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A Scale Adaptation Study Related to the Examination of Adolescents' Levels of Educational Stress

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Abstract

The basic aim of this research is to adapt the Educational Stress Scale (Sun, Dunne, Hou, & Xu, 2011) to Turkish and to examine its psychometric properties. The second purpose of this study is to compare students' educational stress levels according to gender and grades. The research was conducted on 558 high school students in Sakarya and Agri in Turkey. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .81 and there was a significant result on Bartlett's test of Sphericity $\chi^2=3488.103$ ($p<.001$, $df=105$). Factor loadings ranged from .41 to .91. Results of confirmatory factor analyses demonstrated that 16 items yielded five factors as original form and that the five-dimensional model was well fit ($\chi^2= 123.49$, $df= 88$ ($\chi^2/df=1.40$), RMSEA= .03, NFI= .97, CFI= .99, IFI= .99, RFI= .96, GFI= .95, SRMR= .041). Cronbach alpha internal consistency coefficient was found as .86 for whole scale, .87 for the sub-dimension of pressure from study, .93 for the sub-dimension of workload, .90 for the sub-dimension of worry about grades, .90 for the sub-dimension of self-expectation, and .91 for the sub-dimension of despondency. In the concurrent validity, significant relationship ($r=.51$) was found between the Educational Stress Scale and School Burnout Scale. Test-retest reliability coefficient was .67 for the whole scale. Corrected item-total correlations ranged from .40 to .57. Overall results demonstrated that the Educational Stress Scale can be deemed to be a valid and reliable instrument to be used in the field of psychology and education. Moreover, students' educational stress levels changed statistically according to gender and grades. Results were discussed in light of the related literature.

Keywords: stress, educational stress, school burnout, scale.

Introduction

People forget to be satisfied with life itself by focusing on unnecessary details and creating unnecessary stress for themselves in their lives. In addition, stress is so emphasized in modern human life that a new stress model is developed in return to each new situation faced in every area of life. For instance, work stress, birth stress, road stress, match stress, exam stress, etc.

On examining the studies related to stress conducted especially in Far East countries in the last ten years, reflections of stress in educational environments draw the attention (Ang & Huan, 2006a). Presence of stress in educational environments results when what a student is expected to do is beyond his/her level of strength, and when a student's self-capability level is low, and when a student has weak communication with his/her environment because of not possessing the necessary abilities to carry out a certain task (Balci, 2000). Educational stress consists of sub-components such as study pressure, anxiety of passing a grade, hopelessness, and self-expectation.

Expectation of academic success is universally shown as the most important source of stress in students (Brown, Teufel, Birch, & Kancherla, 2006; Christie & MacMullin, 1998; Dodds & Lin, 1992; Shieh & Demirkol, 2014; Gallagher & Millar, 1996; Huan, See, Ang, & Har, 2008; Tang & Westwood, 2007). When academic performance and higher expectations are considered, it has been shown as a result of the studies conducted that students suffer from high levels of academic failure, and that they experience very low levels of academic satisfaction (Ang & Huan, 2006b; Bjorkman, 2007). Academic stress is an important factor in terms of psychological and behavioral disorders such as depression, anxiety and suicidal behavior (Kohn & Frazer, 1986; Lakaev, 2009; Lee & Larson, 2000). Across the world, effect of academic failure is seen, in the studies evaluated in terms of the reasons causing stress for students, to have increased. Among the factors associated with academic success, school anxiety, exam anxiety, and excessive study load are linked to the low level psychological statuses of students (Alokan, Osainle, & Onijingin, 2013; Li & Zhang, 2008; Lin & Chen, 1995; Liu & Tein, 2005; Yesilyurt, 2014; Zhang, Tao, & Zeng, 2001). Academic pressure resulting from high levels of academic expectation leads to problems such as physical violence, and developmental problems (Saricam, 2014).

In addition to the argument that the fact that Educational Stress Scale provides information about the educational stress of individuals, and that depression is closely linked to suicidal thoughts and academic success (Sun et al., 2011) will help the future psychological consulting and guidance applications, measuring tools were found when the relevant domestic literature was examined. These include the Stress Inventory of Academic Expectations (Ang & Huan, 2006a; Kelecioğlu & Bilge, 2009) and Updated Student Life Stress Inventory (Baloglu & Bardakci, 2010; Gadzella & Baloglu, 2001), and this study is expected to help enrich the relevant literature. On examining the studies about stress, those about occupationally resulted stress or psychopathological stress (such as post-traumatic stress disorder) are mostly found. However, there has been a considerable increase in recent years in the number of studies conducted especially about stress related to academic expectations, exam stress, and school stress. On the other hand, these studies mostly involve adult age groups, but ignore children and adolescents.

The main aim of this study, therefore, is to examine the psychometric features of the Educational Stress Scale, which was developed in order to determine adolescents' levels of

educational stress, and to adapt it to Turkish. The sub-aim of the study is to evaluate students' levels of educational stress according to their gender and grade.

Methodology

The study group of the research consists of 558 Turkish high school students in Sakarya/Turkey and in Agri/Turkey. 282 of the participants are female, and 276 are male students. In addition, 300 of the students are 4th graders, 130 are 3rd graders, 66 are 2nd graders and 62 are 1st graders at high schools. The ages of the students range between 13 and 18, and with a mean age of 16.84.

Educational Stress Scale (ESS): The Educational Stress Scale was developed by Sun et al. (2011). When the explanatory factor analysis is applied for the 16-items, it is seen to have a five-factor structure, which explains 63.6% of the total variance. Factor loadings of the items were between .54 and .77 for the subscale of pressure from study, between .59 and .81 for the subscale of workload, between .53 and .91 for the subscale of worry about grades, between .52 and .84 for the subscale of self-expectation, and between .51 and .68 for the subscale of despondency. In the convergent validity study, positive relationships were found between educational stress and academic expectation stress ($r = .85$) and depression ($r = .87$). Cronbach Alpha internal consistency reliability coefficient was .81 for the whole scale, .74 for the subscale of pressure from study, .75 for the subscale of workload, .71 for the subscale of worry about grades, .66 for the subscale of self-expectation, and .66 for the subscale of despondency.

School Burnout Scale (SBS): The scale was developed by Salmela-Aro, Kiuru, Leskinen, and Nurmi (2009) in order to determine children's and adolescents' levels of school burnout. It was adapted into Turkish by Akin et al. (2013), and the Turkish version involves nine items and a single dimension. The possible highest score from the scale is 54, and the lowest is 9. Fit indices values of the scale were found to be as $\chi^2 = 68.78$, $df = 25$, $p < 0.001$, $RMSEA = .075$, $NFI = .96$, $NNFI = .97$, $CFI = .98$, $IFI = .98$, $RFI = .95$, $GFI = .95$, $AGFI = .92$, and $SRMR = .044$. Cronbach Alpha internal consistency reliability coefficient was .85 for the entire scale, and test-re-test reliability coefficient was .75 for the entire scale. It was seen that the corrected item-total correlations of the scale ranged between .35 and .64.

Michael P. Dunne, one of the developers of the Educational Stress Scale, was contacted via e-mail, and permission was obtained to adapt the scale. Translation procedure of the scale consists of certain stages. First of all, the scale was translated into Turkish by five academicians, and then these Turkish forms were applied again to 22 university foreign language preparation students who know Turkish and who had received an English language education and the consistency between the two forms was examined. Again, the same academicians discussed the Turkish forms that they had obtained, and they applied the necessary corrections in terms of grammar, and they obtained the trial form. Finally, this form was examined by two academicians in the field of psychological consulting and guidance as well as assessment and evaluation, and some changes were applied according to their ideas.

The prepared Turkish form was reproduced and applied to high school students following the necessary explanations, and then the forms were collected, and data from these forms entered to the computer for analysis (Brislin, Lanner, & Thorndike, 1973; Cetin & Basim, 2012).

For construct validity of the Educational Stress Scale, explanatory factor analysis (EFA) was applied to data from 258 high school students of the 1st, 2nd, and 3rd grades, and confirmatory factor analysis (CFA) to data from the 300 high school students of the 4th grade. The aim of the EFA application was to evaluate the factor construct of the original form of the Educational Stress Scale in a Turkish sample, and aim of the CFA application was to examine whether or not the factor construct of the original form was confirmed for the high school students (Buyukozturk, 2002; Buyukozturk, Akgun, Kahveci, & Demirel, 2004). As usual in fit indices, $>.90$, RMSEA was taken as a measure for GFI, CFI, NFI, RFI and IFI, and $<.05$ for SRMR (Capik, 2014; Hu & Bentler, 1999; Joreskog & Sorbom, 1993; Tabachnick & Fidell, 2007; Yilmaz & Celik, 2009). Effect size coefficient was assessed according to the criteria of $d>0.2$ small, $0.2 < d < 0.5$ mid and $d>0.8$ big (Cohen, 1988). Pearson Moments Correlation Analysis was applied in order to identify the relationships between the mean and total scores, and independent samples *t*-test and Analysis of Variance (ANOVA) in order to find out whether or not scores across variables differentiated (that the data meets the requirements of the parametric tests). The level of $p<.01$ was taken as a base level of significance. Computer programs SPSS 20 and LISREL 8.54 were used for validity and reliability analyses of the Educational Stress Scale.

Findings

Linguistic Equivalence

In the linguistic equivalence study, correlation coefficient between the English form scores and the Turkish form scores of 22 participants was found to be .68, and correlation coefficient between the Turkish form scores in the application to the same participants at interval of two weeks was found to be .91 (see Table 1). According to Yildiz and Fer (2008), it indicates a good value that consistency coefficient between the two forms in two languages of an assessment tool was significantly above $r=.60$, being at the level of $p<.01$. Colak and Fer (2007) suggested that it is an acceptable value that this value was significantly above $r=.40$, being at the level of $p<.05$.

Table 1. Result of relation analysis about Original Form and Turkish Form

	N	$\bar{X}$	SD	r
Turkish form	22	50.93	3.54	.68**
Original form	22	45.42	3.66	
First application	22	50.93	3.54	.91**
Second application	22	49.91	3.53	

** $p < .01$

Construct Validity

Explanatory Factor Analysis (EFA): As a result of the explanatory factor analysis applied to data from the study conducted on 258 high school students, KMO sample fit coefficient was .81, and Bartlett Sphericity test's χ^2 value was 3488.103. The original form of the Educational Stress Scale consists of five subscales. In the explanatory factor analysis made for this reason, the result of the oblique turn factor resolution with basic components method was limited to five factors. As a result of the analysis made, an assessment tool was obtained that explains 83% of the total variance, and which consists of 16 items, and five subscales (Pressure from study: four items, workload: three items, Worry about grades:

three items, self-expectation: three items, Despondency: three items), and it was seen that the items found in the sub dimensions completely corresponded to the items in the original form, and the results are presented in Table 2. According to Buyukozturk (2002), it is likely that the explained rate of variance was two-thirds of the total variance related to the variables included within the analysis.

Table 2. EFA Factor Loads and Variance Values of the Educational Stress Scale

Items	1.Pressure from study	2.Workload	3.Worry about grades	4.Self- expectation	5.Despondency	One- factor
1	.82					.81
2	.80					.80
3	.84					.85
4	.81					.80
5		.93				.92
6		.90				.91
7		.89				.90
8			.86			.84
9			.81			.79
10			.91			.90
11				.88		.87
12				.91		.90
13				.87		.85
14					.93	.93
15					.92	.90
16					.89	.88
Variance %	18.03	17.17	16.15	15.91	15.64	83

The first factor of the scale explains 18.03% of the total variance, and the factor loadings of the items range between .80 and .84. The second factor of the scale explains 17.17% of the total variance, and the factor loadings of the items range between .89 and .93. The third factor of the scale explains 16.15% of the total variance, and the factor loadings of the items range between .81 and .91. The fourth factor of the scale explains 15.91% of the total variance, and the factor loadings of the items range between .87 and .91. The fifth factor of the scale explains 15.64% of the total variance, and the factor loadings of the items range between .89 and .93.

Confirmatory Factor Analysis (CFA): In the confirmatory factor analysis applied for the five dimension model, fit indices values were $\chi^2 = 123.49$, $df = 88$ ($\chi^2/df = 1.40$), RMSEA = .03, NFI = .97, CFI = .99, IFI = .99, RFI = .96, GFI = .95, SRMR = .041. According to Capik (2014), it shows a perfect fit that $\chi^2/df < 2$, RMSEA < .05, NFI > .95, CFI > .95, IFI > .95, RFI > .95, GFI > .95, SRMR < .05.

Criterion-Referenced Validity: Correlation coefficient between the scale and the scale of school burnout was determined as $r = .51$ for criterion-referenced validity (concurrent validity). In addition, correlation coefficients of the sub dimensions are shown in Table 3. Cohen (1988) and Liu (2013) report that it indicates a strong relationship between the variables that the correlation coefficient was above .50 in the positive relationship between the two variables.

Table 3. Descriptive Statistics Results and Correlation Values

Variables	1	2	3	4	5	6	7
1. School burnout	1	.48**	.42**	.20**	.27**	.50**	.51**
2. Pressure from study		1	.52**	.37**	.46**	.60**	.81**
3. Workload			1	.30**	.35**	.46**	.69**
4. Worry about grades				1	.50**	.27**	.62**
5. Self-expectation					1	.50**	.73**
6. Despondency						1	.72**
7. Educational stress							1
Mean	30.69	12.60	9.57	10.83	10.51	8.74	51.91
SD	11.26	4.04	3.36	3.14	3.47	3.32	12.44

** $p < .01$, * $p < .05$

Reliability

Internal Consistency. Cronbach alpha internal consistency coefficient was .86 for the whole scale, .87 for the pressure from study factor, .93 for the workload factor, .90 for the worry about grades factor, .90 for the self-expectation factor, and .91 for the hopelessness despondency. It indicates that the scale is highly reliable with a Cronbach alpha internal consistency coefficient above .86 (Gozum & Aksayan, 2003; Kayis, 2006; Yesilyurt, 2013a).

Test-re-test reliability: After the scale was applied to 69 students from the study group in Ağrı/Turkey at an interval of 22 days, the correlation coefficient between the two applications was found to be .67 for the entire scale. It is an acceptable value in the literature that the test-re-test correlation coefficient was .70 (Gozum & Aksayan, 2003; Kayis, 2006; Yesilyurt, 2013a).

Item Analysis

Corrected item-total correlation. The corrected item-total correlations range between .40 and .57.

Comparison analysis for gender

Independent samples *t*-test was applied in order to find out whether educational stress scale scores differentiated according to gender, and the results are shown in Table 4.

Table 4. T test results of comparison of gender-associated educational stress scale scores

Variable	Gender	N	$\bar{X}$	SS	t	d
Educational stress	Male	276	46.70	7.60	7.24**	.61
	Female	282	51.63	8.46		

** $p < .01$

On examining Table 4, the mean score of educational stress scale of female students ($\bar{X} = 51.63$) is seen to be higher than that of male students ($\bar{X} = 46.70$), and that this difference is statistically significant. Effect size coefficient Cohen's *d* was found to be 0.61.

Comparison analysis for grade

ANOVA was applied in order to compare the grade-level-associated educational stress scale scores, and the results are shown in Table 5.

Table 5. ANOVA results of comparison of grade-level-associated educational stress scale scores

Educational stress	Sum of squares	df	Mean square	F	η^2
Between groups	9588.47	3	3196.16		
Within groups	29539.46	554	53.51	59.73	.24
Total	39127.93	557			

****** $p < .01$

In Table 5, it can be seen that grade-level-associated educational stress scale scores significantly differentiate statistically ($F_{(3-557)} = 59.73$; $p < .01$). Effect size coefficient η^2 was found to be 0.24. Scheffe test was applied in order to determine between which groups this differentiation took place, and the results are shown in Table 6.

Table 6. Scheffe test results related to differences between groups of educational stress scale scores

		High school grade			
		4	3	2	1
High school grade	4	-	4.04 **	5.89 **	13.02 **
	3		-	1.85	8.97 **
	2			-	7.12 **
	1				-

****** $p < .01$

On examining Table 6, it is seen that 4th graders of high school have the highest mean score of educational stress scale. The mean score of educational stress scale of 4th graders is significantly higher than the other groups statistically. And 1st graders of high school have the lowest mean score of educational stress scale.

Conclusion and Discussion

Aim of this study was to adapt the Educational Stress Scale into Turkish in order to determine adolescents' levels of educational stress. For this purpose, validity of the Educational Stress Scale was determined using factor analysis and similar scale validity. Factor analysis was conducted as explanatory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA was applied in order to evaluate the factor construct of the original form of the Educational Stress Scale in a Turkish sample, and CFA was applied in order to examine whether or not the factor construct of the original form of the Educational Stress Scale was confirmed on adolescents (Buyukozturk et al., 2004; Sumer, 2000).

According to the results of the EFA, factor loads were above .30, being an acceptable value as deemed in the literature (Buyukozturk, 2012; Cokluk, Sekercioglu & Buyukozturk, 2012). According to the results of the CFA, the scale provided a very good fit as a five dimension scale, and it had a perfect value of fit because it indicates a good fit value with SRMR and RMSEA values of .05 and below, and it indicates an acceptable fit value that SRMR

and RMSEA values are 0.08 and below (Simsek, 2007; Joreskog & Sorbom, 1996; Tabachnick & Fidell, 2007). As a result of the fit validity (concurrent validity) study, it was concluded that the scale was valid.

As a result of the reliability studies for the Educational Stress Scale, it was seen that the correlation coefficients were acceptable, obtained through the methods of Cronbach-alpha internal consistency, item-total and test-re-test. The fact that the Cronbach-alpha internal consistency coefficient value in the literature was .70 at a minimum, and that the corrected item-total correlation values were above the criterion of .30 (Erkus, 2012), shows that the Educational Stress Scale is in accordance with the development and adaptation criteria of psychological assessment tools. In addition to these, it will contribute to measuring strength of the scale to conduct studies of discriminative validity and down-up 27% item challenge index.

The findings from the validity and reliability studies for the Educational Stress Scale show that the 16-item scale adapted into Turkish can be used to assess adolescents' (secondary school and high school students) levels of educational stress in a valid and reliable way. Responding system is of 5-item, Likert-type scale (1=strongly disagree, to 5=strongly agree). Scores for each item range between 1 and 5. The possible lowest score from the scale is 16, and the possible highest score from the scale is 80. In addition, the scale provides scores related to sub dimensions.

Another finding of the research was that educational stress scale scores differentiated according to gender. Educational stress scale scores of female students were significantly higher than those of male students statistically. According to a report prepared by Ardic (2009), educational stress levels of female students were significantly higher than those of male students because male students are easy-going at ages within this group. In other words, female students, for instance, act more carefully when preparing tasks, and this perfectionist attitude results in stress. In contrast, Oral, Cok, and Kutlu (2005) viewed the matter from a different perspective, and suggested that girls of this group of ages are better at coping with educational stress than boys are because they have a stronger consciousness about tasks and responsibility. In Turkish culture, which is between modernism and traditionalism and in which social gender roles are still powerful, it is thought that women create more academic expectations in order to find a job, and get rid of the housewife role attributed to them, and this causes educational stress. From this idea, the result of this study is similar to that of Ardic's (2009). Effect coefficient related to the difference between female students and male students was found to be moderately meaningful.

The last finding of the study is that level of educational stress experienced by the 4th graders is higher than that of the students in the other three grades, and the lowest belongs to the 1st graders. It is an expected result that 4th graders suffer from educational stress because they are in a course of exam marathon that will shape their future. Koknel (1993) stated that anxiety and stress complete with each other. According to the results of a large participation study conducted by Capulcuoglu and Gunduz (2013), exam anxiety of the last graders at high schools was significantly higher than that of the other graders. Presence of anxiety may indicate presence of stress (Koknel, 1993; Yerlikaya, 2009; Topkaya, 2012; Yesilyurt, 2014; Hosgorur & Gecer, 2012). This result supports our study's results. In addition to these, another cause of high levels of educational stress experienced by last graders at high schools may be that it is likely that academic stress and stress associated with academic

expectations experienced by last graders at high schools are higher than those of other age groups (Ang, Huan, & Braman, 2007; Zeidner, 1992). Effect size coefficient is smaller than expected, but it is moderately meaningful.

If problems experienced by students, who face many sources of stress, are not detected by their families, specialists, teachers and their immediate environment, and if necessary precautions are not taken accordingly, students will suffer from burnout, and they will feel exhausted and weak. Therefore, they will likely move away from their friends, families and teachers, and they will perceive themselves as more unhappy and less confident (Capulcuoglu & Gunduz, 2013; Civilidag, 2013; Topkaya, 2013; Kulaksizoglu, 2007; Ozdemir, Boydak Ozan, & Aydogan, 2013; Steinberg, 2007; Yılmaz, 2013; Turkcan, Turkcan, & Uygur, 1992). It is thought, therefore, that it will be a preliminary preparation for these precautions to be taken to add to the literature, an assessment tool that can identify levels of educational stress (Saricam, 2014). From this point of view, relationships between educational stress and variables such as burnout, exam anxiety, and locus of control can be addressed.

Notes

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