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The Turkish Adaptation of Self-regulated Learning Teacher Belief Scale[1]

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KEYWORDS Reliability. Scale Adaptation. Self-regulation. Teacher Beliefs. Teaching. Validity

ABSTRACT The aim of this paper is to adapt "Self-Regulated Learning Teacher Belief Scale" (SRLTB) into the Turkish language for language equivalance, reliability, and validity. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted for construct validity of the scale. Within the reliability studies of the scale, Cronbach Alpha value and item-total correlations were calculated using the split-half method. According to EFA results, a single factor construct explaining 36 percent of total variance came out. This is compliant with the original construct of the scale. CFA indicated that the fit indices had values significantly above acceptable values, which confirmed the single-factored structure. The scale's internal consistency coefficient, which was .79, indicating high reliability. In conclusion, the paper provides the Turkish-language equivalance of the scale and finds that the scale is reliable and valid in determining teachers' beliefs about self-regulated learning.

INTRODUCTION

The concept of self-regulation is to understand needs consisting of the difference between time and effectiveness in terms of students' learning process and the reasons behind these differences (Zimmerman 2002). Learning based on self-regulation is an authentic process organizing the learner's cognition, motivation, and learning process through which the learners could be free. Self-regulation is defined as students' taking responsibility for and self-control of their learning. (Baas et al. 2015). Hofer and Yu (2003) stated that learners could have the skill of "learning to learn" in this self-regulated process. The learners having self-regulation skills are those who take responsibility for their own learning process without depending on someone else, who identify their own goals in the process, who make plans to achieve these goals, who choose necessary learning strategies for their learning, and who view and evaluate their own process and make necessary changes and improvements according to the feedback gived in terms of self-criticism when s/he has made a mistake.

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Many papers state that self-regulation skills are not natural skills, so they could be developed with family members, peer group, and/or teachers (Kuo 2010; Lombaerts et al. 2009; Zimmerman 2002; Zumbrun et al. 2011). Thus, teachers may play an important role in terms of developing and supporting self-regulation skills. As self-regulation skills can be gained through role playing by the learners, teachers are expected to use self-regulation skills in their own learning process and to present a healthy learning process through social interaction with students. Van Beek et al. (2014) proport that teachers' self-regulatory skills would affect student's self-regulatory skills and also students' learning levels. Teachers could organize learning processes according to the self-regulation learning process for learners taking responsibility for their own learning, and they could create learners' academic lives in which they use purposeful self-regulation processes and self-regulated learning strategies. Much of the literature demonstrates the positive effect of self-regulation skills on learners' academic achievement (Martin et al. 2011; Peeters et al. 2014; Ruban and Reis 2006; Turan and Demirel 2010). Within the context of Turkish education, self-regulation is considered to be an important aspect of a student's academic achievement in classroom settings (Tanriseven 2014). The development of students' self-regulation skills leads to an increase of task setting, problem solving behaviour, etc. and could there-

fore serve as a strategy to improve school well-being and ultimately achievement (Kindekens et al. 2014). Thus it can be said that teachers' beliefs about self-regulated learning play an important role in the development of learners' learning processes in terms of the learners taking responsibility for their own learning.

Beliefs teachers have not only affect ideas and behaviours but also direct both their own learning processes and their learners' learning processes. Beliefs affect teachers' perceptions and viewpoints, so likewise they affect learning environments and the practices created in the learning process. Moreover, they play an important role in using pedagogical knowledge effectively and transforming theoretical knowledge into practice. There are many studies indicating that teachers' beliefs play a key role in the learning/teaching process (Farrell and Tomenson Filion 2014; Pajares 1992; Teressa Tatto 1998).

Teachers' beliefs being positive toward self-regulated learning is a prerequisite for helpling learners be skilful at "learning to learn," "having responsibility of their own learning," and "organizing their own learning process," and also becoming competent in organizing classroom practices to promote the development of these skills (Hofer and Yu 2003). Beliefs regarding self-regulated learning have a decisive role in planning and setting an objective, making a decision, identifying necessary strategies for learning, evaluating learning processes, and monitoring learning processes without being dependent on any other learning environment (Bjork et al. 2013). Teachers' self-regulating beliefs affect the introduction of self-regulated learning classroom practices (Peeters et al. 2014). Teachers' beliefs about self-regulated learning are highly important for their effective use of self-regulation skills in the learning process and creating a suitable learning environment for helping learners to gain these skills and being a good model for learning.

Pajares (1992) suggested that researchers differentiate teachers' educational beliefs from their general beliefs. Moreover educational beliefs must be assessed on the basis of subject by limiting the field of study (Ertmer 2005; Pajares 1992). Many scales about self-regulated learning have been developed in Turkey or have been adapted to the Turkish language. Altun and Erden (2006) and Buyukozturk et al. (2004) adapted "Motivated Strategies for Learning Questionnaire," which is used in identifying self-regulation skills of preservice teachers. Moreover Turan (2009) developed a questionnaire which identifies self-regulation skills of university students. A scale which determines the level of students' encouragement for self-regulated learning was developed by Celik (2012). There isn't any scale to determine belief level of self-regulated learning in the literature. Thus, adapting Lombaerts et al.'s (2009) "Self-Regulated Learning Teacher Belief Scale" into Turkish contributes to the literature in Turkey.

Aim

The aim of this paper is to adapt "Self-Regulated Learning Teacher Belief Scale" (SRLTB) into the Turkish language for language equivalance, reliability and validity.

METHODOLOGY

Sample

The sample of the study consisted of 292 randomly-selected teachers who have worked at primary and secondary school in Erzurum in Turkey. Teachers in the sample group attended voluntarily in the study. The mean of teacher age is 30.71, and the mean of teachers' length of service is 7.34 years. The other demographical information is shown in Table 1.

Table 1: Demographical information about sample

	f	%
Gender		
Female	154	52.7
Male	137	46.9
Undefined	1	0.3
Grade		
Primary School	149	51
Secondary School	143	49
Educational Status		
Undergraduate	256	87.7
Post-graduate	30	10.3
Undefined	6	2.0
Total	360	100

Data Collection Instrument

The "Self-Regulated Learning Teacher Belief Scale" (SRLTB), developed by Lombaerts et al. (2009) to evaluate teachers' beliefs about self-regulated learning, was used after researchers

got permission to use scale in their paper via e-mail. The scale was developed after it was applied to 399 primary school teachers working at 91 different schools in Belgium for exploratory factor analysis and 553 primary school teachers working at different 68 school in Belgium for confirmatory factor analysis. According to the exploratory factor analysis conducted at the developmental stage of the scale, the 10-item likert-scale construct has a single factor, and explained variance is 34.9. Its factor loadings have changed between .425 and .638. The scale's fit indices according to confirmatory factor analysis are GFI=.94, AGFI=.90 and RMSEA=.074. A 5-point-likert-type scale is ranked as "strongly disagree (0)," "disagree (1)," "neither agree nor disagree (2)," "agree (3)," and "strongly agree (4)." Before items are scaled, there is a section describing the concept of self-regulated learning. This section was added in language equivalence process. The Cronbach alpha reliability coefficient of the original scale was .79.

Process

Linguistic equivalence studies of the scale were conducted at the first stage. After researchers translated the English-language version of scale into Turkish, the translated version of the scale was examined and adjusted by two lecturers completing their post-graduate studies abroad and having authority both on their field of study and the English and Turkish languages. The construct validity of the scale was examined via exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Exploratory factor analysis aims to pinpoint the factor construct based on the relationship among variables. Confirmatory factor analysis examines model-data fit tests hypotheses about the relationship among variables (Kline 2000; Tabachnick and Fidell 2007). Chi-square Compliance testing was used to assess the validity of the model created in confirmatory factor analysis, using approximate Root Mean Square Error (RMSEA), the standardized mean error root (SRM's), a standardized Fit Index (NFI), normed not Fit Index (NNF), the Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI). The item-total correlations were calculated to determine how each item in the scale distinguishes teachers' beliefs about self-regulated learning. The independent samples t-test was used for significance of differences between the upper and lower 27 percent of groups' items scores according to total point. Cronbach's alpha internal consistency coefficient and internal consistency obtained by the split-half method was used to estimate the reliability of the scale. SPSS 21.0 and Lisrel 8.80 were used for statistical analysis.

RESULTS

Linguistic Equivalance

The scale was tranlasted into Turkish language by the researchers. Then two lecturers who are experts in educational sciences made some necessary corrections to it. Afterwards, the corrected version of the scale was translated from English into Turkish. Taking the compability between the translated versions of the scale into consideration led to a decision to provide linguistic equivalance.

Construct Validity

Exploratory Factor Analysis (EFA)

Exploratory factor analysis was used to identify the effect of the original version of "Self-Regulated Learning Teachers Belief Scale" on Turkish teachers. EFA aims to shift from a large number of items to a few defined significant constructs that these variables can explain jointly. A basic criteria to assess the results of factor analysis is factor loading, which is defined as correlations between variables and factors. Factor loadings being high is seen as an indicator of the variable being included under the aforementioned factor (Buyukozturk 2010). The value of item factor loading is generally preferred to be 0.45 or higher. However, it is seen that value of item factor loading can be accepted at 0.30 or above for a smaller number of items in practice (Kline 2000). As this value of factor loading is sufficient, the criteria is accepted as 0.30. The correlation matrix was examined among all the items to determine whether correlations were significant, and they were found to be significant-for factor analysis. Afterwards Kaiser-Meyer-Olkin (KMO) and Bartlett Sphericity tests were used for sampling adequacy. As items are aqueate for factor analysis, KMO test results must be .60 or higher, and Bartlett test results must also

be significant (Leech et al. 2005; Pallant 2005). The KMO value being closer to 1 indicates that the relationship among variables are appropriate and factor analysis yields reliable results (Field 2000). It was found that the KMO sample conformity co-efficient was 0.84, and the Bartlett Sphericity test's χ^2 value was 659.013 ($p<.01$) in this study. These results show that items are appropriate for factor analysis. Table 2 shows information about the Turkish-language version of the scale's factor construct.

Table 2: Items factor loadings

Item No.	*Factor loading*
8	.724
6	.686
10	.673
5	.635
9	.590
2	.587
1	.572
7	.566
4	.459
3	.442
Explained variance Total=	35.971%

According to Table 2, the single-factor construct explains 36 percent of the total variance. This parallels the original version of the scale. There is a single-factor construct explaining 35 percent of total variance in the original version of the scale. Explained variance being 30 percent or higher may be acceptable in single-factor scales (Buyukozturk 2010). Any items in the scale were not removed as factor loadings were higher than 0.30. Additionaly, all items' whose factor loadings were higher than 0.30, their factor loadings changed between .44 and .72.

Confirmatory Factor Analysis (CFA)

CFA is a method estimating the validity used to adapt measurement instruments, especially those developed in another culture or samples. Sumer (2000) states that CFA is an analysis which evaluates how to reconcil actual items with many factors created by variables on a theoretical basis. In other words CFA aims to examine how a predetermined or adjusted construct confirms collected data. When items factor construct on the factor loading basis is identified without a specific pre-expectation or hypotheses in exploratory factor analysis, confirmatory factor analysis is based on testing a prediction that certain variables are accounted for mainly by pre-determined factors based on a theory.

Many fit indices are used to determine fit adequacy of the tested model in CFA. Many fit indices are recommended for use in identifying the adequacy of a model because there are strengths and weaknesses of the model in the evaluation of compliance of the relationship between the theoretical model and the actual data (Buyukozturk et al. 2004). The most commonly used fit indices are Chi-Square Goodness, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI). While calculated values like chi-square value/df value between 0 and 2; RMSEA value between 0.01 and 1, SRMR value between 0 and 0.05; NFI and GFI value 0.95 and 1; NNFI and CFI value 0.97 and 1 and AGFI value 0.90 and 1 demonstrate that the model correlates well, calculated values like chi-square/sd value between 2 and 3; RMSEA value between 0.05 and 0.08; SRMR value between 0.05 and 0.10; NFI and GFI value between 0.90 and 0.95; NNFI and CFI value between 0.95 and 0.97; and AGFI value between 0.85 and 0.90 demonstrate that the model is in acceptable compliance (Baumgartner and Hombur 1996; Byrne and Campbell 1999; Gefenand Straub 2000; Hooper et al. 2008; Hu and Bentler 1999). After the compliance of the model was examined in CFA, the statistical results were not at a desired level (Chi-square/df=3.97; RMSEA=0.101; SRMR=0.066; NFI=0.89; NNFI=0.90; CFI=0.92; GFI=0.91 and AGFI= 0.86). The correlation levels among the errors of some of the items were considered according to the examination of modification indices, and revisions were made accordingly. Modification indices show the decrease of Chi-square value when a fixed parameter or a new parameter is released (Sumer 2000). In accordance with this purpose correlations between i2 and i3 and correlations between i5 and i10 were released. Table 3 shows new goodness of fit indices obtained from the results of the modifications.

When Table 3 is analyzed, it is observed that value of chi-square is significant and its degree of freedom is between 2 and 3, which is an acceptable value. Moreover, all of the fit indices'

Table 3: Values about goodness of fit indexes of the scale

Chi-square	*df*	*p*	*Chi-square /Sd*	*RMSEA*	*SRMR*	*NFI*	*NNFI*	*CFI*	*GFI*	*AGFI*
67.91	33	p<0.05	2.06	0.060	0.076	0.94	0.96	0.96	0.90	0.87

values are acceptable when analyzed; thus, can be said that the model is compliant with the data and the construct validity of the scale has been verified. The diagram about confirmatory factor analysis is presented in Figure 1.

The impact factor and correlation coefficients of each of the implicit dependent variables are shown in Figure 1. Correlation coefficients of the items are seen to change between 0.30 and 0.57. Accordingly, the Turkish-language version of Self-Regulated Learning Teachers' Belief Scale is determined to be in complete compliance with the original version of the scale, and single factor-10 items construct is valid in terms of theoretical and statistical perspective.

Reliability

Internal consistency was calculated to determine the reliability of the scale's results by the means of Cronbach alpha and Speraman-Brown's split-half method. Accordingly, Cronbach's alpha coefficient was 0.79, and Spearman-Brown's split-half coefficitent was 0.75. The critical factor for acceptable value of reliability coefficient is 0.70 and higher (Cronbach 1951). Thus, it can be said the results of the scale are reliable according to this result.

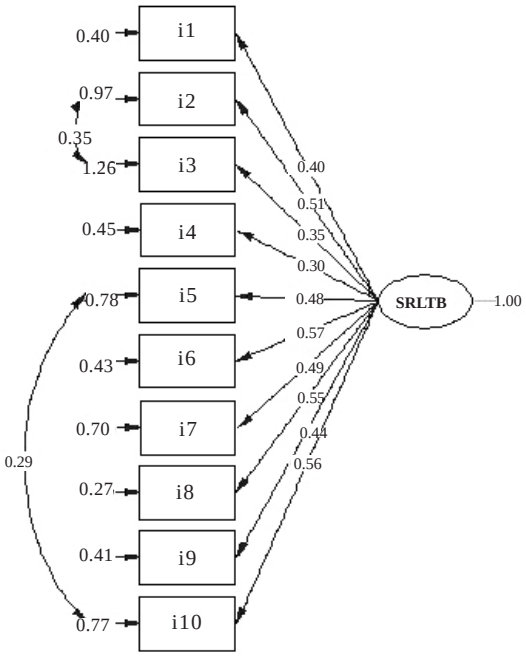

Fig. 1. The diagram about confirmatory factor analysis

Item Discrimination

Item-total correlation was first calculated by determining how each item in the scales discerns teachers' belief about self-regulated learning. Second, a t-test was used to determine the significance of difference between item points in the upper and lower 27 percent of the total. The results are shown in Table 4.

Table 4: Item-total correlations and t-test for item discrimination

Items	*Corrected item-total correlations*	*t*
i1	.427	10.033*
i2	.488	11.840*
i3	.354	8.814*
i4	.329	8.705*
i5	.524	12.693*
i6	.540	10.815*
i7	.430	8.951*
i8	.580	12.934*
i9	.435	9.947*
i10	.560	13.386*

*p<.01

Item-total correlations was between 0.33 and 0.58 according to results, and the t-value (sd=156) of difference of item points in the upper and lower 27 percent of the groups is between 8.71 (p<.01) and 13.34 (p<.01). While commenting on item-total correlations, the items having 0.30 or higher are acceptable for discriminating the feature that will be measured (Nunnally and Bernstein 1994). The t-test results show that the lower 27 percent group's points are significantly higher (p<.01) than the upper 27 percent group's points for all items.

DISCUSSION

The scale first was translated from English into Turkish language by the researchers. Then two expert lecturers in educational sciences made some necesaary corrections to it. The corrected version of it was back-translated from the Turkish language into the English Language. Linguistic equivalance was decided in terms of the adaptation between the translated versions of the scale.

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was made for the construct validity of the scale. According to EFA results, a single-factored construct explaining 36 percent of total variance came out. So that is compliance with the original construct of the scale. Factor loadings of items changed between 0.44 and 0.73. Another factor analysis CFA examined whether this study carried out with Turkish students verified the scale's factor construct. When fit index limits for CFA were taken into consideration, it was determined that the model fitted well and the original factor construct of the scale was compliant with the factor construct of Turkish language version of scale.

Item analysis and comparisons of the upper and lower 27 percent groups were conducted for prediction level of item-total points and item discrimination. According to item analysis results, the adjusted item total correlations results changed between 0.33 and 0.58. It is said that consistency regarding item-total correlations are at a sufficient level. The t-values for the differences of items points of the uppper and lower 27 percent groups changed between 8.71 ($p<.01$) and 13.34 ($p<.00.$). These results show that the upper 27 percent group's items total points are significantly higher ($p<0.01$) than the lower 27 percent group's items total points. Cronbach's alpha reliability coefficient of the scale is 0.79, and the internal consistency coefficient is 0.75 by the means of the split-half method. Accordingly, the findings indicate that the scale is reliable. Moreover the study was carried out with teachers by Dignath-van Ewijk and van der Werf (2012), who found that Cronbach's alpha coefficient was calculated to be 0.75, and another study carried out with preservice teachers by Moos and Miller (2014) calculated it at 0.87.

CONCLUSION

The aim of this paper is to adapt the "Self-Regulated Learning Teacher Belief Scale" (SR-LTB) into the Turkish language for language equivalance, reliability, and validity. EFA and CFA were conducted to determine the construct validity of the scale. Within the reliability studies of the scale, Cronbach Alpha value and item-total correlations were calculated and the split-half method was used. The EFA resulted in a single factor construct explaining 36 percent of total variance, which is compliant with the original construct of the scale. Any items in the scale that were not taken out as factor loadings were higher than 0.30. Additionally all items' factor loadings were higher than 0.30; their factor loadings varied between 0.44 and 0.72. The CFA indicated that the fit indices had values significantly above acceptable values, which confirmed the single-factored structure. The scale's Cronbach's alpha coefficient was 0.79, and the Spearman-Brown split-half coefficitent was 0.75, indicating high reliability. Item-total correlations were between 0.33 and 0.58 according to the results, and the t-value of difference between the item points of the upper and lower 27 percent is between 8.705 ($p<.01$) and 13.336 ($p<.01$). The t-test results show that the lower 27 percent group's points are significantly higher ($p<.01$) than the upper 27 percent group's points for all items. In conclusion, the paper indicates that the Turkish-language equivalant of the scale is provided and the scale is reliable and valid in determining teachers' beliefs about self-regulated learning.

RECOMMENDATIONS

The scale contributes to relating literature as it is reliable and valid in determining teachers' beliefs about self-regulated learning. It is thought that the implementation of the scale in different groups of teachers will contribute to validity and reliability of its use in further studies.

NOTE

1 The summary of this study was presented at 1st Eurasian Educational Research Congress, held on in Istanbul, Turkey, between 24–26 April, 2014

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