Assessment of the Psychometric Properties of the Resilience Scale among University Students in Saudi Arabia

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Resilience is a widely studied variable in enhancing the protective factors and personal resources of individuals. The Resilience Scale is commonly used to measure resilience, but not many studies have reported the psychometric properties of the Arabic translated Resilience Scale. Therefore, this study aimed to evaluate the reliability and validity of the Arabic translated Resilience Scale among university students. A quantitative survey approach was employed to collect data from 353 undergraduate students in Saudi Arabia. Data were collected using a structured questionnaire consisting of the Resilience Scale (RS) and Beck Depression Inventory (BDI). Exploratory Factor Analysis and Confirmatory Factor Analysis were used to analyse the data. The results showed that the scale has excellent internal consistency. The results of exploratory factor analysis extracted five dimensions of resilience. Confirmatory factor analysis showed that the five-factor model has a good model fit. The resilience scores were negatively correlated with depression indicating good concurrent validity. The findings support the reliability and validity of the Arabic version of the Resilience Scale to be used in research with the Saudi population.

Keywords: resilience, reliability, validity, exploratory factor analysis, confirmatory factor analysis

The capacity to bounce back from adversity and preserve one's well-being is known as resilience (Walsh, 1998). Initially, the idea of resilience was created to explain why teenagers experiencing negative events were able to adjust so well (Rutter, 1987). The notion of resilience, which refers to the capacity to endure and overcome hardship and adversity, has significant promise for investigations, interventions, and preventative strategies that endeavour to fortify individuals. Through building resilience, people can rise to obstacles and become more tolerant of stress, anxiety, and depression, strengthening their coping mechanisms in the process. According to Masten et al. (2009), resilience enhances a person's ability to interact with their surroundings, fosters wellbeing, and keeps them safe from the effects of risk factors.

According to Surzykiewicz, Konaszewski, and Wagnild (2019), resilience is a stable protective factor and a personal characteristic that can help people cope with trauma and adversity, achieve good adjustment, and support the ability for positive adaptation. It can also be used to moderate the effects of negative stressors. It is crucial for fostering good mental health and wellness as a result. The concept of resilience pertains to a dynamic and adaptive process that can initiate at any point in an individual's life. It is commonly

characterised by the ability to mobilise both internal and external resources in the face of adverse life situations, events, or even traumatic experiences, and by the ability to quickly adapt, deal with, and recover from such major adversities (Wagnild & Young, 1993; Lutha & Cicchetti, 2000; Luthar et al., 2000; Fergus & Zimmerman, 2005; Wright & Masten, 2005; Mancini & Bonanno, 2009; Feder et al., 2010; Gartland et al., 2011; Masten, 2011; Bonanno et al., 2012; Fletcher & Sarkar, 2012; Masten & Narayan, 2012).

To determine an individual's level of resilience—which the authors view as a positive personality trait that promotes individual adaptation—Wagnild and Young (1993) developed the Resilience Scale and evaluated its psychometric qualities. In a qualitative study, these writers interviewed 24 mature women who had effectively dealt with vulnerable circumstances. These interviews revealed five themes that informed the creation of the scale items: meaningfulness, equanimity, perseverance, self-reliance, and existential aloneness. In addition, research on resilience was conducted by Hjemdal et al. (2006) as a potential predictor of the emergence of mental symptoms in response to stressful life experiences. The findings showed that resilience is a strong indicator of mental health, specifically critical protective variables that avert the emergence of mental health problems in people who experience traumatic life events.

The Resilience Scale has been validated through a number of research. Fernandesa, Amaral, and João Varajão (2018) conducted a study with 115 students studying information systems in Portugal. Five themes were identified by factor analysis: "Perseverance," "Self-Reliance," "Equanimity," "Meaningfulness," and "Existential Aloneness" were identified as components of resilience which is consistent with the original Wagnild and Young's (1993) study. In another study conducted on 1266 adolescents in China (Shi, Wang, Wang, & Fan, 2021), three factors were identified in the responses through the use of parallel analysis and exploratory factor analyses (EFAs): personal competency, meaningfulness, and acceptance of oneself and one's life. The test-retest reliability value was 0.72 and the Cronbach's alpha coefficient for the RS was 0.89. Resilience was found to be a significant predictor of anxiety, depression, and PTSD in terms of predictive validity.

Another study by Abiola and Udofia (2011) was conducted in Nigeria. The Resilience Scale had a Cronbach alpha coefficient of 0.87, while the short version, RS-14 had Cronbach alpha of 0.81. Males and females had respective mean resilience scores of 132.04 (SD = 19.08) and 126.52 (SD = 11.50), with a significant difference between the two groups ($t = 2.50$; $p = 0.012$). Significant correlations were also found between RS and RS-14 ($r = 0.97$; $p = 0.000$), as well as between the HADS anxiety ($r = -0.26$; $p = 0.028$) and depression ($r = -0.28$; $p = 0.017$) subscales.

Several studies using the Resilience Scale was also conducted in Malaysia. Arokiaraj et al. (2011) found that self–esteem, family cohesion and family adaptability together with gender did not produce a significant interaction effect with resilience. Zainah et al. (2014) studied resilience and cognitive styles among 552 respondents comprising of 261 born before 1957 and 291 born after 1957. Resilience Scale was used to measure resilience level and GEFT (Group Embedded Figures Test) for cognitive styles. Results indicated that there was a significant difference in cognitive style between these groups, but no significant difference was found in resilience. A study by Ng Ying Yee and Wan Shahrazad (2017) also used the Resilience Scale to examine the relationship between family functioning, resilience, and depression among adolescents from single parent

families. Results showed that resilience significantly mediated the relationship between family adaptability and depression.

This study aims to validate the 25-item Resilience Scale among university students in Saudi Arabia. As they are considered young adults, the personal characteristic of resilience is crucial as it can buffer life challenges faced in their life. Specifically, this study aims to use exploratory factor analysis to analyse the data of pilot study and confirmatory factor analysis to analyse the data of actual study.

Method

Research design

This research employed a quantitative survey design to measure resilience, and depression. The survey design can be utilized to explain the characteristics of a population to test hypotheses, identify beliefs and attitude (Ary et al., 2014; Creswell, 2012). It is a systematic method of gathering data for a large group of participants (Cohen, Manion & Morrison, 2017), and suitable for studying the relationships between variables. The survey design was utilized in this research to explain the characteristics of student's resilience and depression, and the relationship among the two constructs. Data were collected using a structured questionnaire involving university students in Saudi Arabia.

Research participants

The population for this research comprises university students in Saudi Arabia. This study used stratified random sampling to select the respondents. Three universities out of 28 universities in Saudi Arabia representing the south, west and middle regions were selected randomly and the list of students was obtained from their respective universities. The study population consists of 109,000 university students, from which a sample of 500 was randomly selected. The questionnaires were distributed using various online platforms and 353 responses were received (response rate of 70.6%). The demographic data for the sample include information on gender, institution, and year of study. A total of 243 respondents were males (68.8%) and 110 were females (31.2%). In terms of year of study, 94 students (26.6%) were in their first year, 73 (20.7%) were in their second year, 104 (29.5%) were in their third year, and 82 (23.2%) were in their fourth year.

Research instruments

The researchers obtained permission to use the instrument from the researchers who have translated the instrument to Arabic language (Al-Shammeri & Abu Bakr, 2017). These instruments were compiled into a structured questionnaire to measure two constructs: resilience, and depression, as well as three items on demography.

Resilience was measured using the Resilience Scale developed by Wagnild and Young (1993), consisting of 25 items which are scored using a five-point Likert scale (1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, 5=strongly agree). The scale has five dimensions namely meaningful life, perseverance, self-reliance, equanimity, and existential aloneness. It was reported that the Cronbach's alpha of the 25-item scale was 0.863, indicating a high degree of internal consistency (Saunders, Lewis & Thornhill, 2009). The researchers also eliminated several items with low internal consistency values at the pilot study stage. The actual study retained 23 items of the Resilience Scale which showed satisfactory reliability with Cronbach alpha values ranging from 0.706 to 0.914 for its' five dimensions and 0.796 for the whole scale.

The Beck Depression Inventory (BDI)

(Beck, Steer, & Garbin, 1988) was used to measure depression and comprises a 21-item self-report based on a four-point scale ranging from 0 (symptom not present) to 3 (symptom very intense). The BDI has high reliability with a Cronbach alpha value of 0.92 for outpatients and 0.93 for college student samples (Beck et al., 1988). Based on the results of the pilot study, the researchers retained 16 items and these items showed high reliability with Cronbach alpha value of 0.914.

Prior to administering the survey, the researchers conducted a pilot study with 110 students and used this data to conduct exploratory factor analysis (EFA). These respondents were excluded from the actual study. The researchers then revised the questionnaire based on the results of the pilot study in order to improve the quality of the instrument. Then, for the actual study the respondents were selected randomly from the sampling frame based on Krejcie and Morgan's (1970) guidelines for deciding a minimum sample size. In total, 500 copies of the questionnaire were distributed in this research. At the beginning of data collection, the researchers gave a short briefing to explain the research, its purpose and how to respond to the questionnaire. Students were given 30 minutes to complete and return the questionnaire immediately.

Data analysis

The present study employed exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) using the Statistical Package for Social Sciences (SPSS) and AMOS 26.0 model-fitting program to analyse the data. After performing data cleaning and descriptive analysis, the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was conducted to assess the construct validity of the measurement models. This was necessary to establish the reliability and validity of the measurement model in this study.

Results

Exploratory factor analysis for the Resilience Scale

Several assumptions had to be fulfilled in order to do EFA, one of which is to ensure that the variables must first and foremost be continuously measured. Second, the variables have linear correlations with one another. Third, in accordance with Hair et al. (2010) recommended that the minimum number for EFA is 50 samples. This study has 110 cases for conducting the pilot study. Finally, to guarantee that the variables were suitable for data reduction, there should be sufficient correlations between the variables. The extraction technique for the EFA was Principal Component Analysis (PCA) based on 1.00 eigen value with Promax rotation.

The factorability of the 25 items was assessed before EFA outputs. Factorability presupposed that the variables were not just closely correlated (no singularity problems), but also not too closely linked (no multicollinearity problems). Five widely accepted criteria were evaluated to ascertain the factorability of the variables. The criteria were: (i) Inter-Item Correlations or the Correlation Matrix (R-Matrix), (ii) Anti-Image Correlation Matrix, (iii) Kaiser-Meyer-Olkin (KMO) Measure of Sample Adequacy, (iv) Bartlett's Test of Sphericity, and (v) Communalities. During the EFA, two items were excluded from the analysis due to high cross-loadings. In other words, their primary loadings were less than 0.20 compared to their secondary loadings. There were two problematic items (R24, R25) and these items deleted. Hence 23 items satisfied the factorability of the variables.

The correlation matrix or the R-Matrix indicated for each item, none were less than 10 items correlated at least 0.30, and none of the correlations were above 0.90; suggesting reasonable factorability of all items and that items were not subjected to multicollinearity. A determinant value = 1.081 > 0.00001 confirmed that multicollinearity did not exist between the pairs of the variables. In addition, the anti-image correlation matrix's diagonal values indicated whether the correlations between the variables were sufficient. Values lower than 0.50 suggested that the variables lacked sufficient correlation with other variables and possibly should be omitted from further test. The output of this study analysis indicated that the anti-image's diagonals were over 0.50 justifying the inclusion of the items in the factor analysis.

KMO Test determined sample adequacy. The KMO measure was 0.885 (higher than 0.60), signifying that the sample adequacy fulfilled the minimum requirement. Here, the Bartlett's Test of Sphericity determined whether the R-matrix was an identity matrix. If it was an identity matrix ($p > 0.05$), correlations between the variables did not exist, and the variables were subjected to singularity. The output generated revealed that Bartlett's Test of Sphericity was significant (χ^2 (253) = 4516.781, $p < 0.05$), implying the R-matrix was not an identity matrix. Therefore, the items were not subjected to singularity.

The extraction values from the communalities represented the amount of variance that the extracted components accounted for the variable. Here, the values should be higher than 0.50 to show that each variable shared some common variance with other variables, representing reasonable variance (72% variance) with respect to the extracted components, thus appropriate for Principal Component Analysis. All the communalities were above 0.40 and none of the communalities exceeded 1.00. Moreover, the output indicated that: (i) there were common variance shared between items, (ii) none of the 23 items were outliers, (iii) the 23 items were statistically suitable for EFA, and (iv) interpretable factors were extracted.

Table 1 displays the Total Variance Explained for the EFA procedures. Initial Eigen values denoted the variance of each factor. The Extracted Sums of Squared Loadings showed the number of factors retained depending on the minimum Eigen value which was 1.00 while Rotation Sums of Square Loadings demonstrated the variance with respect to factor after rotation procedures.

Table 1

Total variance explained

Factor	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1.P	1	10.306	44.807	44.807	10.306	**44.807**	20.679
2.Q	2	2.102	9.138	53.945	2.102	**9.138**	18.988
3.S	3	1.595	6.933	60.878	1.595	**6.933**	15.584
4.EX	4	1.545	6.718	67.596	1.545	**6.718**	12.046

5.M	5	1.165	5.067	72.663	1.165	**5.067**	5.366

Extraction Method: Principal Component Analysis.

Notes: P= Perseverance =, EX= Existential Aloneness, M= Meaningfulness, Q = Equanimity, S = Self-reliance

According to Table 1, the first factor, perseverance, accounted for 44.80% with respect to the total variance, while 20.68% with respect to the common variance. Furthermore, the second factor, equanimity accounted for 9.13% total variance, and 18.98% common variance. Next, the third factor, self-reliance accounted for 6.93% total variance, and 15.58% common variance. Subsequently, the fourth factor, existential aloneness accounted for 6.72% total variance, and 12.05% common variance. Finally, the fifth factor, meaningfulness accounted for 5.07% total variance, and 5.36% common variance. Overall, the EFA assumed that the 23 items can be explained by or reduced to five underlying components.

The Pattern Matrix as displayed in Table 2 was the key output as it revealed the factor structure of the items. Factor structure refers to the inter-correlations among the items. The Promax rotation assumed factors were correlated, thus the loadings were essentially the regression coefficient of the items. The pattern matrix in Table 2 showed the loadings for each item on each factor (with suppressed loadings) indicating the propensity of each item to the factor. Based on the illustrated pattern matrix, the items were grouped into factors, or accurately, they loaded onto factors. Here, the loadings indicated a very clean factor structure where convergent as well as discriminant validity were evident by the high loadings within factors (loadings > .40), and no major cross-loadings between factors (primary loading were at least 0.20 larger than secondary loading). The average of the items' primary loadings also revealed the factor's convergent validity, or correlations' strength between the items in a single factor. A strong convergent validity would average out to more than 0.70. In this case, some of the averages were less than 0.70 indicating rather weak convergent validity, but acceptable items' factorability (loadings > .40) (Hair et al., 2013).

Table 2

EFA pattern matrix

	Items	**1**	**2**	**3**	**4**	**5**
Perseverance	R10p	.834				
	R6p	.805				
	R1p	.790				
	R20p	.775				
	R2p	.766				
	R23p	.743				
	R18p	.479				
Equanimity	R7eq		.803			
	R17eq		.784			
	R12eq		.773			

Self-reliance	R9s	.769		
	R19s	.750		
	R8s	.705		
	R16s	.630		
Meaningfulness	R15m		.869	
	R4m		.856	
	R14m		.852	
	R13m		.833	
	R11m		.415	
Existential Aloneness	R3ex			.874
	R5ex			.863
	R22ex			.852
	R21ex			.589

Extraction Method: Principal Component Analysis.

Notes: P= Perseverance =, EX= Existential Aloneness, M= Meaningfulness, Q = Equanimity, S = Self-reliance

Table 3 illustrates the study constructs' internal reliability was evaluated using Cronbach's alpha for the five constructs of this study resilience (perseverance, existential aloneness, meaningfulness, equanimity, and self-reliance). These results for the constructs for Cronbach Alpha revealed high levels of reliability for each instrument with all value well above the generally accepted cut off point of 0.70 (Nunnaly & Bernstein, 1994). It can be concluded that based on the Exploratory Factor Analysis (EFA), particularly Principal Component Analysis (PCA) as well as Cronbach Alpha outputs, the study instrument has ensured its psychometric properties i.e. convergent validity, divergent validity as well as reliability. Hence, CFA was warranted for the next stage.

Table 3

Results of Cronbach's alpha

Construct	**Code**	**Cronbach's Alpha**
Perseverance	**7**	0.83
Equanimity	**3**	0.93
Self-reliance	**4**	0.75
Existential Aloneness	**4**	0.72
Meaningfulness	**5**	0.76

Confirmatory Factor Analysis for Resilience

The Resilience factors included five dimensions, i.e., Perseverance, Existential Aloneness, Meaningfulness, Equanimity and Self-reliance. To gauge how well the theoretical constructions and the real data corresponded, the goodness of fit (GOF) indices were initially estimated. Some of the fit indices did not fall within the permitted ranges, according to the initial CFA model for resilience. The Resilience model fit result showed Chi-square X^2 =516.949, degree of freedom (df) was 199, p=0000, Normed Chi-square=2.598 which was problematic as it was greater than the recommended value (5). The value of CFI=.95, TLI=0.94, IFI=0.95, NFI=0.92 and RMSEA was 0.07 which were acceptable values. However, the loading for some items were low (<0.50) less than the threshold value. Therefore, it is necessary to revise the current measurement model (see Figure 1).

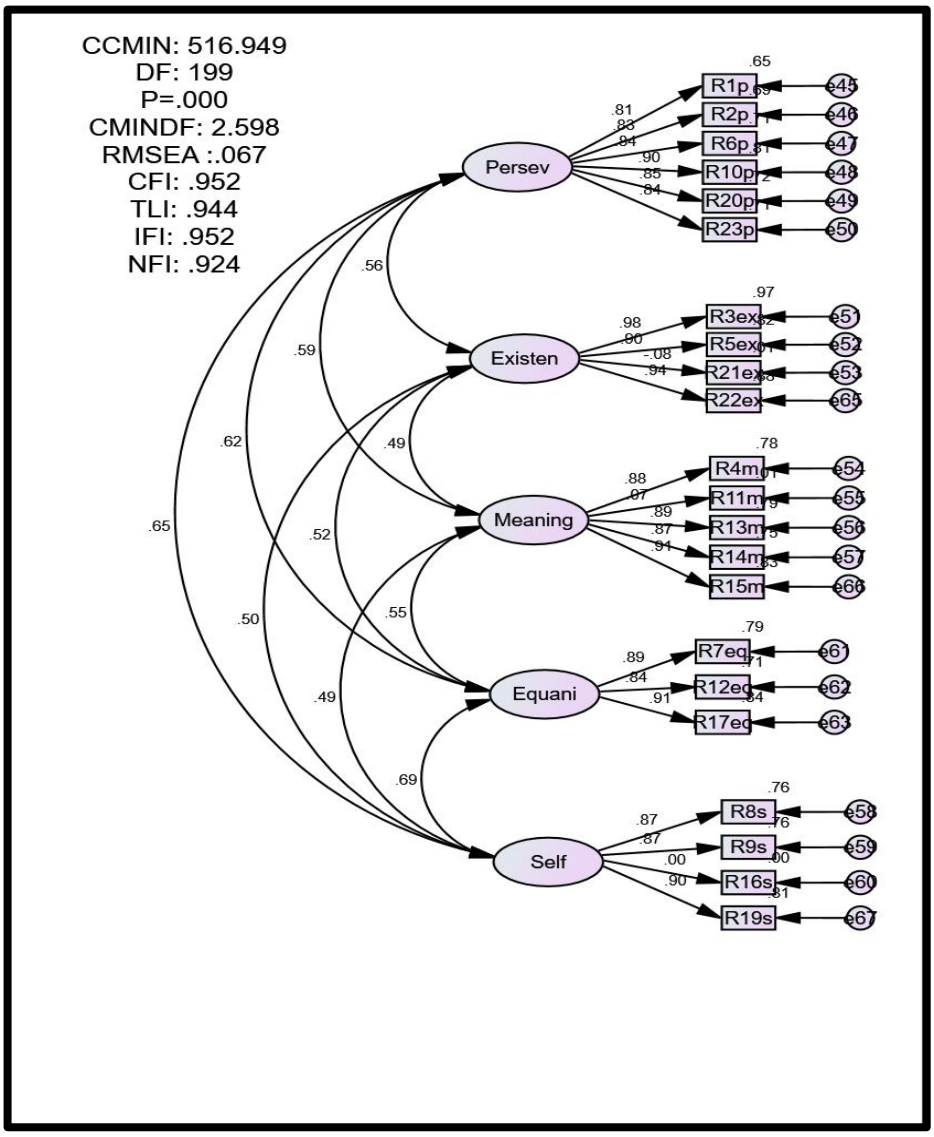

Figure 1 The initial confirmatory factor analysis for Resilience

Next, the measurement model of Resilience factors comprised five dimensions, i.e., Perseverance, Existential Aloneness, Meaningfulness, Equanimity and Self-reliance was revised by using modification indices. Therefore, four items with low loading (R2, R11, R21, R16) that was less than 0.50 were eliminated. The final resilience measuring model established a good fit to the data when the problematic items were removed. Thus, the remaining items were significant reflective markers of the connected components of resilience. To demonstrate the final result, the model demonstrated Chi-square X^2 value was 374.908, degree of freedom=125 and p=000. The RMSEA value of .075 which was below the recommended value of < 0.08. The value of NFI was 0.941, CFI was 0.960, IFI was 0.960 and the TLI value was 0.950 which were all greater compared to 0.90 (see Figure 2). Items loaded above 0.50 were therefore sufficient proof of convergent validity. However, loading smaller than 0.50 should be removed (Hair et al., 2014). Furthermore, all inter-factor correlations for the measurement model were below 0.80 and these values confirmed that the model has no issue regarding its divergent validity (Hair et al., 2017). Consequently, the final measurement model was accomplished, and the findings were satisfactory.

Concurrent validity was also assessed by correlating the scores of resilience with depression as measured by Beck Depression Inventory. Results showed a significant negative correlation between resilience and depression, $r = 0.438$, $p < .0001$. The result of internal reliability was evaluated again using Cronbach's alpha for the five constructs of this study resilience (perseverance, existential aloneness, meaningfulness, equanimity, and self-reliance). These results for the constructs for Cronbach alpha revealed high levels of reliability for overall scale with 0.867, and Cronbach alpha ranging between 0.791 to 0.983 for the dimensions which is well above the generally accepted cut off point of 0.70 (Nunnaly & Bernstein, 1994).

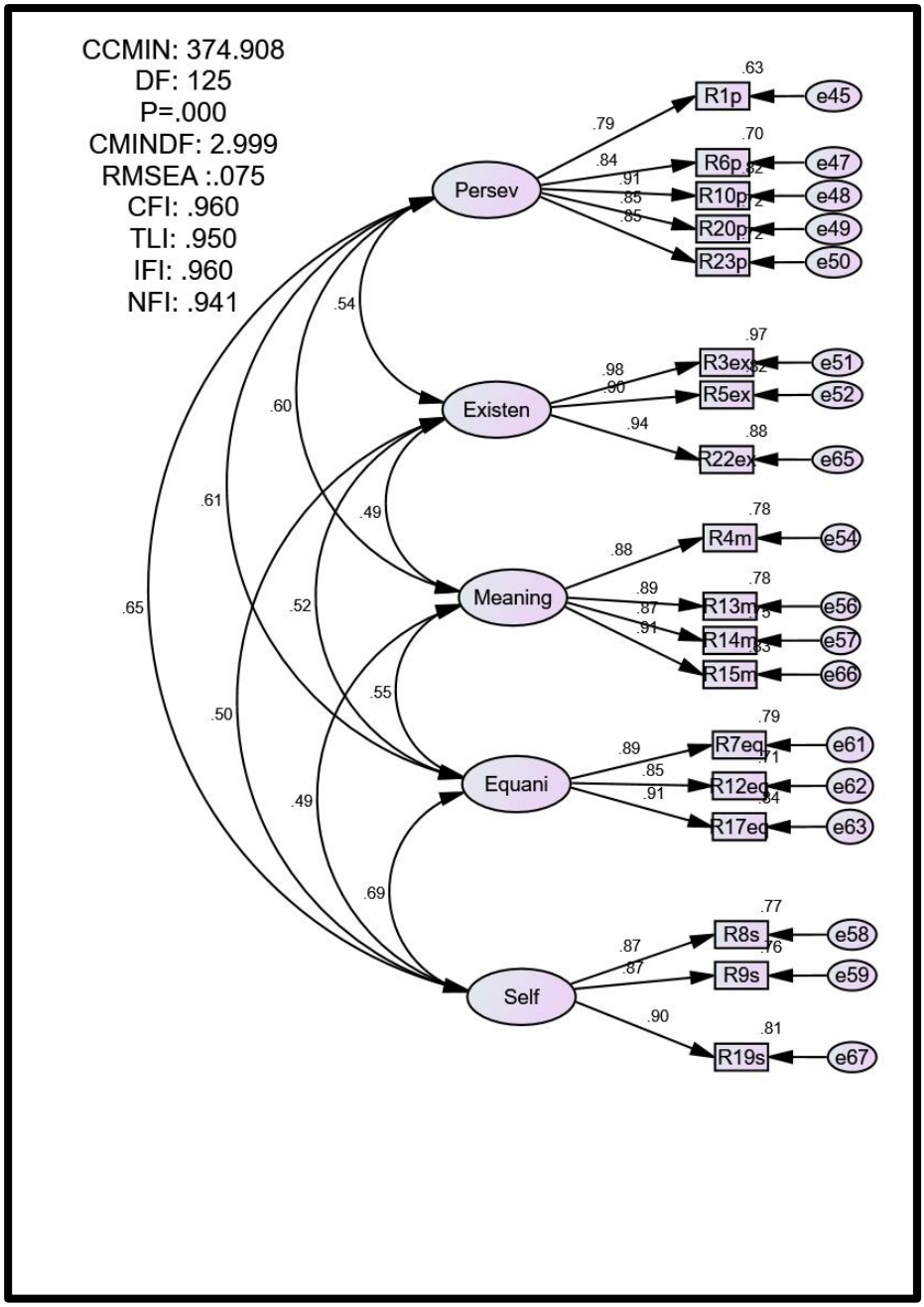

Figure 2 The revised confirmatory factor analysis for Resilience

Discussion and Conclusion

Results of the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) have successfully produced a five-factor model which supports the dimensions of the original Resilience Scale. The findings of this study retained the five dimensions of resilience which are perseverance, existential aloneness, meaningfulness, equanimity, and self-reliance. This indicates that resilience in the Saudi Arabia context also includes similar dimensions of having perseverance, existential aloneness, meaningfulness, equanimity, and self-reliance. This finding is consistent with the five-factor model also obtained in previous studies (Fernandesa, Amaral, & João Varajão, 2018; Arokiaraj et al., 2011; Ng Ying Yee & Wan Shahrazad, 2017). Vitale (2015) affirms that psychological resilience makes the

individual more adaptive to the environment and more interactive, which in turn leads to increased motivation toward achievement and self-fulfillment.

Findings also showed that the resilience scores were negatively correlated with depression indicating good concurrent validity. This is consistent with Abiola and Udofia's (2011) study who also found significant and negative correlation between RS and depression ($r = -0.28$; $p < 0.05$). The findings also showed that the reliability of the Resilience Scale is comparable to original version (Wagnild & Young, 1993) and previous studies (Shi, Wang, Wang, & Fan, 2021; Abiola & Udofia, 2011).

This study has successfully evaluated the Resilience Scale to be used among university students or young adult population is Saudi Arabia. The instrument developed was found to have good validity and reliability. The scale can be used as a screening tool to evaluate the resilience level of individuals facing life challenges and further intervention can address specific areas of individual strength to ensure they achieve well-being in life.

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