Eğitim ve Bilim
2005, Cilt 30, Sayı 137 (74-81)

Education and Science
2005, Vol. 30, No 137 (74-81)

The Development and Validation of a Turkish Version of the Teachers' Sense of Efficacy Scale

Öğretmen Özyeterlik Ölçeği Türkçe Uyarlamasının Geçerlik ve Güvenirlik Çalışması

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Abstract

The purposes of this study can be listed as (a) describing the development of a parallel Turkish version of the Teachers' Sense of Efficacy Scale (TSES), (b) obtaining evidence of the internal consistency reliabilities of scores on each of the three subscales and whole scale, and (c) providing evidence for the construct validity of the three-factor subscale scores through the use of confirmatory factor analysis and Rasch measurement. The participants in this study were 628 pre-service teachers from six different universities located in four major cities in Turkey. The findings of the study provided evidence for the reliability and validity of the Turkish version of the TSES with the sample of Turkish pre-service teachers. These findings suggested that the Turkish version of the TSES can be used with Turkish pre-service teachers.

Key Words: Teacher efficacy beliefs, pre-service teachers, Rasch measurement, confirmatory factor analysis.

Öz

Bu çalışmanın amacı, Tschannen-Moran ve Woolfolk Hoy tarafından geliştirilen öğretmenlerin özyeterlik inançlarına yönelik ölçeğin Türkçeye adapte edilmesidir. Ayrıca, bu ölçek için güvenirlik ve doğrulayıcı faktör analizi ile Rasch yöntemi kullanılarak geçerlilik çalışmalarının yapılması hedeflenmiştir. Çalışmaya, Türkiye'nin dört büyük şehrindeki altı farklı üniversiteden 628 öğretmen adayı katılmıştır. Bulgular bize Türk öğretmen adayı örneklemi için geliştirilen Türkçe "öğretmen özyeterlik ölçeği"nin güvenirlik ve geçerliği hakkında deliller sunmaktadır.

Anahtar Sözcükler: Öğretmen özyeterlik inançları, öğretmen adayları, Rasch yöntemi, doğrulayıcı faktör analizi.

Introduction

In recent years there has been a growing body of research on teacher efficacy as an important factor underlying teaching and learning. Teachers' sense of efficacy is a construct derived from Bandura's (1977) theory of self-efficacy in which the generalized behavior of an individual is based on two factors: self-efficacy (a personal belief to cope with a task) and outcome expectancy (a belief about action and outcome). Bandura hypothesized that an analysis of outcome expectancy and the ability to cope with a task (self-efficacy) would facilitate the prediction of behavior. For example, an individual rating high on both factors would behave in a confident manner (Ginns and Tulip, 1995). Researchers have been applying this theoretical construct to explain patterns of teacher beliefs and the ways in which those beliefs influence teaching and student achievement (Roberts and Henson, 2000; Tshannen-Moran, Woolfolk-Hoy and Hoy, 1998).

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Consistent with the general formulation of self-efficacy, Tschannen-Moran and Woolfolk-Hoy (2001) defined teacher efficacy as "teacher's judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (783).

Teacher efficacy has been found to be one of the important variables consistently related to positive teaching behavior and students outcomes (Ashton and Webb, 1986; Gibson and Dembo, 1984). Teacher efficacy is related to students' own sense of efficacy (Anderson et al., 1988) and student motivation (Midgley, Feldlaufer and Eccles, 1989). Teachers' efficacy judgments are also highly correlated with teaching performance (Riggs et al., 1994), teachers' enjoyment of teaching (Watters and Ginns, 1995), student achievement (Midgley, Feldlaufer and Eccles, 1989) and risk taking (Ashton and Webb, 1986). Additionally, efficacious teachers plan more (Allinder, 1994), persist longer with students who struggle (Gibson and Dembo, 1984), and are less critical of students errors (Ashton and Webb, 1986) and more willing to experiment with new methods to better meet the needs of their students (Guskey, 1988).

Despite the extensive research on teacher efficacy in Western countries, a limited number of attempts have been made to examine this important construct in non-Western contexts (Gorell and Hwang, 1995; Lin and Gorrell, 2001; Lin, Gorrell and Taylor, 2002). These studies suggested that the concept of teacher efficacy may be influenced by the unique features of cultures. Similarly, J. Cakiroglu and E. Cakiroglu (2003) compared pre-service elementary teachers' sense of efficacy beliefs in Turkey and USA. They reported that the pre-service teachers in these two countries may have different science teaching efficacy beliefs. The results also indicated that pre-service elementary teacher in the United States had significantly more positive beliefs in their ability to influence student learning in science than their peers in Turkey. However, a similar difference was not observed for science teaching outcome expectancy beliefs. In another study, Tekkaya, Cakiroglu and Ozkan (2002) investigated Turkish pre-service science teachers' understanding of science concepts, attitude towards science teaching and their efficacy beliefs regarding science teaching. Although the findings of their study indicated that majority of the participants held misconceptions concerning fundamental science concepts, they generally had positive self-efficacy beliefs regarding science teaching.

Although the construct of teacher efficacy has been explored by a number of researchers in recent years, the meaning and appropriate methods of measuring the construct have become the subject of recent debate (Tschannen-Moran et al., 1998). Several reliable efficacy scales have been developed based on specific theoretical models, and in some cases, in specific disciplines (Enochs and Riggs, 1990; Gibson and Dembo, 1984; Goddard et al., 2000; Guskey, 1987; Rose and Medway, 1981). For example, Gibson and Dembo (1984) developed the Teacher Efficacy Scale (TES) to measure the two factors of teacher efficacy. They defined the distinct beliefs as general teaching efficacy (GTE) and personal teaching efficacy (PTE). The TES has subsequently become the principal instrument in the study of teacher efficacy. Reinforcing Bandura's definition of self-efficacy as a situation-specific construct, Riggs and Enochs (1990) developed an instrument to measure efficacy of teaching science, the Science Teaching Efficacy Belief Instrument (STEBI). Consistent with Gibson and Dembo (1984), they found two distinct dimensions: Personal Science Teaching Efficacy (PSTE) and Science Teaching Outcome Expectancy (STOE). The two subscales of the STEBI have been widely applied to empirical studies of both in-service and pre-service teachers.

A current understanding of teacher efficacy, rooted in social cognitive theory, was outlined by Tschannen-Moran and colleagues (1998). They proposed an integrated model which reflects the cyclical nature of teacher efficacy. Within this model, teachers' efficacy judgments are the result of the interaction between a personal appraisal of the relative importance of factors that make teaching difficult on the one hand and an assessment of self-perceptions of personal teaching capabilities on the other. To make these assessments, teachers draw information from four sources: enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological arousal. The consequences of teacher efficacy—the goals teacher set for themselves, the effort they put into reaching these

goals and their persistence when facing difficulties—influence teachers' performance levels, which in turn serve as new sources efficacy information. The cyclical nature of teacher efficacy implies that lower levels of efficacy lead to lower levels of effort and persistency, which lead to a deterioration in performance, which in turn lead to lower efficacy.

Considering the components of the model of teacher efficacy, Tschannen-Moran and Woolfolk Hoy (2001) developed the Teachers' Sense of Efficacy Scale (TSES). Items describe the types of tasks representative of frequent teaching activities. With in-service and pre-service teachers as samples, they reported three factors: efficacy for student engagement, efficacy for instructional strategies, and efficacy for classroom management. The TSES is a promising development in the measurement of teacher efficacy.

Purpose of the Study

The three purposes of this study were (a) to describe the development of a parallel Turkish version of the Teachers' Sense of Efficacy Scale (TSES), (b) to obtain evidence of the internal consistency reliabilities of scores on each of the three subscales and whole scale, and (c) to provide evidence for the construct validity of the three factor subscale scores through the use of confirmatory factor analysis and Rasch measurement. An instrument designed to assess efficacy beliefs of teachers has not been available in Turkey. Therefore, if the statistical findings could result in demonstration of validity and reliability of scores obtained by using a Turkish version of TSES, the use of TSES with Turkish pre-service teachers would be encouraged.

Method

Subjects

The participants included 628 preservice teachers, of whom 439 were female, 189 were males. The participants were senior students who majored in mathematics education (14%), elementary science education (21%), early childhood education (15%), and classroom teaching program (51%). Data were collected from six different universities located in four major cities in Turkey.

Instrument

An English version of the instrument, TSES, was developed in a seminar on self-efficacy in teaching and learning at Ohio State University. The participants of the seminar looked to create an instrument which included the types of tasks representative of frequent teaching activities. Taking Bandura's scale as a base, they developed and added new items. They decided to use a 9-point scale ranging from 1 - Nothing, 3 - Very little, 5 - Some Influence, 7 - Quite a bit, and 9 - A Great Deal. The resulting instrument was investigated in different studies by Tschannen- Moran and her colleagues.

Tschannen-Moran and Woolfolk-Hoy (2001) selected items with higher loadings and developed 12- and 24-item instruments. Analyses of both forms indicated that TSES, either long or short version, could be accepted as a reliable and valid instrument for assessing teacher efficacy construct. Both versions supported the three factor model with high subscale reliabilities (ranging from 0.87 to 0.91 for longer version and 0.81 to 0.86 for shorter version).

The followings are sample items from TSES:

Efficacy for Instructional Strategies - "To what extent can you use a variety of assessment strategies? Efficacy for Classroom Management - "How much can you do to control disruptive behavior in the classroom?

Efficacy for Student Engagement - "How much can you do to get students to believe they can do well in schoolwork?

Translation Procedure and Pilot Study Findings

The original English version of the TSES was translated into Turkish by qualified individuals who are proficient in English and Turkish and who have been doing research on teacher efficacy for a long time. After the initial translation was carried out, this instrument were edited and reviewed by the researchers again. Subsequently, this version was field-tested by four high school teachers in Turkey in order to check the clarity of the statements. Based on their comments, minimal modifications were made. Finally, the instrument was pilot tested with 97 preservice teachers in Turkey. The internal consistency estimates of reliability of scores with this sample were .95 for the whole scale and ranging from .85 to .88 for the subscales. All item-total

correlation coefficients for both subscales and whole instrument were positive and ranging from .35 to .77.

Moreover, confirmatory factor analysis based on efficacy data for preservice teachers was conducted to model a three-factor solution. The Tucker-Lewis Index (TLI) of .97 indicated a perfect fit of the three factor model to the efficacy data (Arbuckle and Wothke, 1999). On the other hand, Root Mean Square Error Approximation (RMSEA) of .09 indicated a fair fit (Browne and Cudeck, 1993). This might be due to small sample size compared to the number of parameters to be estimated.

Data Analysis

Following analyses were performed:

1. Descriptive statistics (means and standard deviations for each of the three subscales) were used to summarize the variables. In addition, intercorrelations among scores on these three subscales were calculated by using Pearson correlation.
2. A coefficient alpha was calculated as a measure of internal consistency reliability of scores on each subscale and whole scale.
3. Confirmatory factor analysis (CFA) was employed to model a three factor solution through the use of AMOS program.
4. The Rasch rating scale model (Wright and Masters, 1982) was used to provide estimates of person and item scores for the used efficacy scale. This analysis was performed via Facets program (Linacre, 1999a).

Results

Descriptive Statistics

On average, Turkish preservice teachers had an efficacy score of 6.92, 7.10, and 6.95 on a nine-point scale for *Student Engagement* (SE), *Instructional Strategies* (IS), and *Classroom Management* (CM) subscales respectively. Generally, scores showed a negative skewness, indicating a high sense of efficacy. Intercorrelations between the subscales of *SE*, *IS*, and *CM* were .75, .74, and .66. All of them were found to be significant at the .01 significance level.

Internal Consistency Reliability of Scores

The coefficient alpha values for the Turkish pre-service teachers were .82 for *SE*, .86 for *IS*, and .84 for *CM*. For the whole scale, the reliability of efficacy scores was .93. All items were contributing to the reliability with high item-total correlations.

Confirmatory Factor Analysis

CFA based on efficacy data for 628 pre-service teachers was conducted to model a three factor solution,

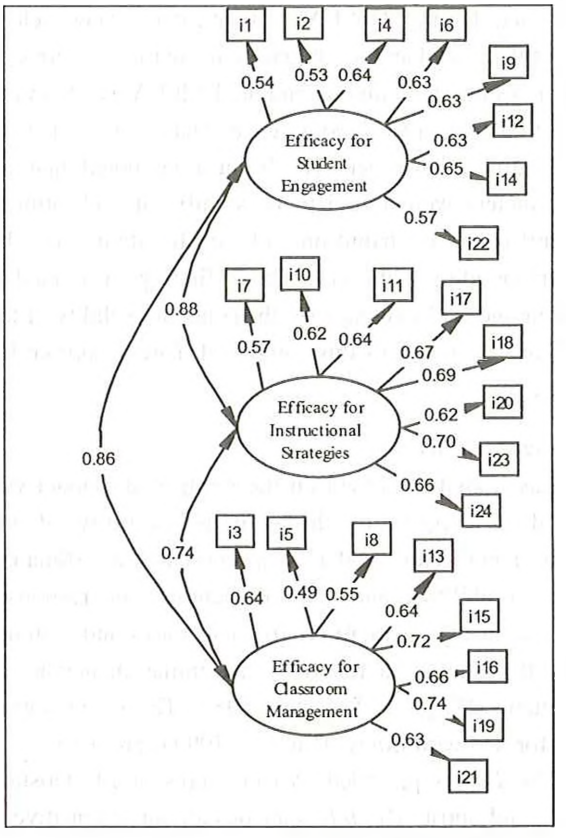

Figure 1. Three factor CFA Model of Turkish Teachers' Sense of Efficacy Scale

as suggested by Tschannen-Moran and Hoy (2001). Figure 1 illustrates the model specification and the parameter estimates. As can be observed from this figure, three subscales of the instrument (SE, IS, and CM) were allowed to correlate to each other. The AMOS output provided chi-square statistics and a number of goodness of fit statistics to evaluate the fit between the hypothesized model and the data.

Bryne (2001) reported the problems of chi-square statistics as "the sensitivity of likelihood ratio test to sample size and its basis on the central chi-square distribution" (81). In order to compensate for the limitations, the fit indices such as TLI, CFI, and RMSEA were used in this study.

The TLI and CFI values higher than .95 indicate a good fit (Arbuckle and Wothke, 1999). The TLI and CFI of .99 indicated a perfect fit of the oblique three-factor model to the efficacy data. Browne and Cudeck (1993) reported that the RMSEA of about .05 indicates a close fit of the model and of .08 represents reasonable error of approximation. With our sample, RMSEA was found to be .065 with a 90% confidence interval of .061-.070, indicating a mediocre fit. It must be noted that all parameters were found to be significant, indicating a significant contribution of each item to the corresponding subscale. These findings provided a single piece of evidence for the construct validity of the TTSES scores with this sample of Turkish preservice teachers.

Rasch Analysis

Rasch analysis based on the rating scale model was used in support of the construct validity of the instrument. This model is appropriate for estimating person abilities and item difficulties for responses scored in two or more ordered categories and assumes that the rating scale functions in a similar manner across all items (Wright and Masters, 1982). The analyses were performed with *Facets* (Linacre, 1999a) program.

The *Facets* provided two measures of fit statistics: infit and outfit. The *Infit* statistics are more sensitive to unexpected responses near a student teacher's level of efficacy, whereas *the Outfit* statistics are specifically sensitive to the unexpected ratings far from a student teacher's level of efficacy. Different researchers have been using different cutoffs for identifying misfitting items and person scores. In this study, the acceptable range for both infit and outfit statistics was selected to be between 0.6 and 1.4 (Wright and Linacre, 1994). Additionally, the person separation reliability index and the item separation reliability index are provided. The person reliability index is an indication of the spread of student teacher efficacy measures along the efficacy continuum and is similar in interpretation to coefficient alpha in classical test theory, whereas the item reliability index shows the degree to which the item calibrations are spread over the efficacy continuum (Linacre, 1999b).

When the fit statistics were examined for each subscale, none of the items were of concern indicating that all items have acceptable fit to the measurement model. Person reliability indices were .82 for *SE*, .84 for *IS*, and .84 for *CM*, which are very close to the Cronbach alpha estimates. The person reliability indices were .99, .98, .98 for *SE*, *IS*, and *CM* respectively, indicating that the student teacher efficacy estimates were well dispersed. Overall, Rasch analysis with acceptable model fit, high reliability estimates, and the presence of few unexpected responses helped verify that the items in each subscale are working together to define a recognizable and meaningful variable.

Discussion

Founded in social cognitive theory, teachers' self-efficacy beliefs have been repeatedly associated with positive teaching behaviors and student outcomes. Although a large research tradition has developed around the construct of teacher efficacy in other countries, less has been done in Turkey. An instrument designed to assess efficacy beliefs of teachers has not been available in Turkey. Based on the evidences provided in this study, Turkish version of the Teachers' Sense of Efficacy Scale (TTSES) appears to be a valid and reliable instrument for Turkish prospective teachers (see Appendix A). The TTSES could be a valuable tool for teacher educators working in practical and research settings to assess the efficacy beliefs of prospective teachers. Strengthening of healthy beliefs about teaching and learning in pre-service teachers is an important educational concern in the new millennium. Early examination of preservice teachers' self-efficacy beliefs in learning and teaching

is crucial to ensuring that new teachers will succeed in their practice. The TTSES could be used in assessing preservice teachers' sense of efficacy and monitoring changes in self-efficacy over the duration of teacher education program. In addition, teacher educator could profitably use the instrument to inform their own teaching practice and performance.

Through the development of TTSES, we may be able to identify means by which we can improve the training of teachers and professional lives of teachers which in turn can improve educational experience of children.

A number of issues should be addressed in future studies: First, further research on validation of the TTSES needs to be continued. Second, the scale needs to be tested with in-service teachers across different settings and different subject-areas. Finally, investigation of the relationships between teacher characteristics and teachers' efficacy judgments should be conducted.

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Geliş	31 Ocak 2004
İnceleme	23 Şubat 2004
Düzeltme	31 Mart 2005
Kabul	4 Nisan 2005

APPENDIX A

Turkish version of the Teachers' Sense of Efficacy Scale (TTSES)

		yetersiz		çok az yeterli		biraz yeterli		oldukça yeterli		çok yeterli
1.	Çalışması zor öğrencilere ulaşmayı ne kadar başarabilirsiniz?	1	2	3	4	5	6	7	8	9
2.	Öğrencilerin eleştirel düşünmelerini ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
3.	Sınıfta dersi olumsuz yönde etkileyen davranışları kontrol etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
4.	Derslere az ilgi gösteren öğrencileri motive etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
5.	Öğrenci davranışlarıyla ilgili beklentilerinizi ne kadar açık ortaya koyabilirsiniz?	1	2	3	4	5	6	7	8	9
6.	Öğrencileri okulda başarılı olabileceklerine inandırmayı ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
7.	Öğrencilerin zor sorularına ne kadar iyi cevap verebilirsiniz?	1	2	3	4	5	6	7	8	9
8.	Sınıfta yapılan etkinliklerin düzenli yürümesini ne kadar iyi sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
9.	Öğrencilerin öğrenmeye değer vermelerini ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
10.	Öğrettiklerinizin öğrenciler tarafından kavranıp kavranmadığını ne kadar iyi değerlendirebilirsiniz?	1	2	3	4	5	6	7	8	9
11.	Öğrencilerinizi iyi bir şekilde değerlendirmesine olanak sağlayacak soruları ne ölçüde hazırlayabilirsiniz?	1	2	3	4	5	6	7	8	9
12.	Öğrencilerin yaratıcılığının gelişmesine ne kadar yardımcı olabilirsiniz?	1	2	3	4	5	6	7	8	9
13.	Öğrencilerin sınıf kurallarına uymalarını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
14.	Başarısız bir öğrencinin dersi daha iyi anlamasını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
15.	Dersi olumsuz yönde etkileyen ya da derste gürültü yapan öğrencileri ne kadar yatıştırabilirsiniz?	1	2	3	4	5	6	7	8	9
16.	Farklı öğrenci gruplarına uygun sınıf yönetim sistemi ne kadar iyi oluşturabilirsiniz?	1	2	3	4	5	6	7	8	9
17.	Derslerin her bir öğrencinin seviyesine uygun olmasını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
18.	Farklı değerlendirme yöntemlerini ne kadar kullanabilirsiniz?	1	2	3	4	5	6	7	8	9
19.	Birkaç problemli öğrencinin derse zarar vermesini ne kadar iyi engelleyebilirsiniz?	1	2	3	4	5	6	7	8	9
20.	Öğrencilerin kafası karıştığında ne kadar alternatif açıklama ya da örnek sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
21.	Sizi hiçe sayan davranışlar gösteren öğrencilerle ne kadar iyi baş edebilirsiniz?	1	2	3	4	5	6	7	8	9
22.	Çocuklarının okulda başarılı olmalarına yardımcı olmaları için ailelere ne kadar destek olabilirsiniz?	1	2	3	4	5	6	7	8	9
23.	Sınıfta farklı öğretim yöntemlerini ne kadar iyi uygulayabilirsiniz?	1	2	3	4	5	6	7	8	9
24.	Çok yetenekli öğrencilere uygun öğrenme ortamını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9