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# Validation of the Resilience Scale for Adolescents in High School in a Spanish Population

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**Abstract:** Resilience is a personal competence that facilitates coping with adversity and forms part of an individual's psychosocial adjustment. Therefore, this construct has an important role in adolescent development. Youths with high levels of resilience usually show less risk of behavioral disorders, low academic performance or interpersonal conflicts. The objective of this study was to validate the Resilience Scale for Adolescents (READ) in a Spanish population, and test whether this questionnaire is valid for different cultures and societies. The sample comprised 317 high school students aged 13 to 18 years old with an average age of 14.93, in the province of Almería (Spain). The Resilience Scale for Adolescents was administered for this. Based on exploratory factor analysis and the various previous studies undertaken on validation of this instrument, four models were proposed, of which the original READ model showed the best fit. Validation of this scale showed good internal consistency and high reliability on five factors: Family Cohesion, Personal Competence, Social Competence, Social Resources and Orientation toward Goals. It is considered a valid instrument for evaluating the various factors of resilience and can help determine the education factors contributing to the process of positive adaptation in adolescence.

**Keywords:** resilience; READ; adolescents; validation; education

## 1. Introduction

Adolescence is characterized by knowledge and experience acquired and by the changes that take place during the three stages (early, middle and late) it can be divided into [1,2]. Psychological, biological and social changes influence the subjective wellbeing of the adolescent [3–5]. To date, most studies in this area have been carried out in adult populations, and only a few have been undertaken with adolescents [6]. Subjective wellbeing has awakened strong interest in psychology, and, therefore, studies should be associated with satisfaction with life and the happiness of individuals [7].

Among the psychological factors that influence subjective wellbeing is resilience, which refers to a phenomenon or progress in positive adaptation, regardless of negative or traumatic experiences undergone [8]. According to Masten [9] resilience is a “phenomenon characterized by good outcomes” (p. 228). Bonanno [10] mentioned that resilience is a personal competence that benefits functioning in the face of adversity. This construct forms part of the individual's psychosocial adjustment, which depends as much on it as self-concept [11], and the two counteract perceived social vulnerability [12]. Resilience is also considered a protective factor [13], and is affected by interaction between genetic and environmental factors [14].

Resilience in adolescence leads to overcoming difficulties through coping strategies [15]. Thus, adolescents with this characteristic can overcome the risks of their progression during this stage more easily [16]. That is, youths with high levels of resilience have less risk of mental illness, behavioral disorders, low academic performance or interpersonal conflicts [17,18]. Resilience also positively affects life development and experiencing emotions [19].

Resilience can be explained by several factors: individual positive factors, family and other support networks outside the family. Personality factors also act as mediators on the effect of resilience, and improvement in it is affected by coping styles [20]. Possessing this characteristic is linked to good psychological wellbeing, good state of mental health [21] and, therefore, high levels of quality of life [22].

### *Evaluating Resilience*

Resilience can be measured by its three categories and, therefore, the development of validated measures with good reliability indices in both intrapersonal and personal factors are necessary to be able to respond to these categories. There are several resilience scales for different populations, such as the Spanish Resilience Questionnaire [23], and other scales for different areas, for example, for the family, the Inventory of Resilience for mothers [24] and the Brief Scale of Resilience to Children's Behavior Problems, addressing evaluation of resilience of parents [25].

Other studies have used the Connor–Davidson Scale of Resilience (CD-RISC) which measures the ability to fight traumatic stress [26]. This instrument has been applied to a general population, psychiatric patients, patients with disorders or anxiety and in primary care, showing good internal consistency and high reliability. Several years later, this same scale was adapted by Yu et al. [27] in a sample of Chinese adolescents, where the five original factors of the scale were combined in an overall resilience scale. It was validated in Spanish by Serrano et al. [28] in an older population. Campbell-Sills and Stein [29] reduced this scale in a brief version called the 10-item CD-RISC, which was adapted to Spanish and validated in a university population [30,31]. In recent years, resilience has awakened greater interest in research, as it facilitates mechanisms for coping better with difficult situations [32]. Even though it is one of the constructs studied in adults [33], university students [34] and children [35], the instruments for evaluating adolescent populations only began to be designed 12 years ago.

In view of this need to design a resilience scale for adolescents, Hjemdal et al. [13] developed the Resilience Scale for Adolescents (READ) for a Norwegian adolescent population aged 13 to 15, which showed good psychometric properties and a negative relationship with depressive symptoms. This scale may be used as a predictor of a good state of health, and to evaluate protective factors linked to signs of depression in an adolescent population [32]. However, it should be used with caution, since the authors reported that the results were found for a specific sample and age, which would be a limitation, as it only considers early adolescence. Von Soest, Mossige, Stefansen, and Hjemdal [36] designed a 23-item version for adolescents aged 18 to 20 to evaluate the resilience factors with few items, and this version is extensive to all ages of adolescence.

A study by Windle, Bennett, and Noyes [37] in a review of several scales, found that the READ had higher content and construct validity than other scales. This instrument has been adapted to other countries, such as Italy [38], Mexico [39] and Norway [40].

Another of the instruments is the Adolescent Resilience Questionnaire (ARQ), which is based on the multidimensional nature of resilience, with 12 scales which measure the factors in individual, family, peer, school and community domains [41]. This instrument has also been validated in the Romanian context [42], in Spanish adolescents [43] and in young Iranians [44].

Not only are there instruments for evaluating middle and late adolescence, but also for evaluating early adolescence. Sahin and Karatas [45] validated the Resilience Scale for Early Adolescence (RSEA) in a sample of Turkish adolescents.

In the light of the importance of resilience to development of the adolescent population, highly reliable, validated instruments must be designed and adapted to be able to measure it. Thus, the

purpose of this study was to find out whether the READ questionnaire is valid for application in different cultures and contexts.

## 2. Materials and Methods

### 2.1. Participants

This cross-sectional study was carried out with a random cluster sample. The sample was made up of a total of 317 participants from two high schools in the province of Almeria (Spain). The students were 13 to 18 years of age ( $M = 14.93$ ; standard deviation ( $SD$ ) = 1.06). Boys made up 50.8% ( $n = 161$ ) of the sample and had a mean age of 14.85 ( $SD = 1.00$ ). Girls made up 49.2% ( $n = 156$ ) and had a mean age of 15.01 ( $SD = 1.11$ ). The sample was distributed over two grades: 61.5% ( $n = 195$ ) were in their third year of high school and 38.5% ( $n = 122$ ) in their fourth year.

The family employment situation was distributed as follows: in 22.1% ( $n = 70$ ), only the father was working, in 11.7% ( $n = 37$ ), only the mother was working, and in 60.3% ( $n = 191$ ) both were working. In 5.4% ( $n = 17$ ) both were either unemployed or retired.

### 2.2. Instruments

An ad hoc questionnaire was designed to collect the sociodemographic data (age, sex, grade, parents' employment status).

*Resilience Scale for Adolescents (READ)*. The Spanish-language adaptation and validation in a Mexican population [39] of the original resilience scale for adolescents by Hjemdal et al. [13] was used in this study. The scale is comprised of five factors: Personal Competence (I feel competent), Social Competence (I make new friends easily), Family Cohesion (I feel good with my family), Social Resources (I know how to reach my goals) and Orientation toward Goals (I have some friends and relatives who often encourage me), distributed in 22 items. Cronbach's alpha was 0.85 on the Family Cohesion scale, 0.69 on Personal Competence, 0.80 on Social Competence, 0.85 on Social Resources, and 0.76 on Orientation toward Goals. The internal consistency of the instrument was 0.90.

### 2.3. Procedure

To carry out this study, the high school principals and participants had the objectives and data usage explained to them. The students were also told that participation was voluntary, and given the instructions necessary for filling out the questionnaire. They were informed of the anonymity of their answers and confidentiality of their data. The participants had the opportunity to give their informed consent to comply with research ethics.

Although the scale used had been validated in Mexican adolescents, the original scale in English was translated into Castilian Spanish, using the back-translation method, such that the scale provided by the authors [39] already translated into Spanish was again translated back into English for retranslation into Spanish, and thus its conceptual equivalence and naturalness evaluated. Finally, it was reviewed by experts for adequacy and evaluation of the back-translation.

### 2.4. Data Analysis

First, the normality of the sample was confirmed following the criterion of Finney and DiStefano [46]. Based on exploratory factor analysis and prior validation studies of the same and other versions of the questionnaire, three models were proposed, the original (READ) model, the model found by exploratory factor analysis (READ-R4) and the model with forced distribution in five factors (READ-R). Confirmatory Factor Analysis was performed on the different models, taking the following goodness-of-fit indices as measures:  $\chi^2/df$ , comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA) at a 90% confidence interval (CI). The  $\chi^2/df$  ratio was used considering below five as acceptable [47], for the CFI and IFI over or near 0.95 and for the RMSEA inner values very near 0.06 [48].

The Cronbach's alpha [49] and combined reliability were calculated to test the reliability of the instrument. An analysis was also done to support invariance across sex of the factor structure proposed. First goodness-of-fit of both subsamples was tested separately (Models M0a-Boy and Model M0b-Girl). The resulting four nested models were evaluated: (a) Model 1. Both subsamples considered simultaneously allowing for free estimation of parameters. (b) Model 2. With metric invariance. (c) Model 3. With scalar invariance. (d) Model 4. Strict invariance.

There was no consensus criterion to determine the criteria to be used to evaluate the difference in fit of the nested models [50]. For evaluation of fit, this study focused on the  $\Delta$ CFI. Thus, the model is completely invariant if the  $\Delta$ CFI is below 0.01 [51].

The analyses were performed with the SPSS statistical package for Windows version 23.0 and AMOS 22.

### 3. Results

#### 3.1. Preliminary Analyses

The correlations of the 22 items, the means, standard deviations, skewness and kurtosis are shown in Table 1. It may be observed that most of the correlations were statistically significant and the kurtosis and skewness of each variable were acceptable, so extraction of principal components with direct Oblimin rotation, which enables correlation of existing factors, seemed justified.

#### 3.2. Exploratory Factor Analysis

The principal component analysis (Determinant  $p = 4.84$  shows intercorrelation between variables) of the READ scale revealed the existence of four components with eigenvalues over 1. The scree test showed the adequacy of rotation with four factors with values of 3.38, the following two being barely below 1, with 0.96 and 0.91, although they are far from the seventh with a score of 0.81 (Figure 1). After factor analysis, the items with factor saturations over 0.40 were selected from the rotated component matrix (varimax rotation). The four-factor distribution of the items is shown in Table 2 (Model READ-4R).

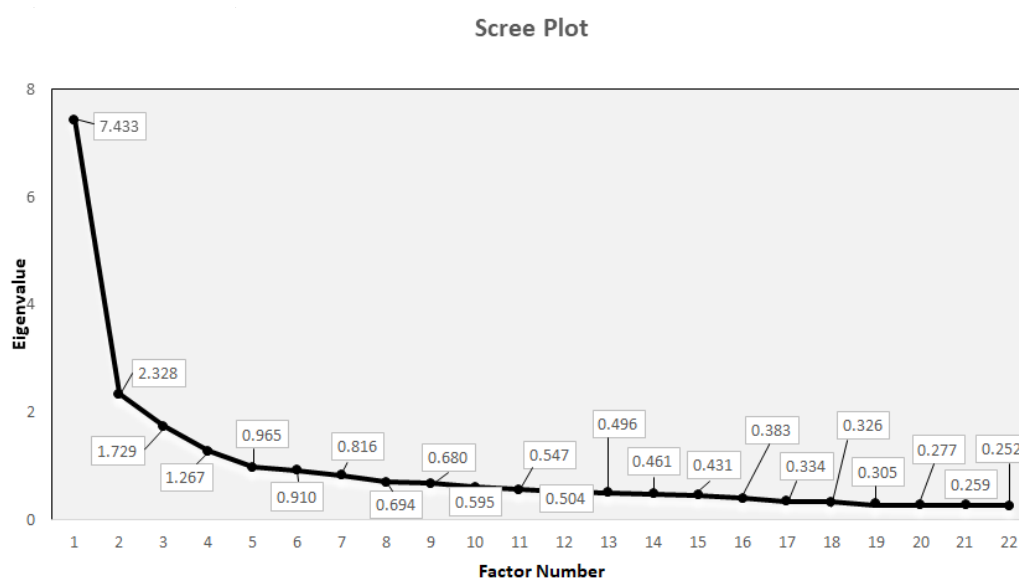


Figure 1. Factor analysis scree plot.

**Table 1.** Correlation analysis of items. Descriptive statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1	*																				
2	0.536**	1																				
3	0.486**	0.549**	1																	*		
4	0.333**	0.402**	0.412**	1																		
5	0.550**	0.612**	0.531**	0.534**	1																	
6	0.486**	0.528**	0.474**	0.315**	0.613**	1																
7	0.325**	0.289**	0.192**	0.122*	0.198**	0.275**	1															
8	0.157**	0.173**	0.118*	0.116*	0.078	0.185**	0.440**	1														
9	0.243**	0.231**	0.138*	0.168**	0.116*	0.151**	0.383**	0.716**	1													
10	0.282**	0.244**	0.245**	0.164**	0.197**	0.217**	0.408**	0.449**	0.518**	1												
11	0.228**	0.171**	0.058	0.097	0.098	0.233**	0.443**	0.352**	0.314**	0.470**	1											
12	0.213**	0.134*	0.095	0.099	0.164**	0.150**	0.203**	0.198**	0.208**	0.216**	0.203**	1										
13	0.142*	0.130*	0.135*	0.063	0.146**	0.184**	0.098	0.155**	0.146**	0.247**	0.251**	0.196**	1									
14	0.251**	0.261**	0.248**	0.248**	0.278**	0.280**	0.315**	0.237**	0.214**	0.315**	0.405**	0.343**	0.481**	1								
15	0.220**	0.283**	0.282**	0.211**	0.270**	0.328**	0.279**	0.216**	0.221**	0.300**	0.303**	0.228**	0.347**	0.540**	1							
16	0.354**	0.430**	0.299**	0.359**	0.374**	0.389**	0.338**	0.288**	0.307**	0.298**	0.395**	0.192**	0.266**	0.389**	0.407**	1						
17	0.271**	0.339**	0.197**	0.247**	0.325**	0.321**	0.269**	0.272**	0.242**	0.172**	0.273**	0.239**	0.203**	0.266**	0.288**	0.598**	1					
18	0.357**	0.449**	0.296**	0.324**	0.408**	0.389**	0.440**	0.296**	0.321**	0.290**	0.309**	0.215**	0.129*	0.319**	0.365**	0.633**	0.544**	1				
19	0.366**	0.475**	0.278**	0.314**	0.462**	0.459**	0.275**	0.255**	0.266**	0.194**	0.241**	0.231**	0.227**	0.278**	0.381**	0.550**	0.603**	0.610**	1			
20	0.250**	0.196**	0.235**	0.192**	0.212**	0.275**	0.246**	0.175**	0.175**	0.268**	0.270**	0.259**	0.385**	0.412**	0.283**	0.333**	0.222**	0.311**	0.364**	1		
21	0.336**	0.255**	0.229**	0.262**	0.334**	0.273**	0.284**	0.182**	0.224**	0.286**	0.220**	0.233**	0.411**	0.458**	0.367**	0.367**	0.374**	0.342**	0.404**	0.517**	1	
22	0.268**	0.224**	0.208**	0.187**	0.241**	0.286**	0.290**	0.214**	0.239**	0.257**	0.318**	0.331**	0.386**	0.440**	0.302**	0.338**	0.392**	0.290**	0.406**	0.497**	0.544**	1
N	316	316	315	316	315	313	314	313	314	316	314	315	314	312	315	316	314	312	314	317	316	317
M	30.82	40.41	30.49	30.85	40.17	30.71	30.93	30.65	30.58	30.70	30.77	30.50	30.54	30.57	30.52	40.22	40.47	40.25	40.27	40.17	40.17	30.93
SD	10.141	0.933	10.130	10.112	10.064	10.177	0.984	10.240	10.259	10.090	10.064	10.101	10.125	10.232	10.157	0.959	0.908	0.984	0.916	0.949	0.923	10.045
Skew.	-0.758	-10.763	-0.526	-0.728	-10.292	-0.661	-0.742	-0.570	-0.519	-0.543	-0.615	-0.314	-0.523	-0.482	-0.396	-10.101	-10.957	-10.362	-10.349	-10.039	-10.072	-0.724
Kur.	-0.102	20.993	-0.258	-0.165	10.112	-0.369	0.102	-0.642	-0.760	-0.304	-0.297	-0.469	-0.282	-0.749	-0.599	0.573	30.695	10.415	10.765	0.554	10.045	-0.056

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ .

**Table 2.** Factor structure, communalities ( $h^2$ ) eigenvalues, Cronbach's alpha and percentage of explained variance ( $n = 316$ ). Extraction method: principal components analysis.

	READ-R Model					$h^2$	READ-4R Model				$h^2$	
	F1	F2	F3	F4	F5		F1	F2	F3	F4		
Item 1	0.70					0.56	0.63				0.47	
Item 2	0.76					0.67	0.73				0.62	
Item 3	0.78					0.64	0.69				0.50	
Item 4	0.59					0.43	0.49				0.30	
Item 5	0.81					0.74	0.80				0.72	
Item 6	0.70					0.61	0.65				0.52	
Item 7					0.54	0.54			0.50		0.38	
Item 8				0.85		0.78			0.76		0.61	
Item 9				0.86		0.80			0.74		0.58	
Item 10				0.57	0.51	0.65			0.64		0.52	
Item 11					0.75	0.66			0.43		0.33	
Item 12		0.45				0.28		0.34			0.18	
Item 13		0.69				0.54		0.61			0.39	
Item 14		0.59			0.52	0.65		0.67			0.53	
Item 15					0.52	0.50		0.45			0.36	
Item 16			0.71			0.70				0.62	0.61	
Item 17			0.79			0.71				0.67	0.57	
Item 18			0.74			0.73				0.66	0.65	
Item 19			0.68			0.72	0.41			0.62	0.65	
Item 20		0.71				0.55		0.59			0.40	
Item 21		0.72				0.63		0.65			0.53	
Item 22		0.73				0.62		0.64			0.49	
Eigenvalue	7.43	2.33	1.73	1.27	0.97		6.96	1.85	1.24	0.84		
% explained variance	33.79	10.59	7.86	5.76	4.39		31.62	8.43	5.62	3.81		
Kaiser–Meyer–Olkin				0.90					0.90			
Barlett's Sphericity		$\chi^2_{(231)} = 2730.45, p < 0.000$						$\chi^2_{(231)} = 2730.45, p < 0.000$				
Cronbach's Alpha	0.85	0.78	0.85	0.79	0.74		0.85	0.80	0.80	0.85		

Note: the items are listed in decreasing order by saturation. Correlation coefficient visualization  $>0.40$ . READ-R = Resilience Scale for Adolescents-Revised; READ-4R = Resilience Scale for Adolescents-Revised 4 factors.

Since the theoretical structure of the construct was five factors, principal axis factoring was carried out with varimax rotation with five fixed factors. After factoring, the items with factor saturations over 0.40 were selected from the rotated components matrix (varimax rotation).

Table 2 (READ-R Model) shows how Factor 1 corresponds to the items that include the Family Cohesion factor on the scale. This Factor 1 is comprised of six items, all of them with loadings of 0.59, which explain 33.79% of the variance. Factor 3 comprises four items and forms the Social Resources component, explaining 7.86% of the variance. Factor 4 has three items which are some of the items from the Social Competence factor (8, 9 and 10) and explain 5.76% of the variance. Factor 2 has six items corresponding to Orientation toward Goals and the Personal Component factor is made up of Items 12, 13 and 14, explaining 10.59% of variance. Finally, Factor 5, comprises three items, each of them a factor different from the original scale.

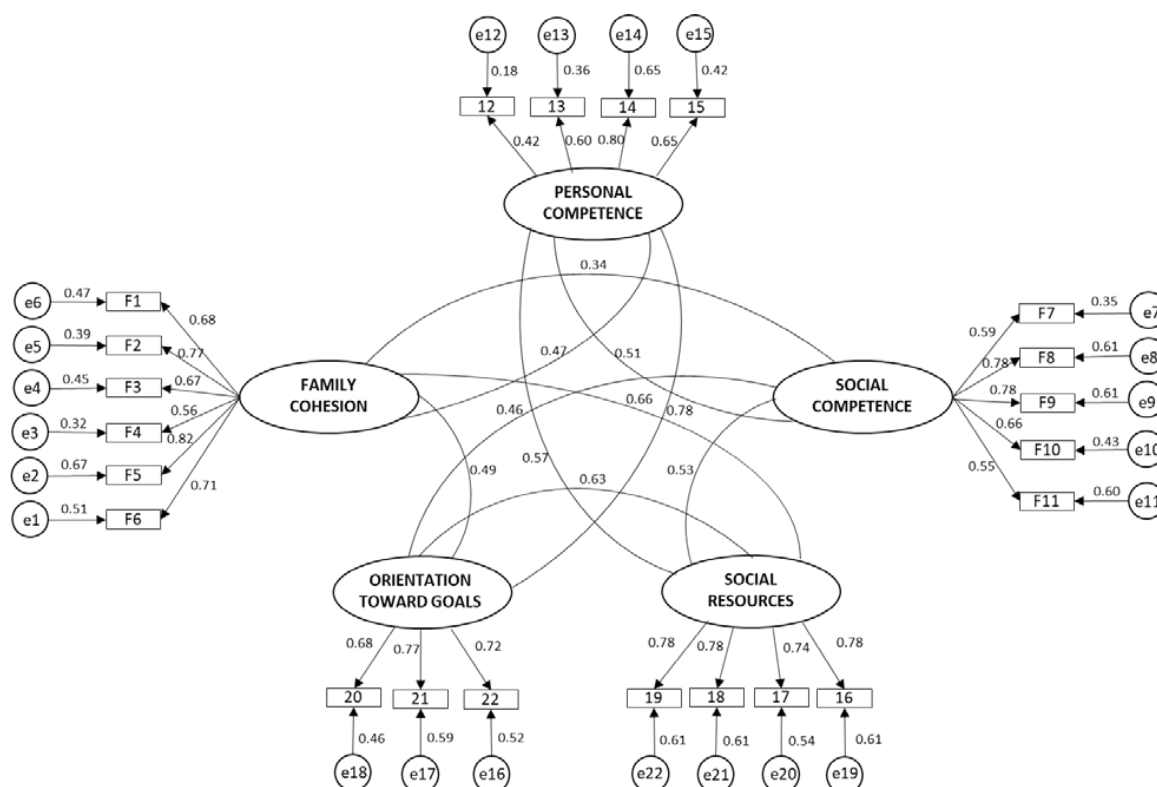
### 3.3. Confirmatory Factor Analysis of the Resilience Scale for Adolescents (READ), READ-R and READ-4R Models

Table 3 compares the models analyzed, showing how the original READ model is the one which fits the best (Figure 2).

**Table 3.** Fit indices for the models proposed (n = 605)

Model	$\chi^2$ (df)	$\chi^2/df$	CFI	TLI	Est.	RMSEA	
						IC90% Below.	Above
Original READ Model	415.548 (199)	2.088	0.923	0.901	0.059	0.051	0.067
Unidimensional READ Model	1186.749 (209)	5.678	0.650	0.576	0.122	0.115	0.128
Proposed <i>READ-R</i> Model	421.648 (199)	2.118	0.92	0.899	0.060	0.052	0.067
Proposed <i>READ-4R</i> Model	454.209 (203)	2.237	0.910	0.888	0.063	0.055	0.070

Note. CFI = Comparative fit index; TLI = Tucker–Lewis index; RMSEA = Root mean square error of approximation; CI = Confidence interval; df = Degrees of freedom; Est. = Estimation.



**Figure 2.** Original READ model (N = 317).

Table 4 shows the values for the five different models, where the  $\Delta CFI$  is below 0.01 in all of them, accepting configural, metric, scalar and strict invariance.

**Table 4.** Multigroup analysis of invariance across gender (male/female).

Model	$\chi^2$	df	$\chi^2/df$	$\Delta\chi^2$	CFI	$\Delta CFI$	IFI	RMSEA (IC 90%)
M0a (male)	652.949 ( $p = 0.000$ )	398	1.640		0.909		0.885	0.045 (0.039–0.051)
M0b (female)	685.936 ( $p = 0.000$ )	415	1.652		0.957		0.957	0.032 (0.028–0.036)
M1 (base model)	733.694 ( $p = 0.000$ )	437	1.678		0.909	-	0.885	0.045 (0.039–0.051)
M2 (FS)	776.207 ( $p = 0.000$ )	459	1.691	0.013	0.909	-	0.885	0.045 (0.039–0.051)
M3 (FS + Int)	799.971 ( $p = 0.000$ )	474	1.687	0.009	0.909	-	0.885	0.045 (0.039–0.051)
M4 (FS + Int + Err)	652.949 ( $p = 0.000$ )	398	1.640	0.038	0.909	-	0.885	0.045 (0.039–0.051)

Note: SF = Factor saturations, Int = Intercepts, Err = Errors.

#### 4. Discussion

The interest that resilience has awakened in recent years is due to the possibility of being able to identify the protective factors necessary for proper adaptation and prevention of psychological



problems [8,13]. This study validated the READ in an adolescent Spanish population as an appropriate scale for evaluating the factors of resilience.

The following conclusions may be arrived at from the factor analyses performed. In the first place, in the exploratory analysis, the items were distributed into four factors that produced the READ-4R model. However, since the original structure was composed of five factors, the READ-R model was designed, in which the distribution of items and factors were different from the original model. Confirmatory factor analyses showed better fit of the original READ model than the two proposed models analyzed. Thus, the scale would comprise five factors, which would be personal competence (made up of four items), social competence (comprised of five items), family cohesion (six items), social resources (composed of four items) and orientation toward goals (which is made up of three items), just as with other previous validations in Italian and Norwegian adolescents [36,38,40]. Furthermore, configural, metric, scalar and strict invariance were accepted for all five models, including the analysis of variance across gender. Therefore, good fit and consistency were found for the model in the validation sample. The factorial structure proposed in the resilience scale for Spanish adolescents is the same as that proposed for the Mexican population [39]. This reflects the importance of the validation of instruments in different cultures and societies. Moreover, it should be considered what the instrument chosen evaluates, since there are different questionnaires evaluating resilience, but each one focuses on one aspect [41] providing different results.

At the same time, there is scientific evidence of the predictive value of READ for signs of depressive symptoms in adolescent populations, as this scale can evaluate the factors for protection from these symptoms and use them as a predictor of a good state of health [32]. According to Ruvalcaba-Romero et al. [39], the predictive value of this scale is very useful in Mexican youths, given the high prevalence of depressive symptoms in this population.

## 5. Conclusions

The Spanish adaptation of the READ can be very useful as a brief instrument for determining the factors of resilience quickly due to the number of items. This validation can serve for the creation of tools and action focused on each of the factors for preventing or intervening in adolescents. These tools should be especially directed at improving the personal competency that is part of individual psychosocial adjustment and facilitates coping with adversity. As mentioned above, according to other studies, finding a sample of resilient adolescents who have experienced an important stressful factor in their lives, and who have been able to cope with it, led to differentiation in the specific characteristics of the individuals, as well as in resilience levels. In addition, this questionnaire enabled, in other areas, a contribution to the process of positive adaptation in adolescence.

In future research, a larger Spanish sample would be necessary to widen the discussion of results, and comparative analyses in different social and cultural contexts, in addition to testing whether all the factors develop the same way.

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