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Development of Postgraduate Education Attitude Scale: (PEAS) Validity and Reliability Study

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ABSTRACT

The aim of this research is to develop "Postgraduate Education Attitude Scale (PEAS)" to be used for determining attitudes of master's and doctoral students toward graduate education. The data were collected from 441 participants via an online survey tool. For content validity, opinions of four experts were elicited while exploratory factor analysis (EFA) was performed for construct validity of the scale. As a result of the analysis, a 21-item scale consisting of three factors named "valuing graduate education, prioritizing graduate education, resistance to graduate education" was obtained. The total variance explained by the three-factor structure is 61.209%. Cronbach's alpha reliability coefficient was estimated for reliability analysis. The Cronbach's alpha reliability coefficient for the entire scale was found to be .94, and the reliability coefficients for the sub-dimensions were .91, .87, and .86, respectively. Item-total correlations and comparisons between upper and lower groups indicated that all items in the scale were discriminative. The correlation coefficients between the total scale score and the sub-dimensions ranged from 0.58 to 0.92, and a medium to high level positive relationship was found at α=0.01 significance level. Based on the obtained data, a valid and reliable measuring tool was developed to determine the attitudes of postgraduate students towards postgraduate education.

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INTRODUCTION

Due to the development of technology and rapid information flow, scientific competence is now being completed through postgraduate education, which is seen as a step to specialize in a certain field after undergraduate education and is considered an important function of higher education institutions (TDK, 2022). Varis (1972) defines postgraduate education as educational activities that aim to raise scientists and academics who have the qualifications needed by science and society and enable the acquisition of postgraduate degrees. In other words, the aim of postgraduate education is to provide human resources who produce knowledge, use this knowledge where necessary, and can think critically. In this regard, postgraduate education is seen as an important factor in training scientists and conducting scientific processes (Alhas, 2006). Considering the requirements of the 21st century, postgraduate education also provides opportunities for individuals to develop themselves, in addition to contributing to scientific advancement (Ardahan and Özsoy, 2015).

Postgraduate education, which is carried out through programs prepared at the master's and doctoral levels in higher education institutions, plays an important role in training scientists who will contribute to the development of countries (Dilci and Gürol, 2012). In Turkey, postgraduate education consists of programs for master's degrees, specialization in medicine, proficiency in art, and doctoral degrees. Students who want to specialize after undergraduate education continue their education through the relevant institutes at universities, in accordance with the postgraduate education and training regulation determined by the Higher Education Council (HEC) (Yağan and Çubukçu, 2019). According to statistics published by the Higher Education Council, as of 2022, there are 358,271 master's and 109,540 doctoral students in our universities. When the number of postgraduates for the 2020-2021 academic year is examined, it is seen that 54,165 students graduated from master's programs and 7,865 students graduated from doctoral programs (YÖK, 2022). Although the number of students has increased significantly since 2009, the difference between the number of students and graduates is remarkable. In addition to informing undergraduate graduates about postgraduate education and encouraging them to pursue it, constructing a positive attitude towards postgraduate education is important in increasing the number of students and graduates.

The quality of universities, which are one of the institutions that make society qualified, is closely related to the quality of postgraduate education. Postgraduate education has functions parallel to the roles of universities, producing and disseminating science/art, accurately perceiving social problems, and developing solutions, and contributing to the training of high-level human resources (Bakırcı and Karaman, 2010). The quality of graduate education also includes components such as graduate student proficiency, management and administrative staff quality, academic staff and counseling quality, physical condition quality, and evaluation process quality (Aksarı and Karakaya, 2022).

Attitude, defined as "manner/a way of thinking" according to Turkish Language Association (2022), is "an emotional readiness or tendency observed as the acceptance or rejection of a certain person, group, institution, or idea" (Özgüven, 2012, p. 353). Allport (1935) defines attitude as a mental or neural readiness state that has a direct or dynamic

directing effect on the object and situations that individuals are associated with and that develops through experiences. Krech and Crutchfield (1948) define attitude as a continuous formation/organization of motivational, emotional, perceptual, and cognitive processes related to a direction in the individual's world. Pickens (2005) defines attitude as the tendency or mindset that directs the individual to act in a certain direction according to their experiences and nature. Eagly and Chaiken (1993) define attitude as a psychological tendency that includes the individual's evaluation of their degree of liking/disliking. According to the definitions, it is possible to say that attitudes are a sum of cognitive, emotional, and psychomotor processes affected by the experiences and life events of individuals and can be defined as a tendency and direction that can positively/negatively direct the individual to the relevant object/situation. Determining the attitudes of candidates and individuals who are already postgraduate students towards postgraduate education is important in terms of understanding their tendencies and positive/negative emotions and their interest and value for postgraduate education. Indeed, according to Çetin (2006), the attitude shown to the relevant object or subject is shaped by the interest and value shown to it. When the literature is examined, research focusing on attitudes towards graduate education and expectations from education have been conducted, especially with teachers. Concepts such as contributing to professional development and competence, providing knowledge and skills in a professional sense, and thus helping career development, supporting the development of critical skills, material, and moral support, and increasing confidence level in decision-making have been associated with attitude. The expectations include organizing programs suitable for working life, fair treatment in interviews and increasing quotas, conducting online education, and increasing the reputation and quality of universities offering graduate programs.

There are scales that have been developed and/or adapted to measure attitudes towards graduate education (Bezen et al., 2016; İlter, 2019; Ünal and İlter, 2010). The Graduate Education Attitude Scale (GEAS), developed by Ünal and İlter (2010), measures undergraduate students' attitudes towards graduate education. The GEAS is a five-point Likert scale consisting of 15 items and has two sub-dimensions: "the function of graduate education" and "desire for graduate education.The Scale for Attitude Towards Graduate Studies developed by Bezen, Aykutlu, Seçken, and Bayrak (2016) aims to measure the attitudes of undergraduate students in vocational education toward graduate education. This scale is a five-point Likert scale consisting of 27 items and has four dimensions named "interest and importance," "fear and anxiety," "lack of need," and "desire and want." The Scale of Attitude towards Postgraduate Education (SATPGE) adapted by İlter (2019) was developed by Ng, Tuckett, Fox-Young, and Kain (2014). The adaptation analysis resulted in a scale consisting of 13 items and three factors: "facilitator roles," "professional recognition," and "inhibiting factors." It was observed that there is currently no measurement tool for the attitudes of postgraduate students towards postgraduate education, regardless of their field of study, in the literature of our country. Therefore, it is thought that the development of the Postgraduate Education Attitude Scale will contribute to providing data on the attitudes of masters and doctoral students towards graduate education.

METHOD

Research Design

This research is designed using a descriptive survey model. The descriptive survey is a research model that is relatively conducted with larger samples to describe situations such as

interests, skills, abilities, and attitudes that have occurred or are currently occurring in the literature (Fraenkel & Wallen, 2006; Karasar, 2007). Furthermore, it aims to collect data to determine certain characteristics of a group and reflect the existing structure as it is (Büyüköztürk et al., 2016).

Study Group

The size of the study group was determined by reviewing the literature for exploratory factor analysis. In the literature, it is stated that a sample of 200 people may be sufficient, but obtaining a larger sample would be beneficial to achieve satisfying results (Kline, 1994). Since Tavşancıl (2014) states that the sample size should be 5-10 times larger than the number of scale items, determining the sample size in this research is based on this recommendation. The scale form was sent via e-mail to all postgraduate students (n=3650) enrolled in the education programs at Gazi University Graduate School of Educational Sciences. The study group of research consists of 441 students who responded to the form. The demographic characteristics of the students are presented in Table 1.

Tablo 1. *The distribution of students according to demographic characteristics*

Variable		Frequency (*f*)	Percentage %
Gender	Female	306	69.38
	Male	135	30.62
Type of graduate education	Master of Science with thesis	231	51.93
	Ph.D.	210	47.62
Total		441	100

Table 1 indicates that 69.38% (n=306) of graduate students are female, while 30.62% (n=135) are male. When the types of graduate education of the participating students are examined, it is found that 52.38% (n=231) of the students are pursuing a thesis-based master's degree, while 47.62% (n=210) are pursuing a doctoral degree.

Steps of Scale Development

It has been stated in the literature that scale development should follow certain stages. In the development of the attitude scale for postgraduate education, following the stages of the descriptive research, the related steps were followed (Büyüköztürk et al., 2016; Cohen and Swerdlik, 2013; DeVellis, 2017; Özgüven, 2012; Tezbaşaran, 1997):

1. Determination of the purpose and scope of the scale; decision on content

The purpose of the scale is to determine the attitudes of graduate and doctoral students towards postgraduate education. The compatibility, scope, and discriminative power of the items in attitude scales are important. On the other hand, it is important for scale items to be based on a theory or to be original. In this scale development study, the originality levels of the items were taken into consideration.

2. Writing items in the determined scope and content direction; item control and creating scale form; determining the scoring method of items

When developing the scale, creating items that reflect the purpose of the scale can be expressed as the starting point. Generation of items is realized by ensuring the items being clear and understandable, asking for the basic idea in a short and concise manner, and being original. Ambiguous and grammatically incorrect expressions were avoided. To ensure

internal consistency, many items were included in the item pool. In this context, a 31-item pool was created, considering the literature. It is important for the measurement tool to show variability and correlation with other scales. One way to increase variability is to have many response categories. Therefore, a five-point Likert-type rating, "1: Strongly Disagree, 2: Disagree, 3: Partially Agree, 4: Mostly Agree, 5: Strongly Agree" was used for the items in the scale.

3.Obtaining expert opinions (Ensuring Face and Content Validity)

In content validity, it is questioned whether the items reflect the "attribute" to be measured sufficiently. In this direction, the opinions of 4 experts are acquired. Of four experts participated in this study, two were from Curriculum and Instruction Department, one is from Turkish Education and one is from Measurement and Evaluation in Education Departments. Three items were edited in line with the opinions of the experts. There was no item removed. The final version of the 31-item scale was sent to a researcher in Turkish education for language and spelling control.

4.Creating the pilot form and conducting the pilot study and the actual implementation

Before starting the actual implementation, a pilot study was conducted with 10 participants using the updated items of the scale to determine the comprehensibility and possible problems of the items. The items were revised considering the responses given. The pilot form includes 19 positive and 12 negative items. The items form cognitive, affective, and psychomotor/behavioral components that constitute attitudes (Allport, 1935; Morgan 1961; Oskamp and Schultz, 2005) according to three factors.

5.Conducting validity and reliability analyses based on data obtained from the actual application.

In the actual application, candidate scale items were delivered to participants via "Google Forms" to collect data. There was no missing data as all items in one section had to be marked before proceeding to the next section. In addition, it was checked whether the data was filled in a specific pattern or randomly. Negative items were reverse-coded. Afterwards, Exploratory Factor Analysis (EFA) and reliability analyses were conducted and reported in the table footnotes.

FINDINGS

In this part, validity and reliability analyses regarding the scale are presented.

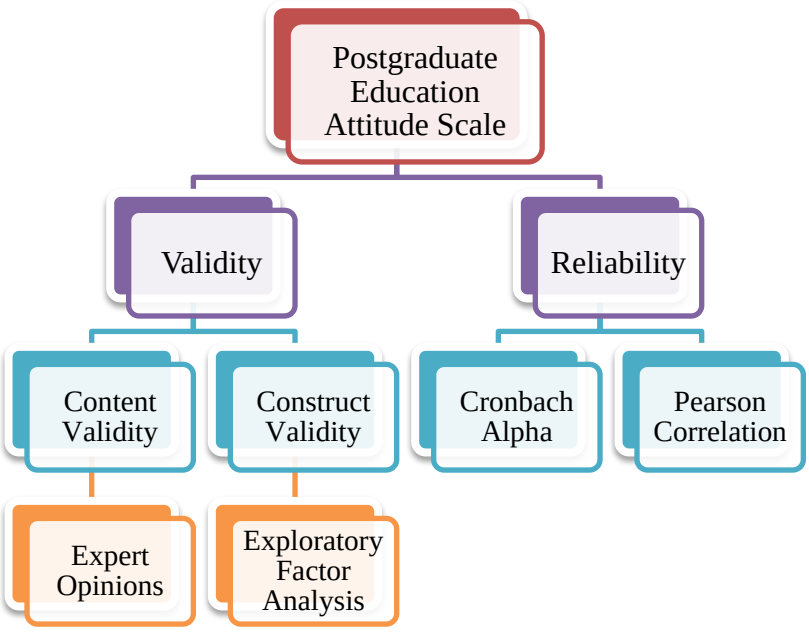

Figure. 1. *The diagram related to Postgraduate Education Attitude Scale*

Findings on the Validity of the Scale

Content Validity

In the form prepared to be sent to expert opinion, three columns titled "appropriate, not appropriate, needs revision" were opened for each item, with an additional column for comments, requesting experts to explain their suggestions if any. Experts were asked to fill out the form according to their opinions. When the opinions of the experts were examined, three items were revised, but the number of items remained the same. Consensus was achieved in the scale items.

Construct Validity

Construct validity is a judgment about the appropriateness of inferences made based on individual test scores for a variable called "construct" (Cohen & Swerdlik, 2013). In other words, researchers prepare observable and/or measurable questions to determine individuals' abilities, performance, attitudes, and other characteristics. The extent to which these questions accurately measure this structure is related to structural validity (Büyüköztürk et al., 2016).

Exploratory Factor Analysis (EFA)

To provide evidence for the construct validity of the scale developed in the study, an EFA was conducted. The KMO coefficient was calculated, and the Barlett Sphericity Test was performed to determine if the scale data set was suitable for factor analysis. The KMO value was found to be .94 and the Barlett Sphericity value was [X2= 5580.857; p<.001]. If the KMO value is greater than 0.5, it is stated that factor analysis can be performed (Kaiser, 1974). In this case, the observed KMO value of .94 was higher than the recommended KMO value, indicating that the scale is suitable for factor analysis (Büyüköztürk, 2018; Field, 2013). To determine the existing factors in the scale, it was rotated with varimax rotation based on a cutoff point of 0.45. As a result of the rotation, three factors were observed with eigenvalues greater than 1. The "Scree Plot" graph based on the eigenvalues of the factors in the scale, is also presented in Figure 2.

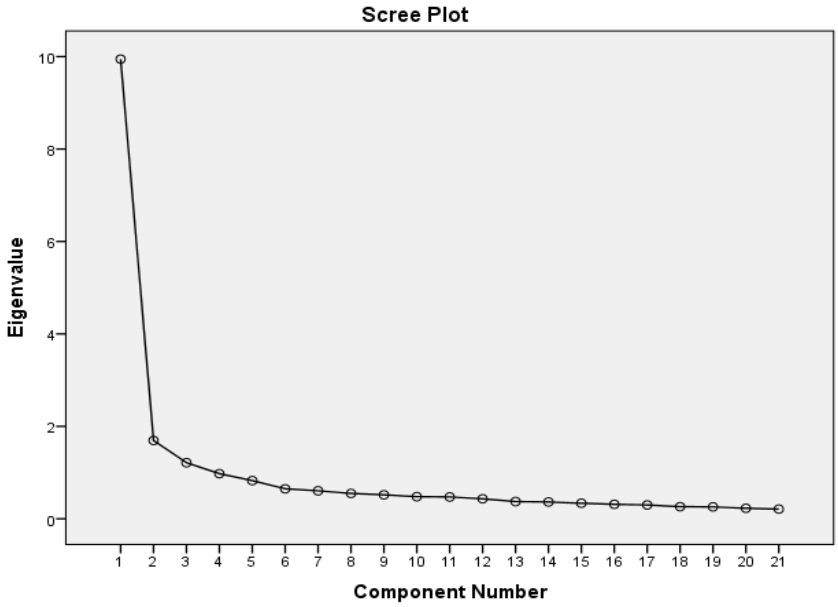

Figure. 2. *Scree Plot Graph*

The values of exploratory factor analysis regarding the scale are presented in the Table 2.

Tablo 2. *EFA results of Postgraduate Education Attitude Scale*

FACTORS	**Common factor variance**	**Varimax Factor loadings**	**Eigenvalue**	**% of variance explained**
<u>Factor 1:</u> Valuing postgraduate education		9,946		22,186
2. I think that postgraduate education contributes to improving myself.	,521	,523		
8. I value all the knowledge I have gained during postgraduate education process.	,556	,596		
10. I think postgraduate education has provided me with a lot of benefits.	,686	,699		
13. I believe that postgraduate education has made a positive difference in my life.	,669	,686		
16. Doing postgraduate education is increasing my self-confidence.	,612	,662		
17. I think postgraduate education has increased my scientific awareness.	,695	,784		
25. It makes me happy to have friends who are interested in postgraduate education.	,571	,526		
27. I think postgraduate education will create future opportunities for me.	,463	,533		
29. I believe that postgraduate education has provided many gains in terms of research process and discipline.	,649	,774		
<u>Factor 2:</u> Attaching importance to postgraduate education			1,694	19,750

1. I am interested in postgraduate education.	,439	,549		
4. I can make many sacrifices to continue postgraduate education.	,579	,743		
5. I think postgraduate education is an opportunity that should not be missed.	,646	,708		
7. I enjoy doing postgraduate education.	,659	,591		
14. Postgraduate education is a must-have in my life.	,641	,704		
19. I do not give up postgraduate education even if I face difficulties.	,651	,747		
Factor 3: Resistance to postgraduate education			1,214	19, 274
9. Postgraduate education is unnecessary.	,563	,640		
21. Doing postgraduate education is an education that useless people should think about.	,392	,544		
24. I feel sorry for those who are considering doing postgraduate education.	,733	,826		
26. I think beginning postgraduate education is a mistake.	,738	,776		
28. I do not suggest anyone to have graduate education.	,775	,833		
30. I think that graduate education is overvalued.	,615	,653		
Total Variance				61,209

Table 2 indicates that the scale consists of a total of 21 items, including 6 negative and 15 positive items. The scale consists of three factors. Factor 1, consisting of 9 items in line with the theoretical structure and content of the items, is named "Valuing Postgraduate Education", Factor 2 consisting of 6 items is named "Attaching Importance to Postgraduate Education", and Factor 3 consisting of 6 items is named "Resistance to Postgraduate Education". The factor loadings of the items in Factor 1 vary between .784 and .523 and account for 22.186% of the total variance. The factor loadings of the items in Factor 2 range from .747 to .549 and contribute to 19.750% of the total variance. The factor loadings of the items in Factor 3 range from .833 to .544 and contribute to 19.274% of the total variance. The total explained variance of the scale is 61.209%. Factor loadings of 0.45 and above for items under a factor can be interpreted as the items measuring the relevant structure (Büyüköztürk, 2018). Accordingly, it can be said that the items under the factors in the scale measure the relevant structure. It is considered sufficient for each factor to explain a minimum of 5% of the variance ratio and for the total explained variance value to be between 40% and 60% (Hair, Black, Babin, and Anderson, 2009). It is seen that the variance ratios obtained in this study and the total explained variance value are above the accepted levels.

Findings Regarding the Reliability of the Scale

To examine the reliability of the scale developed in the study, Cronbach's alpha reliability coefficient was calculated for the total scale and each subscale. Item-total correlation values for each item of the scale and independent t-tests based on upper 27% and lower 27% groups were conducted. The findings of the reliability analyses are presented in Table 3.

Tablo 3. *Findings related to reliability analysis.*

Factor number	-Item	Item total correlation	27% sub and top groups	Cronbach's alpha reliability coefficient
Factor 1				,91
Item 2		,665	12,166***	
Item 8		,670	13,641***	
Item 10		,742	16,250***	
Item 13		,736	18,314***	
Item 16		,692	17,538***	
Item 17		,663	14,544***	
Item 25		,711	15,397***	
Item 27		,618	14,420***	
Item 29		,592	14,279***	
Factor 2				,87
Item 9		,636	11,220***	
Item 21		,389	9,386***	
Item 24		,594	14,677***	
Item 26		,697	15,183***	
Item 28		,647	13,692***	
Item 30		,675	13,719***	
Factor 3				,86
Item 1		,569	11,737***	
Item 4		,518	12,038***	
Item 5		,674	17,635***	
Item 7		,755	17,402***	
Item 14		,669	19,457***	
Item 19		,607	16,044***	
Total				,94

***P<.001,

The reliability coefficient of the Cronbach's Alpha obtained for the entire scale was found to be .94. The Cronbach's Alpha reliability coefficients for the subscales of the scale were found to be .91 for Factor 1, .87 for Factor 2, and .86 for Factor 3. It is considered

sufficient for the Cronbach's Alpha coefficient for reliability to be greater than .70 (Büyüköztürk, 2018). Therefore, the reliability coefficient obtained for the entire scale shows that the reliability is high. When the item-total correlation values of the items in the scale were examined, it was seen that the values varied between 0.38 and 0.75, and the item-total correlation values were significant at the .001 level. The independent sample t-test results for upper and lower group were also found to be significant to reveal the distinctiveness of each item in the table ($p \leq .01$). That is, there is a significant difference between the means of the upper 27% group and the means of the lower group, and this is considered as an indicator of internal consistency (Büyüköztürk, 2018). In addition, the scale was analyzed using the test-retest reliability technique, and the Spearman-Brown internal consistency coefficient was calculated. The Spearman-Brown internal consistency coefficient was found to be "0.90". The high value indicates that the items in the scale measure the same attribute.

The correlation values between the total and subscales of the scale were calculated, and the findings are presented in Table 4.

Table 4. *Correlation coefficients regarding total score and between subscale scores.*

	Total scale	**Factor 1**	**Factor 2**	**Factor 3**
Factor 1	,929**	----------		
Factor 2	,824**	,659**	----------	
Factor 3	,882**	,743**	,580**	----------

**P<.01

It was found that the correlation values between the total scale and the subscales in Table 4 ranged from 0.58 to 0.92, indicating a moderate to high level of positive relationship at the α=0.01 level of significance.

DISCUSSION, CONCLUSION, RECOMMENDATIONS

The aim of this study was to determine the attitudes of postgraduate students towards postgraduate education. Firstly, literature was reviewed and related measurement tools were examined (Bezen, Kutluoğlu, Seçken and Bayrak, 2016; İlter, 2019; Ünal and İlter, 2010). Bezen et al. (2016) developed a scale to evaluate the attitudes of undergraduate students towards postgraduate education. İlter (2019), on the other hand, adapted the scale developed by Ng, Tuckett, Fox-Young, and Kain (2014) to the Şanlıurfa sample to determine the attitudes of individuals who are studying and/or graduated at any level of postgraduate education in higher education. The scale developed in this study differs from the scales in the literature in that it is specifically designed for postgraduate students. Furthermore,literature review indicates that there is not a scale developed in Turkish culture related to attitudes of postgraduate students towards postgraduate education.

The developed measurement tools, factors, and sample items were examined. A 31-item pool was created in line with the scope of the attitude scale to be developed. Then, the opinions of four experts were obtained and a pilot study was conducted after revisions were completed.

After the main implementation of the scale, validity and reliability analyses were

performed. As a result of the Exploratory Factor Analysis, 10 items were removed. The final version of the scale consists of 21 items, with 6 negative and 15 positive items. The three factors identified in the scale were named "valuing postgraduate education, importance given to postgraduate education, resistance to postgraduate education". The total variance explained by the scale is 61.209%. According to the reliability analysis, the Cronbach's Alpha reliability coefficient for the overall scale was found to be .94, and the reliability values for each sub-dimension were .91, .87, and .86, respectively.

The highest score that can be obtained on the scale is 105 and the lowest score is 21. The lowest and highest scores that can be obtained in the "valuing postgraduate education" sub-factor are 9 and 45, respectively; in the "attaching importance to postgraduate education" sub-factor, the lowest and highest scores are 6 and 30, respectively; and in the "resistance to postgraduate education" sub-factor, the lowest and highest scores are also 6 and 30, respectively. Negative items are scored as 1-2-3-4-5, while positive items are scored in reverse.

According to the findings, the "Postgraduate Education Attitude Scale" possesses the psychometric properties that it should have according to the development steps and criteria of the measurement tool. During the literature review, no measurement tool was found evaluating the attitudes of graduate students towards graduate education within the scope and context of the developed scale. It is believed that the developed scale will contribute to attitude determination in the literature. The "Postgraduate Education Attitude Scale" tested for validity and reliability in this study can be used on different samples and different variables. Before these studies are conducted, it is recommended to perform confirmatory factor analysis. While determining the attitudes of students towards postgraduate education with this measurement tool, studies supported by qualitative data through interviews can be conducted.

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