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Adaptation of Academic Success Inventory Scale for College Students to Turkish: Validity and Reliability Study

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Abstract

The approach that "One can not manage without measuring" has brought up the idea that intangible concepts should also be measured into the agenda. Measurement of intangible concepts, in other words defining them in numerical terms is quite difficult and different methods are proposed for measurement of these concepts. Measuring academic success is also considered in this context. In national literature, academic success is generally considered as class passing grade or graduation grade. However, the expression of academic success with the grades taken from the exams does not fully reflect the fact. Because other factors affecting the grades obtained from exams are ignored. Therefore, it is considered that there is a need for a scale that will help both advisors and students and to measure academic success more clearly. With the Turkish adaptation of the Academic Success Inventory for College Students (ASICS), which was developed by Prevatt et al. (2011) to fill this gap in national literature with the aim to measure the academic success of university students as being used successfully in many countries, validity and reliability study has been done. The data were collected by convenience sampling method from university students studying in Mersin between the dates June 18 and July 18, 2020. The survey was created with Google Form and the survey link was shared with the social communication network application. Data analysis was done with R programming language, and SPSS and AMOS sofwares. Explanatory and confirmatory factor analysis were used in the analyses. Cronbach's alpha value of the total scale is 0.937. The values of goodness of fit in the 1st level multifactorial structure were calculated as RMSEA: 0.075, CFI: 0.998, TLI: 0.978, NFI: 0.988 and $\chi 2/df$: 2.220. Calculated values are compatible with reference values. It was evaluated that Academic Success Inventory Scale could also be used in Turkey and more accurate results could be obtained on academic success.

Keywords: *Academic Success, The Academic Success Inventory for College Students, ASICS, scale, reliability, validity.*

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Üniversite Öğrencileri İçin Akademik Başarı Envanteri Ölçeği'nin Türkçeye Uyarlanması: Geçerlik ve Güvenirlik Çalışması

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Öz

"Ölçmeden yönetemezsin" yaklaşımı, soyut kavramların da ölçülmesi gerektiği düşüncesini gündeme taşımıştır. Soyut kavramların ölçülmesi, diğer bir anlatımla sayısal olarak ifade edilmesi oldukça güçtür ve bu kavramların ölçülmesi için farklı yöntemler önerilmektedir. Akademik başarının ölçülmesi de bu kapsamda değerlendirilmektedir. Ulusal yazında akademik başarı, genellikle sınıf geçme notu veya mezuniyet derecesi olarak ele alınmaktadır. Ancak akademik başarının sınavlardan alınan notlarla ifade edilmesi gerçeği tam olarak yansıtmamaktadır. Çünkü sınavlardan alınan notları etkileyen diğer unsurlar göz ardı edilmektedir. Dolayısıyla hem danışmanlara hem de öğrencilere yardımcı olacak, akademik başarıyı daha net ölçen bir ölçeğe ihtiyaç olduğu değerlendirilmiştir. Ulusal yazındaki bu eksikliği gidermek için Prevatt vd. (2011) tarafından üniversite öğrencilerinin akademik başarısını ölçmek için geliştirilen ve pek çok ülkede başarıyla kullanılan Akademik Başarı Envanteri Ölçeği (Academic Success Inventory (ASICS))'nin Türkçe uyarlaması ile geçerlik ve güvenirlik çalışması yapılmıştır. Veriler 18 Haziran-18 Temmuz 2020 tarihleri arasında, Mersin'de öğrenim gören üniversite öğrencilerinden, kolayda örnekleme yöntemi ile toplanmıştır. Anket, Google Form ile oluşturulmuş, anket linki WhatsApp uygulaması ile paylaşılmıştır. Verilerin analizi R programlama dili, SPSS ve AMOS paket programları ile yapılmıştır. Analizlerde açıklayıcı ve doğrulayıcı faktör analizi ile korelasyon analizi kullanılmıştır. Ölçeğin Cronbach alfa değeri 0.937, 1'inci düzey çok faktörlü yapıda uyum iyiliği değerleri; RMSEA: 0.075, CFI: 0.998, TLI: 0.978, NFI: 0.988 ve $\chi 2/df$: 2.220 olarak hesaplanmıştır. Hesaplanan değerler referans değerleri ile uyumludur. Akademik Başarı Envanteri Ölçeği'nin Türkiye'de de kullanılabileceği ve akademik başarı konusunda daha doğru sonuçlar elde edilebileceği değerlendirilmiştir.

Anahtar Kelimeler: *Akademik Başarı, Akademik Başarı Envanter Ölçeği, ASICS, Ölçek, Güvenirlik, Geçerlik*

Introduction

Universities are important education institutions that improve intellectual level of people, enable gaining of scientific thinking ethics, and develop qualified labor force. Universities affect society with respect to academic, social, and cultural aspects and they become the pioneer for change and development (Saygın and Bekmezci, 2019, p. 109). When it is evaluated in this context, it is seen that high academic success of university students is of great importance in terms of both individual and professional qualification of graduates. On the other hand, universities also attach importance to the academic success of their students in terms of revealing the quality of the university. University students' success is generally tried to be estimated by using demographic and academic variables (Alay and Koçak, 2003; Alver, 2005; Kadim and Şişman, 2017). However, it is stated that these variables are insufficient to explain academic achievement (Pritchard and Wilson, 2003; Prevatt et al., 2011). Hence, although graduation from university makes a big difference in terms of people's employment, income and respect in society, a total of 1 million 115 thousand and 530 students have leaved university or frozen their registration in the last 5 years according to official figures in Turkey, whereas within 2013-2014 academic year, their number was 135 thousand and 137; within 2014-2015 academic year, their number was 161 thousand and 193; within 2015-2016 period their number was 197 thousand and 482; within 2016-2017 academic year, their number was 212 thousand and 770; within 2017-2018 academic year, their number was 408 thousand and 948 students. (Sozcu, 2019). Considering the success of the students in the university entrance exam as a result of their efforts to enter the university, it can be said that this situation is a significant loss for both students and the country. Necessary measures can be taken for students to stay at the university and to be successful if the reasons for leaving the university or freezing enrollment are determined.

Academic achievement of university students in Turkey is usually measured by average test scores or graduation rate. However, the exam grade or graduation grade is not sufficient to evaluate academic success. There are many factors affecting the exam grade or graduation grade. The purpose of this study is to adapt Academic Success Inventory for College Students (ASICS) developed by Prevatt et al (2011) for university students with the

aim to measure academic success of university students in a more healthier way and to prevent failure of students having probability to fail, into Turkish and to gain it to Turkish literature.

Academic success and its measurement

Education is the building block of both individual and social development. As a matter of fact, human beings want to grasp, understand and explain concrete and abstract facts and events related to themselves and in their environment, and they create disciplinary knowledge within the framework of positivist understanding of science. It is important to use knowledge in practical life as well as the production of specific knowledge. In this context, educational institutions play a primary role in the systematic transfer of knowledge to certain segments of society. Effective and efficient transfer of knowledge affects both the studying person and the entire society. In this context, the extent to which students acquire the information transferred becomes an important issue. This situation is important in terms of ensuring both individual success and institutional effectiveness. This issue is discussed and measured in the literature within the framework of academic achievement.

In the researches about the academic success of students, academic achievement is generally evaluated on the grade point average (Alay and Koçak, 2003; Alver, 2005; Chamorro-Premuzic and Furnham, 2003; Kadim and Şişman, 2017; Rana and Mahmood, 2010; Treffers-Daller and Milton, 2013; Vaez and Laflamme, 2008; York et al., 2015; Zwick and Sklar, 2005). Although this application measuring the student's current knowledge and previous gains, is easy and useful, it is also known that there are different variables that have indirect effects on academic success. As a matter of fact, this assessment which is expressed as traditional success criteria, explains 25% of the variance in the overall grade average of the university (Festa-Dreher, 2012, p. 2). Other variables affecting academic achievement include discipline, family, groups of friends, self-confidence, school environment, extracurricular activities (Prevatt et al., 2011, p. 26). As a result of the meta-analysis on 109 studies, Robbins et al. (2004) found the psycho-social and work skills factors that determine academic achievement being success motivation, academic goals, institutional commitment, perceived social support,

social participation, academic self-efficacy, general self-perception, academic ability and contextual effects. They determined that the best predictors for GPA are academic self-efficacy and motivation for achievement. These factors identified by Robbins et al. (2004) actually refer to non-traditional assessment factors related to academic achievement other than traditional and standardized assessments. Most of these unconventional evaluations are based on theories such as self-determination theory, cognitive evaluation theory, achievement goal theory and self-regulation theory (Festa-Dreher, 2012, p. 9-11).

Self-determination theory asserts that people have a desire to expand and develop their interests (Festa-Dreher, 2012, p. 9). Self-determination theory focuses on one's interest in learning and enhancing the value of education, self-confidence and effectiveness. Cognitive assessment theory focuses solely on self-motivation. It acknowledges that outcomes such as rewards, evaluations or feedback have a special meaning or functional significance that predicts their effect on intrinsic motivation. This is largely related to the effect of such results on autonomy or competence (Ryan and Deci, 2017, p. 123). Cognitive assessment theory classifies innate human needs into three categories as competence, relationship and autonomy (Deci et al., 1991, p. 327). competence refers to one's sense of skill or ability rather than actual success; autonomy is an internal locus of control from which behavior is initiated spontaneously; relationship refers to making meaningful connections with other individuals. It is stated that facilitating people's competence, autonomy and relationship needs in education will create more subjective well-being, better exam results, higher grade point average and more motivation for the desired career in the future (Sheldon and Krieger, 2007). Success is the state of achieving a goal defined positively at the individual level, and achieving a desired goal (Demir and Acar, 2020, p. 35). Achievement goals are specific and are related to what a student hopes to achieve academically (Festa-Dreher, 2012, p. 14). Goals and a person's interest affect academic performance (Daniels et al., 2009; Harackiewicz et al., 2002). Self-control is a process that involves a person's ability to know, monitor his behavior and motivation in order to achieve his goal (Pintrich, 1999). Students with self-control, approach learning in a systematic, cont-

rolled and planned manner, and take responsibility for learning (Zimmerman, 1990). Academic performance improves as self-control increases (Nota et al, 2004).

Prevatt et al (2011) who stated that scales have been determined as focusing on different aspects of academic success of university students such as their life stress (Gadzella, 1994), motivation (Vallerand et al, 1992), learning and working strategies (Weinstein and Palmer, 2002; Prevatt et al, 2006), university attendance (Davidson et al, 2009) but that a reliable and valid scale measuring different aspects of academic success has not been developed, have developed Academic Success Inventory for College Students (ASICS) for university students. ASICS was developed to identify students who are likely to fail, and it is a comprehensive scale that determines the strengths and weaknesses of these students in order to prevent their failure and helps to make appropriate interventions in this context and is easily applicable (Prevatt et al., 2011, p. 27). The ASICS scale consists of 10 subdimensions and 50 questions. The sub-dimensions of the scale are as follows (Prevatt et al, 2011, p. 27):

General Academic Skills (12 items) - a combination of effort expended, study skill and self-organizational strategies.

Internal Motivation/Confidence (8 items) - belief in one's ability to perform well academically, as well as satisfaction and challenge associated with performance.

Perceived Instructor Efficacy (5 items) - perception of the ability of the instructor to hold the attention of the student, organize, teach, and assess the progress of the student.

Concentration (4 items) - ability to concentrate and pay close mental attention.

External Motivation/Future (4 items) - an awareness of the future relevance or importance of the class, with an emphasis on external job-related issues.

Socializing (4 items) - appropriate levels of socializing or drinking such that one's academic performance is not hindered.

Career Decidedness (4 items) - progress towards and certainty of one's decision about a career goal.

Lack of Anxiety (3 items) - lack of anxiety or nervousness with regard to studying or test taking.

Personal Adjustment (3 items) - lack of personal issues that detract from one's ability to perform academically.

External Motivation/Current (3 items) - motivation to perform, with an emphasis or current external factors such as grades, parents or approval of others.

In the researches conducted in relation to academic success inventory, Cronbach alpha values of sub-dimensions of scale were reported by Prevatt et al (2011) as 0.62-0.93; by Ashkzari et al (2018) as 0.74-0.92; by Sadeghi-Gandomani and Adib-Hajbaghery (2018) as 0.51-0.75; by Howard et al (2019) as 0.52-0.90.

Method

In this chapter; information is given about population and sample, data collection method and tools, and analysis methods used.

Participants

The data were collected from undergraduate university students studying in Mersin between June 18 and July 18, 2020. Therefore, the main body of the study consists of university students studying at undergraduate level in Mersin. It was determined that there were 23.107 undergraduates studying in Mersin at the time of the survey (YOK ATLAS, 2020). The minimum sample size was calculated with the formula (1) (Eygü and Güllüce, 2017, p. 276).

$$n = \frac{NpqZ^2}{(N-1)d^2+pqZ^2} = \frac{23107*0,5*0,5*1,96*1,96}{(23.106*0,05*0,05)+(0,5*0,5*1,96*1,96)} = 380 \qquad (1)$$

The convenience sampling method was used to collect the data. In the literature, it is stated that when the data is needed in a short time and with the least cost, the data can be collected with the non-probabilistic sampling method (Eygü and Kılınç, 2019, p. 1027).

The questionnaire is consisting of two parts: (1) Demographic information, (2) Academic Success Inventory for College Students. We communicated online survey form via socal networks and obtained a data set consisting 403 respondents. Then we analyzed the questionnaires, 21 respondents

were not found suitable for analysis, the remaining 382 respondents were analyzed.

In the analyzes, the data were divided into two groups (1st Sample: 182 surveys and 2nd Sample: 200 surveys). The first sample data were used in the explanatory factor analysis to control the construct validity of the scale, and the second sample data were used in the analyzes conducted within the scope of the confirmatory factor analysis and reliability studies (Eskioğlu, 2017, p. 75). The demographic information of the participants for both samples are given in Table-1 and Table-2.

Table 1. Demographic information relating with 1th sample

Variable		f	%	Variable		f	%
Gender	Female	68	68	Class	Preparatory	22	12
	Male	114	114		1. Class	57	31
	Total	**182**	**100**		2. Class	46	25
					3. Class	39	21
					4. Class	14	8
					5. Class	2	1
					6. Class	2	1
					Total	**182**	**100**
From what field he entered the university	Digital	46	25	Yaş	17-19	20	11
	Verbal	69	38		20-22	64	35
	Equal weight	54	30		23-25	46	25
	Foreign language	11	6		26-28	41	23
	Private skills	2	1		28 and above	11	6
	Total	**182**	**100**		**Total**	**182**	**100**

Table 2. Demographic information relating with 2nd sample

Variable		f	%	Variable		f	%
Gender	Female	76	38	Class	Preparatory	27	14
	Male	124	62		1. Class	60	30
	Total	**200**	**100**		2. Class	50	25
					3. Class	45	22
					4. Class	14	7
					5. Class	2	1
					6. Class	2	1
					Total	**200**	**100**
From what field he entered the university	Digital	60	30	Age	17-19	28	14
	Verbal	69	35		20-22	60	30
	Equal weight	54	27		23-25	50	25
	Foreign language	15	7		26-28	51	26
	Private skills	2	1		28 and above	11	5
	Total	**200**	**100**		**Total**	**200**	**100**

Academic Success Inventory Scale

Academic Success Inventory Scale for College Students has been developed by Prevatt et al (2011) with the aim to measure academic success of university students in general terms. The scale consists of 10 sub-dimensions (1. General Academic Skills, 2. Internal Motivation/Confidence, 3. Perceived Instructor Efficacy, 4. Concentration, 5. External Motivation/Future, 6. Socializing, 7. Career Decidedness, 8. Lack of Anxiety, 9. Personal Adjustment, 10. External Motivation/Current) and 50 questions. The answers in the scale were taken with 7-point Likert (poles from '1' (strongly disagree) to '7' (strongly agree)). Cronbach's alpha coefficient of the scale was reported to be 0.93 for the 1st subscale, 0.86 for the 2nd subscale, 0.92 for the 3rd subscale, 0.87 for the 4th subscale, 0.88 for the 5th subscale, 0.84 for the 6th subscale, 0.87 for the seventh subscale, 0.77 for the 8th subscale, 0.86 for the 9th subscale, and 0.62 for the 10th subscale. The total variance explained is 64%. It was stated that the unification and dissociation validity of the scale was also provided.

Tools Used During Data Analysis

In this study, SPSS and AMOS package programs and R programming language have been used. With SPSS package program, explanatory factor analysis and confidence analysis were made and with AMOS package program, confirmatory factor analysis was made and multi-variable normal distribution of data were controlled with R programming language.

Results

In this section, some calculations made based on expert opinion within the content and logical validity of the scale, results of explanatory and confirmatory factor analysis made within the scope of construct validity and statistical values obtained within the scope of reliability study are included.

Adaptation of scale to Turkish

The method suggested by Brislin (1970) was used in the adaptation of the Academic Achievement Inventory to Turkish. First of all, a group of five

people having expertise is English, translated the scale from English to Turkish separately and created a translation form. On the translation form created afterwards, two people specialized in Turkish language have combined translations with people specialized in English language and they were prepared by ensuring scale language equivalent values. In order to control whether the items of the scale fully meet the purpose specified in Turkish, the English version and the Turkish version of the scale were applied separately to two sample groups of 25 people and the relationship status was checked. Subsequently, the scale was translated from Turkish to English, it was checked whether there was any loss of meaning.

Content And Logical Validity Of Scale

Expert opinion was consulted for the content and logical validity of the Academic Success Inventory Scale. The scale items were shown to an expert group of 20 people, and these people were asked to evaluate each item as "necessary", "necessary but insufficient" and "insufficient" within the scope of the purpose. The Content Validity Ratio (CVR) and Content Validity Index (CVI) required for the evaluation of expert opinions and scale items are given in Table 3.

Table 3. Expert Opinions on the Items of the Academic Success Scale

Subscale and Items	N*	N I*	I*	CVR	CVI
General Academic Skills (GAS)					
I studied the correct material when preparing for tests in this class (GAS1)	19	1	-	0.80	
I worked hard to prove I could get a good grade (GAS2)	19	1	-	0.80	
I tried everything I could to do well in this class (GAS3)	19	1	-	0.80	
I worked really hard in this class (GAS4)	19	1	-	0.80	
I kept on a good study schedule in this class (GAS5)	18	2	-	0.60	
I worked hard in this class because I wanted to understand the material (GAS6)	18	2	-	0.60	0.80
I studied a lot for this class (GAS7)	19	1	-	0.80	
I think I used good study skills when working in this class (GAS8)	19	1	-	0.80	
I made good use of tools such as planners, calendars and organizers in this class (GAS9)	19	1	-	0.80	
I used a goal setting as a strategy in this class. (GAS10)	20	-	-	1.00	
I was good at setting specific homework goals (GAS11)	19	1	-	0.80	
I was well organized (GAS12)	20	-	-	1.00	

Subscale and Items	N*	N I*	I*	CVR	CVI
Internal Motivation/Confidence (IM)					
I got satisfaction from learning new material in this class (IM1)	20	-	-	1.00	
I enjoyed the challenge of just learning for learning's sake in this class (IM2)	19	1	-	0.80	
I felt confident I could understand even the most difficult material in this class (IM3)	19	1	-	0.80	0.80
I was pretty sure I could make an A or B in this class (IM4)	19	1	-	0.80	
I knew that if I worked hard, I could do well in this class (IM5)	19	1	-	0.80	
I worried a lot about failing this class (IM6)	19	1	-	0.80	
I was pretty sure I would get a good grade in this class (IM7)	18	2	-	0.60	
I felt pretty confident in my skills and abilities in this class (IM8)	19	1	-	0.80	
Perceived Instructor Efficacy (PIE)					
I was disappointed with the quality of the teaching (PIE1)	19	1	-	0.80	
I did poorly because the instructor was not effective (PIE2)	19	1	-	0.80	
I would have done better if my instructor were better (PIE3)	19	1	-	0.80	0.80
The instructor in this class really motivated me to do well (PIE4)	19	1	-	0.80	
Anything I learned, I learned on my own. The instructor in this class was not a good teacher (PIE5)	19	1	-	0.80	
Concentration (C)					
It was easy to keep my mind from wandering in this class (C1)	20	-	-	1.00	
I had an easy time concentrating in this class (C2)	19	1	-	0.80	0.85
I had a hard time concentrating in this class (C3)	19	1	-	0.80	
I got easily distracted in this class (C4)	19	1	-	0.80	
External Motivation/Future (EM)					
I needed to do well in this class to get a good job later on (EM1)	19	1	-	0.80	
This class will be very useful to me in my career (EM2)	18	2	-	0.60	0.85
This class is important to my future success (EM3)	20	-	-	1.00	
I think in the future I will really use the material I learned in this class (EM4)	20	-	-	1.00	
Socializing (S)					
Sometimes I partied when I should have been studying (S1)	19	1	-	0.80	
My grades suffered because of my active social life (S2)	19	1	-	0.80	
I got behind in this class because I spent too much time partying or hanging out with my friends (S3)	19	1	-	0.80	0.80
Sometimes my drinking behavior interfered with my studying (S4)	19	1	-	0.80	
Career Decidedness (CD)					
I am certain about what occupation I want after I graduate (CD1)	18	2	-	0.60	
I know what I want to do after I graduate (CD2)	20	-	-	1.00	0.85
I am having a hard time choosing a major (CD3)	20	-	-	1.00	
I am certain that my major is a good fit for me (CD4)	19	1	-	0.80	
Lack of Anxiety (LA)					
I was nervous for tests even when I was well prepared (LA1)	19	1	-	0.80	0.87
Studying for this class made me anxious (LA2)	20	-	-	1.00	

Subscale and Items	N*	N I*	I*	CVR	CVI
I got anxious when taking tests in this class (LA3)	19	1	-	0.80	
Personal Adjustment (PA)					
Personal problems kept me from doing well in this class (PA1)	20	-	-	1.00	
I would have done much better in this class if I didn't have to deal with other problems in my life (PA2)	19	1	-	0.80	080
I had some personal difficulties that affected my performance in this class (PA3)	18	2	-	0.60	
External Motivation/Current (EMC)					
It was important to get a good grade in this class for external reasons (my parents, A scholarship, university regulations) (EMC1)	19	1	-	0.80	
I worked hard in this class because I wanted others to think I was smart (EMC2)	19	1	-	0.80	080
I needed good grades in this class to keep up my GPA (EMC3)	19	1	-	0.80	

* N: Necessary, N/I: Necessary but Insufficient, I: Insufficient

According to the values in Table 3, the Content Validity Ratio (CVR) and Content Validity Index (CVI) values were calculated to decide which items should remain in the scale or which items should be excluded from the scale. CVR is one less ((N / (n / 2) -1) obtained with half of the total number of experts (n) of the number of experts (G) marking the expression "Necessary". CVI is the arithmetic mean of the CVR values of the items remaining in the scale as a result of the statistical evaluation. In the evaluation made according to the expert group of 20 people at 0.05 significance level, the CVR value should be above the critical value of 0.42 and the CVI values should be above the critical value of 0.67 (Alpar, 2012, p. 415). In this context, it was observed that the scope and logical validity of the scale was achieved with the values obtained in the calculation made according to the CVR and CVI values of the scale items in Table 3, and there was no need to remove any scale item.

Construct Validity of the Scale and Explanatory and Confirmatory Factor Analysis

Explanatory factor analysis was performed in order to ensure the content validity of the data and to determine the measured dimensions correctly (Can, 2018; Seçer, 2015; Tavşancıl, 2014). At this stage, Kaiser-Meyer-Olkin (KMO) and Barlett's tests were used to decide whether the data were suitable for explanatory factor analysis. By using Kaiser-Meyer-Olkin (KMO)

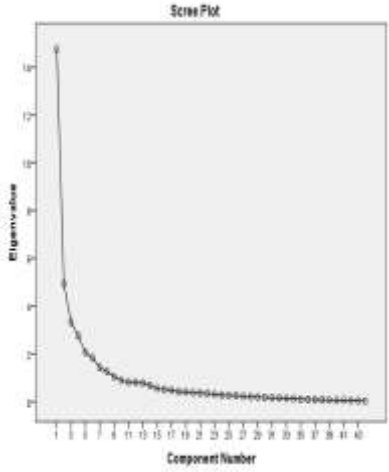
and Barlett's test, the sample is tested to be of suitable size and quality for exploratory factor analysis (Pallant, 2017; Tabachnick and Fidell, 2001). In the explanatory factor analysis, the lowest value that item factor loads should take is accepted as "0.30" and application should be made on factors with eigenvalues greater than "1" (Alyılmaz and Polatcan, 2018; Neale and Liebert, 1980; Pallant, 2017; Tabachnick and Fidel, 2001). For this reason, items with item factor loads below 0.30 and factors with eigenvalues lower than 1 were not evaluated as a result of the explanatory factor analysis.

After the explanatory factor analysis, a confirmatory factor analysis (Kayapalı-Yıldırım and Ekinci, 2019; Naktiyok, 2019; Şencan, 2005) was performed, which enables the factor structure of the scale to be verified and the connection between existing variables and hidden variables to be determined. Confirmatory factor analysis is the factor analysis used to test the compatibility of the factors determined by explanatory factor analysis with the factor structures determined by the hypothesis. Explanatory factor analysis is used to test which variable groups are highly associated with which factor, while confirmatory factor analysis is used to determine whether the variable groups that contribute to the determined number of factors are adequately represented by these factors. Before performing a confirmatory factor analysis, values such as normality, multicollinearity, and sample size related to the distribution should be determined and the values reached should meet the reference values (Gürbüz and Şahin, 2014; Kline, 2005; Tavşancıl, 2014). For this reason, normality, multicollinearity, sample size analyzes were applied and the results obtained were compared with the reference values of RMSEA, SRMR, GFI, AGFI, NFI, $\chi 2$ / df, TLI and CFI fit criteria. While > 0.90 is acceptable value for CFI, GFI, AGFI, NFI and TLI in confirmatory factor analysis, > 0.95 is an extremely good value. For SRMR and RMSEA, <0.1 is an acceptable value, while < 0.05 is considered an extremely good value (Gürbüz and Şahin, 2014; Kayapalı-Yıldırım and Ekinci, 2019; Marcoulides and Schumacher, 2001; Özdamar, 2017; Schumacher and Lomax, 2004; Seçer, 2015; Yıldırım and Naktiyok, 2017).

The construct validity of the scale was performed with explanatory and confirmatory factor analyzes using two different samples. For the analysis, attention has been paid to the fact that the samples are composed of different individuals with similar characteristics.

First, whether the data of both samples show normal distribution with multivariate, which is one of the assumptions of explanatory and confirmatory factor analyzes, was checked in R package program using Henze-Zirks Test, MVN, readxl packages and MVN, readxl libraries. As a result of the normality tests, it was found that both samples were multivariate normally distributed (p (0.1846839, 0.2134676)> 0.05, HZ1 test: 0.1725467, HZ2 test: 0.18546254 and MVN: YES). Subsequently, explanatory factor analysis was performed for the construct validity of the scale and the results obtained are shown in Table-4. However, as a result of the analysis performed with explanatory factor analysis, four items (IM6, S1, EMC1 and EMC2 items) were removed from the scale due to the factor loadings being below 0.30.

Table 4. Academic Success Inventory Scale Explanatory Factor Analysis Statistics

Scree Plot	**Kaiser-Meyer-Olkin (KMO)**		0,837
	**Bartlett's Test of Sphericity**	**Chi-square**	5671,545
		sd	990
		p	0,000

Items	**Factors**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
GAS5	**0,912**								
GAS4	**0,912**								
GAS3	**0,906**								
GAS7	**0,906**								
GAS8	**0,891**								
GAS6	**0,856**								
GAS11	**0,853**								
GAS10	**0,826**								
GAS12	**0,817**								
GAS2	**0,764**								

GAS9	**0,733**					
GAS1	**0,708**					
IM1	**0,688**					
EMC3	**0,599**					
IM7	**0,584**					
IM2	**0,531**					
C3	**0,403**					
PIE2		**0,875**				
PIE3		**0,862**				
PIE5		**0,845**				
PIE1		**0,780**				
PIE4		**0,585**				
IM3			**0,806**			
IM8			**0,717**			
IM4			**0,686**			
IM5			**0,586**			
CD3			**0,417**			
PA3				**0,892**		
PA2				**0,886**		
PA1				**0,851**		
EM3					**0,764**	
EM1					**0,740**	
EM2					**0,700**	
EM4					**0,685**	
S3						**0,871**
S4						**0,869**
S2						**0,780**
CD2						
CD1						
CD4						
LA1						
LA3						
LA2						
C1						
C2						
C4						

Total variance explained

Factors	**Total**	**% Variance**	**% Cumulative**	**Total**	**% Variance**	**% Cumulative**
1	14,811	32,914	32,914	14,811	32,914	32,914
2	4,970	11,045	43,959	4,970	11,045	43,959
3	3,452	7,671	51,630	3,452	7,671	51,630
4	2,904	6,453	58,083	2,904	6,453	58,083
5	2,076	4,614	62,697	2,076	4,614	62,697
6	1,861	4,135	66,832	1,861	4,135	66,832
7	1,426	3,170	70,002	1,426	3,170	70,002
8	1,264	2,809	72,811	1,264	2,809	72,811
9	1,056	2,348	75,158	1,056	2,348	75,158

When the results of the explanatory factor analysis regarding the Academic Success Inventory for College Students Scale in Table 4 are examined, unlike the original scale of the scale, except for the "External Motivation/Current" dimension, it was seen that the 1st factor is "General academic skills", the 2nd factor is "Perceived instructor efficacy", the 3rd factor is "Internal motivation/confidence", the 4th factor is "Personal adjustment", the 5th factor is "External motivation/future", the 6th factor is "Socializing", the 7th factor is "Career decidedness", the 8th factor is "Lack of anxiety", the 9th factor is "Concentration". According to KMO value and results of Bartlett's Sphericity test, it was determined that the factor analysis is suitable for research data (KMO> 0.80 and p <0.05), the subscales of the scale have values in the range of 0.403-0.912 for the 1st subscale, 0.585-0.85 for the 2nd subscale, 0.417-0.806 for the 3rd subscale, 0.851-0.892 for the 4th subscale, 0.685-0.764 for the 5th subscale, It took values between 0.780-0.871 for the 6th subscale, 0.463-0.916 for the 7th subscale, 0.665-0.846 for the 8th subscale and 0.667-0.776 for the 9th subscale (All factor loads> 0.30), and that the variance of nine subscales explained the total variance by 75.158%.

The conformity of the structure obtained after the explanatory factor analysis was checked by confirmatory factor analysis. In this context, the results of the confirmatory factor analysis made on the Academic Success Inventory for College Students Scale are given in Table 5.

Table 5. Academic Success Inventory Scale Goodness of Fit Values

Fit criteria	**Good fit**	**Acceptable fit**	**Unrelated model**	**Single factor model**	**1th level multi-factor Model**	**2nd level multi-factor Model**
*RMSEA**	*0<RMSEA<0,05*	*0,05≤RMSEA≤0,1*	Values outside the reference limits	Values outside the reference limits	0.075	0.085
*CFI**	*0,97≤CFI≤1*	*0,95≤CFI≤0,97*			0.998	0.964
*TLI**	*0,95≤TFI≤1*	*0,90≤TFI≤0,95*			0.978	0.949
NFI	*0,95≤NFI≤1*	*0,90≤NFI≤0,94*			0.988	0.946
χ^2 /df	<3	<5	5.127	3.214	2.220	2.379

* RMSEA: Root Mean Square Error of Approximation; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; NFI: Normed Fit Index

It has been determined that the goodness of fit values of the unrelated model in Table 5 and the single factor model are outside the reference limits, and the goodness of fit values of the 1st and 2nd level multi-factor models

are all within the reference limits. However, according to the values of goodness of fit, it has been determined that the 1st level multi-factor model is better than the 2nd level multi-factor model and it was evaluated that it would be appropriate to use the 1st level multi-factor model in the studies to be conducted in the social sciences area in relation to structural equation model in Turkey.

Reliability Analysis of the Scale

The reliability of the data collection tool was checked by calculating the internal consistency coefficient (Cronbach's alpha) for both the whole scale and all its sub-dimensions. The Cronbach's alpha coefficient is a measure of the internal consistency (homogeneity) of the items in the scale. In other words, it gives information about questioning whether the 'k' items in the scale form a whole in order to explain or question a homogeneous structure with alpha coefficient. Cronbach's alpha value takes a value in the range of 0-1, and the closer this value is to 1, the higher the reliability and internal consistency of the scale (Can, 2018; Karadeniz et al, 2019). Reference intervals of Cronbach's alpha internal consistency coefficient determined by Özdamar (1997) are in the form of "$0.00 \leq \alpha \leq 0.40$ = unreliable, $0.40 \leq \alpha \leq 0.60$ = low reliable, $0.60 \leq \alpha \leq 0.80$ = highly reliable, $0.80 \leq \alpha \leq 1.00$ = highly reliable". In this context, Cronbach's alpha coefficient values obtained in relation to nine sub-dimensions of ASICS consisting of 46 items are given in Table 6.

Table 6. Reliability Statistics

	Item no	**Cronbach Alpha Coefficient Values**	**Standardized Cronbach Alpha Coefficient Values**
The whole scale	46	0,937	0,937
General academic skills subscale	17	0,964	0,965
Perceived instructor efficacy subscale	5	0,872	0,868
Internal motivation/confidence subscale	5	0,751	0,772
Personal adjustment subscale	3	0,898	0,898
External motivation/future subscale	4	0,898	0,898
Socializing subscale	3	0,837	0,846
Career decidedness subscale	3	0,797	0,793
Lack of anxiety subscale	3	0,789	0,793
Concentration subscale	3	0,746	0,746

When the standardized / non-standardized Cronbach's alpha coefficient values in Table 6 were examined, it was seen that all values were above the reference value (> 0.70), and it was concluded that the scale is a reliable scale.

Item analysis should also be done regarding reliability. Item analysis is the operations performed to examine the contribution of the items in the scale to the scale. Within the scope of item analysis, evaluation is made according to the results obtained by calculating the values of "scale average when item is deleted", "scale variance when item is deleted", "corrected item whole correlation", "multiple correlation coefficient", "Cronbach alpha coefficient when item is deleted". ((1) Scale mean when the item is deleted: When the item is deleted, it is desired that there is no large variation in the averages. (2) Scale variance when the item is deleted: When the item is deleted, it is desired that there is no large variation in the values of the calculated variances. (3) Corrected Item Whole Correlation: It is desirable that this coefficient should not be negative and have values above 0.20-0.25. (4) Multiple Correlation Coefficient: It is desirable that the obtained value be quite high. Because the square of this coefficient is the coefficient of certainty and shows the percentage of the explanation of the dependent variable. (5) Cronbach alpha coefficient when the item is deleted: When an item is removed from the scale if the alpha coefficient is lower than the alpha coefficient calculated for the whole scale, that item should remain in the scale.) Values calculated within the scope of item analysis related to Academic Achievement Scale are given in Table 7.

Table 7. Item analysis statistics

	Scale average when item is deleted (1)	**Scale variance when item is deleted (2)**	**Whole correlation of corrected item (3)**	**Multi-correlation coefficient (4)**	**Cronbach's Alpha Coefficient when item is deleted (5)**
GAS1	212,95	1945,075	0,742	0,785	0,933
GAS2	212,71	1952,208	0,642	0,831	0,934
GAS3	212,51	1942,221	0,700	0,935	0,933
GAS4	212,82	1932,880	0,710	0,916	0,933
GAS5	213,16	1936,927	0,737	0,897	0,933
GAS6	212,75	1938,051	0,747	0,884	0,933
GAS7	212,67	1941,665	0,725	0,947	0,933
GAS8	212,70	1929,173	0,775	0,906	0,933
GAS9	213,65	1935,329	0,636	0,808	0,934
GAS10	213,19	1938,141	0,666	0,853	0,933
GAS11	212,70	1941,855	0,686	0,885	0,933

	Scale average when item is deleted (1)	Scale variance when item is deleted (2)	Whole correlation of corrected item (3)	Multi-correlation coefficient (4)	Cronbach's Alpha Coefficient when item is deleted (5)
GAS12	212,55	1945,071	0,779	0,881	0,933
IM1	212,96	1912,177	0,780	0,821	0,932
IM2	213,72	1933,554	0,649	0,720	0,933
IM3	213,09	1973,309	0,493	0,788	0,935
IM4	213,14	1947,314	0,653	0,805	0,934
IM5	212,81	1999,211	0,324	0,587	0,936
IM7	212,80	1951,169	0,656	0,793	0,934
IM8	212,25	1998,327	0,532	0,755	0,935
PIE1	215,00	1963,132	0,487	0,731	0,935
PIE2	214,18	1983,237	0,375	0,873	0,936
PIE3	214,84	1994,074	0,329	0,840	0,936
PIE4	213,75	1997,427	0,348	0,584	0,936
PIE5	214,25	1993,183	0,327	0,781	0,936
C1	213,75	1993,850	0,362	0,726	0,936
C2	213,75	1957,598	0,558	0,721	0,934
C3	214,55	1954,668	0,554	0,582	0,934
C4	213,57	1962,617	0,517	0,567	0,937
EM1	212,83	1968,808	0,513	0,773	0,935
EM2	213,04	1946,332	0,651	0,880	0,934
EM3	213,11	1931,415	0,672	0,908	0,933
EM4	213,11	1938,438	0,642	0,805	0,934
S2	212,82	1989,030	0,377	0,813	0,936
S3	212,26	2022,148	0,257	0,840	0,936
S4	211,82	2044,116	0,312	0,728	0,937
CD1	212,67	2014,595	0,249	0,885	0,937
CD2	212,52	2014,779	0,274	0,886	0,936
CD3	213,18	2002,601	0,288	0,675	0,936
CD4	212,55	1995,227	0,409	0,719	0,935
LA1	215,67	2056,952	0,324	0,714	0,937
LA2	215,18	2060,121	0,314	0,775	0,936
LA3	215,55	2022,420	0,268	0,781	0,937
PA1	213,30	2013,591	0,251	0,798	0,937
PA2	213,96	2005,851	0,250	0,835	0,937
PA3	214,03	2011,735	0,275	0,793	0,937
EMC3	212,65	1958,851	0,521	0,714	0,935

When the item analysis statistics in Table 7 are examined, it has been determined that all values correspond to the reference values. Therefore, ASICS can be used in the form of 9 dimensions and 46 items.

Discussion, Conclusion and Recommendations

In this study, it was aimed to adapt the Academic Success Inventory for College Students Scale into Turkish, to study its validity and reliability and to add it to Turkish literature. Original scale consists of 50 questions and ten subscales being 1. General Academic Skills, 2. Internal Motivation/Confidence, 3. Perceived Instructor Efficacy, 4. Concentration, 5. External Motivation/Future, 6. Socializing, 7. Career Decidedness, 8. Lack of Anxiety, 9. Personal Adjustment, 10. External Motivation/Current. The data used in this study were collected from students studying at two universities in Mersin province in July 2020 of the scale. As a result of the analysis, it was seen that the scale, unlike the original one, consists of 9 sub-dimensions and 46 items.

The Academic Success for College Students Inventory Scale will provide an alternative perspective to the measurement of academic achievement based on quantitative values that are dominant in national literature. Measurements based on academic achievement grade point average do not fully reveal students' interest, knowledge and orientation in certain courses. A measurement that includes qualitative conditions rather than grade point average can give better results in determining the academic success of students. This approach is expected to provide important data in evaluating both the academic performance of students and the effectiveness of educational institutions.

While academic achievement affects an individual's continuing education, professional career, social status, income, intellectual gains and social life, it is also a subject that influences the effectiveness of educational institutions, social welfare, economic development, technological innovation and socio-cultural development. As a matter of fact, the focus of national education policies and corporate education strategies is to increase the academic success of its students. In this context, it will enable the development of different perspectives to measure this issue, and the production of sound foresights and policies that will reinforce the practices. Test grade based measurement, which is widely used in the literature, does not fully reflect the academic development of the students. As a matter of fact, there are other factors that affect the academic development of students apart from lecture

grades, and these factors should also be focused on in order to increase academic success. The Academic Achievement Inventory for College Students Scale has an important guiding feature in both academic studies and practical applications, as it takes these ignored points into account. Inclusion of the scale in national literature will contribute to the development of national literature and will be an important tool for practitioners. In particular, practitioners can make the necessary updates in educational activities by making a comprehensive evaluation according to the subscales of the scale.

The study has limitations due to its scope and content. The process of translating the scale from English to Turkish, applying the questionnaire only to students studying at four universities in Mersin province, data collection time and applied analysis techniques are the limitations of the study. Studies conducted on a sample of students studying at other universities may produce different results. Using the Academic Success Inventory for College Students Scale with other variables in the education system can be offered to researchers as a suggestion.

There are some limitations in this study. The study is limited to two universities in Mersin province, Mersin province where the research was conducted, the questionnaire form in which the data was collected and the study period, analysis methods used in the study.

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Appendix

Adaptation of Academic Success Inventory Scale for College Students to Turkish

1. Genel akademik başarı

1.1.Bu sene iyi bir çalışma programı uyguladım. (GAS5)
1.2.Bu sene gerçekten çok sıkı çalıştım. (GAS4)
1.3.Bu sene başarılı olabilmek için yapabileceğim her şeyi denedim. (GAS3)
1.4.Bu sene çok çalıştım. (GAS7)
1.5.Bu sene ders çalışma konusunda yeteneklerimi çok iyi kullandığımı düşünüyorum. (GAS8)
1.6.Bu sene çok sıkı çalıştım, çünkü bu senenin konularını anlamak istedim. (GAS6)
1.7.Bu sene ödevler konusunda çok iyiydim. (GAS11)
1.8.Bu sene hedef belirleme stratejisini kullandım. (GAS10)
1.9.İyi hazırlandım. (GAS12)

1.10.İyi bir not alabileceğimi ispatlamak için sıkı çalıştım. (GAS2)
1.11.Bu sene ajanda ve takvim gibi planlama araçlarını çok iyi kullandım. (GAS9)
1.12.Bu sene sınavlara hazırlanırken doğru konulara çalıştım. (GAS1)
1.13.Bu sene yeni konular öğrenmekten çok memnunum. (IM1)
1.14.Bu sene sadece öğrenmek uğruna öğrenme zorluğundan zevk aldım. (EMC3)
1.15.Bu sene notlarımın iyi olacağından oldukça emindim. (IM7)
1.16.Not ortalamamı korumak için bu sene iyi notlar almam gerekiyordu. (IM2)
1.17.Bu sene derslere odaklanmakta zorlandım.* (C3)

2. Algılanan öğretmen etkinliği

2.1.Öğretmen etkili olmadığı için zayıf aldım.*(PIE2)
2.2.Öğretmenim daha iyi olsaydı çok daha iyisini yapardım.*(PIE3)
2.3.Ne öğrendiysem, kendi çabamla öğrendim. Bu seneki derslerin öğretmenleri iyi değil.* (PIE5)
2.4.Öğretimin kalitesi beni hayal kırıklığına uğrattı.*(PIE1)
2.5.Bu seneki derslerin öğretmenleri daha iyisini yapmam için beni gerçekten motive etti. (PIE4)

3. İçsel motivasyon/inanç

3.1.Bu senenin derslerinin en zor konularını bile anlayabileceğimden emindim (IM3)
3.2.Bu senenin gerektirdiği beceri ve yeteneklere sahip olduğumdan oldukça emindim (IM8)
3.3.Bu senenin derslerinden A veya B alabileceğimden oldukça emindim (IM4)
3.4.Sıkı çalışsaydım, daha iyisini yapabilirdim (IM5)
3.5.Okuyacağım bölümü (Anadal) seçmekte çok zorlanıyorum.*(CD3)

4. Kişisel düzenleme/durum

4.1.Bu sene performansımı etkileyen bazı kişisel sorunlarım vardı (PA3)

4.2.Hayatımdaki diğer problemlerle uğraşmak zorunda kalmasaydım bu sene çok daha başarılı olurdum.*(PA2)
4.3.Kişisel sorunlarımdan dolayı bu sene derslerimde başarılı olamadım.*(PA1)

5. Dış motivasyon/gelecek

5.1.Gelecekte başarılı olmam için bu sene çok önemli. (EM3)
5.2.İleride/gelecekte iyi bir işe girmek için bu derste başarılı olmak zorundaydım. (EM1)
5.3.Bu senenin kariyerime çok faydası olacak. (EM2)
5.4.Bu sene öğrendiğim konuları gelecekte gerçekten kullanacağımı düşünüyorum. (EM4)

6. Sosyalleşme

6.1.Çok fazla partiye/eğlenceye katıldığım veya dışarıda arkadaşlarımla takıldığım için sınıfta geri kaldım (S3)
6.2.Alkol kullanmak, bazen ders çalışmamı engelledi.*(S4)
6.3.Faal bir sosyal hayatım olduğu için notlarım kötüye gitti.*(S2)

7. Kariyer kararlılığı

7.1.Mezun olduktan sonra hangi işi yapmak istediğimden eminim. (CD2)
7.2.Mezun olduktan sonra ne yapmak istediğimi biliyorum. (CD1)
7.3.Okuduğum bölümün tam bana göre olduğundan eminim. (CD4)

8. Kaygısızlık

8.1.Ne kadar iyi hazırlanmış olursam olayım sınavlar bende gerginlik yarattı.*(LA1)
8.2.Bu senenin sınavları beni endişelendirdi.*(LA3)
8.3.Bu sene beni endişelendirdi.*(LA2)

9. Odaklanma

9.1.Bu sene derslerimde dalıp gitmemi engellemek çok kolaydı.(C1)
9.2.Bu sene derslere odaklanmakta zorluk yaşamadım.(C2)
9.3.Bu sene derslerde dikkatim çok kısa sürede dağıldı.*(C4)

Cevaplar: 7'li Likert (1= Kesinlikle katılmıyorum; 2= Kısmen katılmıyorum; 3= Biraz katılmıyorum; 4= Kararsızım; 5= Biraz katılıyorum; 6= Kısmen katılıyorum; 7; Kesinlikle katılıyorum)
* Tersten kodlanan ölçek maddeleridir.

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