



## Development of the Academic Performance Perception Scale <sup>1</sup>

Recep GUR<sup>2</sup>

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### ABSTRACT

**Purpose:** While numerous studies about academic performance that focused on only one factor, studies aiming to measure academicians' perceptions across many factors have not been observed in the literature. The current study aims to fill this gap and become a resource for upcoming studies. The aim of this study is to develop a valid and reliable scale that measures academicians' performance perception. **Research Methods:** The first research group of the study consists of 125 academicians who have been working in or studying for post-graduate degrees at Ankara University Faculty of Educational Sciences, while the

second group of researchers, who have undergone confirmatory factor analysis, consists of 147 academicians either working as professionals or acquiring post-graduate education at Erzincan University (except for one multivariate extreme value). The pre-testing form of the scale composed of 29 positive and 11 negative factors, for a total of 40 items. The expert opinions obtained about the items is evidence for content validity. **Findings:** Results indicated that the final form of the scale which was composed of 19 positive and 7 negative factors, 26 items in total, is a reliable and valid data collection tool to be used in the field of education. **Implications for Research and Practice:** Researchers may be able to use this newly developed tool to investigate the presence of a meaningful relationship between academic encouragement scores and the academic performance perceptions of academicians.

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<sup>2</sup> Corresponding Author: Erzincan University, Faculty of Education, Department of Measurement and Evaluation, Turkey, [rgur@erzincan.edu.tr](mailto:rgur@erzincan.edu.tr)

## Introduction

Investment is required in society for the development of a nation, while for the development of society, investment is also required in the individual. Education is the most important factor concerning an investment in the individual. Similar to the various developments in economics, technology, and politics, there are also rapid developments in the field of education. Increasingly more scientific studies are required in order to keep up with research being executed in developed countries, to compete with them and not to lag behind.

Academicians are among the first to come to mind with regard to individuals who use their intelligence most in the sense of curiosity. The studies of the academics whose performances are at a high level play a prominent role in the development and changes in society. According to Aldakhillah and Parante (2002), performance is the efficacy and competence of the duty that the individual is obliged to do. Competence refers to the capacity that should be possessed by the individual in order to be able to effectively fulfil a task or a job (Sahin, 2004). Academic performance is the value of the academicians determined by accumulating different criteria together (Kaptanoglu and Ozok, 2006). In the determination of these values, the academic performance perceptions of the academicians are encountered. Perception is the process of interpreting or making sense of the information that was received through the sensory organs (Schunk, 2012). Furthermore, the perception of academic performance is the reflection of the responses encountered in relation to the efficacy and competence of the academician.

Physical and hardware facilities should be provided for academicians to more easily carry out qualified scientific studies. The academic performance of research assistants who are temporary assigned to realise their postgraduate education at another university is affected by numerous external factors, such as the deprivation of physical and instrumental equipment, the absence of their own room, exclusion, the intensity of lecture assistant duties apart from administrative duties that affect post-graduation success, and the anxiety provoked by their various obligations (Kahraman, 2007). Therefore, it is vital to provide the necessary environment to enable the scientists to execute academic work with ease.

The scientists who are the architects of development and changes need to have good language skills. Gastel and Day (2016) emphasised that if a scientist is not a native English speaker, he or she may be more apprehensive to publish in English. Yavuzer and Gover (2012) reached the general conclusions in their research that the aim of the foreign language exams that are being conducted in Turkey are not being fulfilled, that the scope should be expanded in a way to measure the four language skills (reading, writing, listening and speaking), and that foraging language is obligatory in the execution and in the follow-up of scientific activities. Foreign language is important for the universality in science. Therefore, it may increase the quality of the scientific studies if foreign language exams are carried out in accordance with their purposes.

Giving verbal presentations, participating in international congresses with posters, and being able to publish are the criteria of academic performance. In the research conducted by Olkun (2006), the question "Are there any issues you would like to mention in relation to candidate articles coming from developing countries?" was responded to by the editors of national and international journals in the following way:

They noted that there was a significant increase in the number of articles coming from developing countries. However, it was also mentioned that these candidate articles were insignificant, superficial, regarding only local problems. Moreover, they were written with bad English, without complying with the writing techniques. They were weak in terms of research design and analysis, and most of the authors were not updated. It was stated that these articles were rejected because of the insufficient scientific communication, or they were rejected by requesting significant corrections. Some of the editors stated that these problems were also encountered in articles coming from developed countries. So, it turned out that this problem was not only a language problem, but it was also related to scientific writing skills (p. 45).

The results of Olkun's research are parallel with Kline's (2009) expressions emphasising the importance of scientific skills. Kline stated that the use of language spoken in everyday life, antiquated research topics, and unnecessary graphics and tables are among the most notable problems. He also stressed that, in verbal presentations, the most important measure is to decide what to say and what not to say. In verbal presentations, active presentations are needed, instead of boring the audience by reading pages full of slides filled with assorted colours and animations (Kline, 2009). Therefore, raising scientists with advanced scientific writing skills will also positively affect their academic performance.

Gender roles in society come out to be one of the factors affecting academic performance or achievement of academicians. Female academicians listed such factors as "women's multiple roles" and "prejudice against women for positions requiring higher responsibility" among the problems they face within the institution for which they worked; i.e. the causes that result in lowered academic performance (Yilmaz and Ozdemir, 2012). Likewise, a variety of studies have been conducted suggesting that traditional roles imposed on women in the home are also carried out by the majority of female research assistants (Ergol, Koc, Eroglu and Taskin, 2012); neither their level of education nor their status has succeeded in changing the traditional roles created within the home, and the roles of women in society do not tend to change in the workplace (Dikmen and Maden, 2012). Belkis (2016) found that motherhood poses an overall concern due to distractibility in academic activities, fatigue, sleeplessness, and parental issues (babysitter, school, etc.). Even though female academicians persevere at their academic career aspirations with a modern understanding of motherhood, as it creates an intense workload, the academic performance of academicians is adversely affected. Belkis highlighted the social gender inequality generated due to maternity-related stereotypes as the effective

factor on academic performance, not the motherhood itself. Naymansoy (2010) discussed the role of motherhood in his study, and further pointed out the lack of preschool institutions, like day care centres, offering mothers assistance in child care, which constitutes one of the hindrances preventing academic performance.

Although most scientists are left alone with factors that lower their academic performance, they cannot stop themselves from executing scientific works due to the motivating influence of their curiosity. The belief of self-efficacy is also an impressive factor beside the required competence and skills that should be possessed by a scientist to perform qualified work. According to Bandura (1997, p. 3), "Self-efficacy is the individual's judgement related to himself about his capacity to organize and successfully perform the activities that are necessary in order to demonstrate a certain performance". Therefore, the belief related to things that have been achieved by an individual before and can be achieved in the future again affects academic success.

Self-efficacy measures can be formulated based on criteria set for the performance. The self-efficacy belief is an affective factor that increases the performance (McCown, Driscoll, and Roop, 1996). There is not a characteristic that can compensate for lack of knowledge or skills. Therefore, academics with high self-efficacy beliefs choose high-level goals that require being stronger, spending more time, and performing better, which also increases their success (Goddard, Hoy, and Hoy, 2004). Therefore, self-efficacy measures help to explain why academics in the same field with the same level of ability demonstrate different academic performances (Hazir and Bikmaz, 2004; Lane, Hall, and Lane, 2004; Schunk and Pajares, 2005; Zimmerman and Kitsantas, 2005). Therefore, the academic performances of the academicians who believe they will succeed, even when facing difficulties, i.e. academicians with high self-efficacy, are expected to be high.

Many studies have been conducted on the self-efficacy belief, especially regarding an individual's choice of activities, the steadiness against the difficulties, the level of the effort, and its impact on the performance. The following examples can be given in this regard; career self-efficacy (Bacanli, 2006); self-efficacy beliefs in writing; academic self-efficacy beliefs (Lent, Brown and Gore, 1997), research self-efficacy (Bishop, Bieschke, and Garcia, 1993), self-efficacy beliefs related to computers (Akkoyunlu, Orhan and Umay, 2005), professional self-efficacy (Schyns, 2004). In the conducted studies, it was concluded that high academic self-efficacy had an important influence on academic life (Pajares and Graham, 1999; Schunk, 1995) and a positive effect on performance (Vrugt, Langereis and Hoogstraten, 1997).

The research self-efficacy beliefs are among the factors that affect scientific research skills. Research self-efficacy is the belief that an individual can complete a research task. This belief affects an individual's academic performance (Bard, Bieschke, Herbert and Eberz, 2000). Bailey (1999) concluded that there was a positive relationship between research self-efficacy and the motivation of the academicians, academic degrees, and scientific research experiences. Therefore, scientists with high research self-efficacy exhibit a higher academic performance.

In the globalising world, the contribution of computers to science is a fact that cannot be denied. It was concluded that academicians who show a positive attitude towards the computer are more confident during their teaching process, and display higher self-efficacy beliefs toward their academic performance because they benefit more from computers and information technology (Ipek, Tekbiyik and Ursavas, 2010). It is important for scientists to improve their ability to use technological facilities and follow technology closely to conduct scientific research.

In the literature, the research studies related to academic performance seem to focus on a single dimension, such as language competence (Ocal, 2012; Yavuzer and Gover, 2012), academic writing skills (Kline, 2009; Olkun, 2006), career self-efficacy (Bacanli, 2006), self-efficacy beliefs in writing (Parajres, Hartley, and Valiante, 2001), academic self-efficacy beliefs (Lent, Brown, and Gore, 1997), research self-efficacy (Bishop, Bieschke and Garcia, 1993), self-efficacy beliefs related to computers (Akkoyunlu, Orhan and Umay, 2005), and professional self-efficacy (Schyns, 2004). Although there are studies about the academic performance that focus only on one factor, no studies have been found in the related literature that intend to measure the academic performance perception of the academicians amongst numerous factors. The identification of the level of the academicians' academic performance perceptions is considered to be beneficial for the relevant institutions. By determine this measure, institutions may be able to detect what steps should be taken in order to enable the academicians to continue their contributions to their country scientifically and technologically, and train qualified academicians by using the existing resources of the country in the best way. A limited number of studies conducted on the academic performance are available in the literature. This study is considered to be a source for other studies in terms of eliminating deficiencies in the literature. From this point on, the aim of this study is to develop a valid and reliable scale that can measure the academic performance perceptions of academicians.

## Method

### *Research Groups*

There were two different research groups involved in this study. Principal Component Analysis (PCA) was applied for the data obtained from first research group, while Confirmatory Factor Analysis (CFA) was performed with the data obtained from the second research group. The first research group of this study consisted of 125 academicians working at Ankara University, Faculty of Educational Sciences or enrolled in postgraduate education. Of the 125 academicians, 77 were women (61.60%) and 48 were men (38.40%). The average age of the academicians was 29, and their ages varied from 22 to 51. With regard to marital status, 47 of the 125 academicians were married (37.60%), 75 were single (60.0%), and 3 were divorced (2.40%). In addition, 111 of the academicians (88.80%) had no children, 10 (8.00%) had one child, and 4 academicians had two children. Of the 125 academicians, 120 (96.00%) attended or were still attending the "Scientific Research Methods" course, while 5 of the academicians (4.00%) had not attended this course.

The second research group consisted of 147 academicians (except for one multivariate extreme value) either working as professionals or enrolled in post-graduate education at Erzincan University. Of the 147 academicians, 54 (36.80%) were Research Assistants, 13 (8.80%) were Lecturers, 62 (42.20%) were Assistant Professors, 13 (8.80%) were Associate Professors, and 5 (3.40%) were Professors. Of these academicians, 46 (61.60%) were females and 101 (38.40%) were males. The average age of the academicians was 34, ranging from 23 to 55. Of the 147 academicians, 99 (67.30%) were married, 45 (30.70%) were single, and 3 (2.00%) were divorced. Furthermore, 63 (42.90%) had no children, 26 (17.70%) had one child, 48 (32.70%) had two children, 8 (5.40%) had three children, and 2 (1.40%) had four children. A total of 131 (89.10%) had attended or were currently attending the "Scientific Research Methods" course, while the remaining 16 (10.90%) had not yet attended the "Scientific Research Methods" course.

#### *Research Instruments and Procedures*

Three academicians working at Ankara University, Faculty of Educational Sciences, were asked to write an essay describing their feelings and thoughts about the factors affecting the academic performance. As a result of the literature review and the examination of the essays written by the academicians, 13 negative and 32 positive expressions regarding the academic performance perception were created. Expressions that conveyed double negativity, uncertainty, and incoherency were avoided by considering the development steps of the Likert-type scale (Tavsancil, 2010). The prepared items were examined by two experts who conducted research on "self-efficacy", three Measurement and Evaluation experts, a specialist in Computer Teaching and Technology, an English Teacher, and a Turkish Language Expert, and were evaluated in terms of language, scope, and psychometrics.

The expressions were revised according to the opinions, and the Academic Performance Perception Scale, consisting of 40 items, was prepared for a pre-trial application. A total of 29 of these expressions were positive ("*I know the concepts related to my field well enough to teach them effectively to the students*", "*I can perform the data analysis of my research without any help*", "*I closely follow the developments in technology*", etc.), while 11 of these expressions reflected negative perceptions regarding academic performance ("*I hesitate to speak at congresses held abroad*", "*I have difficulties in reporting statistics programs (e.g. SPSS/SAS.)*", "*I leave my research incomplete when facing difficulties*", etc.). The positive and negative items were mixed in the scale.

#### *Data Analysis*

Since 29 items on the scale reflected positive perception regarding the academic performance, a scoring key graded as '1' Never, '2' Rarely, '3' Occasionally, '4' Frequently, and '5' Always was prepared, while for the 11 items reflecting negative perception, the scoring key was rated reversely. The scores of the scale were calculated according to this scoring key by collecting the scores of the academicians. Univariate outliers were not found in relation to the total scores of the academicians' academic performance perception scale because there was no z value other than the -

$3 < z < 3$  range (Mertler and Vannatta, 2005). Histogram graphs, skewness, and kurtosis values, along with the mean, median, and mode values, were examined for the univariate normality assumption. The range between -1 and +1 was taken as the acceptable range for the skewness and kurtosis (Leech, Barrett, and Morgan, 2005).

The Pearson Product Moments Correlation Coefficient was calculated for the item-total test correlation in order to determine the item validity of the 40 items included within the test form of the scale. The item analysis method based on the difference between the sub-superior group averages was used in order to determine the item discrimination. The difference between the sub-superior groups was calculated by the t test of the independent groups. Furthermore, as proof of the item validity, the Ordinal Logistic Regression Method was utilised to detect Differential Item Functioning (DIF) in polytomous items in terms of gender (Miller and Spray, 1993). Ordinal Logistic Regression assumes a negligible/tolerable level of DIF, if  $\Delta R^2 < .13$  (Level A); a medium level of DIF, if  $.13 \leq \Delta R^2 < .26$  (Level B); and a magnitude level of DIF is present if  $\Delta R^2 > .26$  (Level C) (Zumbo and Thomas, 1996). One of the most significant steps of the scale development process is to identify if there is any biased item for and against a group in a systematic manner (Camilli and Shepard, 1994; Zumbo, 1999; Allalouf, Hambleton and Sireci, 1999). A biased item in a scale has an adverse effect on the validity of the measurement results (Clauser and Mazor, 1998). Differential Item Functioning procedures should be followed as a prerequisite to identify the item bias (Zumbo, 1999). An item containing DIF in a measuring scale available for affective traits suggests that the likelihood of individuals in different subgroups (as per gender, ethnicity, etc.) with the same scale scores (same attitude/perception level) exhibiting similar responses to the relevant item will vary (Hulin, Drasgow and Parsons, 1983; cited by Dodeen and Johanson, 2003). Estimations based on expert reviews are needed to claim bias on any item that is specified to flag DIF as a result of the statistical analysis (Camilli and Shepard, 1994; Zumbo, 1999). Notwithstanding the differences in literature with regards to the sample sizes of DIF studies in polytomous items, Wood (2011) defined a small sample size to be 40 individuals, while Fidalgo, Hashimoto, Bartram, and Muñiz (2007) and Muñiz, Hambleton and Xing (2001) defined a small sample size to be 50 individuals per group.

The principal component analysis method was used to determine the construct validity of the academic performance perception scale. According to Sencan (2005), instead of the descriptive factor analysis, researchers should use the principal component analysis method if the main aim of the research is to develop a main objective scale or to detect under which dimensions the measurement items can be grouped. The KMO value and the results of the Bartlett test were examined in terms of the assumptions of the principal component analysis (Kline, 2000). In addition, the items that did not fit to the scale provided load for more than one factor, and had a factor load of less than .50 because the size of the sample was  $N = 125$ , according to Km-Yin (2004), were excluded from the scale by considering the items whose factor eigenvalue was bigger than 1 (as cited in Sencan, 2005). In order to validate the underlying factor structure derived following the implementation of Principle

Component Analysis (PCA) on the data of first research group, Confirmatory Factor Analysis (CFA) was applied for the data collected from the second research group (N=147). The criterion that required the sample size to be at least five times the observed number of variables was considered in performing CFA (Tabachnick and Fidell, 2007). Moreover, upon the examination of the z scores of academicians in relation to their CFA assumptions, coefficients for Mahalanobis distance, residual values, tolerance, VIF values, and condition index (CI), it was concluded that no univariate extreme value ( $\pm 3z$ ) was present, and there was only one multivariate extreme value ( $\chi^2 = 59.20 > \chi^2_{(26,.001)}=54.05$ ;  $p<.001$ ). Furthermore, the data exhibited a multivariate normal distribution, test linearity was achieved, and a multicollinearity problem (tolerance $<.10$ ; VIF $<10$ ; CI $<30$ ) did not exist. The Cronbach's Alpha coefficient was calculated for the reliability of the academic performance perception scale.

### Results

The descriptive statistics related to the scale scores of the academicians in the first research group are presented in Table 1.

**Table 1**

*Descriptive Statistics Related to the Scale Scores of the Academicians*

<i>N</i>	<i>Range</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>Med</i>	<i>Mod</i>	<i>K<sub>y</sub></i>	<i>B<sub>s</sub></i>	<i>S<sub>s</sub></i>
125	93	94	187	139.23	140	140	-.06	-.05	17.76

When examining Table 1, it can be stated that the group consisting of 125 academicians is heterogeneous because of the wide range and high standard deviation. The fact that the values of the skewness and kurtosis are within  $\pm 1$  and that the mode, median, and arithmetic mean values are close to each other provides information regarding that the univariate normality assumption was ensured (Leech et al., 2005). In addition, the histogram graph related to the scale scores of the academicians is given in Figure 1.



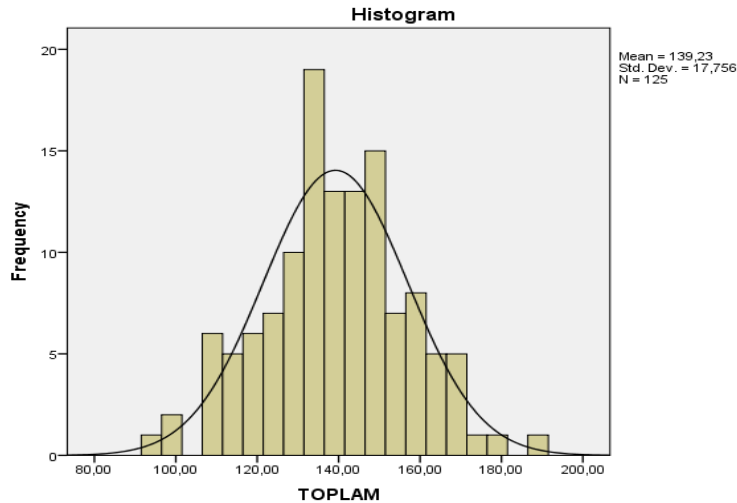


Figure 1. Histogram graph related to the scale scores of the academicians

When examining Figure 1, it is seen that the distribution of the academicians' scale scores shows a distribution which is similar to a normal distribution. The item-total test correlation was examined to determine whether there was a positive and linear relationship between the responses given to an item on the scale and the responses given to the whole scale (Erkus, 2003). The item-total test correlations were between .18 and .73, and each of the items had a significant relationship with the scale scores ( $p < .05$ ).

When the  $t$  values were calculated for the 27% sub-superior groups to determine whether the items distinguished between those having positive perceptions regarding academic performance and those having negative perceptions, the  $t$  values were observed to vary between 1.66 and 12.77. Therefore, the item scores, except the item scores of the 17<sup>th</sup>, 24<sup>th</sup>, 32<sup>nd</sup>, and 33<sup>rd</sup> items on the academic performance perception scale, showed a significant difference according to the 27% sub-superior groups ( $p < .05$ ). Accordingly, it can be stated that, when the non-significant items are excluded from the scale, the sub and superior groups of the scale are well-distinguished. The Ordinal Logistic Regression Method was used to explore if polytomous items that contain DIF in terms of gender exist in the scale that was developed to measure the academic performance perceptions of academicians. In line with this information, the Results of the Ordinal Logistic Regression Method for DIF Analysis is given in Table 2.

**Table 2***The Results of the Ordinal Logistic Regression Method for DIF Analysis*

Item No	$\Delta R^2$	Item No	$\Delta R^2$	Item No	$\Delta R^2$	Item No	$\Delta R^2$
1	.012	11	.001	21	.036	31	.008
2	.009	12	.003	22	.008	32	.049
3	.006	13	.008	23	.032	33	.017
4	.004	14	.009	24	.042	34	.012
5	.030	15	.045	25	.003	35	.041
6	.028	16	.034	26	.033	36	.046
7	.013	17	.001	27	.029	37	.038
8	.033	18	.019	28	.022	38	.031
9	.082*	19	.051	29	.048	39	.080
10	.064*	20	.074*	30	.023	40	.023

(\*:  $\chi^2_{Model3} - \chi^2_{Model1} > \chi^2_{.01}$ )

When examining Table 2, it can be propounded that, even if three out of 40 items flagged DIF in terms of gender, these three items (Items no. 9, 10, and 20) have a negligible/tolerable level of DIF, i.e. ( $\Delta R^2 < .13$ ) at Level A (Zumbo and Thomas, 1996). Hence, in addition to the item-total test correlation and the outcomes of the t test for 27% sub-superior groups, the inexistence of an item containing DIF at the levels of B and C in the scale can be claimed as evidence for item validity.

To determine the construct validity of the scale, the principal component analysis method was applied to the 36 items that were found to be significant according to the t test results for item-total test correlation and the 27% sub-superior groups. As a result of the analysis, 10 items were removed from the scale because the items provided load to more than one factor and had a factor load less than the .50 needed to be excluded.

When the results of the KMO value and the Bartlett test were examined, the KMO value was found to be .84, which showed that the data structure of the research group consisting of 125 academicians and belonging to the 26 items was good enough to perform the principal component analysis in terms of the size (Leech et al, 2005). The fact that the obtained chi-square value related to the Bartlett test result was significant ( $\chi^2(406, N=125)=1861.418, p < .01$ ) at the  $p=.01$  level meant that the data came from a highly variable normal distribution. For the test of the construct validity, the Varimax rotation technique was used in the analysis of the principal components, since the scale was multi-factored. The findings related to the factors are given in Table 3.

**Table 3**

*Findings Related to Factors that Were Obtained as a Result of the Principal Component Analysis*

Factor	Eigenvalues	Variance Percentage	Total Variance Percentage
1	7.83	27.00	27.00
2	4.49	15.47	42.47
3	2.09	7.20	49.66
4	1.46	5.02	54.68
5	1.34	4.62	59.30

When examining Table 3, it can be seen that there were five factors with an eigenvalue bigger than 1.00. The first factor described 27% of the total variance. The contribution of the factors of the total variance percentage decreased after the first factor. This situation can be seen in Figure 2.



**Figure 2.** Scree Plot

When examining Figure 2, it can be stated that the slope experienced by high acceleration and rapid deceleration indicated a significant number of factors. After the fifth factor, it seemed that the slope started to stabilise. Therefore, it can be propounded that the eigenvalue that made the largest contribution to the total variance percentage was formed by a five-factor structure, by paying attention to the number of factors above one. The first factor consisted of 10 items, the second factor consisted of five items, the third factor of five items, and the fourth and fifth factors consisted of three items. The 26 items collected under these five factors described 59.30% of the total variance.

**Table 4***Items and Factor Loads in the Dimensions as a Result of the Principal Component Analysis**Items and Factor Loads of the Foreign Language Self-Efficacy Dimension*

<b>Item No</b>	<b>Factor Load</b>
8	.87
10	.86
20*	.85
15	.84
21*	.79
22*	.78
7	.73
13	.72
18*	.71
23*	.65

*Items and Factor Loads of the Scientific Research Self-Efficacy Dimension*

<b>Item No</b>	<b>Factor Load</b>
4	.82
5	.77
31*	.73
12	.63
3	.53

*Items and Factor Loads of the Technology Self-Efficacy Dimension*

<b>Item No</b>	<b>Factor Load</b>
19	.76
9	.59
2	.58
11	.56
16	.53

*Items and Factor Loads of the Effective Lecture Dimension*

<b>Item No</b>	<b>Factor Load</b>
26	.78
27	.72
28	.65

*Items and Factor Loads of Self-efficacy versus external factors dimension*

<b>Item No</b>	<b>Factor Load</b>
35	.72
29	.63
36*	.62

\*Items scored reversely

When examining Table 3, it can be observed that the factor loads of the items collected under the five dimensions varied between .53 (3<sup>rd</sup> item "I can make my scientific studies fit the format of each journal".) and .87 (8<sup>th</sup> item "I can engage in joint research with a foreign academician without the need for tools such as dictionaries or translation programs".).

As a result of the implementation of Principle Component Analysis, the Academic Performance Perception Scale consisting of 26 items with five factors was applied to the second research group. Confirmatory Factor Analysis (CFA) was conducted for the data obtained following the application to determine whether they fit the Five-Factor Model. Notwithstanding the differences in literature concerning which of the goodness of fit indexes acquired after CFA should be reported, in addition to the  $\chi^2/df$  of all other indexes, Iacobucci (2010) suggested CFI and SRMR to be reported, while Brown (2006) emphasised the reporting of RMSEA, SRMR, CFI and NNFI. However, Karagoz (2016) noted that RMSEA is highly responsive to sample sizes and, hence, RMSEA should not be reported in studies with small sample sizes ( $N < 250$ ). In line with this information, the Goodness of Fit Index for Academic Performance Perception Scale is provided in Table 5.

**Table 5**

*Goodness of Fit Indexes and Values for Academic Performance Perception Scale*

<i>Goodness of fit index</i>	<i>Values</i>
$\chi^2$	588.90
df	289
NNFI	.90
CFI	.91
SRMR	.09

Upon the analysis of Table 5,  $\chi^2/df = 2.04$  index, which is below 2.50, proves to have a perfect fit (Kline, 2011); NNFI and CFI indexes, which are equal to or above .90, have an acceptable fit (Bentler, 1980; Marsh, Hau, Artelt, Baumert and Peschar, 2006); and SRMR index, which is below .10 have an acceptable fit (Hu and Bentler, 1999; Kline, 2011). Moreover standardized factor loadings of the items weren't found to be higher than 1, so it can be propounded that, the five-factor model have an acceptable fit with the data (Simsek, 2007). An overall analysis of fit indexes as a result of the Confirmatory Factor Analysis revealed the validation of five-factor structure of Academic Performance Perception Scale with 26 items. Brown (2006) stated that the examination of model stability or invariance on research groups is enabled when CFA is performed on different research groups. Therefore, the five-factor model for the Academic Performance Perception Scale can be inferred to have stable outcomes over different research groups as per CFA results.

The Cronbach's Alpha ( $\alpha$ ) coefficient, which is the internal consistency measure for the 40-item scale was .89, while it was found to be  $\alpha = .88$  for the final scale including 26 items, which was obtained as a result of the item-total test correlation, item analysis based on the sub-superior group averages in addition to the DIF outcomes, the analysis of the principal components. The Cronbach's alpha coefficient is quite high. This result indicates that the items forming the scale are consistent with each other, which means that the academic performance perception scale can be used reliably. After the validity and reliability analysis, the original form of the scale consists of 26 items. Nineteen items on the scale are positive, and 7 are negative. The highest score that can be obtained from the scale is 130, while the lowest score is 26.

## Discussion and Conclusion

### *Discussion*

In this study, a 26-item scale was developed to measure the academic performance perceptions of the academicians. The scale consists of five dimensions: Foreign Language Self-Efficacy, Scientific Research Self-Efficacy, Technology Self-Efficacy, Teaching Effectively, and Self-Efficacy versus External Factors. Foreign language is very important for the rapid spread of knowledge and communication within the globalising world (Ocal, 2012). In the study conducted by Yavuzer and Gover (2012), it was concluded that foreign language was obligatory in the execution and follow-up of the scientific activities. Therefore, the "Foreign Language Self-Efficacy" of the academicians is one of the factors that affects academic performance perceptions.

It is also emphasised that there is a need for educators who use computers effectively during the learning and teaching process, who are able to persevere when facing computer-related problems, i.e. who have high computer-related self-efficacy beliefs (Akkoyunlu, Orhan and Umay, 2005). In addition, there is a high level of positive correlation between the individuals' attitudes towards the computers and their self-efficacy beliefs related to academic performance (Ipek, Tekbiyik and Ursavas, 2010), which is in line with the "Technology Self-efficacy" dimension included within the academic performance perception scale. However, in the study conducted by Odaci and Celik Berber (2012), a significant negative relationship was found between problematic internet users who spend their time by browsing unnecessary pages on the Internet and academic self-efficacy; the academic procrastination behaviours of the such individuals showed a reduction in their academic self-efficacy beliefs. According to these findings, it can be stated that, if the technology is not used properly, it can negatively affect the academic performance of the academicians.

The prospect of the academicians' self-efficacy scores on their academic performances (Bishop, Bieschke and Garcia, 1993), according to the findings, demonstrate that high self-efficacy beliefs are likely to influence the willingness to teach and to be more successful in classroom management (Gibson and Dembo, 1984). In addition, individuals who display high self-efficacy do not give up while facing difficult situations (Bandura, 1997), which can be shown as evidence for the dimensions of scientific research self-efficacy, effective teaching, and the dimension of self-efficacy versus external factors.

### *Conclusion*

In this study, it was concluded that the items were discriminating, since the item-test correlation was significant and the item scores of the academicians (except four items) showed a significant difference ( $p < .05$ ) according to the 27% sub-superior groups, and no item containing DIF in terms of gender exists at the levels of B-C. As a result of the principal component analysis, the factor loads of the 26 items varied from .53 to .87 and described 59.30% of the total variance. Findings of CFA were

proven to demonstrate a good fit with the Five-Factor Model. This result provided evidence for construct validity. The internal consistency coefficient of the scale was .88. As a result, a reliable and valid data collection tool was developed that can be used for the determination of academicians' academic performance perceptions.

#### *Recommendations*

An application similar to the in-service training applied by the Ministry of Education for the teachers can be established by the Higher Education for the academicians by determining their academic performance perception levels. It can be investigated whether there is a significant relationship between academicians' academic incentive scores and their academic performance perceptions. Studies can be conducted on the accuracy level of the academic performance perception scale scores of the academicians working at five universities included among the best 500 universities, according to the ranking of the best universities in the world, and the academicians working at five universities that are not included within this ranking.

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### Akademik Performans Algı Ölçeği Geliştirme Çalışması

#### Atf:

- Gur, R. (2017). Development of the academic performance perception scale. *Eurasian Journal of Educational Research*, 69, 177-197. <http://dx.doi.org/10.14689/ejer.2017.69.10>

#### Özet

*Problem Durumu:* Akademik performans üzerine tek boyutlu odaklanılan çalışmalar bulunmasına rağmen, akademisyenlerin birçok boyutta akademik performans algılarını belirlemeye yönelik ilgili literatürde herhangi bir çalışmaya rastlanılamamıştır. Akademisyenlerin akademik performans algılarının ne düzeyde olduğunu belirlebilmesi, ülkelerin mevcut olanaklarını en iyi şekilde kullanarak hem nitelikli akademisyenlerin yetiştirilmesi hem de mevcut akademisyenlerin

bilimsel ve teknolojik yönden ülkelerine katkılarının devam etmesini sağlayabilmek için atılması gereken adımların neler olması konusunda ilgili kurumlara katkı sağlayacağı düşünülmektedir. Ayrıca akademik performans üzerine literatürde sınırlı sayıda araştırma yapılmıştır. Bu çalışmanın literatürdeki söz konusu eksikliği giderme açısından, diğer çalışmalara da kaynaklık edebileceği düşünülmektedir.

*Araştırmanın Amacı:* Bu çalışmada, akademisyenlerin akademik performans algularını ölçebilecek geçerli ve güvenilir bir ölçek geliştirilmesi amaçlanmıştır.

*Araştırmanın Yöntemi:* Bu çalışmanın ilk araştırma grubunu, Ankara Üniversitesi Eğitim Bilimleri Fakültesi'nde görev yapmakta ya da lisansüstü eğitim almakta olan 125 akademisyen; doğrulayıcı faktör analizi (DFA) yapılan ikinci araştırma grubunu ise, Erzincan Üniversitesi'nde görev yapmakta ya da lisansüstü eğitim almakta olan (1 çok değişkenli uçdeğer atıldıktan sonra) 147 akademisyen oluşturmaktadır. Ölçek geliştirilirken likert tipi ölçek geliştirme adımları dikkate alınarak çift olumsuzluk taşıyan, belirsizlik yaratan, anlatım bozukluğuna sebep olan ifadelerden kaçınılmıştır. Hazırlanan maddeler, "Öz-yeterlik" üzerine çalışmalarda bulunan iki uzman; üç Ölçme ve Değerlendirme Uzmanı; bir Bilgisayar Öğretimi ve Teknoloji Uzmanı; bir İngilizce Öğretmeni ve bir Türk Dili Uzmanı tarafından incelenmiş, dil, kapsam ve psikometrik açıdan değerlendirilmiştir. Görüşler doğrultusunda ifadeler gözden geçirilmiş ve 29'u olumlu; 11'i ise olumsuz olmak üzere toplamda 40 maddeden oluşan Akademik Performans Algı Ölçeği ön deneme uygulamasına hazır duruma getirilmiştir. Yazılan maddelerin uzman görüşüne sunulması kapsam geçerliği için kanıt olarak gösterilebilir. Ölçeğin deneme formunda yer alan 40 maddenin madde geçerliğini belirlemek amacıyla madde- toplam test korelasyonları için Pearson Çarpım Momentler Korelasyon Katsayısı hesaplanmıştır. Madde ayırt ediciliklerini belirlemek için ise, alt üst grup ortalamaları farkına dayalı madde analizi yöntemi kullanılmıştır. Alt üst grup ortalamaları arasındaki fark, bağımsız gruplar t testiyle incelenmiştir. Bunların yanı sıra madde geçerliğine kanıt olarak cinsiyet değişkenine göre değişen madde fonksiyonu (DMF) gösteren çok kategorili madde bulunup bulunmadığı incelemek için sıralı lojistik regresyon yöntemi kullanılmıştır. Akademik performans algı ölçeğinin yapı geçerliğini belirlemek amacıyla, ilk araştırma grubundaki verilere temel bileşenler analizi uygulanmıştır. Temel bileşenler analizi sonucunda elde edilen faktör yapısının doğruluğunu test etmek için, ikinci araştırma grubundan toplanan veriler üzerinde doğrulayıcı faktör analizi (CFA) yöntemi uygulanmıştır. Akademik performans algı ölçeğinin güvenilirliğine ilişkin olarak ise Cronbach Alfa katsayısı hesaplanmıştır.

*Araştırmanın Bulguları:* Bu çalışmada, madde toplam test korelasyonlarının .18 ile .73 arasında değerler aldığı ve her maddenin ölçek puanlarıyla manidar ilişki gösterdiği sonucuna ulaşılmıştır ( $p < .05$ ). Maddelerin, akademik performans algısına olumlu yönde sahip olanlarla, olumsuz yönde sahip olanları ayırt edip etmediğini saptamak için %27'lik alt ve üst gruplar için t değerleri hesaplandığında, t değerleri 1.66 ile 12.77 arasında değişmektedir. Dolayısıyla, akademik performans algı ölçeğinde yer alan 17, 24, 32 ve 33. maddeler dışındaki madde puanları, %27'lik alt ve üst gruba göre manidar bir farklılık göstermektedir ( $p < .05$ ). Buna göre manidar olmayan maddeler ölçekten çıkarıldığında, ölçeğin alt ve üst grubu iyi ayırt ettiği söylenebilir.

Akademisyenlerin akademik performans algılarını ölçmeye yönelik geliştirilen ölçme aracında cinsiyet değişkenine göre DMF gösteren çok kategorili maddelerin bulunup bulunmadığına ilişkin sıralı lojistik regresyon yöntemi sonuçları incelendiğinde, cinsiyet değişkenine göre, 40 maddeden üçünde DMF bulunsa da üç madde (9., 10. ve 20. Madde) için de değişen madde fonksiyonlarının, A düzeyinde ( $\Delta R^2 < .13$ ) bir başka ifadeyle ihmal/tolerans edilebilir düzeyde olduğu bulgusuna ulaşılmıştır. Dolayısıyla madde-toplam test korelasyonu ve %27'lik alt ve üst gruplar için t testi sonuçlarının yanı sıra ölçekte B ve C düzeyinde DMF gösteren maddenin bulunmaması madde geçerliğine kanıt olarak sunulabilir. Akademik performans algı ölçeğinin yapı geçerliğini belirlemek amacıyla yapılan temel bileşenler analizi sonucunda, (KMO=.84;  $\chi^2$  (406, N=125)=1861.418,  $p < .01$ ) ölçeğin beş faktör toplamda 26 maddeden oluştuğu saptanmıştır. Elde edilen 26 maddenin faktör yük değerleri .53 ile .87 arasında değişmekte ve bu beş faktör toplam varyansın %59.30'unu açıklamaktadır. Temel bileşenler analizi sonucunda beş faktörden oluşan 26 maddelik Akademik Performans Algı Ölçeği ikinci araştırma grubuna uygulanmıştır. Uygulama sonucunda elde edilen verilerin, beş faktörlü model ile uyum gösterip göstermediğini tespit etmek için doğrulayıcı faktör analizi yapılmıştır. Doğrulayıcı faktör analizi sonucu elde edilen uyum indeksleri ( $\chi^2/df = 2.04$ ; NNFI=.90; CFI=.91; SRMR=.09) genel olarak değerlendirildiğinde, 26 maddelik Akademik Performans Algı Ölçeğinin beş faktörlü yapısının doğrulandığı sonucuna ulaşılmıştır. Bir başka ifadeyle, doğrulayıcı faktör analizi sonuçlarına göre, Akademik Performans Algı Ölçeğine ilişkin beş faktörlü modelin farklı araştırma grupları üzerinde kararlı sonuçlar verdiği şeklinde yorumlanabilir. Bu sonuçlar, yapı geçerliğine kanıt sağlamaktadır. İç tutarlılık katsayısı incelendiğinde ise ( $\alpha=.88$ ) ölçeği oluşturan maddeler birbirleriyle tutarlı olduğu görülmektedir.

*Araştırmanın Sonuçları ve Önerileri:* 19'u olumlu, 7'si ise olumsuz toplamda 26 maddeden oluşan ölçeğin asıl formunun, akademisyenlerin akademik performans algılarını belirlemek üzere kullanılabilir ve geçerli bir veri toplama aracı olduğu sonucuna ulaşılmıştır. Araştırmacılar için akademisyenlerin akademik teşvik puanları ile akademik performans algıları arasında manidar düzeyde ilişki bulunup bulunmadığına yönelik bir çalışma önerilebilir. Ayrıca, en iyi dünya üniversiteleri sıralamasına göre, ilk 500'de yer alan 5 üniversitede görev yapmakta olan akademisyenler ile ilk 500'de yer almayan 5 üniversitede görev yapmakta olan akademisyenleri, akademik performans algı ölçeği puanları hangi doğruluk düzeyinde sınıflandırdığına ilişkin çalışmalar yapılabilir. Kurumlara yönelik ise, YÖK tarafından akademisyenlerin akademik performans algı düzeyleri belirlenerek akademisyenlerin ihtiyaçları doğrultusunda hizmetiçi eğitimlerin verilmesi önerilebilir. Bu eğitimler kapsamında, teknolojiye yaşanan gelişmeler; yabancı dil; diksiyon ve beden dili; makale yazımında dikkat edilecek hususlar; şehirlerin ihtiyacı olan akademik çalışmalar hakkında bilgilendirme; veri analizleri; akademik çalışmalarda yararlanılabilecek istatistik ve yazılım programları hakkında seminerler verilebilir.

*Anahtar Kelimeler:* Akademik çaba, öz-yeterlik, başarı, akademik yeterlik.