Turkish Adaptation of the Mentorship Effectiveness Scale: A validity and Reliability Study

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The purpose of this study is to adapt the Mentoring Relationship Effectiveness Scale to Turkish, and to conduct validity and reliability tests regarding the scale. The study group consisted of 156 university science students receiving graduate education. Construct validity and factor structure of the scale was analyzed first through exploratory factor analysis, then with confirmatory factor analysis. One item was deleted from the scale after the exploratory factor analysis and the scale was observed in its original one dimensional form. The confirmatory factor analysis indicated that the one dimensional model of the scale was acceptable. Reliability of the scale was examined with test-retest and internal consistency (Cronbach Alpha) methods. The internal consistency coefficient for the whole scale was 0.936. The reliability coefficient for the test-retest, which was carried out two weeks apart, was 0.89. The findings suggest that Mentoring Relationship Effectiveness Scale is sufficiently reliable and valid for science education of graduate students.

Keywords: mentorship, graduate student, science education, validity, reliability

INTRODUCTION

Mentorship is a recognized concept in fields such as management, education, and psychology (Crisp & Cruz, 2009). The multi-pronged nature of this concept has resulted in many definitions in the literature that describe the characteristics of a mentor. Bakioglu and Hacifazlioglu (2000) state that it is not possible to make one single definition for the concept of mentorship due to the differences in mentor attitudes and behaviors based on human states and relationships. Therefore, terms such as guide, role model, consultant, advisor, master, and teacher are often used as

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equivalents for the word mentor (Stanley & Lincoln, 2005; Karakose, 2007). Mentorship is regarded as a developmental relationship that embodies role model, career, psycho-social and many other functions for the individual recipients (Higgins & Kram, 2001; Ragins & Kram, 2007; Haggard, Dougherty, Turban, & Wilbanks, 2011).

According to many resources, the emergence of the term mentor dates back to King Odysseus of Ithaca in Ancient Greece and his friend Mentor. When Odysseus left for the Trojan War he assigned his trustful friend Mentor to train his son Telemachus. Mentor trained Telemachus for ten years and guided him (Swap, Leonard, Shields, & Abrams, 2001; Miller, 2004; Ensher & Murphy, 2005; Cakir & Kocabas, 2016; Campbell, Smith, Dugan, & Komives, 2012). The term mentorship has sustained its meaning since the emergence of Greek Mythology which depicts an experienced, wise, older person taking a younger and less experienced person under his wings and nurturing him (Ensher & Murphy, 2005). Accordingly, mentoring is defined as a learning and collaboration process in which individuals consult wise and experienced masters in order to enhance their career and personal developments. Skills and information transmission occurs during this process between mentor and mentee through communication and interaction (Roberts, 2000; Buell, 2004).

State of the literature

- Mentorship is a recognized concept in fields such as management, education, and psychology
- Mentorship is regarded as a developmental relationship that embodies role model, career, psycho-social and many other functions for the individual recipients
- Professional functions are sponsorship, exposure, visibility, and challenging assignments which assist the learner's career advancement

Contribution of this paper to the literature

- This study was conducted in order to adapt the Mentoring Relationship Effectiveness Scale, originally developed by Berk et al. (2005), into Turkish and to analyse the validity and reliability of the scale.
- Confirmatory factor analysis was carried out to test the construct validity of the scale and the results confirmed the one dimensional structure of the scale

Business and education organizations utilize mentorship intensely in order to fulfill organizational objectives. A novice person in a profession or department is partnered off with an experienced colleague in order to adapt to the environment and position. The partnership is arranged for them to become oriented with the new environment and to become successful in their work (Buell, 2004). In this respect, supervisors of graduate students can also be regarded as mentors as well (Bullis & Bach, 1989; Tenenbaum, Crosby, & Gliner, 2001; Karakose, 2008).

Clutterbuck (1985) defines mentorship as a crucial bond of friendship based on mutual respect and which offers personal development and benefits for both sides. Mentors are teachers, educators, or administrators responsible for promoting specific skills in their students. Studies show that participants gain socialization (sharing culture and experiences) and internalization (learning by practice) skills during the mentoring process (Swap et al., 2001). As a result of the supervisor-student relationship in universities, young academicians acquire knowledge of academic culture and learn the skills required for academia by way of practice under the supervision of their mentor.

In his studies on mentorship, Kram (1985) states that mentorship has two primary functions. These are professional and psychosocial functions (Tenenbaum et al., 2001). These two functions, as highlighted by Kram (1985), have long been accepted in the literature and have guided many studies on this subject. Professional functions are sponsorship, exposure, visibility, and challenging assignments which assist the learner's career advancement. Among the psychosocial functions are role modeling, confirmation, counseling, and friendship, which all go to enhance the learner's sense of self-efficacy (Fowler & O'Gorman, 2005; Ozen, 2016; Chao, 1997).

Mentorship for Graduate Students

Education is one of the fields in which mentoring has become widespread. Students receiving graduate education at universities prepare for an academic profession under the control and guidance of supervisors. At this point, as a mentor, the advisor is the source of knowledge, a guide, and shares his experience and knowledge, and strives to enhance the student's personal performance. Mentoring relationships within universities emerge as an experienced instructor watches over a student and guides him in setting objectives, developing skills and successfully starting their academic and professional role (Moses, 1989; Karakose, Yirci, & Kocabas, 2014; Ozkalp, Kirel, Sungur, & Cengiz, 2006; Oguz & Ataseven, 2016).

Like all other professions, academia has its own unique rules, practices, and structure. Mentoring provides a major source of support for students in adapting to the attitudes, values, research skills, research knowledge, and academic life that academicianship requires (Valadez & Duran, 1991). That the equipped individuals are employed by universities and have the opportunity to enhance their academic profession indicates that graduate education is of a high quality. Therefore, regarding the education of graduate students as a process and the experienced instructors taking the role of cultivating this experience is a significant issue . Supervisors as mentor are expected to exhibit the following attributes:

Teaching: Exemplifying, acknowledging, guiding, questioning.
Sponsorship: Supporting, protecting.
Encouragement: Encouraging, inspiring and forcing.
Counseling: Preaching, problem solving, listening.
Friendship: Acceptance, making contact (Miller, 2004).

Displaying the abovementioned mentoring behaviors successfully in a well-organized mentoring relationship can enable the student to advance himself both academically and psychosocially. This will help the student to adapt to the profession and the academic environment, and as a result, promote life satisfaction (Tenenbaum et al., 2001). However, it is worth pointing out that because most academicians are generally too busy, they cannot always spare sufficient time to mentor their students. Academic and administrative meetings, research studies, and lecturing according to a syllabus consume much of the time of academicians (Lee & Bush, 2003). According to Cunningham (1999), the most significant obstacle against effective mentoring at universities is the heavy workload of instructors. Commission practices, large numbers of students, and high performance expectations of the institution also constitute obstacles against effective mentoring. Low levels of importance perceived within departments towards mentoring is also considered an important problem.

The number of students wanting to receive graduate education in Turkey is increasing. According to the data 217,588 students are currently undertaking a master's degree and 59,763 students are undertaking education for a doctoral degree, making a total of 277,351 students receiving graduate education in Turkey (OSYM, 2015). Preparing graduate students and bringing them into the academic field is very important. Instructors that supervise these students also take on the responsibility and duties of a mentor. Together with the mentoring role of instructors, students are afforded the opportunity to realize their own capabilities and adapt to the academic culture. For this reason, realizing the supervisor-student relationship during graduate education can facilitate an effective graduate education experience. The "Mentoring Relationship Effectiveness Scale" can be used as an instrument to determine the mentoring relationship between graduate students and their supervisors, and to identify problematic areas of the relationship between student and mentor. Within this scope, the purpose of this current study is adapting the Mentoring Relationship Effectiveness Scale into Turkish, and to determine its validity and reliability.

METHODS

Instrument and Procedures

The "Mentoring Relationship Effectiveness Scale" was developed by Berk, Berg, Mortimer, Walton-Moss, and Yeo (2005). The scale is a one-dimensional Likert-type scale containing 12 items. These items or questions aim at analyzing the behavioral features of the mentor. There are no reverse-coded items in the scale. The maximum score that can be recorded using the scale is 60, with higher points indicating higher levels of effectiveness of the mentoring relationship between university student and their supervisor.

Hambleton and Patsula (1998) stated that scale adaptation is more rapid and less costly than actual scale development, and researchers may find adaptation of scales more reliable for their studies. In addition, being able to effectively apply the same scale across different cultures enables cross-cultural comparisons of the data.

Analysis

Berk et al. (2005) were contacted by e-mail before starting the adaptation of the scale. Written permission to adapt the scale was received and the translation process began. The important point in translating a scale from the original language into the target language is to translate the meaning of the items into the target language in the most accurate way (Deniz, 2007). The main framework introduced by Hambleton and Patsula (1999) to guide research in developing cross-cultural scales was taken into consideration. The translation process was carried out by an expert group, each with a doctorate or a master's degree. The Turkish forms were then retranslated back into English and the term consistency between the two forms was examined. The Turkish forms, were then revised according to meaning, grammar and expression and their final shape realized after consultation with three expert instructors.

Confirmatory factor analysis was conducted in order to test the scales construct validity. Item analysis of the scale was carried out by the corrected item-total correlation method, and reliability was analyzed through the internal consistency method. SPSS and AMAOS software programs were used in the analysis of reliability and validity. According to Hambleton, Merenda, and Spielberger (2004), errors that occur during scale adaptation processes can be discussed under three titles. First there is cultural or language differences, the second is technical issues, design or methods used, and the third is interpretation of the results. Researchers should be very meticulous and careful at every stage of scale development.

Sample of research

Convenience sampling method was used to determine the sample of the study. The study was conducted with 156 science students attending graduate programs. The gender distribution of the participants was 86 males (55.1%) and 70 females (44.9%). Participants were aged between 23 and 46 (inclusive). Over half of the participants were aged 28 or below (52.6%; n=82). According to the graduate education that the students are receiving, 37.2% are undertaking a master's degree program (n=58), and 62.8% are studying for their doctorate (n=98). Data concerning how often the participants see their supervisors in the role of a mentor are shown in Table 1.

It is evident from Table 1 that the majority of graduate students see their supervisors at a sufficient level. Meeting on a regular basis is considered crucial for a healthy mentor-mentee relationship.

Table 2 shows the methods that graduate students use mostly when meeting their supervisors. Face-to-face method is the most frequent method that graduate students resort to. E-mailing, which is a widespread instrument used in sharing information and documents, is the second most used method.

Table 1. Frequency of graduate students seeing their supervisors

Year	Frequency	%
Never	4	2.6
Seldom	20	12.8
Sometimes	64	41
Frequently	56	35.9
Very Often	12	7.7
Total	156	100.0

Table 2. Methods of graduate students meeting with their supervisor

| Method	Frequency	%
Telephone	26	16.7
E-mail	60	38.5
Internet (Skype etc.)	8	5.1
Face-to-face	62	39.7
Total	156	100.0

FINDINGS

Whether or not the data was distributed correctly was checked before the factor structure of the scale was tested. The Kolmogorov-Smirnov value (p>.05) indicates that the data was distributed normally. The Bartlett normal range test result and Kaiser-Meyer-Olkin (KMO) coefficient were examined to see whether or not the scale was suitable for exploratory factor analysis. While the Kaiser-Meyer-Olkin (KMO) test considers whether or not the sample size is sufficient, the Bartlett test questions whether or not the data has multivariate distribution. When the value is 0.70-0.79 in the KMO test then the sample size is "good"; when 0.80-0.89 the sample size is "very good"; and when 0.90 or above the sample size is regarded "perfect" (Tavsancil, 2002). The KMO (Kaiser-Meyer-Olkin) value for this study was found as 0.883. The Bartlett test result was X2=1417. 25 (p< .00).

After determining the scales suitable, exploratory factor analysis was conducted with varimax and principal component analysis methods. Factor analysis is a statistical technique which aims at reducing a variable and reaching significant conceptual structures, and can be interpreted very easily (Tabachnick & Fidell, 2007; Ozdamar, 2002). Before testing the factor structures during the exploratory factor analysis, item-total correlations were examined to check the conformity of the scale items against other scales. The first item's "My supervisor was accessible" correlation score with other items was below 0.30. There was an increase in the reliability coefficient when this item was deleted from the scale. According to Bulus (2001) and Dag (2002), the increase in the alpha coefficient and the scale average is taken into consideration when deciding whether or not to delete an item from a scale. The item "My supervisor was accessible" was deleted from the scale and the exploratory factor analysis was conducted again on the 11 remaining items. The scale was now a single component with an eigenvalue above 1. The scale was observed to have a single factor structure convenient with its original form. Factor loading values, means and standard deviations of the scale items are shown in Table 3.

According to Table 3, factor loading values of the scale items range from .601 to .863. Factor loading values that are 0.60 or over are regarded as "high", but values of 0.30-0.59 are regarded as "medium" and are then considered when deleting a variable

Table 3. Factors resulting from the EFA and the factor loading values

Item	Mean	SD	Factor Loading
1.	3.974	1.1581	.719
2.	3.923	1.1670	.783
3.	4.321	.8575	.601
4.	4.205	.9687	.784
5.	4.154	1.0665	.863
6.	4.038	1.2175	.808
7.	4.026	1.1581	.839
8.	4.077	1.0868	.855
9.	4.154	.9913	.783
10.	3.987	1.0348	.774
11.	4.180	1.0746	.784
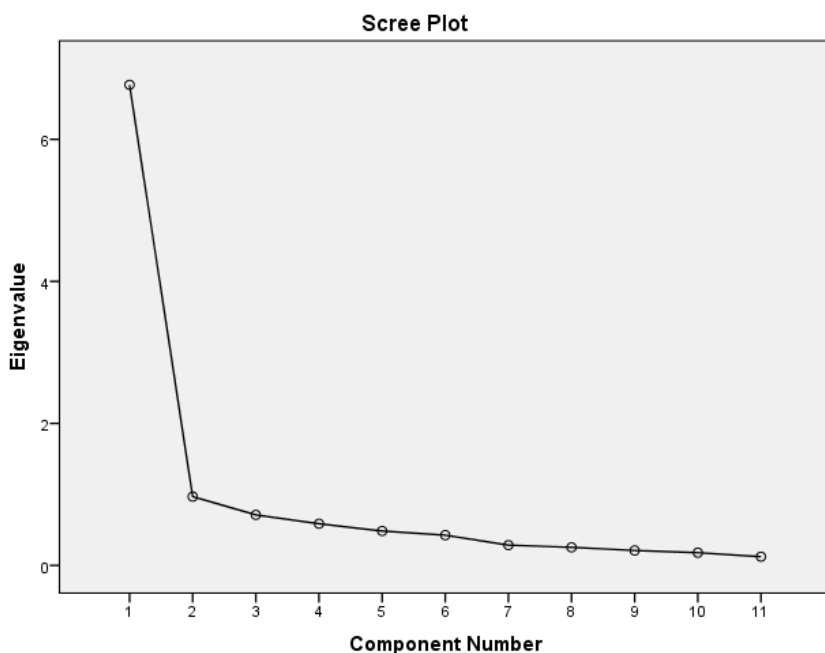
Figure 1. Scatter diagram resulting from the EFA Analysis (Scree Plot)

(Kline, 1994, as cited in Buyukozturk, 2002). The factor loading values for this current study are observed as being of a high level.

The scatter diagram resulting from the exploratory factor analysis indicates that the scale is one dimensional.

The horizontal curves on the line chart of Figure 1 show the number of items, and the vertical curves show eigenvalues. According to the line chart, there is a sharp decrease in the rapid, sudden fall after the second point. The factor in which rapid fall occurs indicates the important factor number.

According to Table 4, the total variance that the single factor of the scale explains is 61.5%. The variance explained from the items of scales with single factors should be at least 30% (Buyukozturk, 2010). Accordingly, it can be said that the construct validity of the adaptation form of the "mentoring effectiveness scale" is rather high.

Confirmatory Factor Analysis

In order to test the accuracy of the Turkish adaptation of the "Mentoring Effectiveness Scale", single factor model Confirmatory Factor Analysis was conducted by using Amos 18 software. Confirmatory factor analysis looks at whether or not

Table 4. Eigenvalues and explained variance resulting from the varimax rotation

Component	Eigenvalues	% of Variance
1	6.768	61.529
2	.969	8.808
3	.712	6.469
4	.587	5.334
5	.485	4.409
6	.426	3.870
7	.286	2.598
8	.254	2.313
9	.211	1.917
10	.179	1.629
11	.123	1.122

Table 5. DFA fit indexes of the scale

Measurement	Good Fit	Acceptable Fit	Model Fit Values
($\chi2$/sd)	≤ 3	≤ 4-5	4.832
RMSEA	≤ 0.05	0.06-0.8	0.07
NFI	≥ 0.95	0.94-0.90	0.92
CFI	≥ 0.97	≥ 0.95	0.96
GFI	≥ 0.90	0.89-0.85	0.87
AGFI	≥ 0.90	0.89-0.85	0.86
TLI	≥ 0.95	0.94-0.90	0.93

Table 6. T-test results regarding the Mentoring Relationship Effectiveness Scale and the gender variable

Gender	n	$\overline{\text{X}}$	SD	t	p	Levene Test	
						f	p
Male	86	4.106	.8266	.185	.853	.125	.725
Female	70	4.081	.8639				

there is an efficient relationship between factors, and to what extent these factors explain the model. CFA can be used in developing a new scale, to examine the psychometric features of a new or existing scale, or to question the construct validities of scales (Harrington, 2008; Brown, 2006).

The Maximum Likelihood method was preferred for the CFA in this current study. Chi-Square Goodness of Fit, $\chi2$, RMSEA (Root Mean Square Error of Approximation), GFI (Goodness of Fit Index), CFI (Comparative Fit Index), NFI (Normed Fit Index), TLI (Tucker Lewis Index) and AGFI (Adjusted Goodness of Fit Index) fit indexes were taken into consideration in this study and the values regarding the single factor scale structure are shown in Table 5.

When the goodness of fit indexes of the CFA are considered, the results are as follows; Chi-Square Goodness of Fit ($\chi2$/sd: 4.832), goodness of fit index (GFI: 0.87), adjusted goodness of fit index (AGFI: 0.86), comparative fit index (CFI: 0.96), normed fit index (NFI: 0.92) and Tucker-Lewis Coefficient (TLI: 0.93). All the values are considered to be acceptable fit rates. The "mentoring effectiveness scale" was therefore regarded as convenient to be explained with a single factor model.
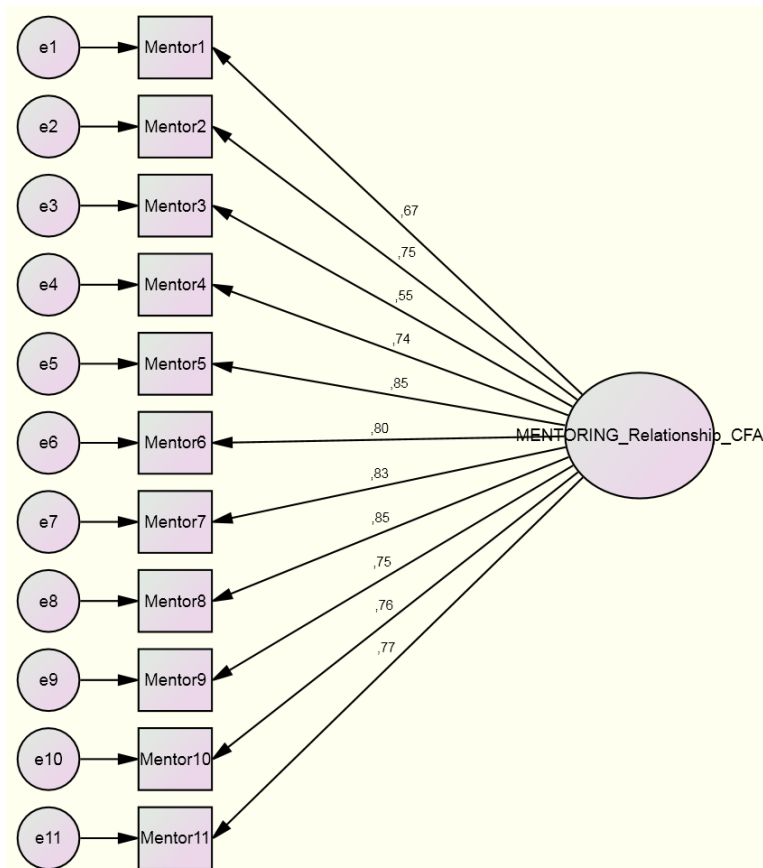
Figure 2. Track Diagram Developed from the Confirmatory Factor Analysis

The track diagram drawn with the AMOS graphic from the CFA is shown in Figure 2. It is possible to observe the factor loading values of the items on the track diagram in Figure 2. At this point, all the standardized values should be below 1.00 (Aytac & Ongen, 2012). According to Figure 2, item loading values ranged between 0.55 and 0.85. Tabachnich and Fidell (2007) state that when a factor loading value is below 0.30, it is not taken into consideration. As a general rule, when the factor loading value is above 0.71, it is regarded as "perfect"; when 0.63-0.70 it is "very good"; when 0.55-0.62 it is "good"; when 0.45-0.54 it is "medium", and when 0.32-0.44 it is regarded as a weak factor loading value.

Findings on the Reliability of the Scale

The Cronbach Alpha coefficient for the "Mentoring Relationship Effectiveness Scale" is $\alpha=.936$. According to Ozdamar (2004), it is considered a highly reliable scale when the Cronbach Alpha coefficient is between 0.80 and 1.00. We can therefore conclude from these findings that overall, the scale is highly reliable. The test-retest technique was used to test the stability of the scale's Turkish form over time. For this test, the scale was conducted with 48 students undertaking master's degrees at a different university, and repeated after a two week interval. Pearson product moment coefficient was used in comparing the average scores collected from both analyses. The score averages collected from scales conducted at two different times indicate a highly positive and significant relationship ($r=0.89$, $p<.05$). This suggests that the scale is stable over time.

Analyzing the Scale According to Gender

Whether or not scores gathered from the Mentoring Relationship Effectiveness Scale differ according to gender was examined by conducting the Independent samples t-test. As Dogan and Totan (2010) stated, the purpose of this study is to enable researchers, who will later use this scale, to make comparisons based on the variable of gender.

Table 6 suggests that there are no significant differences between the scores collected from the mentoring relationship scale regarding the gender variable. Although the score averages of male participants ($\overline{X}$ =4.106) are higher than the average scores for female participants ($\overline{X}$ =4.081), this difference was not regarded as statistically significant (p=0.853>0.05). The general score average of the Mentoring Relationship Effectiveness Scale was $\overline{X}$ =4.094 (SD=0.841). This finding suggests that participants find the mentoring relationship effectiveness level with their supervisors to be sufficient.

CONCLUSION AND DISCUSSION

This study was conducted in order to adapt the Mentoring Relationship Effectiveness Scale, originally developed by Berk et al. (2005), into Turkish and to analyze the validity and reliability of the scale. Although studies on mentoring and mentorship in the field of education have increased over the last 20 years, studies on this issue within Turkey are relatively new (Yirci & Kocabas, 2010; Bakioglu, 2011; Ozdemir & Ozan, 2013). Even though there has been an increase in the importance attached to mentorship, there are still limited numbers of assessment instruments in Turkey. The purpose of this study was to adapt a reliable and valid assessment instrument in order to determine the mentoring relationship effectiveness between graduate students in Turkey and their supervisors. Hence, it could be possible now to apply cross-cultural comparisons between studies on mentorship.

A team which has a full command of both English and Turkish was in charge of language equivalency, which is a crucial step in the scale adaptation process. Scale forms created from the translation and re-translation stages were confirmed by three expert instructors in order to arrive at their final structure. The scale scores collected from a sample group with 156 students receiving graduate education in three different Turkish universities from an implementation conducted twice over a two week period resulted in a high consistency score (r=0.89, p<0.05).

For the validity test, KMO (0.883) and Bartlett (X2=1417. 25; p< .00) test results were analyzed, with results indicating that the scale was convenient for exploratory factor analysis. The correlation of scale items with other items was examined and one item was deleted due to its low convenience level with the other items (r<.30). Factor analysis reconducted on 11 items indicated that the scale had a one dimensional structure, with factor loading values ranging from 0.601 to 0.863. The total variance that the one dimensional factor explains is 61.5%.

Confirmatory factor analysis was carried out to test the construct validity of the scale and the results confirmed the one dimensional structure of the scale. When the goodness of fit indexes of the CFA are considered, the results were as follows; Chi-Square Goodness of Fit (χ2/sd: 4.832), goodness of fit index (GFI: 0.87), adjusted goodness of fit index (AGFI: 0.86), comparative fit index (CFI: 0.96), normed fit index (NFI: 0.92) and Tucker-Lewis Coefficient (TLI: 0.93). These findings suggest that the scale model is acceptable.

The reliability of the scale was determined with the Cronbach alpha coefficient. The Cronbach Alpha coefficient for the "Mentoring Relationship Effectiveness Scale" was α=.936. This result shows that the scale has a high level of reliability. The highest

score that could be gained from this Likert-type scale with 11 items is 55 and the lowest possible score is 11. Higher scores indicate that the effectiveness of the mentoring relationship is increasing.

Whether scores gathered from the Mentoring Relationship Effectiveness Scale differ by gender was also examined. No statistical significant differences were observed between the scores collected from the Mentoring Relationship Effectiveness Scale regarding the variable of gender (p=0.853>0.05). The average score ($\overline{X}$ = 4.094) which the study group gained from the Mentoring Relationship Effectiveness Scale suggests that the mentoring relationship effectiveness is at a sufficient level.

In conclusion, based on the analyses conducted, it can be asserted that the Mentoring Relationship Effectiveness Scale is a valid and reliable assessment instrument in the Turkish language. This adaptation was carried out together with graduate students. Researchers can apply this scale in other fields dealing with mentoring. For example, this scale can be useful when revealing the effectiveness of the mentoring relationships between candidate teachers and their supervisors, or revealing the effectiveness of the mentoring relationship which freshmen receive. The influence of mentoring relationships on individuals' motivation, anxiety, and stress levels can be the subject of further research.

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Appendix: Mentorship Effectiveness Scale Items

N	Items
1.	Danışmanım mesleki olarak tutarlı ve açık bir tutum sergiledi
2.	Danışmanım ihtiyacım olduğunda alan uzmanlığı sağladı
3.	Danışmanım cana yakın idi
4.	Danışmanım destekleyici ve cesaretlendirici/ teşvik edici idi
5.	Danışmanım çalışmam üzerinde faydalı ve yapıcı eleştirileri oldu
6.	Danışmanım yaptığım çalışmayı geliştirmem için beni motive etti
7.	Danışmanım beni yönlendirerek mesleki gelişimime katkı sağladı
8.	Danışmanım sorularımı tatmin edici şekilde cevapladı (Örnek: zamanında, açık, anlaşılır cevap verme v.b.)
9.	Danışmanım katkılarımı /çabalarımı takdir etti
10.	Danışmanım çalışmalarım için uygun kaynaklar ve uzman kişiler önerdi
11.	Danışmanım beni teşvik ederek yeteneklerimi geliştirmemde önemli rol oynadı
12.	*Danışmanım ulaşılabilir idi**

* Item removed from the scale