

**İNGİLİZCEYİ YABANCI DİL OLARAK ÖĞRENEREN ÖĞRENCİLERDE
TRİCE AKADEMİK KONTROL ODAĞI ÖLÇEĞİNİN
TEK BOYUTLU FAKTÖR YAPISININ ÖN İNCELEMESİ**

**A PRELIMINARY INVESTIGATION OF UNIDIMENSIONAL
FACTOR STRUCTURE OF TRICE ACADEMIC LOCUS OF
CONTROL SCALE IN EFL STUDENTS**

**ПРЕДВОРИТЕЛЬНЫЙ ОБЗОР ОДНОМЕРНОЙ СТРУКТУРЫ
ТРЕУГОЛНИКА TRICE С ЦЕЛЬЮ ИЗМЕРЕНИЯ ЗНАНИЙ У
СТУДЕНТОВ ИЗУЧАВШИХ АНГЛИЙСКИЙ КАК ИНОСТРАННЫ ЯЗЫК**

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ÖZ

Denetim odağı okul ve akademik performansının önde gelen belirleyici faktörlerindedir. Dışa yönelik denetim odağı olanlar olayların kader, şans ve başka güçler tarafından kontrol edildiğine inanırlar. Bunun aksine, içsel denetim odağı olanlar hayattaki olayların kendi davranışları tarafından etkilendiğine inanırlar. Bu çalışmanın amacı Türkiye’de üniversite seviyesinde İngilizceyi Yabancı Dil Olarak (EFL) öğrenen ve Türkiye’nin Ege Bölgesinde bir üniversitede okumakta olan 402 katılımcı üzerinde Trice Akademik Kontrol Ölçeğinin güvenilirliğini ve geçerliğini ortaya çıkarmaktır. Katılımcıların yaşları 18 ve 27 arasında değişkenlik göstermektedir. Çok kuvvetli olmayan sekiz tane metrik unsur çıkarıldıktan sonra verilerden TALCS’ın tek boyutlu öncelikli faktör yapısı incelenmiştir. TALCS ölçeğinin güvenilirlik katsayısı (Cronbach’ın Alfası) $\alpha = .96$ ’ya eşitti. Öğrencilik yıl sürelerinin ortalama değeri $M=3.02$ olmasına karşın standart sapma $SD=1.24$ ’dür. Akademik kontrol odağı üzerindeki cinsiyet farklılıklarının ise istatistiksel olarak önemli olmadığı ve önceden tanımlanan alfa. 05 seviyesinde olduğu görülmüştür. Katılımcıların okuma sürelerinin aritmetik ortalaması $M=3.02$ olmasına karşın $SD= 1.24$ olarak ortaya çıkmıştır. Katılımcıların akademik kontrol odağı ve yaşları ile korelasyonunun düşük ve istatistiksel olarak anlamlı olduğu ortaya çıkmıştır. Araştırma bulgularının sonuçları tartışılmış olup pedagojik psikoloji alanında ileride yapılabilecek çalışmalar için önerilerde bulunulmuştur.

Anahtar sözcükler: akademik kontrol odağı, güvenilirlik, İngilizce öğrenen öğrenciler, güvenilirlik, geçerlilik.

ABSTRACT

Locus of control is one of the major factors of school/academic performance. People who have external locus of control believe that life events are controlled by fate, chance, or luck. Conversely, those who have internal locus of control believe that life events are influenced by their behavior. The aim of this study is to check psychometric properties (i.e. the reliability and validity) of Trice Academic Locus of Control Scale using a sample of 402 EFL students involved in tertiary education in Europe (Nmales = 198, 50.5%;

* 10.17498/kdeniz.279654

Nfemales = 204, 49.5%; Mage = 21.56, SDage = 1.88). Their ages ranged between 18 and 27 years old. After excluding eight items with poor psychometric characteristics, a unidimensional underlying factor structure was examined of the TALCS from the data. The reliability coefficient (Cronbach's Alpha) for the revised version of the TALCS scale was .96. The mean value of their years of study was calculated as M = 3.02 whereas the standard deviation was SD = 1.24. Gender differences in academic locus of control were not statistically significant at predefined alpha level of .05. The correlation between participants' academic locus of control and their age was very small and statistically insignificant. Some implications of these findings were discussed as well as suggestions for future studies in this field of pedagogic psychology.

Keywords: academic locus of control, EFL students, reliability, validity.

АННОТАЦИЯ

Цель статьи раскрыть надёжность и фактор действия системы академического контроля Trice. Для этого был проведён опрос 402 студентов одного из вузов эгейского региона, где студенты изучают английский как иностранный язык (EFL). Возраст опрошенных студентов является от 18 до 27 лет. В течении опроса не было использовано 8 слабых метрических элементов. После чего, исследование было проведено по принципу одномерой системы TALCS. Оно было равно к (Cronbach'in Alfasi) $\alpha = .96$. Средний период обучения равно $M=3.02$, а стандартное отклонение - $SD=1.24$. Разница данных между полами является - альфа 05. Для измерения срока обучения по шкале ровно $M=3.02$, а средних арифметических данные ровно $SD=1.24$. Было установлено, что академический локус контроля и коллерация по отшошениис возрастом низкая и с точки зрения статистики значительная. Эту статью можно использовать как рекомендацию в сфере педпсихологии.

Ключевые слова: академическая локус контроля, надёжность, студенты изучающие английский, срок действия.

Introduction

Locus of control is a term coined and introduced into psychology by Julian Rotter in 1954. This was part of the *Rotter's social learning theory*, one of the chief approaches in social psychology (McLeod et al., 2015). Later (in 1966), it was stated that this construct has two opposite poles – internal and external (as cited in Rotter, 1990). Locus of control is the way people perceive the antecedents and causes of their life events as well as success and failure. If somebody thinks and behaves predominantly in accordance with internal locus of control (ILOC), s/he believes that her/his own behavior, competencies, skills and efforts determine and influence life outcomes (in life's educational, professional, private and social aspect). On the other hand, externals (those people who think and behave from the external locus of control /ELOC/ perspective) believe that their life outcomes and events are influenced by a third party or some outside forces. In other words, by external factors (destiny, fate, chance, God, other people who have some sort of power: political leaders, parents, teachers; unpredictable circumstances, etc.). Thus, the construct of locus of control is a continuum where each person can be placed into one point between ILOC and ELOC. *Academic locus of control* is a domain-specific locus of control (Rinn et al., 2014). For example, students who are labeled as internals use learning strategies more frequently

compared to externals, and they achieve greater academic performance than the latter group of students (Durna & Senturk, 2012).

As for gender differences in locus of control, various studies revealed more internal locus of control in males as compared to females (Cairns, McWhirter, Duffy, & Barry, 1990; Haider Zaidi & Naeem Mohsin, 2013; Stipek & Weisz, 1981); however, some studies did not yield statistically significant gender differences in this variable (Clarke, 2004; Naik, 2015). A research showed positive correlation between age and the level of internal locus of control (Blanchard-Fields & Irion, 1988). In other words, older people think that their behavior is influenced by their wills and decision making whereas youngsters are more prone to explaining their life circumstances and behaviors by referring to external factors (such as chance, fate...).

Locus of control is a good predictor of lots of psychological and educationally-relevant variables: self-esteem and hopelessness (Balbag, Cemrek & Mutlu, 2010), actual and future self-concept as well as academic self-efficacy (Sagone & De Caroli, 2014; Yeşilyurt, 2014), goals achievement (Kazak Çetinkalp, 2010), motivational persistence (Sarıçam, 2015), and grade point average - GPA (Hasan & Khalid, 2014).

There are several tools that measure locus of control. The best-known is *Rotter Internal-External Locus of Control Scale* (Rotter, 1966). Here participants choose between externally and internally defined items. For example: "Many of the unhappy things in people's lives are partly due to bad luck " is an item that refers to external locus of control whereas the following item: "People's misfortunes result from the mistakes they make" is an internally defined item." There are 23 pairs of items in total. *Levenson IPC Scale* (Levenson, 1972) mostly deals with measuring externality side of the locus of control construct. It is divided into three subscales that cover internality pole as well as two sources of externality: Internality, Chance and Powerful others. *Academic Locus of Control Scale* (Akin, 2007) consists of 17 items divided into two subscales – one measures external and the other internal academic locus of control. *Trice Academic Locus of Control Scale* (Trice, 1985) will be explained in detail within the methods section of this paper.

The purpose of this study includes checking psychometric properties of the *Trice Academic Locus of Control Scale* (Trice, 1985) among EFL students. It is one of the widely used instruments in educational context which is utilized to put students in a particular point of the *internal-external locus of control continuum*. More particularly, the author of this study is interested in the suitability of this scale for EFL students in Turkey. He chose this group of students, because academic locus of control is a very interesting and important hypothetical construct in learning English as a foreign language. In fact, this psychological concept is one of the crucial variables in the context of education.

Accordingly, the three following hypotheses were defined:

1. *Trice Academic Locus of Control Scale* is a unidimensional measurement tool with acceptable internal consistency ($\alpha \geq .700$).

2. There are no statistically significant gender differences in locus of control among EFL students (it is defined as a null-hypothesis, because the findings from the literature are ambiguous).

3.Participants’ age and year of study are in negative and statistically significant correlations with their scores on the TALCS scale (i.e. participants’ externality decreases while age and year of study increases).

The last hypothesis is defined based on the expectation/anticipation that, as students get older, tend to attribute their academic success to their intelligence, experience, working habits, and other kinds of individual effort (thus, to the internal sources rather than to luck, fate, or chance).

It should be pointed out that the main hypothesis is the first one whereas the other two hypotheses were specified because it is aimed to examine whether some demographics influence participant’s scores on the above mentioned scale.

Method

The conducted study is a quantitative one. To be more specific, it is mainly a correlational research. A psychological scale was used as the main measurement tool. Thus, this study can, in terms of psychology, be labeled as a psychometric validation of an instrument that is used to measure a particular hypothetical construct (i.e. academic locus of control).

Sample

The sample involved 402 students who were involved in tertiary education in Europe, 204 of whom (50.5%) were females and 198 were males (49.5%). The mean of participants’ age was $M = 21.56$ ($SD = 1.88$). Their age ranged between 18 and 27 years old. Students from 1st to 6th year of study participated in this research. The average year of their study was $M = 3.02$ whereas the standard deviation was $SD = 1.24$. We used the convenience sampling technique, which is a type of non-probability sampling method. Participants’ age and year of study were shown in Table 1 below.

Table 1. *Participants’ Age and Their Year of Study*

Age	Year of study						Total
	1 st	2 nd	3 rd	4 th	5 th	6 th	
18	10	0	0	0	0	0	10
19	9	15	0	0	0	0	24
20	3	20	1	0	0	0	24
21	2	5	15	0	0	0	22
22	0	1	30	12	0	6	49
23	0	0	8	28	1	0	37
24	0	0	3	11	2	0	16
25	0	0	0	1	2	2	5
26	0	0	0	0	1	0	1
27	0	0	0	0	2	0	2
Total	24	41	57	52	8	8	190

As can be seen (Table 1), the majority of our participants are at the third year of their studies ($N = 57$) whereas the lowest number of participants are at 5th and 6th year of their studies ($N = 8$ each). On the other hand, the majority of our participants were 22 years old ($N = 49$) whereas only one student was 26 years old.

Data Collection

Questions on demographics. At the beginning of the research, participants answered questions on their gender (male/female), age and year of study (1st to 6th). These demographics' questions were added because it was aimed to investigate the possible gender differences in participants' average scores on *Trice Academic Locus of Control Scale*, as well as differences with regard to their ages and year of studies.

Trice Academic Locus of Control Scale (Trice, 1985). This measurement tool comprises 28 True-False items. Eleven of them are reversely coded: 1, 3, 10, 11, 13, 15, 16, 17, 19, 25 and 28. Minimum possible score is 0 and the maximum one is 28. Each item is attributed with one point (if it represents external locus of control and is answered with "True"). Otherwise, participant's answer receives zero points. Greater scores indicate external academic locus of control whereas lower scores indicate internal academic locus of control. An example of the items that represent external locus of control is the following one: "I sometimes feel that there is nothing I can do to improve my situation." Internal locus of control is represented pretty accurately by the content of the following item: "I never feel really hopeless-there is always something I can do to improve my situation." Because this paper deals with the validity and reliability of *Trice Academic Locus of Control Scale*, its psychometric properties are provided later, in *Findings*.

Process

The data were collected in 2015 via internet. An online form of the measures was distributed among participants. All the students give their informed consent to participate in this research. The researcher guaranteed their anonymity and the confidentiality of the collected data that include some personal information. The researcher also informed the participants that they have the right to give up this study whenever they want. In addition, they were told about the chief purpose of data to be collected: writing a science paper through which academic community can be informed on the studied variables and their relationships. Therefore, pedagogical and psychological research standards and ethics were followed.

Analysis of Data

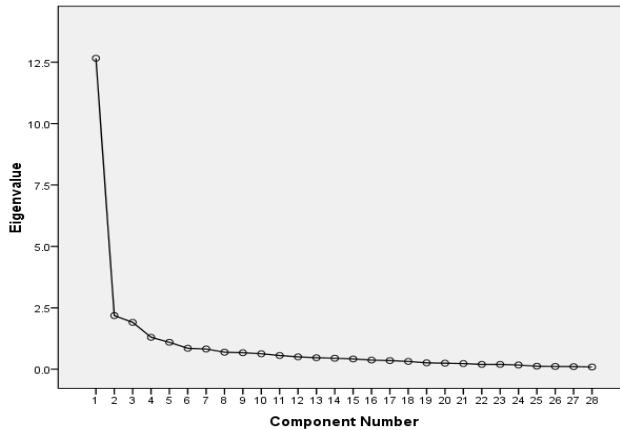
The statistical analyses conducted for this article were: principal component analysis (PCA), item analysis along with reliability check (expressed as the Cronbach's alpha coefficient - α), Mann-Whitney U test (in order to test the statistical significance of gender differences), and Spearman's rho (r_s) coefficient of correlation. Because distributions of the main variables were different from the normal curve (see the findings part below), nonparametric statistical procedures were used after PCA.

Findings

Several authors recommended that for exploratory factor analysis (EFA, where PCA is included) subjects to item ratio should be at least 5:1 (e.g. Gorsuch, 1983; Hatcher, 1994). In our study, this ratio is 190:28 (or 6.79:1), thus, we can conduct principal component analysis. First, the results based on principal component analysis (PCA) will be presented (Graphic 1, Table 2, Table 3). Referring to numbers displayed in Table 2, Kaiser-Meyer-

Olkin measure of sampling adequacy was quite high ($KMO = .908$), and the result of Bartlett’s test of sphericity was statistically significant ($\chi^2 = 3978.853$, $df = 378$, $p < .001$). Hence, the prerequisites for conducting principal component analysis were met.

According to Kaiser-Guttman’s criterion (eigenvalue greater than 1), five components (factors, latent dimensions) were extracted. However, these components were not enough interpretable. Hence, another criterion was taken into consideration – Cattell’s scree-plot criterion, based on eigenvalues’ graphical representation (Graphic 1). As can be noticed in Graphic 1, three distinguished points can be observed (i.e. three components explain a considerable amount of the manifest variable). After them, other components account for much less variance and this should be rejected. Hence, a three-component solution was retained.



Graphic 1. Scree Plot

These three factors accounted for 59.828% of the manifest data variance (Table 2). In order to simplify the obtained solution, hence, a three-component solution was retained. The *Varimax* rotation was conducted.

Table 2. *Extracted Principal Components, Their Eigenvalues (λ) and Percents of Variance (Before and After Rotation)*

Component	Initial values			After <i>Varimax</i> rotation		
	Λ	% of variance	Cumulative % of variance	Λ	% of variance	Cumulative % of variance
1	12.659	45.210	45.210	12.603	45.012	45.012
2	2.185	7.805	53.015	2.204	7.871	52.883
3	1.908	6.813	59.828	1.944	6.944	59.828

$KMO = .908$ $\chi^2 = 3978.853$, $df = 378$, $p < .001$

After the *Varimax* rotation had been applied, the first extracted component explained 45.012%, the second one 7.871% and the third component explained 6.944% of the total variance. In addition, rotated component matrix was produced (Table 3).

As can be noticed (Table 3), some items have secondary saturations with one of the other components: .371 (item 1 with the third extracted component), .534 (item 27 with the second extracted component), and .367 (item 17 with the first extracted component). The criteria was the saturation with the primary (main) factor that is greater than .350 and saturations with other factors that are less than .350. These three items were eliminated because they were multifactorial (i.e. they had high factor loadings on two or more extracted components/factors).

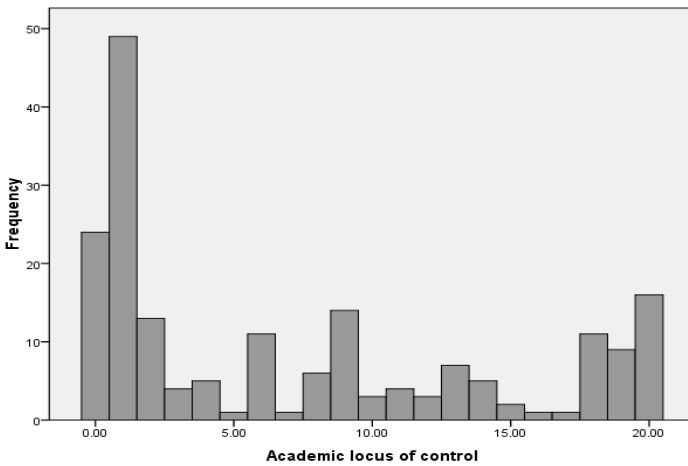
Table 3. Rotated Component Matrix with Communalities of Items

Item number	Communalities (h^2)	Component 1	Component 2	Component 3
18	.739	.860*	.012	-.092
23	.748	.859	.032	-.020
9	.723	.850	-.024	.003
15	.720	.846	.039	.051
11	.692	.835	-.027	-.109
20	.710	.830	-.004	.066
10	.681	.820	-.034	.086
7	.673	.819	-.047	-.009
24	.677	.815	-.041	-.104
3	.711	.792	-.003	.182
28	.661	.785	-.071	.298
2	.628	.781	-.053	-.108
14	.625	.773	.031	-.023
16	.599	.773	-.037	.171
25	.576	.758	.002	-.036
6	.496	.689	-.080	.125
12	.476	.652	-.062	-.217
1	.553	.602	-.231	.371**
8	.395	.567	-.231	.144
27	.358	.539	.534	.230
4	.276	.522	-.120	-.266
22	.565	.425	-.015	-.308
5	.654	.272	-.741	.188
26	.659	-.327	.739	-.013
13	.628	.139	.737	.043
21	.513	.103	.074	-.705
19	.443	-.022	-.049	.663
17	.575	.367	.347	.566

* saturations by primary component that were greater than .350 were bolded; ** saturations by secondary components that were greater than .350 were bolded and italicized

Next (Table 3), it can be noticed that only three items (items 5, 13 and 26) corresponded to the second component and only two items (items 19 and 21) within the third component remained. On the other hand, 20 items corresponded to the first extracted component. Hence, it was decided to keep these 20 items because they were good indicators of academic locus of control. To sum up, the following items were deleted: 1, 5, 13, 17, 19, 21, 22 and 26. After the aforementioned items had been excluded, Cronbach’s alpha coefficient was calculated as $\alpha = .960$ and it indicated very high level of internal consistency of this measurement tool.

By examining the distribution of participants' academic locus of control scores (with the help of Kolmogorov-Smirnov test), it can be noticed that there is a statistically significant difference between this distribution and the normal curve ($K-S Z = .221, p < .001$; Table 4). This distribution is displayed in Graphic 2 below.



Graphic 2. The Distribution of Academic Locus of Control variable

Minimum obtained score was 0 and the maximum one was equal to 20 (Table 3). The mean value of the *Trice Academic Locus of Control Scale* was $M = 7.28$ ($SD = 7.18$). However, because its distribution was non-normal, median (C) and semiinterquartile range (SQR) are more relevant indicators of its centrality and dispersion ($C = 4.5, SQR = 6.0$).

Table 4. Descriptive Statistical Values of the *Trice Academic Locus of Control Scale* Along with Participants’ Age and Year of Study

Variable	N	Min	Max	M	SD	C	SQR	K-S Z	P
Academic locus of control	190	0	20	7.27	7.18	4.5	6.0	.221	<.001
Participants’ age	190	18	27	21.56	1.88	22	1.5	.172	<.001
Year of study	190	1	6	3.02	1.24	3	1.0	.153	<.001

In Table 4, descriptive statistical values for participants' age and year of study were presented as well. Both of their distributions are significantly different from the normal curve: $K-S Z = .172, p < .001$ (participants' age) and $K-S Z = .153, p < .001$ (participants' year of study). The median of their ages was calculated as $C = 22$ ($SQR = 1.5$) and the median of years of studies was $C = 3$ ($SQR = 1.0$). Thus, nonparametric statistical procedures will be applied in the next part of this article (Mann-Whitney U test and Spearman's rho coefficient of correlation).

Values displayed in Table 5 and 6 correspond to the reject or fail to reject the 2nd and 3rd null hypotheses.

Table 5. Results of Mann-Whitney U test

Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	P
Males	94	98.65	9273.5	4215.5	-.791	.429
Females	96	92.41	8871.5			

Despite the mean rank of males' scores was greater (Mean Rank = 98.65) compared to that of females (Mean Rank = 92.41), the difference between their mean ranks was not statistically significant (Mann-Whitney $U = 4215.5, Z = -.791, p > .05$, Table 5). Hence, male and female EFL students have similar level of academic locus of control.

Table 6. Matrix of Correlations Between Academic Locus of Control, Participants' Ages, And Their Year of Studies

	Academic locus of control	Age	Year of study
Academic locus of control	1	.059	-.045
Age		1	.819*
Year of study			1

* $p < .001$

As can be noticed from Table 6, academic locus of control was in small and non-significant correlations with participants' age ($r_s(188) = .059, p > .05$) and their year of study ($r_s(188) = -.045, p > .05$).

Discussion / Conclusion and Suggestions

Research findings suggest that the *Trice Academic Locus of Control Scale* should be revised so that it includes 20 items that adequately represent the content of *academic locus of control* as a psychological/hypothetical construct. After this revision, the scale can be considered to be a valid and reliable instrument for assessing students' academic locus of control. Cronbach alpha coefficient was very high ($\alpha = .960$) and indicated strong item-total and inter-item correlations. Hence, the first hypothesis is mostly confirmed. Hasan and Khalid (2014) reported lower value of Cronbach alpha coefficient ($\alpha = .600$) whereas Trice (1985), the author of this scale, reported test-retest reliability coefficient of .900.

On average, EFL students reported low levels of external academic self-esteem ($C = 4,5$ out of possible 20 points). This result was obtained probably due to social desirability and impression management issues. EFL students presumably wanted to present themselves as they take responsibility for their actions in a mature way (i.e. as if they are internals).

No gender differences were found and the second hypothesis was completely confirmed. This findings are in line with those of Clarke (2004) and Naik (2015), but they diverge from the results obtained by Cairns et al. (1990), Haider Zaidi and Naeem Mohsin (2013), as well as by Stipek and Weisz (1981). The most plausible reason that lays behind these findings is that female students are perceived by teachers as more talented in learning and speaking languages compared to male students. Thus, they attribute their academic success in foreign languages to their personality, behavioral and cognitive characteristics (inborn talent, motivation, high level of intelligence, good working habits, persistence and conscientiousness) which increases their academic internal locus of control and decreases their externality. Conversely, despite lots of studies showing that males are internals, their internal locus of control is not enough distinctive when considered in the light of explanations related to EFL female students.

The third hypothesis was rejected because age and year of study did not significantly correlate with EFL students' levels of academic locus of control. These findings are not concordant with those obtained by Blanchard-Fields and Irion (1988). However, these authors examined this relationship with wide range of participants' age (youngsters, middle-aged persons and older persons). In our case, the restriction of age dispersion probably diminished the correlation between locus of control and participants' age (as well as their year of study).

To conclude, this scale is a unidimensional measurement tool, after the revision (i.e. deletion of eight items with poor psychometric properties). It is a valid and reliable measure of a domain-specific (academic) locus of control. Males' academic locus of control is not significantly different from that of females. In college and university population of students, age and their year of studies were not significantly related to their levels of academic locus of control.

Several suggestions/recommendations should be made in order to provide future researchers in this field with some ideas about examining relationships and differences with regard to academic locus of control:

1. Could non-formal education (such as workshops and peer-education) change the level of external locus of control among students who are labeled as externals?

2. What is the impact of interaction between students' socioeconomic status, religiosity, and locus of control on their academic/school performance?

3. Is locus of control a mediator that influences the relationship between motivation and academic success?

The main advantage of this research is the use of principal component analysis, a multivariate technique that allows us to make sufficiently plausible conclusions about factor (construct) validity of a measurement tool. Three main disadvantages are: lack of the criterion validity check, generalization issues (only students from one Turkish university were included), and convenience (non-probability) sampling. However, this was a preliminary validation of the TALCS scale that provide us with a general insight into academic locus of control as an important construct for EFL learning. The construct validity of this scale could also be examined by using confirmatory factor analysis (CFA) and examining the size of several commonly-reported fit indices (RMSEA, GFI, AGFI, CFI, NFI, and RMR).

The theoretical implications of the present study include the following considerations. Academic locus of control is a bipolar construct which means that it is a continuum where

internal locus control is one extreme point and external locus of control is the other extreme point of this dimension. If participant's score is low, s/he has high level of internal and low level of external academic locus of control. On the other hand, if a participant scored high on this scale, s/he has high level of external and low level of internal academic locus of control. In addition, if we want to standardize this scale, we do not need to set norms (i.e. arithmetic means, standard deviations, percentiles...) for males and females separately. This is due to the fact that gender differences were not statistically significant.

Some pedagogical implications of this study are given below. If college/university teachers want to help students to be more internally oriented (i.e. to have more internal academic locus of control), they do not need to plan their supporting actions separately for males and females. This is because gender differences were not statistically significant. They can also use the same supporting techniques in every year of study (as academic locus of control was in a non-significant correlation with EFL students' year of studies). Of course, teachers should help those students who think, behave and study in accordance with external academic locus of control. They have to advocate the importance of the relationship of self-efficacy and individual effort with the positive learning (academic) outcomes. Students who have high levels of internal academic locus of control can help their peers to realize that good working (i.e learning) habits and proper personal engagement in learning process lead to better grades and other highly valued academic achievements.

Additionally, EFL teachers at college/university level should use a revised *Trice Academic Locus of Control Scale* rather than the original one, because its revised form has better psychometric properties. Its scoring system is easy to follow and implement, hence; students' scores can be calculated very quickly.

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