guillemín, and other researchers have identified four conditions in which cross-cultural adaptation is essential. One of these conditions was the adaptation of a data collection tool for the use of people from other countries who speak different languages, so in this type of study, first the tool is translated and at the same time adaptation is done.^[39,44,45] Establishing the internal consistency of the Persian version in an Iranian population is essential for future psychological resilience evaluation.

According to the results of this study and confirming all the validity and reliability indices in the psychometric analysis, it can be stated that the Persian version of the RES has an appropriate content validity, face validity, and acceptable construct validity for assessing psychological resilience in a Persian language-speaking community in Dezful, Iran. Also, its convergent validity was found

Table 5: Results of confirmatory factor analysis

Component	Item number	Standardized factor load	T statistic	P
self-confidence	1	0.728	---	---
	7	0.690	15.12	<0.001
	9	0.838	15.91	<0.001
self-efficacy	2	0.667	---	---
	3	0.754	18.95	<0.001
	4	0.643	15.79	<0.001
	5	0.617	15.38	<0.001
	6	0.772	16.89	<0.001
	8	0.612	13.72	<0.001

Table 6: The results of Confirmatory factor analysis, Spearman's correlation coefficient, intra-group correlation coefficient, Cronbach's alpha coefficient, and McDonald's omega coefficient

Component	Question	Standardized factor load	T statistic	P	Spearman correlation coefficient	Intra-class correlation	Cronbach's alpha coefficient	McDonald's omega coefficient
self-confidence	1	0.728	---	---	0.96	0.97	0.723	0.727
	7	0.690	15.12	<0.001	0.94	0.95		
	9	0.838	15.91	<0.001	1	1		
Self-efficacy	2	0.667	-----	---	0.99	0.95	0.779	0.786
	3	0.754	18.95	<0.001	0.82	0.83		
	4	0.643	15.79	<0.001	0.95	0.96		
	5	0.617	15.38	<0.001	0.89	0.89		
	6	0.772	16.89	<0.001	0.93	0.94		
	8	0.612	13.72	<0.001	1	0.99		
Total							0.829	0.834

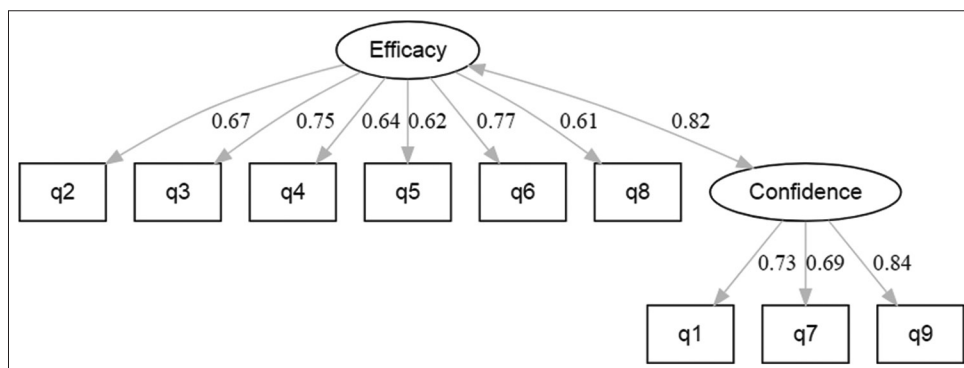


Figure 2: Confirmatory factor analysis model in standard estimation mode

to be good, as its comparison with another resilience scale. It was also found that this scale has appropriate internal reliability and stability. It was shown that the Persian version of the RES is a valid and reliable scale to assess psychological resilience among the population of this study.^[9] This Cross-Cultural Methodological Research contributes to the emergent need for identifying information and measuring distinct factors that affect psychological outcomes after traumatic incidents in the Persian language society.

Cronbach's alpha coefficient and Omega-McDonald's were used for the internal consistency coefficient. Therefore, the scale had an acceptable internal consistency. Spearman correlation coefficient and intra-group correlation coefficient (ICC) were also used to assess instrument consistency. The reliability of the used Persian RES is comparable to the results of the original research that developed the RES. In fact, Cronbach's alpha is more significant than 80% in both studies.^[9] Our findings are in line with those of van der Meer *et al.* (2018). ICC coefficients were above 0.8 for all questions indicating that scale consistency was at a high level. Also, van der Meer showed that the internal consistency and ICC of both English and Dutch scales were at an excellent level above 0.8, and these results indicated high internal consistency and ICC in the Dutch, English, and Persian versions.^[9] Construct validity was evaluated by EFA and CFA. The result of EFA shows that the Persian version of RES also has two factors like the original one, and also these two factors explained 55.9% of the variance. The other results showed that the CFA model is well fitted. In the conceptual model, the factor loadings for the "self-confidence" and "self-efficacy" components were above 0.6. Therefore, the components are at an acceptable level. In this regard, Hair Jr 2014 stated that factor loading bigger than 0.5 is acceptable,^[46,47] and the T-statistic indicated that all questions had a statistically significant role in explaining the components. With regard to the convergent validity, the score of the Persian version of the RES correlated well with the Connor and Davidson Resilience scale.

Therefore, we can say with more assurance that the RES scale can measure the level of psychological resilience well, however; further studies are required to further delve into this subject. Therefore, considering the importance of measuring the psychological resilience of people at risk of each stressful events in a community and determining their psychological resilience in the prevention and mitigation phases of accidents/PTEs, and in order to identify the psychological resilience and strengths of individuals and communities, it is recommended that this valid and reliable measure of psychological resilience be used. The validation of the RES in the Persian language has a significant role in future psychological resilience

research in Persian language regions, and high-risk individuals across all Persian-speaking communities could be measured to determine the basis of the psychological resilience of people in those areas for better planning and intervention in order to reinforce the possible negative points of psychological resilience. Also, adding this scale to measure psychological resilience in the Persian language society maybe will prove to further advance empirical research examining the features and drivers of psychological resilience.

Limitations

The developed scale needs to be investigated in more diverse environments with larger sample sizes, more diverse population, with a broader range in age, education level, culture, profession, and mental health status in order to ensure its reliability. It is also recommended to conduct further studies on this tool among people with post-traumatic stress disorder or pre-trauma and to measure measurement invariance across different cultures.

Conclusion

Based on the results of face validity, content validity, construct validity, convergent validity, reliability, and internal consistency of the Persian RES, it can be concluded that the Persian RES is a short, valid, reliable Persian for measuring psychological resilience, which can be of great use in examining the psychological resilience of individuals in the Persian-speaking community.

Acknowledgments

Many thanks to the Institute for School of public health of TUMS, for funding and supporting the current study (Grant No: 99-1-99-39956).

Ethics approval

This work was approved by Resilience Research Institute of Iranian Red Crescent Society – (Grant No. Ethical Code; IR.RCS.REC, 98.006).

Financial support and sponsorship

Nil.

Conflicts of interest

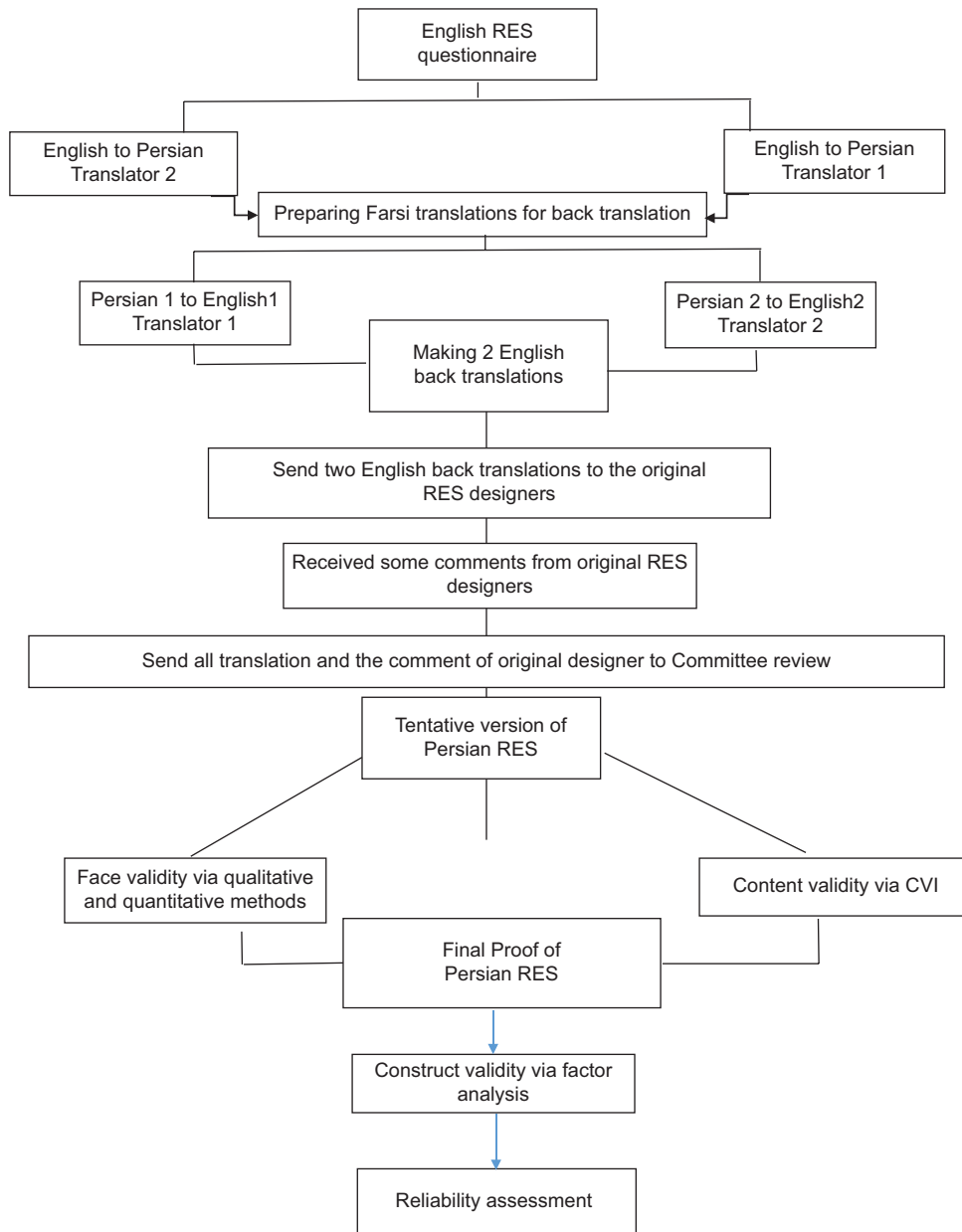
There are no conflicts of interest.

References

1. Witting AB, Bagley LA, Hunt Q, Johnson L, Busby DM. Relational and mental health outcomes of trauma and disaster in couples: The intermediary role of grit. *Int J Disaster Risk Reduct* 2023;86:103533.
2. Watters ER, Aloe AM, Wojciak AS. Examining the associations between childhood trauma, resilience, and depression:

- A multivariate meta-analysis. *Trauma Violence Abuse* 2023;24:231-44.
3. Miller-Karas E. *Building Resilience to Trauma: The Trauma and Community Resiliency Models*. Taylor and Francis; 2023.
 4. Melegkovits E, Blumberg J, Dixon E, Ehntholt K, Gillard J, Kayal H, *et al.* The effectiveness of trauma-focused psychotherapy for complex post-traumatic stress disorder: A retrospective study. *Eur Psychiatry* 2023;66:e4.
 5. Liu Y, Zou L, Yan S, Zhang P, Zhang J, Wen J, *et al.* Burnout and post-traumatic stress disorder symptoms among medical staff two years after the COVID-19 pandemic in Wuhan, China: Social support and resilience as mediators. *J Affect Disord* 2023;321:126-33.
 6. Ali DA, Figley CR, Tedeschi RG, Galarneau D, Amara S. Shared trauma, resilience, and growth: A roadmap toward transcultural conceptualization. *Psychol Trauma* 2023;15:45-55.
 7. Maercker A, Cloitre M, Bachem R, Schlumpf YR, Khoury B, Hitchcock C, *et al.* Complex post-traumatic stress disorder. *Lancet* 2022;400:60-72.
 8. Lebois LA, Harnett NG, van Rooij SJ, Ely TD, Jovanovic T, Bruce SE, *et al.* Persistent dissociation and its neural correlates in predicting outcomes after trauma exposure. *Am J Psychiatry* 2022;179:661-72.
 9. van der Meer CA, Te Brake H, van der Aa N, Dashtgard P, Bakker A, Olf M. Assessing psychological resilience: Development and psychometric properties of the english and dutch version of the resilience evaluation scale (RES). *Front Psychiatry* 2018;9:169.
 10. Usamah M, Handmer J, Mitchell D, Ahmed I. Can the vulnerable be resilient? Co-existence of vulnerability and disaster resilience: Informal settlements in the Philippines. *Int J Disaster Risk Reduct* 2014;10:178-89.
 11. Iacoviello BM, Charney DS. Psychosocial facets of resilience: Implications for preventing posttrauma psychopathology, treating trauma survivors, and enhancing community resilience. *Eur J Psychotraumatol* 2014;5. doi: 10.3402/ejpt.v5.23970.
 12. Jones JM. Surviving while black: Systemic racism and psychological resilience. *Annu Rev Psychol* 2023;74:1-25.
 13. Bekhet AK. Theoretical substruction of resilience theory: Dementia caregivers' burden and their care recipients' behavior. *Nurs Sci Q* 2023;36:64-9.
 14. Walker B. Resilience: What it is and is not. *Ecol Soc* 2020;25. doi: 10.5751/ES-11647-250211.
 15. Vella S-LC, Pai NB. A theoretical review of psychological resilience: Defining resilience and resilience research over the decades. *Arch Med Health Sci* 2019;7:233-9.
 16. Denckla CA, Cicchetti D, Kubzansky LD, Seedat S, Teicher MH, Williams DR, *et al.* Psychological resilience: An update on definitions, a critical appraisal, and research recommendations. *Eur J Psychotraumatol* 2020;11:1822064.
 17. Bonanno GA, Brewin CR, Kaniasty K, Greca AML. Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families, and communities. *Psychol Sci Public Interest* 2010;11:1-49.
 18. Windle G, Bennett KM, Noyes J. A methodological review of resilience measurement scales. *Health Qual Life Outcomes* 2011;9:8.
 19. Southwick SM, Bonanno GA, Masten AS, Panter-Brick C, Yehuda R. Resilience definitions, theory, and challenges: Interdisciplinary perspectives. *Eur J Psychotraumatol* 2014;5. doi: 10.3402/ejpt.v5.25338.
 20. Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. *Child Dev* 2000;71:543-62.
 21. Connor KM, Davidson JR. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depress Anxiety* 2003;18:76-82.
 22. Ostadtaghizadeh A, Ardalan A, Paton D, Khankeh H, Jabbari H. Community disaster resilience: A qualitative study on Iranian concepts and indicators. *Nat Hazards* 2016;83:1843-61.
 23. Ostadtaghizadeh A, Ardalan A, Paton D, Jabbari H, Khankeh HR. Community disaster resilience: A systematic review on assessment models and tools. *PLoS Curr* 2015;7:ecurrents.dis.f224ef8efbdfcf1d508dd0de4d8210ed. doi: 10.1371/currents.dis.f224ef8efbdfcf1d508dd0de4d8210ed.
 24. Chmitorz A, Kunzler A, Helmreich I, Tüscher O, Kalisch R, Kubiak T, *et al.* Intervention studies to foster resilience—A systematic review and proposal for a resilience framework in future intervention studies. *Clin Psychol Rev* 2018;59:78-100.
 25. Friberg O, Hjemdal O, Rosenvinge JH, Martinussen M. A new rating scale for adult resilience: What are the central protective resources behind healthy adjustment? *Int J Methods Psychiatr Res* 2003;12:65-76.
 26. Jorgensen IE, Seedat S. Factor structure of the Connor-Davidson resilience scale in South African adolescents. *Int J Adolesc Med Health* 2008;20:23-32.
 27. Karırmak Ö. Establishing the psychometric qualities of the Connor-Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. *Psychiatry Res* 2010;179:350-6.
 28. Yu X, Zhang J. Factor analysis and psychometric evaluation of the Connor-Davidson Resilience Scale (CD-RISC) with Chinese people. *Soc Behav Pers Int J* 2007;35:19-30.
 29. Ahern NR, Kiehl EM, Lou Sole M, Byers J. A review of instruments measuring resilience. *Issues Compr Pediatr Nurs* 2006;29:103-25.
 30. Wagnild GM, Young H. Development and psychometric. *J Nurs Meas* 1993;1:165-78.
 31. Aroian KJ, Schappler-Morris N, Neary S, Spitzer A, Tran TV. Psychometric evaluation of the Russian language version of the Resilience Scale. *J Nurs Meas* 1997;5:151-64.
 32. Girtler N, Casari E, Brugnolo A, Cutolo M, Dessi B, Guasco S, *et al.* Italian validation of the Wagnild and Young resilience scale: A perspective to rheumatic diseases. *Clin Exp Rheumatol* 2010;28:669-78.
 33. Heilemann MV, Lee K, Kury FS. Psychometric properties of the Spanish version of the resilience scale. *J Nurs Meas* 2003;11:61-72.
 34. Lei M, Li C, Xiao X, Qiu J, Dai Y, Zhang Q. Evaluation of the psychometric properties of the Chinese version of the Resilience Scale in Wenchuan earthquake survivors. *Compr Psychiatry* 2012;53:616-22.
 35. Lundman B, Strandberg G, Eisemann M, Gustafson Y, Brulin C. Psychometric properties of the Swedish version of the Resilience Scale. *Scand J Caring Sci* 2007;21:229-37.
 36. Portzky M, Wagnild G, De Bacquer D, Audenaert K. Psychometric evaluation of the Dutch Resilience Scale RS-nl on 3265 healthy participants: A confirmation of the association between age and resilience found with the Swedish version. *Scand J Caring Sci* 2010;24(Suppl 1):86-92.
 37. Unisdr U, editor Hyogo framework for action 2005–2015: Building the resilience of nations and communities to disasters. Extract from the final report of the World Conference on Disaster Reduction (A/CONF 206/6); 2005: The United Nations International Strategy for Disaster Reduction Geneva.
 38. Unisdr U, editor Sendai framework for disaster risk reduction 2015–2030. Proceedings of the 3rd United Nations World Conference on DRR, Sendai, Japan; 2015.
 39. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: Literature review and proposed guidelines. *J Clin Epidemiol* 1993;46:1417-32.
 40. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, *et al.* Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO)

- measures: Report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health* 2005;8:94-104.
41. Nevo B. Face validity revisited. *J Educ Meas* 1985;22:287-93.
 42. Hajizadeh A, Asqari M. *Methods and Statistical Analyzes by Looking at the Research Method in the Biological Sciences and Health Sciences*. University Hahad; 2011.
 43. Polit DF, Beck CT. Generalization in quantitative and qualitative research: Myths and strategies. *Int J Nurs Stud* 2010;47:1451-8.
 44. Torabinia M, Mahmoudi S, Dolatshahi M, Abyaz MR. Measuring engagement in nurses: The psychometric properties of the Persian version of Utrecht work engagement scale. *Med J Islam Repub Iran* 2017;31:15.
 45. Polit DF, Beck CT. *Nursing Research: Generating and Assessing Evidence for Nursing Practice: Lippincott Williams and Wilkins*; 2008.
 46. Hair J, Black W, Babin B, Anderson R. *Multivariate Data Analysis*. Pearson Education Limited; 2014.
 47. Hair Jr., J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2009) *Multivariate Data Analysis*. 7th Edition, Prentice Hall, Upper Saddle River, 761.



Supplementary Figure 1: Summary of method

Supplementary Appendix A

Final 9-Item English and Persian Version of the Resilience Evaluation Scale (RES)

RES instruction: Below you will find a number of statements about how you think about yourself and the way in which you usually respond to difficult situations. Please indicate to what extent each statement applies to you.

Original item	Completely disagree	Disagree	Neutral	Agree	Completely agree	شماره	گزینه
I have confidence in myself	0	1	2	3	4		1
I can easily adjust in a difficult situation							2
I am able to persevere							3
After setbacks, I can easily pick up where I left off							4
I am resilient							5
I can cope well with unexpected problems							6
I appreciate myself							7
I can handle a lot at the same time							8
I believe in myself							9