



RESEARCH ARTICLE

Cross-Cultural Perspective on Family Resilience: Turkish Validity and Reliability Study of Family Resilience Scale Short Form

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ABSTRACT

The Short Form of the Family Resilience Scale (FRS-16) captures the core components and key mechanisms of family resilience, serving as a tool for both cross-cultural research and the assessment of therapy outcomes. The study aims to translate and validate the Turkish form of the FRS-16 on a sample of university students. The research consisted of 430 students with a mean age of 20.94 years. Beaton's six-step translation process was applied to translate the scale and assess its psychometric properties cross-culturally. Construct validity was assessed with Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Concurrent validity was assessed using the Brief Resilience Scale (BRS) and FRS-16. Reliability was analyzed by Cronbach's alpha (α), McDonald's omega (ω), and the split-half reliability method for assessing internal consistency. EFA results reflected three sub-dimensions as in the original FRS-16: "Communication and Connectedness," "Positive Framing," and "External Resources." Turkish FRS-16 and sub-dimensions were positively correlated with the BRS ($p < 0.05$). The Cronbach's α coefficient of the 16-item scale was 0.90, and McDonald's ω was 0.89. Test-retest reliability yielded Pearson correlation coefficients and intraclass correlation (ICC) values above 0.90 for each sub-dimension and the total scale. The 16-item Turkish FRS-16 is a reliable, concise, and psychometrically validated tool for assessing family resilience.

Family resilience, as a construct, has garnered considerable attention in the field of psychology and family studies over the past few decades (Walsh, 2003). In the face of adversities and challenges, families have demonstrated remarkable abilities to adapt, cope, and thrive, highlighting their capacity for resilience (Önal et al., 2023). This is not only the absence of adversity but rather the ability of the family to effectively navigate and overcome adversity with a sense of being supportive and cohesive (Black & Lobo, 2008). The model of family resilience was developed by Walsh (Walsh, 1996). Family resilience in the model refers to three broad realms of family functioning.

Family Belief Systems are the shared values, beliefs, and meaning-making of the family. Strong families share beliefs that allow them to deal with adversity and view adversity as challenges to personal growth. Such beliefs allow members of the family to reinterpret adversity in a manner that promotes both relational and personal growth. Organizational Patterns is the second category. Resilient families exhibit effective organizational patterns and routines that enable them to resist stressors. These styles may include established roles and tasks,

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effective problem-solving strategies, and adaptability in the face of change. This area highlights the importance of family cooperation and unity in adversity. Communication Processes is the last key of the model. Communication is a crucial feature in family resilience. Open, honest, and effective communication allows members of the family to share concerns, feelings, and thoughts, allowing them to assist one another psychologically. Strong families have healthy communication patterns conducive to coping as well as problem-solving (Walsh, 2016).

Walsh's model departs from the usual understanding of resilience as a return to baseline after adversity. Walsh broadens the definition of resilience as a trigger for relational and personal change. This means that families bounce back not just from challenges but also change through the adversity they encounter. Adversity then serves as a platform for good, resulting in more meaningful relationships and growth. Overall, Walsh's Family Resilience Model provides a comprehensive system for understanding how families can become more capable of thriving during times of hardship. It highlights the interplay between belief systems, organizational structures, and communication processes in supporting growth and resilience.

Various tests are utilized in family resilience assessments (Duncan et al., 2021; Qiu et al., 2021). Quantitative assessments have been used in limited research to examine Walsh's (2002) theory and concept of family resilience. Thus, Sixbey (2005) developed the Family Resilience Assessment Scale (FRAS) with six subscales for measuring areas of family resilience based on Walsh's model—family belief systems, organizational patterns, and communication processes. It has Family Belief Systems subscales such as Maintaining a Positive Outlook, Ability to Make Meaning of Adversity, and Family Spirituality. Organizational Models is related to two subscales: Utilization of Social and Economic Resources and Family Connectedness (Sixbey, 2005). Finally, it was related to Communication Processes, Family Communication, and Problem-Solving subscales (Chow et al., 2022). Güngör adapted and validated the long version of the FRAS into Turkish (Güngör, 2014). Chow et al. adapted the FRAS into the Family Resilience Scale Short Form (FRS-16).

A short version of the family resilience scale has been cross-validated in both Western and Eastern cultures. Chow et al. maintained that this short version of the scale captures the essential elements and most critical processes of family resilience and is suitable for cross-cultural studies and research where testing time is limited, for instance, therapy outcome studies, intensive longitudinal research, and telephone surveys (Chow et al., 2022). There are no validity and reliability studies of the Turkish adaptation of the FRS-16 short form. The study aims to translate FRS-16 into Turkish and evaluate its validity and reliability in university students.

Material and Method

Participants

Individuals over the age of 18 studying at various universities in Turkey were included in the study. For this study, we selected the number of subjects and decided how many to be based on the rule of thumb or convenience sampling. According to the principle of factor analysis, power (sample size) is decided according to the number of items, a rule of thumb. According to this rule, 20 observations per item is good (Allen Jr, 2011). Based on this rule, 450 students were invited to the study. Among these students, those under the age of 18 ($n=2$), those diagnosed with physical or sensory disabilities ($n=4$), and those who did not attend formal education ($n=7$) were excluded from the study. Seven students did not accept the research invitation, and the study was completed with 430 students. After giving detailed information about the research to the individuals, informed consent forms were obtained by e-mail from those who participated voluntarily. The study was implemented following the ethical guidelines established in the Declaration of Helsinki. Participants' sociodemographic characteristics are presented in Table 1.

Table 1. Socio-demographic characteristics of participants (n = 430)

	Min	Max	Mean (SD)
Age (year)	18	40	20.94 (3.5)
Number of family members	2	7	3.35 (1.2)
	n	%	
Gender			
-Female	373	86.7	
-Male	57	13.3	
Class			
-1st	210	48.8	
-2nd	185	43	
-3rd	26	6	
-4th	9	2.1	
Parental Marital Status			
-Married	398	92.6	
-Divorced	32	7.4	
Family Income Level			
-Low	67	15.6	
-Medium	342	79.5	
-High	21	4.9	

SD:standard deviation

Measures

Sociodemographic Form

The questionnaire was used to collect information about students' characteristics, including age, gender, education level, living space, social environment, and family structure.

The Brief Resilience Scale (BRS)

The Short Form of the Family Resilience Scale (FRS-16) captures the core components and key mechanisms of family resilience, serving as a tool for both cross-cultural research and the assessment of therapy outcomes. The present study seeks to adapt and validate the Turkish version of the FRS-16 among university students. The sample consisted of 430 students, with a mean age of 20.94 years.

Family Resilience Scale Short Form (FRS-16)

The Family Resilience Assessment Scale (FRAS) was developed by Sixbey (2005) to measure family resilience. The initial factor analysis, conducted on a version consisting of 66 items and nine sub-dimensions, did not yield the desired results. Subsequently, a revised factor analysis led to a structure with 54 items and six sub-dimensions, which explained 30.06% of the total variance. The total score obtained from the scale ranges from 66 to 188. It is a 4-point Likert-type scale, with items 1, 33, 37, 45, and 50 reverse-scored. The scale provides an overall score by summing the individual item scores. A higher score indicates a greater level of family resilience (Sixbey, 2005). Chow et al. later developed the currently recommended Family Resilience Scale–Short Form (FRS-16) based on the FRAS (Chow et al., 2022).

Procedures

Stage 1: Translation and Cultural Adaptation

The translation procedure method defined by Beaton was used to adapt the scale to Turkish culture and to ensure its validity and reliability (Beaton et al., 2000). The Beaton cultural adaptation procedure guidelines serve as a template for the cultural adaptation process and translation. The process includes tailoring individual items, scale instructions, and response options, and consists of six stages. Stages I–V outline the proposed methodology for the text, while Stage VI provides a proposed evaluation process, in which an advisory

committee or developers review the process and decide whether it is an acceptable translation (Beaton et al., 2000). The translation procedure is summarized in Appendix 1.

Step I- Initial Translation. In principle, two additional translations of the scale should be done in another language (target language) based upon the original language. This can be used to compare translations and detect how some original text, meaning possibly more ambiguous wording in the translation process, differs, or is inconsistent. Two translators, GZ and ET, handled the advanced translation process. While the translators had different academic and professional backgrounds, Translator 1 (GZ) was particularly familiar with the concepts addressed in the instrument and had prior research experience in family resilience. Translator 2 ET was a Turkish teacher with a good command of English. The bilingual translator, whose mother tongue is Turkish and fluent in English, produced the independent translation. Each of the translators prepared a written report of their completed translation. They made additional comments to highlight compelling sentences or ambiguities. The reasons for their preferences were also summarized in the written report.

Step II- Synthesis of Translations. Two translators and a recorder (GG) met to synthesize the results of the translations. An initial combined version of the translation was developed by synthesizing the original questionnaire with the drafts prepared by Translator 1 (T1) and Translator 2 (T2). All the issues addressed and how these problems were resolved were captured in a written report that thoroughly documented the synthesis process.

Step III- Back Translation. Using the already available version of the scale and with no information on the original version, translators ZW and HQ translated the scale back into English. Translators ZW and HQ had no information on the concepts that were being researched and did not have any medical training.

Step IV- Expert Committee. The committee of experts compiled all scale versions and finalized a draft version to be administered during the field testing phase. So, all the translations were reviewed by the committee and a consensus was reached in case of disagreement. The committee evaluated the translations according to four key criteria: semantic, idiomatic, experiential, and conceptual equivalence.

Step V- Test of Pre-Final Release. In both forward and backward translation phases, fidelity to the original scale was maintained, while select terms were altered to better reflect the intended meaning in Turkish. These adjustments produced a draft version for the pilot study. The pilot study was conducted face-to-face with 40 students. All participants completed the scale and were asked what they believed each scale item and response meant, and what their response meant. The meaning of items and responses was challenged. The response pattern was examined to find a high rate of missing items or uniform answers.

Step VI- Submission of Documentation to the Developers or Coordinating Committee for Appraisal of the Adaptation Process. The final step of the adaptation process involved submitting all reports and translated forms to the original tool developer or the designated follow-up committee. Beaton et al. (2000) stated that the process of cultural adaptation and translation completion or pilot study completion does not warrant the use of the scale. Hence, the psychometric properties of the scale were determined through studies, too.

Stage 2: Validity

Explanatory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were performed to determine Construct Validity. EFA was conducted to determine what kind of factor structure the scale would show in Turkish university students. CFA was performed to confirm the existing structure of the scale. The Brief Resilience Scale (BRS) was used together with FRS-16 for criterion-related validity.

Stage 3: Reliability

In the context of evaluating reliability, researchers employed Cronbach's Alpha (α) coefficient, McDonald's omega (ω) coefficient, and the Two-Half Test Reliability method to evaluate the internal consistency of the measurement scale.

Data Analysis

The information in the research that was derived was analyzed using SPSS 23 and AMOS 23 software packages. Normality for numerical variables was tested using the Shapiro-Wilk test and also through the values of skewness and kurtosis. Mean, standard deviation, and minimum-maximum values were calculated in numerical variables; frequency tables were created in ordinal variables.

For structural validity, the 430 participants' data set was divided randomly into two halves. EFA was conducted on one half of the data set ($n=215$) and CFA on the second half ($n=215$). Kaiser-Meyer-Olkin (KMO) Test and Bartlett Test of Sphericity were used to evaluate the data set's suitability for factor analysis. $KMO > 0.6$; for Bartlett Test, $p < 0.05$ was considered to be true (Sikka Kainth & Verma, 2011). Principal axis factoring method was used to get the factors of EFA and the following criteria were used to determine if the factors need to be retained: (1) eigenvalue > 1 , (2) variance explained $> 40\%$, (3) factor loading cut off point value > 0.35 (Baris & Seren Intepeler, 2019; Chen et al., 2021). But the two loadings should differ by at least 0.10, as these items are considered cross-loadings and thus have to be dropped. Principal Component Analysis using EFA utilized parallel analysis with evidence as one of the strongest indicators of the number of factors in addition to a scree plot (eigenvalue > 1) (O'Connor, 2000). Factor rotation applied the oblique rotation method and generated the Rotated Component Matrix.

Following EFA, CFA was conducted in an attempt to quantify conceptual integrity. Linear Regression Analysis was used to check for the presence of multicollinearity in determining whether the dataset was a good fit for CFA or not. A tolerance level greater than 0.2 and a Variance Inflation Factor (VIF) less than 10 were reasonable in a bid to eliminate lack of multicollinearity (Worthington & Whittaker, 2006). "Maximum likelihood" was applied to estimation in a bid to get covariance matrices. Goodness of fit for the model was tested using the Chi-Square Goodness of Fit test (CMIN/DF), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI-Tucker Lewis Index (TLI)), and Root Mean Square Error of Approximation (RMSEA). Correlation statistics were employed in the development of relationships between sub-dimensions. In the context of CFA, the convergent and divergent validity of the scale was calculated. Convergent validity was acceptable if the AVE value was > 0.05 and $CR > AVE$. $AVE > MSV$; $AVE > ASV$; If $\sqrt{AVE} > \text{correlation between factors}$, then divergent validity was accepted (Comrey & Lee, 2013).

Under reliability tests, Pearson Correlation Test and Interclass Correlation (ICC) were used under the scale invariance, and item total score analysis, Cronbach's α coefficient, McDonald's ω , and Split-Half Reliability were used under internal consistency of the scale. The acceptable values were Cronbach's α coefficient and McDonald's ω coefficient of 0.70 or higher, item-total correlation score of 0.30 or higher, and ICC of 0.70 or higher (Baris & Seren Intepeler, 2019). Split-Half Reliability had items on the scale divided into 2 halves (odd items and even items). Each half's reliability coefficient (Cronbach's α) was calculated via the Spearman-Brown formula. Tukey's Test of Additivity was utilized to check for scale homogeneity, and Hotelling's T^2 Test was used to check for response bias. A significance level of $p < 0.05$ was considered for all statistical analyses.

Results

Expert Opinion and Pilot Study

Considering both expert opinions and the results obtained from the pilot study, the term "church activities" in Item 14 was changed to "religious activities" to better align with Turkish culture.

Item Analysis

As a result of the item analysis, the reliability coefficient (Cronbach's Alpha) of the scale was found to be 0.90. When Cronbach's alpha values were examined item by item, it was determined that removing any item would not significantly change the scale structure.

Construct Validity

Explanatory Factor Analysis

After establishing the appropriateness assumptions for factor analysis (through the KMO test and the Bartlett test), an EFA was conducted on a sample of 215 participants to analyze the sub-dimensions of the scale. Principal Components Factor Analysis was applied to a 16-item dataset for EFA. The factor eigenvalues obtained through the use of the oblique rotation process, percentage of variance explained, and the items' factor loadings for each dimension are given in Table 2 in detail.

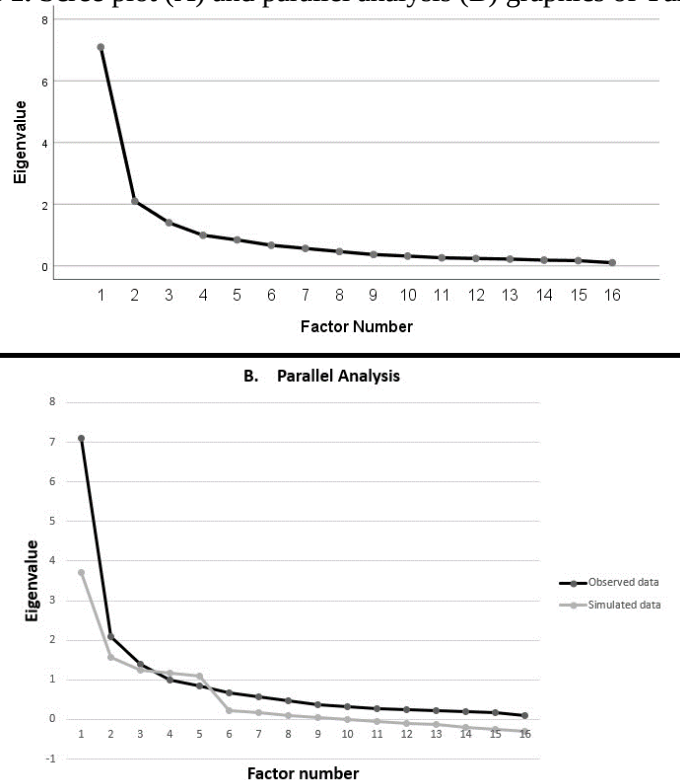
Table 2. Rotated component matrix after EFA (n=215)

Scale items	Factor loads		
	Factor 1	Factor 2	Factor 3
5	.927		
2	.832		
3	.825		
1	.806		
4	.773		
6	.625		
11	.575		
12	.392		
13		.791	
14		.783	
7		.636	
8		.626	
10			.791
15			.770
16			.753
9			.717
Eigenvalues	7.096	2.098	1.401
Explanation rate of variance (%)	44.349	13.114	9.754
Cumulative rate of variance (%)	44.349	57.463	66.217

Note: The Kaiser-Mayer-Olkin test (0.865). Bartlett test was significant ($\chi^2 = 2289.916$, $p = 0.000$)

On reviewing the findings obtained from the EFA results, three sub-dimensions were observed to be obtained, as in the case of the original FRS-16. No differences were identified between the items constituting the sub-dimensions of the original form. According to the results, consistent with the original FRS-16, the sub-dimensions were named as (1) communication and connectedness, (2) positive framing, and (3) external resources. Scree plot and parallel analysis results with the factors of the scale are shown in Figure 1.

Figure 1. Scree plot (A) and parallel analysis (B) graphics of Turkish FRS-16



Confirmatory Factor Analysis

After EFA, CFA was conducted on a new data set of 215 participants to establish the factor structure of the scale. To decide whether the data set is suitable for CFA, correlation among the factors, tolerance of the scale, and VIF values were calculated. Correlations ($p < 0.05$) existed between the sub-dimensions. For each of the sub-dimensions, the Tolerance value was calculated to be greater than 0.2, and VIF was found to be below 10, which means that none of the sub-dimensions has any multicollinearity.

Modifications were made to the model to improve the fit indices obtained from the CFA. Fit indices before and after these modifications are presented in Table 3. The CFA path diagram and the implemented model modifications are illustrated in Figure 2.

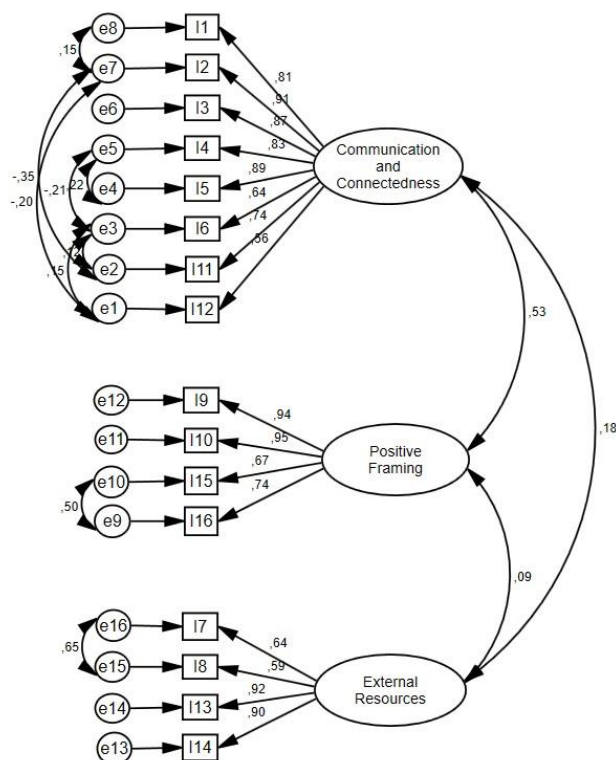
Table 3. Calculated fit index values of the Turkish FRS-16 (n=215)

Criterion	Perfect fit	Acceptable fit	Pre-modification finding	Post-modification finding
RMSEA	$0 \leq \text{RMSEA} \leq 0.05$	$0.05 < \text{RMSEA} \leq 0.09$	0.084	0.052
GFI	$0.95 < \text{GFI} < 1$	$0.90 < \text{GFI} < 0.95$	0.895	0.925
AGFI	$0.90 < \text{AGFI} < 1$	$0.85 < \text{AGFI} < 0.90$	0.85	0.90
NNFI	$0.95 \leq \text{NNFI} \leq 1$	$0.90 \leq \text{NNFI} < 0.95$	0.931	0.973
CFI	$0.95 \leq \text{CFI} \leq 1$	$0.90 \leq \text{CFI} < 0.95$	0.944	0.979
NFI	$0.95 < \text{NFI} < 1$	$0.90 < \text{NFI} < 0.95$	0.911	0.946
IFI	$0.95 \leq \text{IFI} \leq 1$	$0.90 \leq \text{IFI} < 0.95$	0.945	0.979
CMIN/DF	$0 < \text{CMIN/DF} < 2$	$2 < \text{CMIN/DF} < 3$	2.495	1.589

RMSEA: The Root Mean Square Error of Approximation; GFI: Good Fit Index; AGFI: Adjusted Good Fit Index; NNFI: Non-normed Fit Index; CFI: Comparative Fit Index; NFI: Normed Fit Index; IFI: Incremental Fit Index; CMIN/DF: Chi-square Fit Test.

In comparing the fit indices, it was established that the factor structure obtained using EFA was supported by CFA and thus set the foundation that the scale consists of 16 items loading on three factors. Additionally, based on the Hoelter Model, the sample size required for CFA was calculated to be 16 at a significance level of 0.05 and 186 at a significance level of 0.01. This supported the sample size fit

Figure 2. The 3-factor model of the Turkish FRS-16 with standardized estimates (n = 215)



Convergent-Divergent Validity

According to the findings of convergent-divergent validity, in every sub-dimension, $CR > 0.70$, $AVE > 0.50$, $CR > AVE$, $AVE > MSV$, and $AVE > ASV$ were established. The finding of convergent validity indicated that the items in the factors highly correlated with each other as well as with the concerned factors they are affiliated with. The outcome of divergent validity established that the items were loosely related to other sub-dimensions except for the one they belonged.

Concurrent Validity

The concurrent validity of the scale was tested against the BRS, and the scale was found to be correlated with all sub-dimensions of the Turkish FRS-16. The correlation coefficients are shown in Table 4.

Table 4. Correlation Coefficients Between Subscales of the Turkish FRS-16 and the BRS (n=430)

		BRS	
		r	p
Turkish FRS-16	Communication and Connectedness	0.298	<0.01**
	Positive Framing	0.184	<0.01**
	External Resources	0.212	<0.01**
	Total	0.316	<0.01**

BRS: Brief Resilience Scale; FRS-16: The Family Resilience Scale Short Form; r: Pearson Correlation Coefficient, **p<0.01

Reliability

The Cronbach's α coefficient of the 16-item scale was calculated as 0.90 and McDonald's ω as 0.89. Item-total correlation for all the items was also over 0.30. While checking inter-item correlation among scale items, the minimum value of the correlation coefficient was 0.34 and the maximum value of the correlation coefficient was found as 0.872. On determining the internal consistency coefficients for every sub-dimension, $\alpha = 0.91$ for connectedness and communication, $\alpha = 0.891$ for positive framing, and $\alpha = 0.832$ for external resources. As uncovered from the test-retest analysis that had been performed after the scale had been administered to 120 participants for the second time, the Pearson correlation coefficient and ICC for all sub-dimensions and scale total were above 0.90 (Table 5). When the scale items were split into odd-numbered items and even-numbered items, Cronbach's α for odd-numbered items was 0.816, while the Cronbach's α for even-numbered items was 0.785. The Spearman-Brown Split-Half coefficient for the two halves was 0.955.

Table 5. Reliability findings (n=430)

	Cronbach's α	McDonald's ω	ICC	Pearson correlation coefficient
Communication and Connectedness	0.91	0.89	0.981	0.979
Positive Framing	0.891	0.89	0.973	0.965
External Resources	0.832	0.84	0.958	0.943
Total	0.90	0.89	0.971	0.966

ICC: Interclass correlation coefficient.

Additivity and Response Bias

Tukey's additivity test established that nonadditivity = 0.766 ($F = 0.88$), the nonadditivity was insignificant, it indicating that the scale was additive. The results of Hotelling T^2 test provided that the Hotelling $T^2 = 290.308$, $p = 0.000$, and it was established that the scale was unbiased in terms of response.

Discussion

This article reports the Turkish validity and reliability results of the FRS-16. The only available scale in the Turkish language for assessing family resilience is the FRAS, and due to the time-consuming nature of its administration, the use of its short version, the FRS-16, in assessment processes with limited time has been

considered important. The FRS-16 is a user-friendly self-assessment tool consisting of 16 items that assess family members' perceptions of family relationships.

FRS-16 was initially developed by Chow et al. and validated in Chinese and American populations (Chow et al., 2022). In comparison to the longer version of the scale, FRAS, which consists of 6 subscales and a total of 54 items ("Intrafamily Problem Solving and Communication," "Utilization of Social and Economic Resources," "Maintaining a Positive Outlook," "Family Connectedness," "Family Spirituality," and "Ability to Make Sense of Difficulty"), FRS-16 comprises three subscales and 16 items. In the development of FRS-16, researchers selected core items for the proposed Short Form of FRAS and based their selection on two criteria, guided by Sixbey's findings: (1) the two items with the highest factor loadings for each subscale and (2) six items with factor loadings and item-subscale correlations higher than 0.7 for the "Family Communication and Problem Solving" subscale (Sixbey, 2005). Ultimately, 16 items were chosen. The study proposed a three-factor model built upon the work of Li et al (Li et al., 2016). The three suggested factors are: (1) Communication and Connectedness; (2) Positive Framing; and (3) External Resources.

The factor analyses in this study confirmed that the Turkish adaptation of the FRS-16 consists of a three-factor structure: The "Communication and Connectedness" subscale consists of eight items assessing patterns of family communication (e.g., "We can talk about the way we communicate in our family."). The "Positive Framing" subscale consists of four items assessing problem-solving strategies within the family (e.g., "We can survive if another problem comes up."). The "External Resources" subscale assesses external resources that impact the family structure and has items such as "We feel people in this community are willing to help in an emergency."

EFA and CFA were employed simultaneously to enhance the internal consistency and validity of the factor structure. The participants were split into two groups: one for EFA and the other for CFA. EFA was utilized to analyze the underlying factor structure and to determine the minimum number of items for the Turkish FRS-16 scale. For cross-validation of the EFA results, CFA confirmed the conceptual model by verifying whether the item pattern could be explained or not by the proposed factor structure. Moreover, to find the adequate internal consistency of the total scale and subscales, Cronbach's α and McDonald's ω estimates were calculated. Cronbach's α is another popular coefficient to assess the internal consistency of items in a scale and is preferred for its ease. Nevertheless, it can miss the factor complexity or heterogeneity under the assumption of homogeneity among the items. McDonald's ω , however, captures the factor structure more accurately and is a more trustworthy option, particularly for multi-factor scales (Cho, 2021; Malkewitz et al., 2023). Therefore, as the scale's structure and characteristics would allow, employing both Cronbach's α and McDonald's ω reliability coefficients to better understand its internal consistency was thought to be beneficial. McDonald's ω values had not been presented in the original FRS-16. Cronbach's α for Connectedness, Positive Framing, External Resources, and Communication were 0.67, 0.51, and 0.68, respectively (Chow et al., 2022). For Turkish FRS-16, Cronbach's α was also good with the total 0.90 and subscales of 0.91, 0.891, and 0.832, respectively, showing good internal consistency. McDonald's ω was 0.89 for the total scale and 0.89, 0.89, and 0.84 for the subscales, respectively.

One of the advantages of this study is that the factor structure was cross-validated based on the scree plot as well as parallel analysis. Factor structure identification is a key activity in assessing a scale's validity and reliability. The scree plot displays eigenvalues obtained through factor analysis graphically, and one aims to find the point, or the "elbow point," at which the factors begin to decline in explaining variance. Conversely, parallel analysis determines the factors by comparing a series of artificially generated datasets with identical characteristics as the original dataset (Çokluk Bökeoğlu & Koçak, 2016; Ledesma & Valero-Mora, 2019). Parallel analysis is a more confident procedure than the scree plot and has several advantages. Parallel analysis is more objective since it statistically evaluates the difference between the simulated datasets and the original dataset. Parallel analysis estimates the number of factors by comparing the eigenvalues of the original dataset with the simulated dataset eigenvalues. It provides a more accurate estimate of how much variance is accounted for by the factors. Besides, parallel analysis also takes into account the fact that all items are independent when creating random datasets. Parallel analysis can hence give more precise outcomes even without any real correlation among the factors. Parallel analysis is therefore a robust and consistent method in determining the

number of factors in comparison to the scree plot (Çokluk Bökeoğlu & Koçak, 2016; Dinno, 2009; Ledesma & Valero-Mora, 2019). By utilizing this method in the evaluation of the results of factor analysis in the research, more accurate and valid outcomes were achieved.

Alongside the size of the Turkish FRS-16, its convergent-divergent validity was tested in the framework of the study as well, and it provided valid outcomes for the scale. Convergent-divergent validity tests whether a scale measures the targeted concept accurately as well as discriminates it from other concepts (Nickerson & Fishman, 2009). It is crucial to verify such through such verification in ascertaining that the scale measures concepts of the real world and does not confuse them with other concepts. In evaluating convergent-divergent validity of a scale, similarity and consistency across different items of the scale are evaluated. This can enhance the scale's internal consistency and reliability (Nickerson & Fishman, 2009; Webb et al., 2013). This validity analysis can also assess whether the scale behaves in line with theoretical foundations. If the scale does not show the expected relationships with other theoretically predicted concepts, the theoretical foundations of the scale might be questioned. Conducting a convergent-divergent validity analysis can contribute to making the scale more valid and reliable. When it is confirmed that the scale yields conceptually and practically meaningful results, it can enhance users' confidence in the scale (Holton III et al., 2007; Webb et al., 2013).

Within the scope of this research, concurrent validity findings were also significant, showing that each subscale of the Turkish FRS-16 was meaningfully correlated with the BRS. Although the correlation coefficients were moderate (ranging from 0.184 to 0.316), the results were statistically significant at $p < 0.01$, likely due to the large sample size ($n = 430$), which increases the statistical power of the test. In larger samples, even moderate or low correlation coefficients can reach statistical significance, as increased sample size reduces the standard error, making it easier to detect smaller effects (Field, 2013). These moderate yet significant correlations indicate that family resilience, as measured by the FRS-16, is strongly associated with individual resilience levels, supporting the instrument's effectiveness in capturing resilience across different relational levels. Studies have shown that resilience within the family unit often serves as a foundation for individual resilience, particularly through supportive family dynamics and adaptive coping strategies (Bonanno, 2004; Walsh, 2016). Specifically, the significant correlations for "Communication and Connectedness," "Positive Framing," and "External Resources" subscales with individual resilience highlight the integral role that family support and resilience mechanisms play in bolstering personal resilience. Evidence has indicated that healthy family communication and shared coping resources are essential in stimulating individual well-being and resilience during adversity (Hillaker et al., 2008; Winslow et al., 2005). Such a finding is particularly relevant in the Turkish socio-cultural environment where the family plays an important role in individual coping and resilience approaches (Güngör, 2014). The Turkish FRS-16 is not only a valid measure of family resilience but also concurrently valid in the measurement of individual resilience dimensions by the assumption that resilience is a relational process characterized by family context (Walsh, 2003; Chow et al., 2022).

Turkish FRS-16 also demonstrates its effectiveness in presenting the relationship between family resilience and individual resilience through all of its subscales. The findings emphasize that each dimension of FRS-16 is linked with individual resilience levels. Following the assumption that "effective family communication can only be achieved with an optimal balance of mutual support and respect for individuals' autonomy" (Theiss, 2018), the "Communication and Connectedness" subscale precisely assesses family interactions that demonstrate appropriate reactions to strained moments. Such interactions assist family members in developing coping strategies to manage distress (Winslow et al., 2005). How family members express emotions and respond to one another's emotions create a framework for effectively managing stress, which in turn enhances individual resilience.

The second factor, Positive Framing, represents attitudes or beliefs within a family that help it maintain positivity during times of adversity. Various resilience studies indicate that supportive, positive, and responsive family attitudes assist family members in developing necessary skills to confront and cope with challenging conditions in different environments, while negative attitudes and coping methods can render family members

more vulnerable in diverse life circumstances (Bonanno, 2008; Hillaker et al., 2008). Therefore, positive framing within the family can foster flexible, adaptive, and resilient personal characteristics.

Outside support is required for families to cope with inner and outer crises. Throughout the literature, social support (i.e., neighbors), economic support (i.e., welfare systems), and spiritual support (i.e., churches or other religious institutions) are defined as required outside assistance for the family's functioning during crises (Theiss, 2018). The third subscale of FRS-16 strives to quantify all these dimensions of support. Both the literature on individual resilience and family resilience research point to the positive effect of external support networks on resilience.

Limitations and Future Research

Among the limitations of this study are the sample consisting of university students and the use of a cross-sectional design. Future research could explore the validity and reliability of the scale on different age groups and diverse populations from a broader perspective. Furthermore, the predictive validity of Turkish FRS-16 on various variables associated with family resilience should also be considered.

Conclusion

Our results support that the Turkish FRS-16 has adequate internal consistency and validity. The FRS-16 provides an assessment of the perception of family resilience by measuring three aspects: communication and connectedness, positive framing, and external resources. The Turkish FRS-16 stands out as a suitable tool for situations such as pre-intervention or post-intervention resilience assessment, intensive longitudinal surveys, and telephone surveys, especially when evaluation time is limited. The concise and effective structure of the scale enhances its practical utility in family resilience research. By establishing a foundation for future investigations, this study contributes to a broader and more diverse understanding of family resilience.

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Data Availability. The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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