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Development and psychometric properties of the Nursing Student Academic resilience Inventory (NSARI): A Mixed-Method study
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Development and psychometric properties of the Nursing Student Academic resilience Inventory (NSARI): A Mixed-Method study

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Abstract

Introduction: Resilience has been proposed as a suitable solution to a better deal with nursing students in the face of challenges and difficulties which lead to better preparation of students to play their professional roles in the future. The complex and multidimensional nature of resilience has made the measurement of this concept to be challenging. This study is fulfilled to develop and validate a theory-driven inventory labeled Nursing Student Academic Resilience Inventory.

Methods: This study is an exploratory sequential mixed-method design. In the qualitative phase of the study, individual interviews are conducted with 15 participants to elicit the concept of resilience through purposive sampling. In the quantitative phase, psychometric analysis of the extracted items is performed using face, content, and construct validity (exploratory and confirmatory factor analysis) with a sample size of 405 nursing students. Besides, reliability has been done through internal consistency and test-retest methods. According to the COSMIN standards, in addition to two important indicators of validity and reliability, responsiveness, interpretability also is considered.

Results: A 6-factor structure (optimism, communication, self-esteem/evaluation, self- awareness, trustworthiness, self-regulation) with 24 items are extracted based on the derived categories from the qualitative phase. In confirmatory factor analysis, the χ^2/df ratio is 2.11 for the NSARI six-factor structure. Suitable values are obtained for the goodness of fit indices (CFI=0.904, AGFI=0.885, IFI=0.906, PCFI=0.767, RMSEA= 0.053). In the second-order factor analysis, AVE= 0.70 indicated the existence of convergent and divergent validity. The Cronbach's alpha and omega coefficients is investigated to be (0.66- 0.78), and (0.66-0.80), respectively. The AIC is between 0.33 and 0.45 for all factors, which is acceptable. Also an intraclass correlation coefficient (ICC) obtained for the whole instrument is .903 (CI .846- .946, P <0.0001).

Conclusion: Multidimensional nature of resilience is supported through exploring its 6-factor structures in the nursing students' field. This tool also shows an acceptable validity and reliability for measuring resilience in the population of nursing students.

Key words: Nursing, student, psychometric, development, Resilience

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Introduction

Research conducted in Iran showed that nursing students are affected by various stressors such as lack of effective communication between trainer and students, unclear training goals, lack of essential efficacy when attending the patient's bedside, fear of infectious diseases, assignments overload, and dissatisfaction with the field of the study [1]. The issue of stress in nursing students requires further study; due to the detrimental effects of high stress including poor commitment to clinical internships, lower self-esteem, and lack of physiological and mental health, besides Low-quality patient care, as well as students` drop out [2].

Resilience has been suggested as a beneficial solution for better dealing with challenges and difficulties in nursing students, which leads to excel for playing their professional roles in the future [3]. It is documented that students with higher academic resilience maintain a foremost level of academic achievement and performance even in the stressful or failure situation [4]. A systematic review study by Ray et al. (2015) shows that nursing students and trainers face prime challenges that necessitate resilience [5] therefore, academic resilience is essential for nursing students [4].

Resilience is described as a characteristic, process or outcome hinges on the theory accepted by the researcher [6]. Theories can be effective in identifying and understanding the factors influencing an event or behavior and determining how they work together; therefore, a conceptual model can lead to a better understanding of the existing conditions [7]. In line with the different resilience theories in this study Stephen's resilience model is used which emphasizes the importance of defining the concept of resilience as a process. She declares "as nursing students learn to identify, enhance, and/or develop their protective factors, they will be better equipped to effectively manage perceived adversity and stress. The cumulative successes of

these events will lead to increased resilience demonstrated by enhanced coping/adaptive abilities and well-being" [3].

Diverse approaches to measuring resilience affected by different nature of potential risk factors, and protective processes have led to contradictions [8]. While establishing the resilience concept as a meaningful concept in research and clinical practice, it is inevitable to determine its distinctive factors and measure its factors in a valid and reliable method [9]. Based on the result of a review study yielded by Chmitorz et al. (2018) various resilience scales have been developed [10]. Different studies have founded different factor structures of resilience tools in different populations and cultures [11, 12].

As a result, researchers and clinicians do not have strong evidences about the choice of resilience measurement tools and may make inappropriate choices in the field of study [13]. Notwithstanding the prevalence of stress and the obligation to design an appropriate tool to assess students' resilience, it is not yet clear which factors measure the resilience in nursing students. The purpose of this study is to develop and design a valid and reliable inventory for measuring resilience in nursing students through an exploratory sequential mixed-methods design.

Methods

This exploratory sequential mixed-method study is conducted between May 2019 and August 2020 in Iran. The study population includes all bachelors nursing students. The data in the qualitative phase is collected through semi-structured interviews based on resilience Stephen's model in nursing students. Item generation and developing inventory are done based on the

categories extracted from the qualitative phase. Then, psychometric properties are evaluated in the quantitative phase.

Qualitative phase

Data collection

In this phase, semi-structured individual interviews are conducted with thirteen nursing students aged 18- 25 years, one nurse, and one trainer using purposive sampling in a quiet room. Exploratory questions are asked following the main questions that are derived from the Stephen resilience model. The main questions include "explain about the situation experienced stress during nursing education.", "which protective factors did you apply in these situations?", and "explain about cumulative success do you have acquired?". To achieve maximum data diversity students are selected of both gender, different semesters, private and public universities. The interviews are perpetuated until data saturation.

Data analysis

The method of analysis is the deductive content analysis approach which is recommended by Elo et al. [14]. The interviews are audio-recorded, transcribed, and consequently analyzed using MAXQDA software version 10. Data analysis is performed during three stages of preparation, organization, and reporting. During the preparation phase, semantic units are identified based on the purpose of the study. To get immersed in the data, the written interviews are read through several times. To make sense, the researcher frequently asks wh-questions during the analysis. In the organizing phase the text is read line by line, and paragraph by paragraph according to the purpose of the study, hence important sentences and codes are identified. After this open coding, the lists of categories are classified under higher-order headings based on the comparison between these data and other observations that do not associate with the exact category. To

assure data credibility, samples are selected with maximum variation, and also peer checking is   124

done by three co-authors experienced in qualitative studies [14]. Hence, the first draft of the   125

inventory is developed based on the findings of the directed content analysis.   126

Quantitative phase   127

In the quantitative phase, the psychometric properties of the Nursing Student Academic   128

Resilience Inventory are assessed using face, content, and construct validity (exploratory factor   129

analysis, confirmatory).   130

Face and Content validity   131

Following revising items of the designed inventory according to the comments of 12 nursing   132

students, in the qualitative face validity stage, quantitative face validity is assessed using the   133

impact factor method, based on the following equation: 134

Impact Score = Frequency ✗Importance   135

The items which equal and above 1.5 are retained and other items are modified [15]. Content   136

validity ratio (CVR) determined essential items according to the cut-off point proposed by   137

Lawshe [16]. The Content Validity Index for each item (ICVI), and then the modified kappa   138

coefficient is calculated based on the following equation[17]. Finally, S-CVI is estimated.   139

$$K = \frac{I.CVI - PC}{1 - PC} \rightarrow PC = \left\lfloor \frac{N!}{A!(N-A)!} \right\rfloor \times 0.5^N$$

140

Item Analysis   141

The internal consistency is assessed in the population of 36 nursing students before construct   142

validity assessment in a pilot study to recognize potential problems in the NSARI through   143

estimating Cronbach's alpha and inter‑item correlation. The items whose corrected item-total 144

correlation score is less than 0.3 are removed from the analysis [18]. 145

Normal distribution, Outliers, and Missing data 146

The univariate and multivariate normal distribution of data are investigated by skewness (± 3) 147

and kurtosis (± 7) [19]. The presence of a multivariate outlier is assessed by Mahalanobis d- 148

squared ($p <$ .001), and multivariate normality by Mardia coefficient of multivariate kurtosis ($<$ 149

20), respectively [20]. There is no missing data in the study due to completing the surveys by an 150

online Survey software (Porsline). All the statistical analyses are calculated by SPSS- $AMOS_{25}$ 151

and SPSS R-Menu v2.0. 152

Construct Validity 153

Exploratory Factor Analysis 154

Exploratory factor analysis is conducted to test the factor structure of the items of the NSARI so 155

in a cross‑sectional study 200 nursing students of private and public universities from 6 156

different provinces in Iran participated in the study through convenience sampling. The Kaiser- 157

Meyer-Olkin statistic of sampling adequacy and the Bartlett test of sphericity are calculated to 158

check the suitability of the data for factor analysis. KMO 0.8 is considered acceptable. In hence, 159

the latent factors are extracted employing the maximum likelihood estimation, and an oblique 160

factor rotation technique, promax, The allocation of an item to a factor is determined based on 161

the formula CV = 5.152 $\sqrt{}$ (n -2) which is approximately 0.3 [21]. According to the three 162

indicator rule, at least 3 items must be retained for each factor in the EFA [22]. Items with 163

communalities less than 0.2 are removed from the EFA [23]. 164

Confirmatory Factor Analysis 165

Confirmatory factor analysis has been done on a different sample including 205 nursing students 166
to examine fit indices of the extracted factors using Amos 24 software. Table 2 shows the 167
accepted fit indices (CMIN / DF, RMSEA, PCFI, IFI, CFI, PNFI) [19]. In the second-order 168
factor analysis, it is supposed that the extracted latent factors in the first-order factor analysis are 169
a reflection of more general concept in the upper levels [24], therefore the second-order factor 170
analysis is performed following the first-order factor analysis. 171

Convergent and Divergent validity 172

Convergent and divergent validity is evaluated based on the average variance extracted (AVE), 173
the maximum variance (MSV). The convergent validity is generated when AVE> 0.5 and 174
divergent validity is confirmed when MSV <AVE [25]. 175

Reliability, Responsiveness, and Interpretability 176

Internal consistency of the NSARI is estimated using coefficients of Cronbach's alpha, and 177
Omega McDonald [26]. Values above 0.6 are considered acceptable[27, 28]. AIC above 0.2- 0.4 178
is acceptable [29]. Construct reliability, which replaces Cronbach's alpha in the structural 179
equation model, is considered as acceptable in the values above 0.7[30]. Test-retest reliability is 180
conducted to investigate the questionnaire' stability. 36 nursing students were requested to fill 181
the questionnaire twice with a two-week interval. In this study, responsiveness is determined also 182
by the standard error of measurement (SEM) and the minimal detectable change (MDC) score 183
[31]. The MDC less than 30% is acceptable, and below 10% is considered excellent. According 184
to the COSMIN standards, interpretability, and scoring similarly are considered as important 185
capabilities of a tool, in addition to validity and reliability [32]. To determine the interpretability 186
of the NSARI, the distribution of total scores in the whole samples, floor, and ceiling effects are 187

calculated. It is considered that the floor and ceiling effects are present if more than 20% of respondents attained the lowest or the highest score, respectively [33].

Trustworthiness in the mixed-method study

To diminish the threats to the internal and external validity of the mix-method study, participants are selected with different experiences; also none of the samples in the qualitative phase participate in the quantitative phase. Furthermore, designing the item poll is based on the main categories and sub-categories which are extracted in the qualitative phase. Consequently, all stages of the study are carefully reviewed and verified by other researchers [34].

Ethical consideration

This study is approved by the ethics committee of Semnan University of Medical Sciences (Approval Number IR.SEMUMS.REC.1398013). The volunteering and confidentiality of data are explained to the participants.

Results

Qualitative phase

After condensing the codes extracted from the semantic units, 797 codes are gained. These codes are allocated to three themes, 9 categories, and 31 subcategories. Moreover, an item pool consisting of 93 items are generated that explain the resilience of nursing students based on the directed content analysis. The number of items is reduced to 83 items, following discussion with the research team.

Quantitative phase

In the psychometric evaluation phase, confusing items are revised and duplicate, redundant items are merged and essential items are added based on the results of the face and content validity. The clarity of the items in the initial item pool is evaluated by 13 nursing students through quantitative face validity and then the results of calculating the impact score of each item shows that all of the 83 items extracted are suitable for measuring resilience. According to the results of the content validity ratio (CVR), items with a numerical value of less than 0.59 (11 experts) are removed, and 52 items remain. Finally, after removing the items with the kappa index less than 0.74, 45 items are sent to the nursing students for item analysis. SCVI inventory is 0.92.

Item Analysis

Cronbach's alpha for 45 NSARI items is 0.88. Intra-class correlation coefficient of NSARI total score specifies a high level of temporal stability ($ICC = 0.88$, *95% CI:* 0.82-0.93). Finally, 13 items are eliminated from the analysis.

Construct Validity

The mean age of the participants is 21.67 ±2.72 years. The majority of the students are girls (120). The adequacy index of sampling is 0.892. The Bartlett's test is statistically significant (df= 325, $\chi 2$ = 3123.231 ، p< 0.001). During exploratory factor analysis, 8 items are removed due to their low factor loading. The remaining 24 items are loaded on six factors which explain 45.47% of the total variance. Factors that are extracted are labeled based on their items, and their similarity with the dimensions of NSARI is discovered in the qualitative phase of the study (Table 1).

Table1. Exploratory factor analysis of the NSARI

Factor	Items	Factor loading	$h^{2\,a}$	Eigenvalue	Variance (%)
optimism	**Q12.** There are many opportunities in	.789	0.58	2.82	11.75

	nursing field for me				
	Q20. I am looking forward to be a great nurse in near future.	.739	0.58		
	Q21. I am looking forward to an economic prosperity in the field of nursing.	.719	0.37		
	Q17. I have a positive attitude toward nursing.	.712	0.56		
	Q29. I am motivated to participate in internships.	.360	0.36		
communication	**Q24.** Patient companion reduces my stress.	.739	0.47	1.97	8.2
	Q26. Understanding my terms by my instructor, reduces my stress	.641	0.49		
	Q25. Cooperation by nurses reduces my stress.	.584	0.38		
	Q23. Having a good communication with attending physicians reduces my stress.	.420	0.40		
Self-esteem/ evaluation	**Q5.** My instructors trust my judgment in taking care of the patients.	.706	0.56	1.53	6.4
	Q4. I get support from my instructors.	.643	0.38		
	Q10. I have sufficient confidence in taking care of patients.	.344	0.44		
	Q15. I have adequate knowledge in (science of) nursing.	.316	0.29		
Self-awareness	**Q9.** I manage the difficulties of my academic years.	.825	0.62	1.58	6.6
	Q11. I'm not disappointed by the failures during my education.	.521	0.45		
	Q30. I have adequate motivation to participate in theory sessions.	.365	0.36		
trustworthiness	**Q2.** I earn my patient's trust by making a suitable communication.	.570	0.48	1.41	5.9
	Q1. By strengthening my nursing knowledge, I will do my best to take care of the patient.	.470	0.50		

	Q6. I get support from my family.	.439	0.34		
	Q7. My friends and colleagues support me.	.420	.31		
Self-regulation	Q14. I examine all options to reach my goals.	.783	0.43	1.59	6.62
	Q22. My attempts are to strive and reach my goals.	.461	0.41		
	Q32. I learn better by executing bedside procedures.	.393	.36		
	Q13. I try to endure the academic hardship.	.336	.37		

a. Communalities

Confirmatory factor analysis

The results of the Chi-square test and other fitness indices confirm the suitability of the studied pattern in the first and second-order factor analysis (Table 2).

Table2. Fitness indices in the first and second-order factor analysis

Indexes	Cut-off values	First-order	Second-order
CMIN/DF	< 3	2.11	2.23
P- value	≥ 0.05	<.0001	<.0001
RMSEA	≤ 0.08	0.053	0.055
PCFI	≥ 0.5	0.767	0.783
I	≥ 0.95	0.904	0.890
IFI	≥ 0.90	0.906	0.891
AGFI	≥ 0.90	0.885	0.875
PNFI	≥ 0.5	0.708	0.721

According to the final factor structure of the NSARI, correlations between the measurement errors of items4 and 5, 11 and 30, 6 and 7are detected (Fig. 1). The second-order factor analysis is carried out to investigate whether all the factors fit the general concept of "Resilience" or not. Table 2 presents the indices of fit for the first-order CFA compared to the second-order model. Figure 2 shows the structural model and the CFA of the NSARI.

Convergent and divergent validity, internal consistency

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The convergent and divergent validity of the NSARI is not confirmed in the first-order factor   241

analysis due to the presence of a latent factor which indicates that all extracted factors are a   242

reflection of concept called "Resilience". The results of the second-order factor analysis (AVE =   243

0.70) indicate the existence of convergent and divergent validity. The internal construct   244

reliability is confirmed using Cronbach's alpha coefficients and McDonald omega. The AIC is   245

between 0.33 and 0.45 for all factors, which is acceptable (Table 3). The ICC is calculated   246

through the test-retest method which is 0.903(CI .846- .946, P <0.0001) for the whole inventory.   247

Table3. Internal consistency and construct reliability of NSARI   248

| Factor | α | AIC | Ω | CR* | | 249
|---|---|---|---|---|---|
| optimism | 0.787 | 0.450 | 0.806 | 0.80 | |
| communication | 0.678 | 0.367 | 0.701 | 0.70 | |
| Self-esteem/evaluation | 0.685 | 0.357 | 0.691 | 0.65 | |
| Self-awareness | 0.631 | 0.371 | 0.664 | 0.70 | |
| trustworthiness | 0.647 | 0.342 | 0.675 | 0.65 | |
| Self-regulation | 0.662 | 0.330 | 0666 | 0.66 | |

*CR: Construct Reliability   250

Responsiveness and Interpretability   251

 The minimum detectable change percentage is calculated below ten percent (8.61%) and the   252

sstandard error of measurement is determined (3.12). The effect of ceiling and floor on the total   253

inventory scores are estimated less than 20%. The mean and standard deviation of resilience   254

score is different in students with different gender, high and low GPA, semester and different   255

ages. The results of t-test and ANOVA show that all variables except gender and age variables   256

have a significant difference between resilience scores (Table 4).   257

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Table4. Distribution of resilience scores in nursing students

Variable		Mean± SD	Result
semester	1	116.88±31	F=3.29; df= 7; p=0.002
	2	128.31±16.27	
	3	122.48±17.29	
	4	122.52±14.44	
	5	130.28±11.53	
	6	120.25±16.16	
	7	133.55±14.73	
	8	124.79±16.87	
GPA	<17	123.32±16.92	t=-3.10; df= 382; p=0.002
	>17	130±14.56	

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Scoring Items 261

Each item is rated on a five-point likert scale ("completely agree", "agree", "no idea", 262

"disagree", and "completely disagree"). The scores of the inventory are recoded to zero to one 263

hundred; then the following scores are transformed to standard scores through the linear scoring 264

using the below formula: 265

$$Transformed\ scale = (\frac{Actual\ row\ score - lowest\ possible\ raw\ score}{Possible\ raw\ score\ range}) * 100$$ 266

Obviously, after converting the scores to the standard values, the higher average score of 267

resilience close to one hundred means the higher score of the resilience in nursing students. 268

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Discussion 270

This is the first study with an exploratory sequential mixed-method design to develop an 271

inventory for measuring the resilience in nursing students. Numerous tools have been designed in 272

different contexts, indeed resilience is a context-based concept [35]. In this study, the NSARI 273

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including 24 items, based on extracted categories in the qualitative phase, is designed. The   274

psychometric of the NSARI shows the validity and reliability of the inventory. The internal   275

consistency of the inventory detects that all items measure resilience. Regarding reproducibility,   276

the result of ICC identifies that this inventory can probably catch up with reliable results at   277

different times and places. The Cronbach's alpha coefficient is obtained in the range of 0.63-   278

0.78. Nunnally et al. (1994) [28], and Moss (1998)[27] reported 0.6 as an acceptable value [28].   279

Based on exploratory factor analysis, six-factors including optimism, communication, self-   280

esteem/evaluation, self-awareness, trustworthiness, and self-regulation are extracted which   281

explain 45.47% of the total variance, similarly review literature show the existence of instability   282

in the factor structure of the resilience scales in different populations [36]. The first-factor   283

extracted in the present study is optimism. Optimism is people's positive expectations of what is   284

happening in their lives [37]. A positive optimistic attitude can help to deal with stress more   285

effectively [38]. Numerous studies have shown the relationship between optimism and students'   286

ability to adapt as well as their educational performance so that Soares et al. (2011) declare that a   287

low level of optimism is a predictor of problems such as maladaptation with the academic   288

environment, the incidence of depressive symptoms, isolating feeling, and stress symptoms   289

during the first year of the course as well as less academic performance in subsequent years [37].   290

In another study, Camp (2016) show that the academic optimism is positively correlated with   291

surviving till finals and become well-qualified in the field, motivation, and academic   292

achievement [39]. The second factor is communication. Effective communication is an essential   293

element for nursing students to feel well-being and subsequently increases the level of their self-   294

confidence, and motivation as well as their self-esteem [40]. Also Sheu et al. report that the   295

inability to communicate with nurses is one of the most important stressors among senior   296

students[41], additionally academic competency is evaluated based on academic achievement, 297

classmate relationship, and social behavior[42]. Furthermore, Marañón (2015) states that the 298

student-instructor relationship is a determining factor in learning, as far as it makes progress in 299

the learning process and leading to shaping students' identities as forthcoming nursing 300

professionals [43] as well as increasing in their motivation for learning [44]. The third factor 301

extracted is self-esteem/evaluation which is known as a prime predictor of stress management. In 302

other words, Self-esteem indicates the degree of belief in the ability, importance, success, and 303

individual's competency. Having a high-level of self-esteem in managing the needs of nursing 304

students during the practice course, and establishing a strong and therapeutic relationship with 305

the patient is crucial [45]. In the present study, students also attempt to achieve self-esteem 306

through knowledge enhancement, making trust, and support. The fourth extracted factor is self- 307

awareness.This psychological component implies awareness of feelings, motivations, self- 308

concept, and personality [39]. Since, self-awareness is a key for preventing unhealthy reaction to 309

stress, therefore nursing has accepted Maslow's theory of motivation, and Rogers's view of self- 310

awareness as fundamental issues of professional nursing [46], and it is mentioned as an 311

antecedent to high-quality nursing care [47], so that awareness of identity as a nurse allows us to 312

be aware of the positive and negative effects of the role. Also, the "nursing process" is often 313

described as a problem-solving method, the nurse's self-awareness will help to answer this 314

question, what is the problem?. On the other side, by understanding the effects of characteristics 315

such as age, gender, and race on another person, the nurse can better gain the patient's trust and 316

cooperation to stimulate patients' active participation [48]. The fifth factor extracted is 317

trustworthiness. The development of resilience in nursing students hinges on a trust-based 318

educational culture which paves the way for caring so nursing students in this culture can focus 319

on the needs of the patient [49]. In a systematic review of qualitative studies, Rørtveit et al. 320

(2015) stated that nurses who facilitate the trust relationship engage, listen, and act as a patient 321

supporter comprehensively [50]. In this study the whole students try to meet the patient's needs 322

by establishing a trust-based relationship through strengthening nursing knowledge and for 323

achieving this goal, they benefit from the support of family and friends. The last factor extracted 324

is self-regulation. One of the protective factors in resilience is the development of self-regulation 325

(emotional and behavioral regulation) [42], indeed Students who personally adjust their learning 326

process will learn more effectively [51]. As far as Self-regulation is a deed that includes 327

determining learning goals, adjusting personal effort, participating in time management, 328

supervision, and evaluating existing performance [52] consequently, one must be directed to a 329

specific goal or organization to motivate [53]. Achievement in theoretical courses, and becoming 330

an expert in the clinical settings are considered as the goals of nursing students [54], thus 331

students try to maintain and promote resilience by determining and achieving reasonable and 332

task-based goals. In this regard, according to the practical identity of nursing, the more the 333

students do clinical procedures, the more expert they become. 334

The CFA results detect the fitness of the final model of the NSARI in nursing students. Other 335

construct validity indices also show the convergent and divergent validity in the final model. 336

Convergent validity exists when the factors of the instrument are close together and explain a 337

large variance. In other words, there is divergent validity when the extracted factors are separate 338

from each other [20]. 339

Limitations 340

Despite the validity and reliability of the inventory and final approval of the factor structure, the 341

present study has some limitations that include the method of data gathering through the self- 342

report method, which can cause errors in reporting. Also, the design of the study is cross-sectional and data collected at one time, therefore to study the effects of time, and individuals' characteristics follow-up studies will be valuable to investigate the changes in the resilience factor structure. In addition, the percentage of extractive variance is almost less than 50%, which is accepted by many psychometric studies. To our knowledge, the NSARI is the first inventory to measure resilience in a theoretically driven way that has the potential to track and predict resilience in nursing students because of evidence of validity and reliability in this population. Further studies are recommended to investigate the conceptual structure of this inventory to gather more evidence regarding the psychometric properties of the inventory. Moreover, it seems necessary for further studies in nursing students in other cultures to confirm the findings of the present study.

18

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Figure1

Figure2
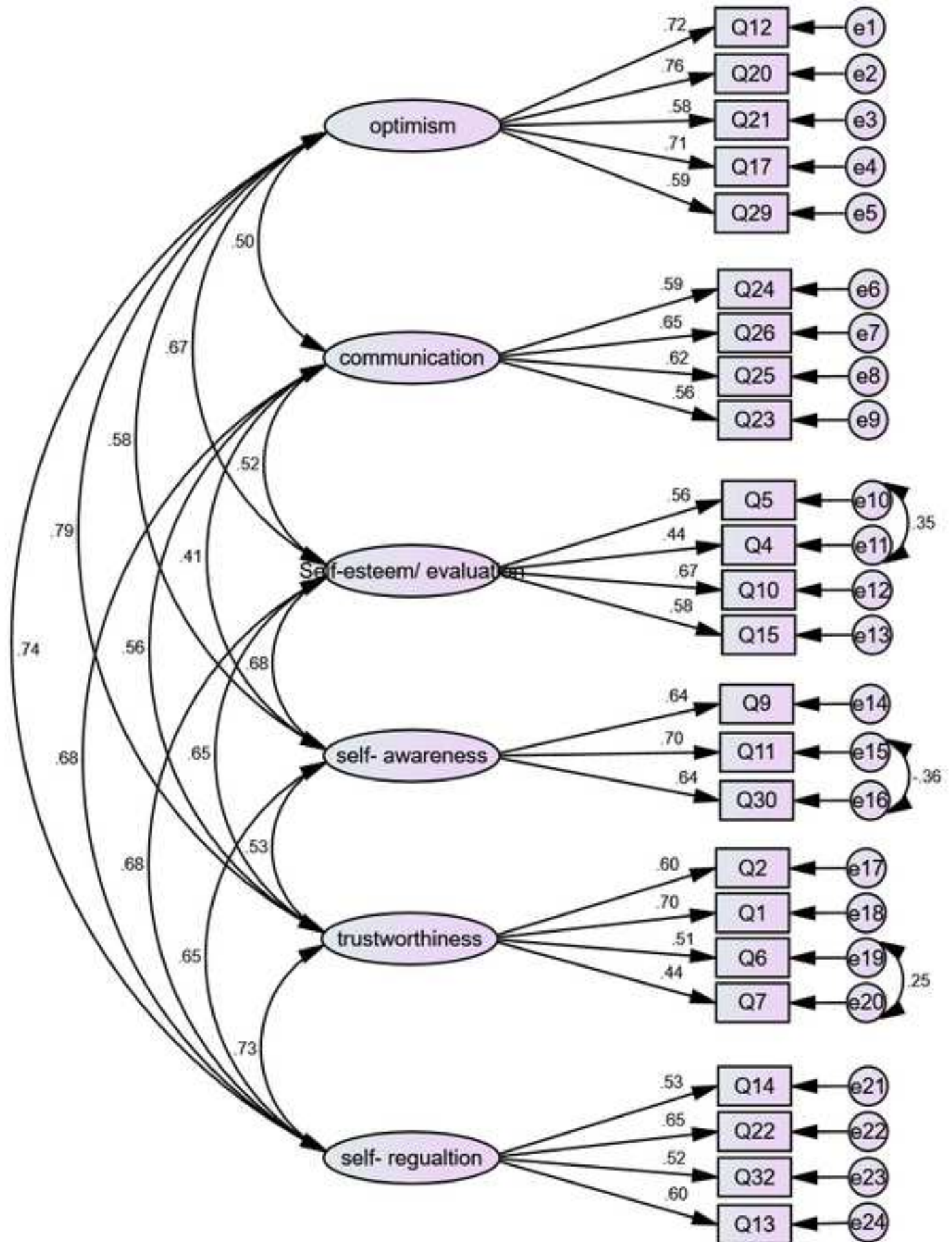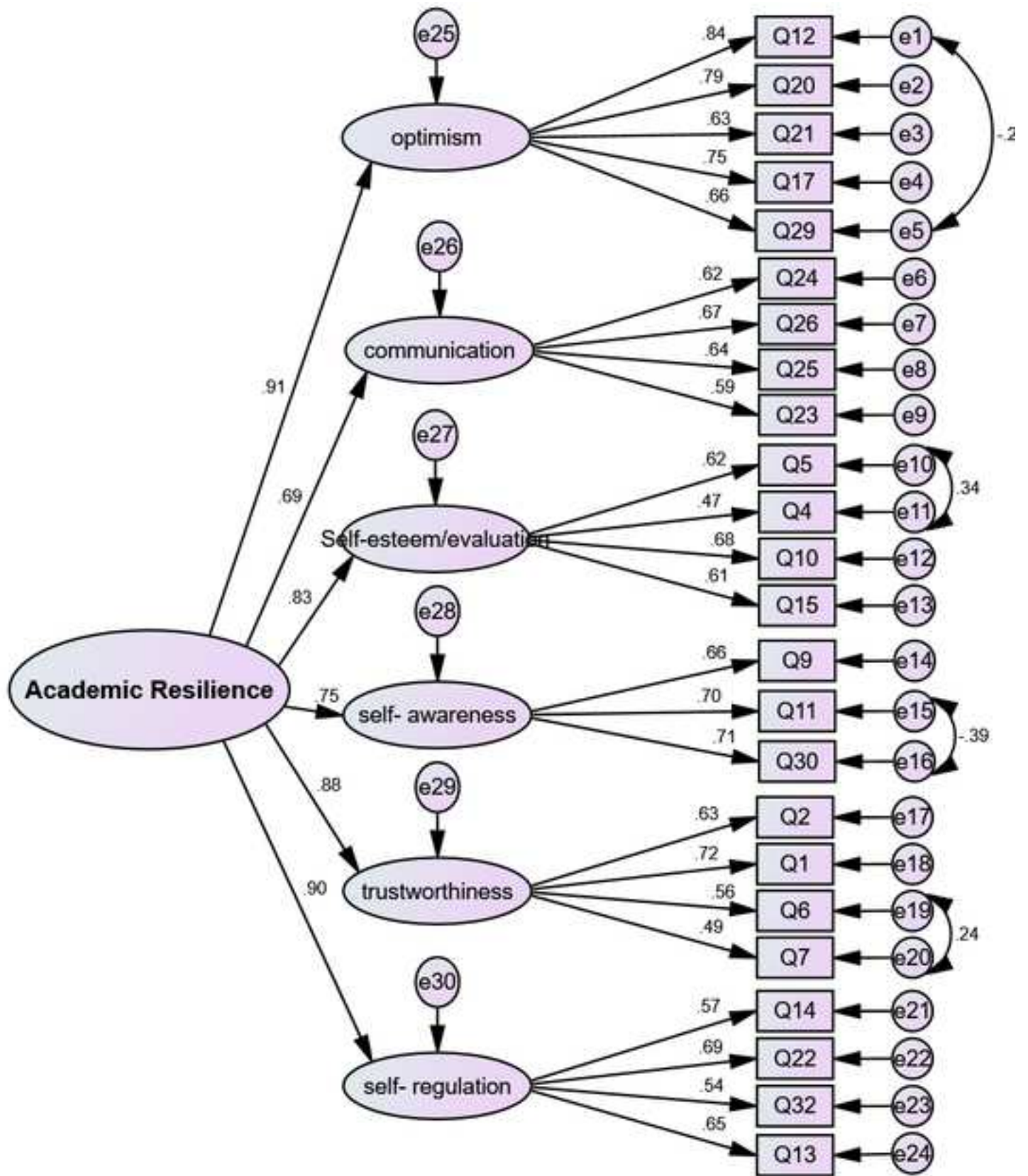
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