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Validity and Reliability of the Resilience Scale for Early Adolescents

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Abstract

The aim of the study is to develop a new scale, called the "Resilience Scale for Early Adolescents" (RSEA). This study was carried out on four different groups consisting of secondary school students (in total 760 students) from Burdur in Turkey. The psychometric properties of the RSEA were analyzed by means of item analysis, exploratory and confirmatory factor analysis, and criterion related validity, internal consistency and test-retest methods. The exploratory and confirmatory factor analysis results demonstrated that the scale comprised four factors. As a result of the EFA, the factor loadings of 23 items in the four factors were found to vary between 0.68 and 0.78. These four factors explained 48% of the total variance. Within the scope of the criterion related validity, negatively significant correlations were found between the RSEA and the Depression Scale for Early Adolescents. The RSEA's internal consistency coefficient and test-retest reliability coefficient were each determined to be 0.85. In conclusion, RSEA can be used as a reliable and valid measure for Turkish early adolescents.

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1. Introduction

The concept of resilience, which originates from the Latin word "resiliens", identifies a substance's elasticity and ability to return to its original shape (Greene, 2002). Resilience is also a general concept concerned with how a child overcomes stress and how he survives trauma. In addition, it is related to positive development characteristics, like adaptability and competence, looking to the future and hope (Murphy, 1987). Resilience is generally described in literature as the ability to adapt or overcome extreme adversity or stress (Garmezy, 1991; Masten, 2001; Masten, Best & Garmezy, 1990, cited in Hand, 2008). Resilience is best defined as an outcome of successful adaptation to

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adversity. Characteristics of the person and situation may identify resilient processes, but only if they lead to a healthy outcome following stressful circumstances (Reich, Zautra & Hall, 2010). Resilient individuals are seen as those who can either make a rapid recovery to their previous state of functioning following a trauma, or who appear to be invulnerable to life's untoward events (Holaday & McPhearson, 1997, cited in Hand, 2008). Resilience is suggested as just one of a number of constructs that protect or reduce vulnerability. Lösel, Bliesener and Köferl (1989) suggested that other protective factors include hardiness, adaptation, adjustment, mastery, a good fit between the child and his environment and buffering of the environment by important adults in the child's life (Goldstein & Brooks, 2006).

The number of studies into resilience scales in Turkey is very limited and examination of these studies shows us that they were performed on several age-groups. Studies into adapting the scale for adolescents' resilience were carried out by Özcan (2005) and Gizir and Aydın (2006). A study into scale adaptation for university students' resilience was completed by Terzi (2006) and Gürgan (2006) researched scale development for the same age-group. For adults, a resilience scale adaptation study was carried out by Basım and Çetin (2011) and an ego resilience scale was adapted by Karaırmak (2007). In addition to which, there are studies for family and mother resilience, for which scale development was researched by Kaner and Bayraklı (2010a, 2010b).

It is noticeable, from a review of studies outside of Turkey, that many scales have been developed in order to determine the resilience level of various age groups (Benard, 1991; Werner & Smith, 1992; Wagnild & Young, 1993; Wolin & Wolin, 1993; Benneth, Novotny, Green & Kluever, 1998; Siebert, 1999; Jew, Green & Kroger, 1999; Hurtes, 2001; Connor & Davidson, 2003; Smith, Dalen, Wiggins, Tooley, Christopher & Bernard, 2008; Ryan & Caltabiano, 2009). However, from this literature it can be seen that the scales developed were mostly for adults, university students and high school students. For the research performed within Turkey, it is noticeable that most of the studies were scale adaptations and that there is no resilience scale specific to Turkish Culture for secondary school students. Therefore, this research aims to develop a resilience scale for early adolescents, which is appropriate for Turkish Culture.

2. Method

2.1. Participants

Four study groups took part in the research. The first group of fifty students participated in a focus group interview in order to construct items. An explanatory factor analysis was performed on the data obtained from the second group, which included 459 students, consisting of 234 females (51%) and 225 males (49%). These students were aged 12 (35%), 13 (36%) and 14 (29%). Confirmatory factor analysis was performed on the data obtained from the third group which comprised 201 students, 118 females (58%) and 84 males (42%), also aged 12 (36%), 13 (32%) and 14 (31%). Data obtained from a fourth group, of 50 students was used to calculate the test-retest reliability.

2.2. Scale Development Process

In order to construct the pool items, focus group interviews were performed with fifty students from the 6th, 7th and 8th grades using open-ended questions about the concept of resilience. Using the answers to these questions, the literature about resilience and items from similar scales, an item pool of 39 entries was formed. Items were then corrected using feedback from four academic members from the Department of Turkish Language Teaching and Department of Psychological Counseling and Guidance. In addition, a pilot application was performed on fifty students who were in the focus group, in order to ensure that the items were understood by the age group (6th-8th grade students). According to the questions from the students, the unclear items were corrected. A four-level Likert scale of 1 (never true), 2 (sometimes true), 3 (usually true) and 4 (always true) was used as the scale.

2.3. Validity and Reliability Studies of the Scale

For the validity study of this "Resilience Scale for Early Adolescents" (RSEA), the validity of different scales, specifically the structural validity and criterion related validity, were taken into consideration. Exploratory factor analysis (EFA) could be described as the ordered simplification of interrelated measures. EFA has traditionally been

used to explore the possible factor structure underlying a set of observed variables without imposing a preconceived structure on the outcome (Child, 1990). By performing EFA, the underlying factor structure is identified. Confirmatory factor analysis (CFA) is a statistical technique used to verify the factor structure of the set of observed variables. CFA allows the researcher to test the hypothesis that a relationship exists between the observed variables and their underlying latent constructs; the "Depression Scale for Children" was used to test the criterion related validity.

The reliability of the Resilience Scale for Early Adolescents was examined using internal consistency values (Cronbach's alpha statistic) and test-retest methods. Item analysis was performed using corrected items-total correlation and the significance of mean item difference of the top 27% and bottom 27% of the group using *t* test.

3. Findings

Factor analysis was performed to find out the structural validity of the scale. The data set was checked for outliers before analysis, in order to confirm that the data set was suitable for analysis. The z table values with a significance level of 0.01 were examined for dependent and independent single variable outliers and 57 data items exceeding 3.29 were removed from the data set. For multi-variable outliers, the Mahalanobis distance was examined and no value was found to be greater than 1 (Tabachnick & Fidell, 2007). Thus, 459 data items were used for factor analysis. The KMO value was computed as 0.88 and the Barlett Sphericity test $\chi 2$ value was computed as 3002.875 (p<0.001). A KMO value larger than 0.60 and a meaningful Bartlett Sphericity show that factor analysis is possible (Tabachnick & Fidell, 2007). After repeated analyses, an assessment instrument, which was made up of 23 items and four factors and was able to explain 48% of the total variance, was obtained. The first factor was named "self-originated resilience". This factor, which consists of nine items, accounted for 14% of the total variance and the factor loads of these items varied between 0.30 and 0.69. The second factor, which included seven items, was named "family originated resilience" and explained 14% of the total variance. Factor loads of the items in this factor varied between 0.56 and 0.68. The third factor, consisting of four items, was given the name "friends originated resilience" and accounted for 11% of the total variance. Factor loads of the items in this factor varied between 0.51 and 0.84. The fourth factor was called “school / teacher originated resilience" and accounted for 9% of the total variance. Factor loads of the items in this factor varied between 0.68 and 0.78. Results of the explanatory factor analysis are presented in Table 1.

Table 1: Results of the Factor Analysis of the Scale

	Factor loading				Total
Item	I	II	III	IV	
1. I keep up even under the most difficult circumstances.	.68				
2. I have self-confidence even in the most difficult conditions.	.58				
3. I use my creativity to solve the problems I face in my life.	.67				
4. I find different solutions to problems.	.61				
5. I control my life.	.53				
6. I find a solution even in the most difficult conditions.	.69				
7. I easily adapt to the changes in my life.	.46				
8. I struggle to the end for things which I think are true.	.49				
9. I have plans for the future.	.31				
10. My family supports me in every condition.		.68			
11. My family gives me responsibilities which I can handle.		.64			
12. I have good relationships with my family.		.68			
13. I feel safe with my family.		.67			
14. I share my problems with my family.		.58			
15. My family trusts me.		.67			
16. We overcome the difficulties in the family all together.		.56			
17. My friends listen to me when I have a problem.			.70		
18. My friends trust me.			.84		
19. My friends appreciate me.			.83		

20. I communicate with people easily.			.51		
21. I attend a school I like.				.71	
22. My teachers appreciate me.				.78	
23. My teachers support me to overcome difficulties.				.68	
Rotation Sums of Squared Loadings	14%	14%	11%	9%	48%

After explanatory factor analysis, the model data fit of the scale which contains four factors and 23 items was tested by confirmatory factor analysis. Data for the confirmatory factor analysis was collected from 230 students who attended five different schools. The data items were controlled as to whether they were coherent to univariate and multivariate analyses and 29 data items were excluded from the data set because the z table value for these data items exceeded 3.29 (Tabachnick & Fidell, 2007). CFA results are given in Table 2.

Table2: Values of the Goodness-of-Fit Test

X^2	X^2/df	P-Value	NFI	RFI	CFI	GFI	AGFI	SRMR	IFI	RMSEA
354.13	1.58	0.000	0.89	0.88	0.95	0.87	0.84	0.07	0.95	0.054

* p<0.001

When Table 2 was evaluated, it was seen that the chi-square value (*x2*= 354.13, n= 201, df= 224, *p*= 0.00) was meaningful. Of the fit indices, it was found that RMSEA= 0.054, NFI= 0.89, CFI= 0.95, IFI= 0.95, RFI= 0.88, GFI= 0.87, and SRMR= 0.07. The GFI value was 0.87 and the AGFI value was 0.84. According to Cole (1987), a range of 0.85 - 0.90 for the GFI value and an AGFI value higher than 0.80 show the existence of an acceptable fit. An RMSEA value in the range of 0.05 to 0.10 is considered to be an indication of fair fit and values above 0.10 indicate a poor fit (MacCallum et al., 1996). However, according to Hooper, Couglan and Mullen (2008), for a RMSEA in a well-fitting model, the lower limit is closer to 0 while the upper limit should be less than 0.08. A SRMR value as high as 0.08 is deemed acceptable (Hu & Bentler, 1999); this is an indication that the model shows a good fit. As a result of the explanatory and confirmatory factor analyses, it was found that the model consisting of 23 items and four factors was appropriate theoretically and statistically. The results are also proof that the scale has structural validity.

Item-total correlation of the RSEA varies from 0.31 to 0.56 and, according to *t*-test results, the differences between the means of the top 27% and bottom 27% for each item were significant; the results are given in Table 3.

Table 3: Item Total Correlation Coefficients and t Test Results

Items	Item total correlation				*t*
	I	II	III	IV	*Total*
1	.43				9,85*
2	.44				10,49*
3	.47				10,73*
4	.37				10,54*
5	.44				10,31*
6	.39				11,03*
7	.50				8,09*
8	.56				9,96*
9	.46				7,61*
10		.43			7,98*
11		.39			7,58*
12		.41			8,09*
13		.40			6,65*
14		.48			9,71*
15		.46			7,76*
16		.48			9,30*
17			.44		9,11*
18			.46		9,59*
19			.41		9,96*

20	.50		9,63*
21		.31	7,07*
22		.48	9,96*
23		.51	10,20*

*P<0.01

Criterion related validity: A negatively significant relation (-0.373, p<0.01) was determined between the "Depression Scale for Children" and the "Resilience Scale for Early Adolescents" during the analyses for scale related validity.

The reliability of the scale was evaluated by the test-retest method and the Cronbach's alpha value was calculated, to discover the internal consistency of the items. The test-retest method was applied twice using 50 secondary school students and a 15-day interval. The computed test-retest reliability coefficient for the RSEA was 0.85. This result shows that the scale gives consistent results when applied at different times. The Cronbach's alpha value was calculated for internal consistency; this was 0.75 for the first factor, 0.78 for the second factor, 0.72 for the third factor, 0.73 for the fourth factor and 0.85 for the whole of the scale.

4. Conclusion and Discussion

As the result of explanatory and confirmatory factor analyses carried out for determination of the psychometric properties of the RSEA, a structure with four factors was derived. It was observed that the 23 items chosen were able to explain almost half of the total variance (48%). The observed explanation rate is at an acceptable level.

The structure obtained by the explanatory factor analysis and the model fit were tested by confirmatory factor analysis. It was found that the fit index values were X^2/df=1.58, RMSEA= 0.054, NFI= 0.89, CFI= 0.95, IFI= 0.95, RFI= 0.88, GFI= 0.87 and SRMR=0.07. It was observed that there was a good fit between these values, the hypothetical model and the observed data. Therefore, it can be stated that these four factors were theoretically and statistically appropriate. The results of the study also prove that the scale has structural validity. It was found that the item-total correlations range between 0.31 and 0.56. The results of the item-analysis showed that the differences between the means of the top 27% and bottom 27% for each item were significant.

According to other findings about scale validity, a negatively significant correlation (-0.373, p<0.01) was found between RSEA and the Depression Scale for Children.

The reliability of the scale was calculated by computing the test-retest reliability coefficient and Cronbach's alpha coefficient. The internal reliability coefficient of the Turkish-version of the whole scale was calculated as 0.85 and the internal reliability of each of the four factors was calculated and found to be in the range 0.78 – 0.72. In addition, the test-retest reliability coefficient was calculated to statistically test the consistency of the scale, in terms of the aspect being measured over time, and was found to be 0.85.

According to these results, RSEA proves a satisfactory level of reliability and validity for Turkish early adolescents. It can be used for measuring the resilience level for secondary school students by researchers, counselors and teachers. RSEA can be used by researchers to find out the variables which affect the resilience level of early adolescents, especially those in hard living conditions. In practice, counselors and teachers can use this scale to test the efficiency of applications for raising the resilience level. In conclusion, RSEA can be recommended as a reliable and valid measure for resilience in Turkish secondary school students.

References

Basım, N. & Çetin, F. (2011). The reliability and validity of the resilience scale for adults Turkish version. *Turkish Journal of Psychiatry, 22*(2), (pp. 104-114).

Benard, B. (1991). *Fostering resiliency in kids: Protective factors in the family, school and community.* Western Center for Drug-Free Schools and Communities. Department of Education. Washington DC. ED335781.

Benneth, E.B., Novotny, J.A., Green, K.E. & Kluever, R.C. (1998). *Confirmatory factor analysis of the resiliency scale.* U.S. Colorado.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö.E., Karadeniz, Ş. & Demirel, F. (2008). *Scientific research methods*, Ankara: Pegem.

Child, D. (1990). *The essentials of factor analysis, second edition.* London: Cassel Educational Limited.

Cole, D. A. (1987). Utility of confirmatory factor analysis in test validation research. *Journal of Consulting and Clinical Psychology, 55*, (pp. 1019–1031).

Connor, K.M. & Davidson, J.R.T. (2003). Development of a new resilience scale: the Connor-Davidson resilience scale (CD-RISC). *Depressıon and Anxıety, 18*, (pp. 76–82).

Gizir, C.A. & Aydın, G. (2006). The adaptation of the resilience and youth development module: validity and reliability studies. *Turkish Psychological Counseling and Guidance Journal*, *3*(26), (pp. 87-99).

Goldsteine, S. & Brooks, R.B. (2006). *Handbook of resilience in children*. United States of America: Springer.

Greene, R. (2002). Human behavior theory: A resilience orientation, in R. Greene (Ed.), *Resiliency: An integrated approach to practice, policy, and research.* (pp. 1-28). Washington, DC: NASW Press.

Gürgan, U. (2006). Resiliency scale (RS): Scale development, reliability and validity study. *Ankara University, Journal of Faculty of Educational Sciences, 39*(2), (pp. 45-74).

Hand, M.P. (2008*). Psychological resilience*. Saarbrücken, Germany: VDM Verlag Dr. Müller Aktien Gesellschaft & Co. KG.

Hooper, D., Coughlan, J. & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods, 6* (1), (pp. 53-60).

Hu, L.T. & Bentler, P.M. (1999). "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives," *Structural Equation Modeling, 6* (1), (pp. 1-55).

Hurtes, K. (2001). Measuring resiliency in youth: The resiliency attitudes and skills profile. *Therapeutic Recreation Journal*. 66, (pp. 89-98).

Jew, C. L., Green, K. E. & Kroger, J. (1999). Development and validation of a measure of resiliency. *Measurement and Evaluation in Counseling and Development*, *32,* (pp. 75-89).

Kaner, S. & Bayraklı, H. (2010a). Family resilience scale: Development, reliability and validity. *Ankara University Journal of Special Education Faculty of Educational Sciences, 11*(2), (pp. 47-62).

Kaner, S. & Bayraklı, H. (2010b). Psychometric properties of the mother resilience scale. *Educational Sciences and Practice, 9*(17), (pp. 77-94).

Karaırmak, Ö. (2007). Investigation of personal qualities contributing to psychological resilience among earthquake survivors: A model testing study. Middle East Technical University, Social Sciences Institute, Unpublished Doctoral Dissertation, Ankara.

MacCallum, R.C., Browne, M.W. & Sugawara, H.M. (1996). Power Analysis and Determination of Sample Size for Covariance Structure Modeling, *Psychological Methods, 1* (2), (pp. 130-49).

Murphy, L. B. (1987). Further reflections on resilience, in E. J. Anthony B. J. Cohler (Eds.), *The Invulnerable Child,* (pp. 84-105) New York: The Guilford Press.

Özcan, B. (2005). *Comperative of protective factors and resilience traits of high school students having divorced or nondivorced families.* Ankara University, Educational Sciences Institute, Unpublished Master's Thesis, Ankara.

Ryan, L. & Caltabiano, M. (2009). Development of a new resilience scale: The resilience in midlife scale. *Asian Social Science, 5*(11), (pp. 39-51).

Reich, J.W, Zautra, A.J. & Hall, J.S. (2010). *Handbook of adult resilience.* New York, London: The Guilford Press.

Siebert, A. (1999). *How resilient are you.* New York: Guilford Press.

Smith, B.W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P. & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine*, *15*, (pp. 194–200).

Tabachnick, B. G. & Fidell, L.S. (2007). Using *Multivariate Statistics,* (5th ed.). Needham Heights, MA: Allyn and Bacon Publishers.

Terzi, Ş. (2006). The adaptation of the resilience scale: Validity and reliability studies. *Turkish Psychological Counseling and Guidance Journal, 3*(26), (pp. 77-86).

Wagnild, G. M. & Young, H. M. (1993). Development and psychometric evaluation of the resilience scale. *Journal of Nursing Measurement, 1*(2), (pp. 165-178).

Werner, E. E. & Smith, R. S. (1982). *Vulnerable but invincible: A longitudinal study of resilient children and youth.* New York: McGraw-Hill.

Wolin, S. & Wolin, S. (1993). *The resilient self: How Survivors of troubled families rise above adversity.* New York: Villard.

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