Psychometric Properties of an Iranian Version of the Response to Stressful Experiences Scale (RSES)

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Research Article

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Posted Date: February 25th, 2021

DOI: https://doi.org/10.21203/rs.3.rs-237904/v1

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Abstract

Objective: Few psychometric scales have been developed to measure resilience and related constructs such as Response to Stressful Experiences in military. This study aimed to translate and validate the Response to Stressful Experiences Scale (RSES), a measure of individual differences in cognitive, emotional, and behavioral responses to stressful life events in Iranian Military Personnel.

Method: In this methodological study, 501 Military personnel were selected by convenience sampling from three military units in Tehran, Iran .The forward backward-procedure was applied to translate the questionnaire from English into Persian. Face validity, Content validity, construct validity (EFA, CFA) and convergent validity have been employed to validate the prepared scale. Cronbach's alpha coefficients and the test-retest were used to assess the scale reliability.

Results: By performing EFA on the first sample part (n = 300), the exploratory factor analysis showed that the present scale has three factors. The factors were called as active coping, meaning-making and flexibility, resiliency, according to their content and the research, which explained 37.5% of the overall extracted variance. CFA was performed on the second part of the sample (n = 201), to test the fitness of the 3-factor solution. The confirmatory factory analysis showed a moderate fit for the data (CFI = 0.930, CMIN/DF = 1.879, RMSEA =0.060). The 3-factors subscales were associated with the Connor–Davidson Resilience Scale (CD-RISC), indicating the good convergent validity of RSES. The internal consistency was acceptable (active coping=.0.761, meaning-making and flexibility=0.863, resiliency=0.865 and Cronbach's alpha of the total was 0.920). The ICC value of 0.91 ranging from 0.79 to 0.87 was found for the whole scale and the subscales.

Conclusion: The findings suggest that the Persian version of the RSES has acceptable psychometric properties. Therefore, it can be used to measure Response to Stressful Experiences or resiliency in research and clinical settings.

Keywords: Resilience, Military Personnel, Stressful Experiences, Reliability, Validity

Background

In recent decades, attitudes toward stress and psychological stress due to stressful situations have evolved under the influence of positive approaches in the field of health psychology, and in line with this approach, equipping individuals with their personal and psychological capacities in dealing with stressful experiences can be useful [1]. The response to stress depends on factors such as the nature and severity of stressors, the social environment, and the ability to endure and resist it as a protective mediator of the individual in difficult situations [2, 3]. One of the traits that cause the person to be least harmful in a traumatic situation is a capacity called psychological resilience. Although definitions of resilience are various, it is widely accepted that resilience is an outcome observed in the context of risk formally defined as a good mental health outcome following an adverse life event or a period of difficult life conditions [4]. Resilience not only increases one's ability to cope with problems, but also helps maintain one's mental health [5]. It is generally described by three dimensions: outcome, process, and personality traits [6]. First, in terms of outcome, resiliency can be described as the outcome that has led to successful adjustment despite acute and chronic stressors [7]. From the process perspective, resilience is a dynamic process through which people are easily adapted to life's problems and quickly pass through life's losses [8]. Finally, from the personality-trait point of view, resilience is the ability to overcome and adapt to harsh conditions [16]. Resilience can be associated with better psychological adjustment and potentially have positive effects on psychological well-being and quality of life of individuals [9]. It increases coping self-efficacy in the process of adaptation, permits for effective coping behavior, helps people better answer to stressful conditions [10] and serves as a mediator between coping and psychopathology, such as anxiety, depression, anger, aggression [11]. In other words, resilient individuals are typically seen as having a positive self-image, optimism, active coping, and hardiness [12]. Resilience in the military personnel may be of greater importance than the urban population due to the military's exposure to numerous stressors, such as climate change, home

avoidance, fears, risk of death, and issues related to combat conditions [13], because resilience and hardiness can reduce anxiety and depression [14]. On the other hand, military organizations are expected to employ highly resilient individuals in stressful situations, including combat and other conditions related to the military environment [15]. Given the fundamental role of resilience in stress management [15], improving the quality of life [6], improving the psychological well-being of individuals [10], evaluating and measuring resilience in the military environment is important. The use of valid tools in this field can help plan to improve resiliency and subsequently improve the quality of life and stress management in military personnel.Various psychometric scales have been developed to measure resilience and related structures [16-19]. Four such measures are: the Connor–Davidson Resilience Scale [16], the Resilience Scale for Adults (RSA) [17], the Dispositional Resilience Scale-15 (DRS-15) [18] and the Resilience Scales for Children and Adolescents (RSCA) [19]. The Connor–Davidson Resilience Scale (CD-RISC) is mostly used for post-traumatic stress disorder in the clinical setting, measures the personal qualities that enable one to grow in the face of adversity [6], and it is an outcome measure in interventions shown to enhance resilience [20]. It contains 25 items about 5 factors, but it does not cover attributes of resilience in much depth and is not obvious [9]. The RSA is intended to examine intrapersonal and interpersonal factors granted to simplify adaptation to psychosocial difficulties. This scale is used in clinical and health psychology and is effective to determine the protective factors that serve as a barrier against psychological disorders [9], both tools have the limitation that they often lack information on psychometric properties or measure resilience from the view of personality property only [5]. The DRS-15 and Resilience Scales for Children and Adolescents have primarily been used to assess characteristics of resilience (e.g., hardiness, coping, self-efficacy [21, 22]. The Response to Stressful Experiences Scale (RSES) is a self-report tool to measure individual differences in cognitive, emotional, and behavioral answers to stressful life events. The (RSES) is intended to complement existing measures of resilience by providing a measure that

focuses on how an individual characteristically responds during and immediately after life's most stressful events; by extending dimensions of resilience to include factors such as cognitive flexibility, meaning making, and restoration; and by providing a more comprehensive measure of individual characteristics that may consult protection against the injurious effects of high quantity stressor [23]. Assessing psychological characteristics using standard tools can be effective in evaluating and planning to improve those characteristics. Since no studies have yet assessed the psychometric properties and factor construct of the RSES in Iran, the present study was conducted to carry out a psychometric assessment of the Persian version RSES in a sample of military personnel.

. Methods

Participants

A methodological study was conducted at three military units of Iran in Tehran. Some investigators recommended that for factor analysis, a sample of 100 participants is inadequate, 200 as relatively good, 300 as good, 500 as very good, and 1000 as high [24]. In practice 501 military personnel from three military units in Tehran were selected by convenience sampling. Inclusion criteria in this study included were:

- Formal membership of the military organization,
- The individual is fully satisfied with the accountability and participation in the research.

Exclusion criteria included was Unwillingness to fill out the questionnaires.

Translation procedure

The World Health Organization protocol of forward-backward translation technique was used for translating the scale from English into Persian [25]. For this purpose, at first two independent professional translators translated two separate English Translations of the Persian version of the

questionnaire. The Persian version of the two above-mentioned translations was obtained with the best translation available. Subsequently in the next step, two English language experts translated the final version into English again. After this step, the original English version was compared with the English version derived from the translation of language specialists by the research team, and at last, the final version of the Persian version was approved.

Statistical analysis

In addition to descriptive statistics, several analyses were carried out in order to assess the psychometric properties of the Iranian version of RSES. Internal consistency was assessed by the Cronbach's alpha (α), McDonald's omega (Ω). Coefficients Ω and α values greater than 0.7 were acceptable (26). To assess the test-retest reliability of the RSES, a subset of the participants (n = 25) completed the test twice, with a 2-week interval between tests. Test-retest reliability was then examined by calculating intraclass correlation coefficients (ICC). An ICC>0.80 indicated good test–retest reliability and stability [27].

Validity of RSES was assessed using content and face validity and Convergent validity, For face validity the views of ten military personnel were gathered on the appropriateness, difficulty, relevance and ambiguity of the questionnaire items, and any necessary arrangement were made based on their views on the items. The time needed for responding to the scale items was also computed in this phase. For content validity, Persian version of the RSES was distributed among 10 specialists (including military Psychologist, Psychiatrist, PhD Student of military Psychology); and were asked to answer a 4-point Liker scale in order to assess that the questions measured what they were intended to measure (relevancy), and that the items were clear enough to be understood without difficulty (clarity), and finally that questions were simple enough to be rated (simplicity). Then, the Content Validity Index

(CVI) was calculated for the scale. Polite and Beck recommended 0.80 for the acceptable lower limit for the CVI value [28].

To assess the Convergent validity of the RSES, the Pearson's correlation coefficient between the scores of the RSES and the CD-RISC were computed. Values of r ≥ 0.81–1.0 are considered as excellent, 0.61–0.80 very good, 0.41–0.60 good, 0.21–0.40 fair, and 0–0.20 poor (29).

The factor structure of the questionnaire was extracted by performing both exploratory (EFA) and confirmatory factor analyses (CFA). For the first sample part of the participants (ie, n = 300), Exploratory factor analysis was performed using the Maximum likelihood (ML) estimation and the promax rotation. In order to evaluate sampling adequacy for performing a satisfactory factor analysis, Kaiser- Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's tests also were calculated. The items with absolute loading values of 0.3 or greater were regarded as suitable [30]. For the second part of the participants (n = 200), confirmatory factor analysis (CFA) was used to test the fit of the standard RSES structure (30). There are some fit indicators for determining the goodness of fit of the model and it is suggested that several indicators be considered [31]. The model fitness was assessed according to Root Mean Square of Error of Approximation (RMSEA<0.5 good and <0.08 acceptable), Comparative Fit Index (CFI>95% Good and > 90% acceptable), Incremental Fit Index (IFI >95% Good and > 90% acceptable) Parsimonious Comparative Fit Index (PCFI>0.5 good), Parsimonious Normed Fit Index (PNFI>0.5 good) and CMIN/DF(Good <3 and <5 Acceptable), (31).The univariate and multivariate distribution of data was investigated for the distribution of normal data individually by skewness (± 3) and kurtosis (± 7).The existence of multivariate outlier was assessed by Mahalanobis d-squared ($p < 0{\cdot}001$) and multivariate normality by Mardia coefficient of multivariate kurtosis >8 [32]. The missing data were evaluated using multiple imputation, then replaced by the average participant response [33].All statistical values were calculated by SPSS- AMOS22.

Measures

Demographic information

Demographic, military characteristics assessed included age, sex, education, employment duration, work type, service branch.

The Response to Stressful Experiences Scale (RSES)

Douglas et al. developed and validated the (RSES) using multiple samples, including large groups of active duty and reserve component military personnel with a wide variety of military experiences and degrees of combat exposure in USA [23]. The (RSES) consists of 22 items divided between 5 subscales: meaning-making and restoration (8 items), active coping (6 items), cognitive flexibility (4 items), spirituality (2 items) and self-efficacy (2 items). Responses are provided using a 5-point Likert scale (0= not at all true to 4= true nearly all the time).Total scores range from 0 to 88, and higher scores indicate greater resilience. The scale has proven highly reliable, Cronbach alpha = 0.91 and good test–retest reliability (r = 0.87) [23].

The Connor Davidson Resilience Scale (CD-RISC)

The CD-RISC contains 25 items and assesses five components of resilience (personal competence (8 items), trust/tolerance (7 items), strengthening effects of stress (5 items), acceptance of change and secure relationships (3items), spiritual influences (2 items), Responses are indicated on a five point Likert Type Scale (0= not at all true to 4= true nearly all the time). The range of the total scale is 0-100 with higher totals indicating greater resilience. The CD-RISC has demonstrated good reliability ($\alpha = 0.82$) and validity in Iran. [43].

Ethics

Participants were given written consent to participate in the study. This study was approved by the Ethics Committee of Baqiyatallah University with Code of Ethics. The certificate number is IR.bmsu.REC.1398.203. all methods were carried out in accordance with relevant guidelines and regulations.

Results

92.4% of the participants were male and 80.4% of them were married. The mean age of participants was 34.6 (SD = 4.4) years. The length of military service on average was 9.3 (SD = 3.6) years. 73.7% of the participants served in the ground force. Further information about the personal characteristics of the participants in this study is presented in Table 1.

[Please insert table 1 here]

Content and Face Validity

To assess the content validity, we evaluated the items' CVI. In the expert panel review, all tasks received a CVI above 0.80, representing good content validity. Ten experts rated almost all items as relevant, clear and simple. Regarding face validity, all participants could understand every item; their judgment towards the meaning of the scale was consistent with the established purpose.

Convergent validity

Statistically significant positive associations between total scores of the RSES and the CD-RISC ($r = 0.782$, $p < .001$), was found, which are considered excellent convergent. In sum, these correlations provide evidence of convergent validity for the RSES. The results are shown in Table 2.

[Please insert table 2 here]

Factor analysis

According to Mardia coefficient and Mahalanobis d-squared, the items had a suitable multivariate distribution. the KMO test value was .934, and Bartlett's test value was 3728.124 ($p < 0.001$). For the first sample part of the participants (ie, n = 300), Using the maximum likelihood and the promax rotation three factors (active coping, meaning-making and flexibility, resiliency) were extracted that explained 37.5 % of the total variance (Table 3). Items 5, 13, 15 were removed because they have a factor load of less than 0.3. For the second sample part of the participants (ie, n = 201), all goodness of fit indices confirmed the RSES model fit (χ^2 =247.371; N = 201; df = 146, $p < 0.001$; CMIN/DF = 1.879; RMSEA = .060 (CI 90%, [0.053 to 0.076] ,CFI=0.929) . Following the modification indices, three correlations were inserted between the errors (e1–e2, e10–e13, and e14–e15). The results of construct validity assessment are shown in Table 4. The results of confirmatory factor analysis for RSES are presented in Figure 1.

[Please insert table 3 here]

[Please insert table 4 here]

[Please insert figure 1 here]

Reliability

The Cronbach's alpha (0.76 to 0.86), McDonald's omega of the three extracted factors were good (>0.7).The reliability of RSES was strong, with ICC value ranging from 0.79 to 0.87. The results for reliability are presented in Table 5.

Discussion

The aim of this study was to assess the psychometric features of the RSES scale. The face and content validity of the scale were approved with minor modifications. CVI for the Persia version of the RSES was greater than recommended amount. However, the CVI of the original scale were not reported [23]. The three factors (active coping, meaning-making and flexibility, resiliency), together explained 37% of the total variance. The first factor of the RSES scale that found in the study was named active coping. Coping is defined as an individual's use of behavioral and cognitive tactics to improve harmful aspects of their environment, as well as minimize or escape internal threats compelled by stress or trauma [34]. Active coping reflects efforts to change understanding of the stressor or qualities of the stressor (e.g., problem solving and cognitive restructuring) [35]. Resilient individuals have been found to employ greater amounts of active coping [36-37] and social support-seeking behaviors [36]. This factor was supported by past research [23].we named Factor 2"meaning-making and flexibility", as the items included in the factor measure characteristics associated with meaning-making and cognitive flexibility. Meaning-making, especially following highly stressful encounters (e.g., PTSD), is identified as having far-reaching applicability to mental health. Meaning-making is an action which regards to progress one's ability to explain how an adverse life event happened and attributing causality to the event, thereby helping complete it into one's global meaning system. Meaning-making after stressful events can lead to a new comprehension of the world, new goals in life, or a new identity. These meanings made are related to better psychological adjustment following traumatic events and subsequently to psychological resilience [38]. On the other hand, Cognitive flexibility play a

significant pattern in an individual's capability to adapt to continuously changing environments. In addition to facilitating goal-directed behaviors, cognitive control and flexibility have been implicated in emotion regulation, and disturbances of these abilities are present in mood and anxiety disorders. In the context of stressful experiences, the reported studies tested processes dependent to cognitive control and flexibility, emotional regulation and depressive symptoms [39]. In line with this study, this factor appeared in other study as an important aspect of the RSES instrument [23]. Factor 3 that identified in the present study was named "resiliency", as it includes items that measure characteristics associated with resiliency. Windle (2010) pointed out that resilience may be "interlaced" with everyday life and the presence of chronic adversity may interfere with the person's ability to be "resilient" [40]. Resilience seems to play a decisive role in perceived stress, the number of current life events, persistent stress, interpersonal sensitivity, symptoms of anxiety and depression [41]. The study findings revealed a significant good levels of correlation between all the subscales of the RSES and the CD-RISC with correlation coefficients ranged from 0.48 to 0.92. Previous study has confirmed the convergent validity of the RSES in other military population [23]. This result reinforces the convergent validity of the RSES. The internal consistency of the RSES was acceptable by Cronbach's alpha. The high level of Cronbach's alpha signifies the internal consistency suitability of the scale and the correlation between the items [42]. In the study by Douglas et al. it has been stated that the total Cronbach's alpha coefficient is 0·91 [23]. The reliability of the scale was good. The original version of the RSES approved the stability of the scale [23]. According to the final model of RSES of the current study, participants' item responses are affected by measurement errors. Correlated measurement error occurs when variables are not clearly defined or measured. This can affect how participants respond to specific cases [44]. Measurement errors may be due to the research method (eg, self-report questionnaires). Also, measurement errors can result from words that have the same meaning in both positive and negative expressions [45].

Limitations and suggestion

This study had a number of limitations. Since most of the Iranian military is male, most of the participants in this study were male, and subsequent researchers can replicate this study in environments where gender is balanced. Also, there may be information bias as the data was collected via self-report. Future studies can examine the validity and reliability of the RSES in other groups.

Conclusion

In conclusion, the RSES scale is a validated and reliable tool. Due to the features as simple scoring, appropriate reliability and validity, ability to be completed in short time, it seems that this questionnaire is a suitable instrument.

Abbreviations

RSES: Response to Stressful Experiences Scale

CD-RISC: Connor–Davidson Resilience Scale

RSA: Resilience Scale for Adults

DRS-15: Dispositional Resilience Scale-15

RSCA: Resilience Scales for Children and Adolescents

EFA: Exploratory Factor Analysis

KMO: Kaiser–Meyer–Olkin

ICC: Intraclass Correlation Coefficients

AGFI: Adjusted Goodness of Fit Index

CFI: Comparative Fit Index

GFI: Goodness of Fit Index

RMSEA: Root mean square error of approximation

Ethics approval and consent to participate

The Baqiyatallah University Ethics Committee approved the study. All participants signed informed consent form.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare they have no conflict of interests

Funding

No funding body played a role in the design of the study and collection, analysis, and interpretation of data or in writing of the manuscript.

Authors' contributions

AM was the main investigator, carried out the study and wrote the first draft. HSH was the statistical advisor and contributed to data analysis. AE helped with the preparation of the manuscript and critical revision of the draft.BD supervised the study. HS supervised the study and contributed to writing process. All authors read and approved the final manuscript to be published.

Acknowledgments

The researchers appreciate the participants in this study as well as the research Deputy of Baqiyatallah University of Medical Sciences who supported this project.

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Acknowledgments

The researchers appreciate the participants in this study as well as the research Deputy of Baqiyatallah University of Medical Sciences who supported this project.

Conflict of Interest

None.

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Table 1.Demographic characteristics of research participants

Variables	N (%)
Sex	
Male	463(92.4)
Female	38(7.6)
Age	
20-30	152(30.3)
31-40	265(59.9)
41-50	80(0.16)
51-60	4(0.08)
Marital status	
Married	402(80.4)
Single	98(19.6)
Education	
High school	104(20.8)
University	397(79.2)
Employment duration (years)	

1-10	135(46.9)
11-20	196(39.2)
21-30	70(13.8)
Work type	
Combat specialist	444(88.6)
Military university student	57(11.4)
Service branch	
Army	369(73.7)
Air force	41(0.10)
Navy	91(17.1)

Table 2. The correlation between the RSES and CD-RISC

Dimension	**RSES**	**active coping**	**meaning-making and flexibility**	**resiliency**
CD-RISC	0.782*	0.732*	0.735**	0.540*
Personal competence and tenacity	0.709**	0.635*	0.665*	0.510*
Trust in one's instincts	0.924**	0.875*	0.850*	0.617*
accepting of change positively	0.804*	0.577**	0.744*	0.886*
control	0.790*	0.820*	0688**	0.484*
spiritual influences	0.789**	0.565*	0.793*	0.708*

* $P < 0.05$, ** $P < 0.001$

Table 3: Exploratory factors extracted from items of RSES

Factor	Q_n. Item	Factor loading	h^2	Eigenvalue	%Variance
1.Active coping	9.See it as a Challenge	0.775	0.534	2.894	15.2%
	6.Find Opportunity for Growth	0.724	0.437		
	8. Try to "Recharge" Myself	0.624	0.456		
	10. Look at Problem Number of Ways	0.624	0.436		
	7. Calm and Comfort Myself	0.562	0.351		
	11. Look for Creative Solutions	0.545	0.509		
	14. Find Meaning From Experience	0.471	0.373		
	12. Put Things in Perspective	0.397	0.416		
2.Meaning-making and flexibility	19. Understand That Bad Things Can Happen	0.798	0.488	2.631	13.8%
	21. Draw Upon Lessons Learned	0.711	0.522		
	20. Lean on Faith in God	0.707	0.469		
	18. Learn Important and Useful Life-Lessons	0.576	0.444		
	22. Practice Ways to Handle Better	0.496	0.425		

	16. Know I Will Bounce Back	0.463	0.370		
	17. Expect That I can Handle	0.448	0.381		
3.Resiliency	2. Not Give up	0.734	0.568	1.62	8.5%
	1. Take Action	0.692	0.481		
	3. Find Way to Carry on	0.633	0.574		
	4. Pray or Meditate	0.452	0.305		

Table4. Fit model indices of the CFA of 19 items (n=201) (32)

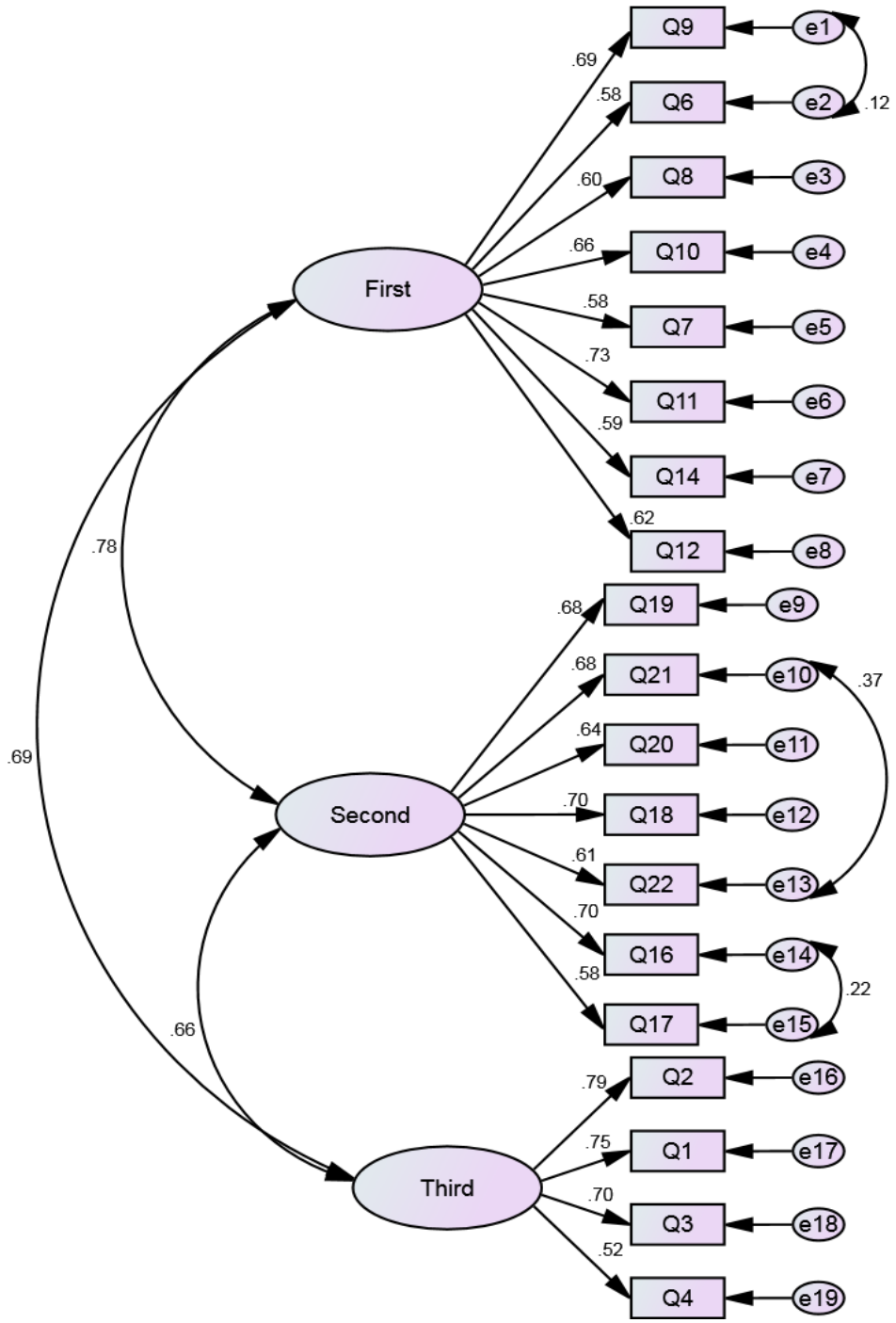
Model \ Indices	χ^2	Df	P-value	CMIN/DF	RMSEA	PCFI	PNFI	IFI	CFI
CFA model	247.37	146	< .001	1.879	.060	.79	.73	0.93	.92

Table 5. Cronbach's Alpha and Intra class correlation index of the RSES

Factors	Number of items	Alpha [CI95%]	Omega	AIC	ICC (n=25, CI95%)
active coping	8	0.76 (0.61 to 0.89)	0.68	0.43	0.79 (0.62 to 0.90)
meaning-making and flexibility	7	0.86 (0.74 to 0.93)	0.84	0.42	0.88 (0.79 to 0.94)
Resiliency	4	0.85 (0.74 to 0.92)	0.85	0.41	0.87 (0.77 to 0.93)

RSES	19	0.92 (0.82 to 0.96)	0.86	0.42	0.91 (0.81 to 0.95)

Fig. 1 the results obtained from confirmatory factor analysis for the RSES


First
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Third
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.66
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Q8
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Q7
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Figures

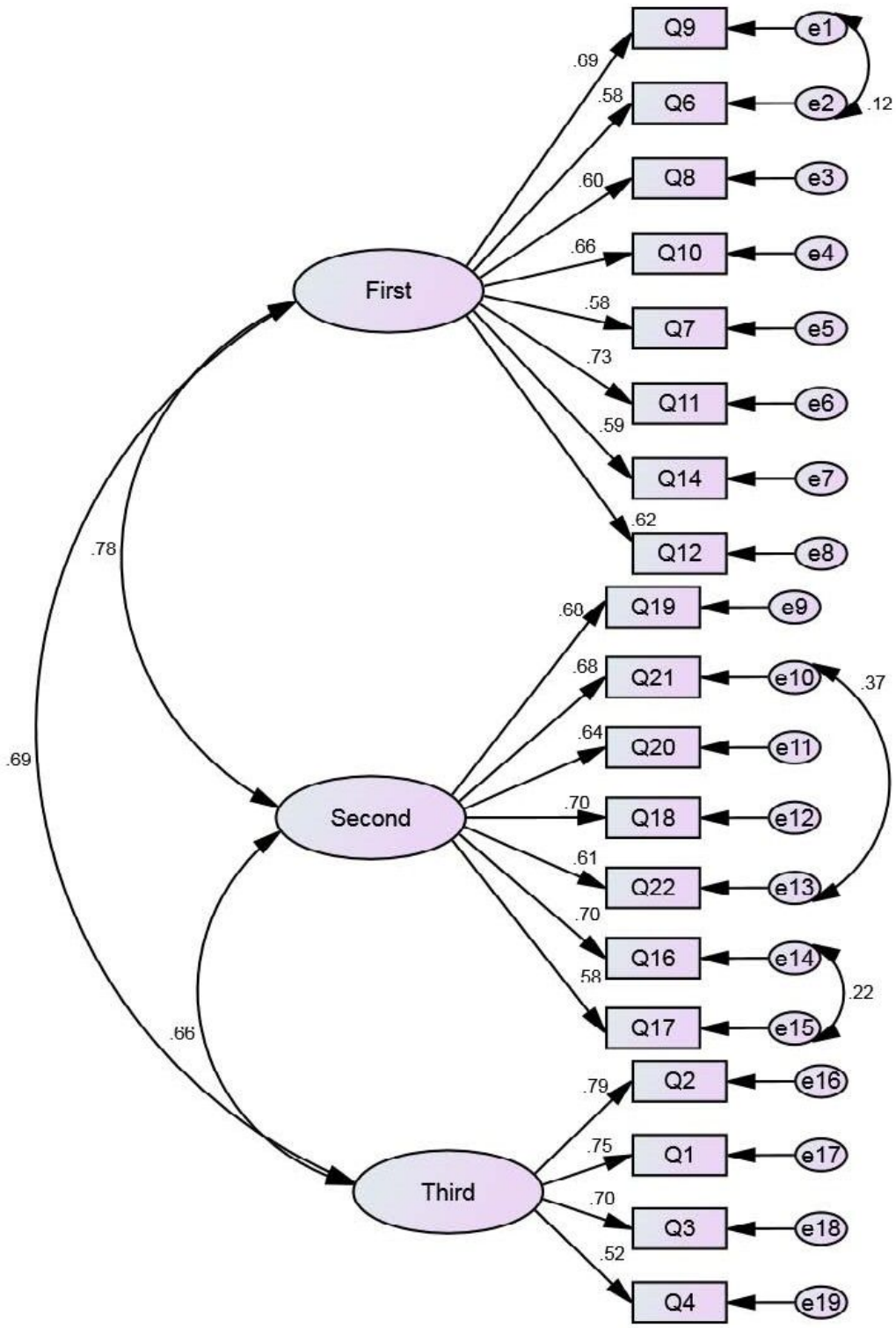

Figure 1

the results obtained from confirmatory factor analysis for the RSES