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Grammar Anxiety Scale: The Validity and Reliability Study

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Anxiety is an affective variable that impacts learning negatively by impeding cognitive progress. Anxiety is associated with learners' individual differences such as beliefs, attitudes, expectations, motivation, and emotions. It has been determined in many studies that anxiety affects language learning negatively and interferes with many types of learning. The purpose of this study is to develop a measurement tool that will determine the level of anxiety students experience or may experience during the learning process of grammar. The population of the study consists of Turkish Language Teaching students receiving education in the academic year of 2019-2020. The sample of the study comprised of 328 participants who were selected by the random sampling method among the students studying at public university in Turkey. When scale score ranges are examined, it is seen that high scores indicate high anxiety, and low scores indicate low anxiety. It was verified as a result of the analysis that the sub-factors of the scale are the components of this structure, which is called grammar anxiety, and that they form the determined structure together. It was concluded that the model and goodness of fit indices are at acceptable levels. The scale sub-factors of Cronbach's Alpha internal consistency coefficient were .92 for "emphasis on grammar learning", .87 for "learner beliefs" and .88 for "grammar learning experience". The internal consistency coefficient obtained for the whole scale was determined as .92. The obtained values also show that this scale is a reliable measurement tool for measuring grammar anxiety.

Introduction

Language education helps learners acquire basic skills in reading, listening, speaking, and writing, but it also means teaching them how to think. Language users make use of language when they think and concretize their ideas. Therefore, grammar teaching is not separate from other skills in the language learning process. Failing to consider and misunderstanding the functions of grammar while teaching language transform grammar

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learning from a useful tool into a field of knowledge that must be memorized through abstract linguistic exercises.

Grammar is not a skill with subjects and rules to be taught by having students memorize them, it is the skill of effectively using, understanding, analysis, and reproduction (Göçer, 2015). However, grammar teaching has often been the most problematic area of native language teaching (Çiftçi, 2015: 397). Perspectives on grammar have determined the boundaries of how to teach it. According to Vardar (2001: 40-42), the definitions and methods of grammar that are not fully clarified and grammatical arguments that form a subjective framework cause learners to create many mistakes about the language. The prioritization of grammar rules and the opposition of the correct and the incorrect lead to analyzing linguistic relationships incorrectly, but the rules and the forms abstracted from the meaning alone should be handled individually. The teaching approaches for memorizing forms individually cause some problems with their teachability and learnability. The problems discussed by many studies in the literature include: the fact that grammar teaching does not support the use of language by students; teaching the structure and function of language as a separate subject; teachers and students finding grammar teaching unnecessary; problems with methods, techniques, tools and materials; the gradualness of the subjects and gains separating grammar from reality, failure to excite students' interest or meet their needs, students' negative attitudes toward grammar, and students' dislike for grammar and difficulties with learning grammatical concepts (Çeçen & Mete, 2011; Çeçen & Aytaş, 2008; Çolak, 2013; Derman, 2011; Ekinci Çelikpazu, 2019; Ekinci Çelikpazu & Taşdemir, 2017; Erdem, 2008; Erdem & Çelik, 2011; Göçer & Sayın, 2014; Güneyli & Küçükavşar, 2011; Güven 2013; Karagöz & Oryanşın, 2014; Karatay, Kartallıoğlu & Coşkun, 2012; Onan, 2012; Temizkan, 2012; Yaman & Karaaslan, 2010). However, in the studies conducted, it is seen that the anxieties experienced by the students in the grammar teaching process, which requires understanding/analyzing/reproducing the structural features of the native language, are not emphasized. If anxiety is regarded as one of these features, the question "Do learners experience anxiety while learning the grammar features of the native language?" is waiting to be answered.

Anxiety defined by Freud (1936) as "an unpleasant affective state or conditioning" (as cited in Han, 2009) is subjective tension and stiffness and rigidity associated with the stimulation of the autonomic nervous system (Horwitz, Horwitz & Cope, 1986; Horwitz, 2001; Spielberger, 1972). As many language learners understand intuitively, it is an affective variable that affects language learning negatively and severely (Ariza, 2002; Horwitz, 2001; Ride, 2011). Affective variables, motivational orientations and language learning strategies are the factors that make learning easier or more difficult for language learners. One area where the effect of affective variables on learning has been clearly demonstrated is anxiety (Kılıç, 2017: 111).

Ellis (1995, as cited by Kılıç, 2017) created a model of anxiety's effect on language learning:

- Anxiety at the beginner stage is very little, restricted to state anxiety, and has no effect on learning.
- At the post-beginner stage, if a learner perceives it as a threatening situation based on bad learning expectations, situation-specific anxiety emerges, and they perform poorly.
- At the later stage, poor performance and continued bad learning experiences cause increased anxiety, which results in the prolongation of poor performance.

The first idea about language anxiety that comes to mind is foreign language anxiety. This is called as "foreign language anxiety" in the literature; it is a complex and multi-dimensional phenomenon (Horwitz, 2001: 113). One important study determining the relationship between foreign language learning and anxiety was conducted by Horwitz, Horwitz and Cope (1986). They defined classroom anxiety as an important variable in foreign language learning and developed the Foreign Language Classroom Anxiety Scale (FLCAS). They associated foreign language anxiety with performance evaluation in academic and social contexts and found a parallelism between this anxiety and other three types of anxiety, the first of which is communication anxiety. Establishing verbal communication in conversations, in groups or in larger circles, and difficulty listening to or understanding messages are the causes of communication anxiety about a foreign language (Horwitz, Horwitz, & Cope, 1986: 127). Tests administered during foreign language learning can also cause anxiety to arise often. Students say that they know the grammar of the foreign language but forget it during written tests or oral exams and that they know the correct answers, but choose incorrect answers due to test anxiety. Test anxiety refers to performance anxiety due to the fear of failure (Horwitz, Horwitz, & Cope, 1986: 128). Tests cause situational anxiety in terms of individual, affective and behavioral dimensions and they negatively affect students' motivation. Test anxiety affects both successful students and unsuccessful students (Yoğurtçu & Yoğurtçu, 2013). However, some studies have reported that test anxiety is not a component of foreign language classroom anxiety (Aida, 1994; Yang, 2012).

Another type of anxiety about foreign language learning is fear of criticism. This type of anxiety is defined as avoiding the evaluations of others and thinking that their evaluations will be negative. Students may also be sensitive to the –real or imaginary– judgements of their peers as well as teachers (Horwitz, Horwitz, & Cope, 1986: 128).

Although Horwitz, Horwitz and Cope (1986) emphasize that communication anxiety, test anxiety and fear of criticism are the conceptual building blocks of foreign language anxiety, they also say that foreign language anxiety not only combines these concerns, but is based on a combination of students' self-perceptions, beliefs, emotions and behaviors.

Language anxiety, which is a cognitive activity based on coding, storing, and acquisition processes, negatively affects learning and teaching during language learning (MacIntyre & Gardner, 1994). Exploring language anxiety in specific language processes has caused anxiety about specific language skills to be examined (MacIntyre, 2017). When language education is viewed as an integral whole composed of speaking, writing, and listening skills, studies have examined anxiety related to these skills and found results indicating that anxiety concerning one skill affects the others.

Botes, Dewaele and Greiff (2020) found a negative correlation between foreign language anxiety and academic success According to Horwitz, Horwitz and Cope (1986), anxiety is an important factor that affects the communication strategies that students use in foreign language classrooms and is an obstacle that must be overcome to learn a language. Anxious students abstain from participating in language activities in the target language. For example, students with high writing anxiety about a foreign language keep their writing tasks short and consider them to be low quality. Other students with high anxiety worry about speaking a foreign language, not being able to understand the target language, being less competent than other students, and being evaluated negatively. Cheng, Horwitz and Schallert (1999) concluded that foreign language classroom anxiety and anxiety about writing in foreign language are related, but distinguishable forms of anxiety. Some second language students

lacked confidence in their ability to speak the target language, and others felt anxious about the possibility of failure, poor performance and criticism. Regarding writing in the second language, self-respect, negative thoughts about writing and fear of criticism caused writing anxiety. Brown (2008) examined the anxiety of international masters' degree students about their English language levels and found that anxiety caused non-native English speakers to feel inadequate about speaking fluently, discussions, daily speaking, grammar, grasping the meaning of words, and classroom participation. They also had poor reading and writing skills. A study on the effect of anxiety on the semantic components of speech found that anxiety impaired the relationships between successive sentences due to its effect on information processing (Zohar, Livne, & Fine, 2003).

Most studies of language learning anxiety have focused on anxiety about reading, speaking in classroom or social settings, writing, understanding grammatical concepts in foreign languages and the causes of language learning anxiety. Most researchers have used the FLCAS developed by Horwitz, Horwitz and Cope (1986) to determine the presence of language learning anxiety. There are scales for assessing language learning anxiety about listening, speaking and writing (Cheng, 2004; Karakaya & Ülper, 2011; Karakuş Tayşi & Taşkın, 2018; Karçiç & Çetin, 2015; Melanlıoğlu, 2013; Melanlıoğlu, 2014; Melanlıoğlu & Demir, 2013; Şen & Boylu, 2017).

Language learning means not only studying the four language competence skills, but also analyzing the basic system of rules that defines grammatical structure of the target language. Although many studies of grammar teaching and learning have been conducted, they have tended to ignore students' attitudes toward and perceptions of grammar learning (Akay & Toraman 2015). Anxiety about learning the grammar of one's native language has also not been examined in detail. There are few studies of students' anxiety about grammar. For example, Önem and Ergenç (2013) investigated the relationship between the anxiety about teaching English and success. They focused on teaching grammar subjects and found a statistically significant difference between the experimental and control groups' anxiety and success levels. Some studies have also discussed learners' anxieties about learning the grammatical structures of the target or foreign language (Akay & Toraman, 2015; Awan, Azher, Anwar & Naz, 2012; Ehrman & Oxford, 1995; Giovanelli, 2015; Khattak, Jamshed, Ahmad & Baig, 2011). Svalberg (2012) drew attention to the importance of grammar studies in language learning, defined anxiety as a feeling of tension that makes learning difficult and proposed a series of grammatical activities intended to reduce students' anxiety and enable them to understand texts more easily.

Sparks and Ganschow (1995) identified anxiety as a cause of problems in language learning and argued that in several language tests language learning anxiety is caused by a lack of linguistic coding and is the outcome of lacking language skills and coding problems (as cited by MacIntyre, 2017). This issue suggests that failure to analyze grammatical structures completely both in native and foreign languages can play a role in emergence of language anxiety. Failure to analyze and interpret grammatical structures completely and being unable to reproduce them can cause language learning anxiety. Identifying anxiety felt during learning grammar, which explicitly helps to develop implicit knowledge about language and support language development (Ellis 2006), is an important way to organize and improve language learning. However, no studies of anxiety about learning the grammar of one's native language were found in the literature. There is thus a need for a scale for measuring the anxiety that learners have experienced or might experience about native language grammar learning. In the study, language anxiety was confined to grammar learning and called

grammar anxiety, and a new category of language anxiety was created.

Since some studies have determined that grammatical coding in language learning can cause language anxiety, this study's main purpose is to develop a scale for measuring grammar anxiety.

Method

Model

The present research is scale development study. The development of a new scale to measure grammar anxiety presupposes that all items in the scale share a common cause, that is the latent variable trust, and that item-total scores relate to this variable (Devellis, 2012).

Participants

This study's population consisted of students in the department of Turkish language teaching in the 2019-2020 academic years. Since this is a scale development study, its sample is to be large enough for exploratory and confirmatory factor analyses. Convenience sampling was used and the sample included 328 Turkish Language Teaching students at a public university. Convenience sampling (also known as availability sampling) is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in study. Convenience sampling is a type of sampling where the first available primary data source will be used for the research without additional requirements. In other words, this sampling method involves getting participants wherever you can find them and typically wherever is convenient (Saunders, Lewis & Thornhill, 2012).

Although there is no exact criterion in the literature on the number of items tested or the size of the sample group, some researchers state that the sample size should be at least five times the number of items tested, whilst other researchers suggest that it ought to be ten times the size of the sample (Child, 2006; Gorsuch, 1983; Kline, 1994). The sample size was determined based on the fact that it should be five times the number of items for item analysis and factor analysis in scale development studies.

The numerical distribution of the students in the study according to gender, grade level, department and age variables is shown in Table 1:

Table 1. Distribution of students' gender, faculty variables by grade level

	Grade level	1		2		3		4		Total	
		f	%	f	%	f	%	f	%	f	%
Gender	Female	42	0,13	68	0,21	48	0,15	36	0,11	194	59
	Male	34	0,10	37	0,11	33	0,10	30	0,09	134	41
	Total	76	0,23	105	0,32	81	0,25	66	0,20	238	100
		f	%	f	%	f	%	f	%	f	%
Faculty	Education	62	0,19	68	0,21	69	0,21	35	0,11	234	71
	Science-Literature	14	0,04	37	0,11	12	0,04	31	0,09	94	29
	Total	76	0,23	105	0,32	81	0,25	66	0,20	328	100

As seen in Table 1, the fact that the sample has different levels of participation such as 1,2,3 and 4th grades in the distribution of the sample by gender and department shows that the scale has a representative power for these groups in the research. When the distribution of class levels in the sample is examined by gender, it is seen that the most students are in the 2nd grade as 21% female and 11% male. Considering the distribution of grade levels in the sample according to faculties, it is seen that 21% of the students are in the 3rd grade at the faculty of education and 11% are in the 2nd grade at the faculty of science and literature.

Table 2. Gender distribution by faculty

Gender	Faculty					
	Education		Science-Literature		Total	
Male	f	%	f	%	f	%
	94	0,29	40	0,12	134	0,41
Female	f	%	f	%	f	%
	140	0,43	54	0,16	194	0.59
Total	234	0.72	94	0.28	328	100

As seen in Table 2, it can be said that the variance of the age variable of the students participating in the research is large. When the gender distribution of the students in the sample in faculties is examined, 29% of the males are in the faculty of education, 12% are in the faculty of science and literature; On the other hand, it is seen that 43% of women are in the faculty of education and 16% in the faculty of science and literature.

Table 3. Age distribution of students

	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Age	18		19		20		21		22		23		24		25	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
	25	7,6	29	8,8	91	27,7	44	13,4	43	13,1	73	22,3	14	4,3	9	2,7

According to Table 3, 27.7% of the students in the sample have 20, 22.3% 23, 13.4% 21, 13.1% 22, 8.8% 19, 7%, It was observed that 6 of them were 18 years old, 4.3% were 24 years old, and 2.7% were 25 years old.

The draft scale and items

To measure grammar anxiety, second-, third- and fourth-year students in the department of Turkish Language and Literature in the Faculty of Arts and Sciences, and in the department of Turkish Education in the Faculty of Education were asked to write a text about their experiences of grammar learning anxiety, and their positive and negative evaluations of grammar teaching at the university. Texts were received from 87 students and included in the study. Based on the texts written by the students and the literature review, an item pool consisting of 120 expressions that could reveal grammar anxiety was created. The prepared 120-item draft form was examined by five experts, three of whom work in the field of Turkish Education, and two of them working in the field of Assessment and Evaluation, apart from the researchers. Experts evaluated the items in terms of the presence of similar expressions, incomprehensible/misunderstood expressions, not reflecting other psychological factors other than anxiety, and being anxiety items for grammar. At the same time, the draft form was applied to 196 Turkish language education department students. The application of the scale took approximately one lesson hour (40 minutes). After the pilot application and the opinions of the experts, similar items that were not understood by the students were removed from the

scale and a 45-item scale form was created. Thus, the content validity of the draft form was tried to be ensured. In the evaluation of the scale, it was decided to make a four-point Likert-type scale scoring, taking into account the opinions of the experts. The rating used in this context is expressed as “Never (1)”, “Sometimes (2)”, “Usually (3)” and “Always (4)”.

Data Analysis

After the data collection process was completed, the data obtained were organized to perform appropriate statistical operations. Then, regarding the validity of the scale:

a) Correlation coefficients were calculated between item scores and total scale scores in order to provide evidence for the validity of the items forming the scale.

Here, the criterion that provides a basis for choosing an item and deciding on the suitability of the item is taken as the item total test correlation value of 0.30 and above.

b) Principal component factor analysis was applied to provide evidence for the construct validity of the scale and to examine the factor structure of the scale, and here the criterion factor load value was taken as 0.30 and above, which provides a basis for deciding on item selection and item suitability. Factors with an eigenvalue greater than 1 were processed (Kaiser, 1960; Tabachnick & Fidell, 2001).

In addition, the model data goodness of fit of the scale is IFI, CFI, NFI, GFI, AGFI,TLI model-data fit was determined by looking at values ((Hu & Bentler, 1998; Marsh, Hau, Balla, & McDonald, 1988).

Regarding the reliability of the scale:

a) Cronbach's alpha reliability coefficients of the scale and subscales were found in order to determine how consistent the items of the scale were with each other and with the total test scores (internal consistency). The internal consistency coefficient obtained for the whole scale was determined to be .92.

Findings

Content validity

The students’ texts were examined by researchers who are expert in the fields of assessment and evaluation, and Turkish education, and 120 statements of anxiety were selected from them for the draft form of the scale, which was administered to 127 students as a pilot study. The statements that were incomplete, not long enough, unclear, not written in plain language or grammatically incorrect and were not answered by the students were rearranged. The items were revised to exclude conceptual expressions, prompting, bias and double negatives so that they were expressed simply and plainly with unequivocal meanings. Items including extreme responses were corrected (Oppenheim, 1996). These items were presented to experts in Turkish language education, Turkish language and literature, and assessment and evaluation. Their opinions were obtained using the Davis (1992) method and evaluated as four items. The experts were asked to rate each item as: 1-the item does not represent the feature, 2-the item needs major correction, 3-the item needs minor correction, and 4-the item represents the feature. The number of experts who marked options 3 or 4 for each item was divided by the total number of experts to determine their content validity

indices (CVIs). The items with CVIs under 0.80 were excluded. The finalized scale has 45 items that were deemed to be appropriate in terms of language, expression, and implementation period.

In order to prevent the scale from being marked without being read and to ensure the validity of the data, items with similar anxiety were included in the scale. More than one item measuring the same anxiety state were retained in the scale in order to increase the reliability of the data (Fraenkel & Wallen, 1996). Scale development studies require a large sample for exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). This study uses a four-point Likert-type scale, which is commonly used in the social sciences, with the responses: 1=never, 2=sometimes, 3=usually and 4=always.

Implementation and analysis

Construct validity is the degree in which a test measures a theoretical construct that is intended to be measured. For a fair number of times scientists evaluate or measure abstract constructs. Statistical analysis methods such as factor analysis, internal consistency analysis and hypothesis test are used to determine construct validity. When the aspect being measured is known as an abstract construct that is estimated from straight apparent events, then it may be known as "construct validity" (Karl, 2012). In this study, EFA and CFA were used to determine construct validity. The scale's factor structure was analyzed using principal components analysis (PCA), Varimax rotation and CFA. The scale was administered to Turkish language education and Turkish language and literature education 328 students. It was desired to carry out CFA work with all students who received education in the field, but due to the inability to reach the student and the lack of markings given to the scale, the validation study continued in the EFA group. EFA determined that it had three factors (subscales), and this was verified using CFA.

Findings obtained by statistical analyses are listed below. The Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's' test of sphericity were used to determine the suitability of the data for factor analysis. KMO coefficient was 0.923, which indicates that the sample was adequate for factor analysis.

The analysis results in the KMO coefficient is 0.923 indicating that sampling adequacy was provided for factor analysis. For KMO value, a value between 0.5-1.0 is acceptable; values below 0.5 are regarded to be inadequate for factor analysis. It was also found that Bartlett test of sphericity was at a significant level ($\chi 2=8119.452$; $p<.05$). These data indicate that the draft scale was appropriate for factor analysis. EFA was performed to determine the basic factors. PCA was used to determine the main factors, and Varimax rotation was used to interpret the factors and to verify their significance.

Table 4. The variance values of the draft scale

Initial Eigenvalues				Total Variance Explained		
Factor	Total	%Variance	Cumulative%	Total	%Variance	Cumulative%
1	12.434	27.631	27.631	12.434	27.631	27.631
2	5.971	13.268	40.899	5.971	13.268	40.899
3	3.324	7.386	48.285	3.324	7.386	48.285
4	1.351	3.002	51.287	1.351	3.002	51.287
5	1.234	2.743	54.030	1.234	2.743	54.030
6	1.173	2.606	56.636	1.173	2.606	56.636
7	1.083	2.406	59.042	1.083	2.406	59.042
8	1.029	2.286	61.328	1.029	2.286	**61.328**

PCA determined that the 45-item draft scale had an eight-factor structure with an eigenvalue greater than 1. The percentage of total variance was 61.328%. Scree plot, eigenvalues, and percentage of total variance are most frequently used to decide the number of a scale's factors (Tabachnick & Fidell, 2007).

The scree plot indicated that the scale had three subscales, considering where the graph began to flatten, the proximity of the values and the table of total variance value.

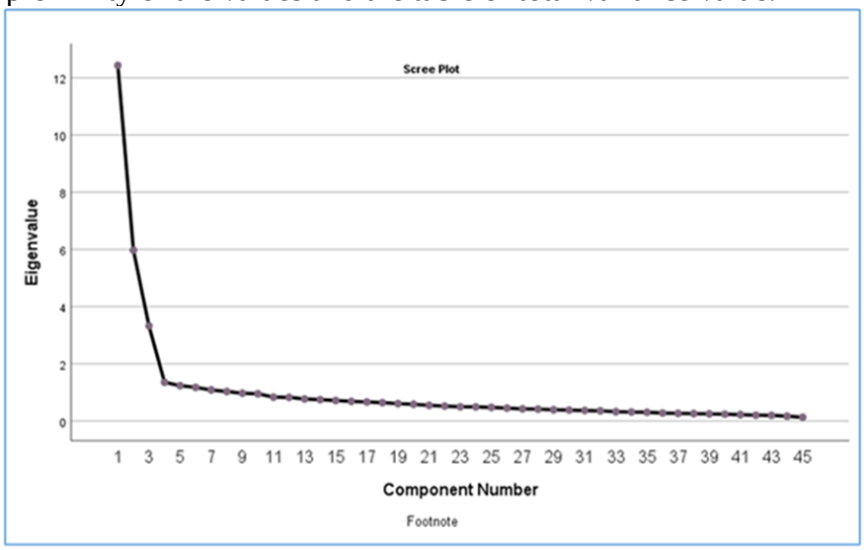


Figure 1. Scree plot of draft scale

Items with values less than .30 and those that loaded on more than one factor in the first rotation were excluded from the scale. The items with values less than .30 and those that loaded on more than one factor in the first rotation and the following rotations were examined.

Then the factor load values of the items were checked and the i2, and i37 considered overlapping, collected in other factors, were excluded one by one to complete the EFA. The scale's final rotation item factor loads found as a result of PCA rotated according to the principal axes analysis are shown in Table 5. It was concluded that the items had three factors.

Varimax vertical rotation determined that the item correlations of those with loads over .30 were appropriate, and their common factor variance values, where the items were explained together by any item, were examined.

Table 5. The rotated variables matrix

Items	F1	F2	F3
i17	.813		
i29	.801		
i25	.776		
i15	.748		
i4	.739		
i26	.717		
i14	.715		
i34	.685		
i16	.682		
i44	.649	.345	
m43	.649		
i12	.601		
i45	.564		.389
i36	.549		
i19	.515		
i38		.774	
i40		.728	
i10		.719	
i27		.705	
i18		.679	
i3		.633	
i8		.595	.398
i31		.590	
i22		.576	
i41		.565	.460
i30		,552	.394
i13			.775
i28			.761
i7		.302	.648
i9	.378		.644
i42		.304	.638
i32			.601
i35	.348		.593
i33		,339	.593
i23			.588
i20			.570
i5			.359

Although Table 5 shows that some items loaded on more than one factor, no items were excluded because the differences between the factor loads were greater than 0.10. Of the remaining 37 items, 15 were collected under factor 1, 11 were collected under factor 2, and 11 were collected under factor 3. Of the variance of the scores of the 37 items, 21.16% was explained by factor 1, 15.09% was explained by factor 2, and 14.60% was explained by factor 3. Of the total variance, 50.864% was explained by the three-factor scale.

Table 6. The eigenvalues of the subscales and total variance values

Initial Eigenvalues				Total Variance Explained		
	Total	%Variance	Cumulative%	Total	%Variance	Cumulative%
Emphasis on grammar learning	10.806	29.205	29.205	10.806	29.205	29.205
Learner beliefs	4.885	13.202	42.407	4.885	13.202	42.407
Grammar learning experience	3.129	8.456	50.864	3.129	8.456	50.864

The subscales describing the state of anxiety and named based on the literature were-emphasis on grammar learning, learner beliefs and grammar learning experience. The eigenvalue of the first factor (emphasis on grammar learning) was 10.806, the eigenvalue of the second factor (learner beliefs) was 4.885, and the eigenvalue of the third factor (grammar learning experience) was 3.129. The first subscale, emphasis on grammar learning, was listed as i17 and i19 from the one with higher factor load to the one with a lower factor load. The factor loads ranged from 0.813 to 0.515. The second subscale, learner beliefs, was listed as i38, i40, i10, and i30 from the one with higher factor load to the one with a lower factor load. The factor loads ranged from 0.774 to 0.552. The third subscale, grammar learning experience, included items i13 and i5. The factor loads ranged from 0.775 to 0.359. These items were used in the item-test correlation coefficient calculations.

Reliability studies for the Grammar Anxiety Scale (GAS)

Factor loads are expected to be higher than .30 in factor analysis for item-total correlation values (Martin & Newell, 2004). There were GAS items with item-total correlation values of less than .30. After items i5, i20 and i3, which had item-total correlation values of less than .30 were determined, the change in factor variance values was examined, and those with factor variances of less than .30 were excluded, reducing the number of items to 34.

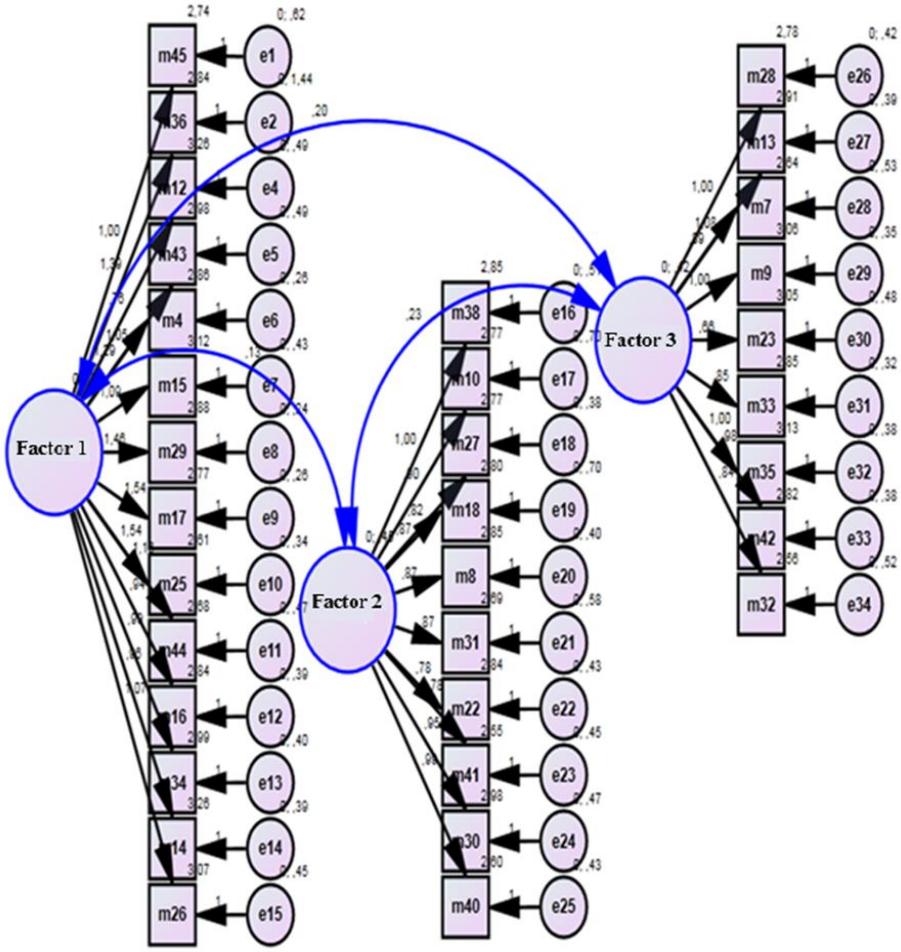
Table 7. The reliability coefficients of the gas and its subscales

Scale and Subscales	Number of Items	Cronbach's Alpha (α)
Factor 1.Emphasis on grammar learning	15	.921
Factor 2.Learner beliefs	10	.876
Factor 3.Grammar learning experience	9	.883
Total	34	.928

Cronbach's alpha reliability coefficients were calculated for three subscales. As Table 7 shows, the Cronbach's alpha reliability was 0.928 for the entire GAS. They were 0.921 for emphasis on grammar learning, 0.876 for learner beliefs and 0.883 for grammar learning experience. When the internal consistency coefficients of all subscales of the scale were examined, the Cronbach's Alpha reliability coefficient was 0.928, which indicates high reliability.

CFA Model Fit Results: The first fit index examined in order to test the model fit is $\chi 2/df$. $\chi 2$ tests the significance of the difference between the observed covariance matrix and the estimated covariance matrix (Bagozzi & Heatherton, 1994). While evaluating the model fit, instead of acting directly from the $\chi 2$ value; It is recommended to take the value obtained by dividing the $\chi 2$ value by the degrees of freedom (Hoe, 2008). The CFA determined that $\chi 2/df$ was 2.932, which indicates that the model had acceptable goodness of fit. Values of 2 or less indicate that the model is perfect, and values of 5 or less indicate acceptable goodness of fit.

As a result of the CFA of the 34-item scale, the goodness of fit index (GFI) and the adjusted goodness of fit index (AGFI) of the model whose root mean square error of approximation (RMSEA) value was 0.076 before modification determined that the GFI value was 0.74, and that the AGFI value was 0.71. The standardized regression load of item 19 was less than .50, so it was excluded from the scale.
The RMSEA value was 0.077 after the modification. RMSEA values of 0.05 or less indicate perfect goodness of fit, and values of 0.08 or less indicate good goodness of fit. The model had a good goodness of fit.



Chi-Square= 1442,319 df= 492 P-value=0.000 RMSEA= 0.077

Figure 2. Confirmatory factor analysis model

Table 8. The CFA fit indices of the GAS

Fit Indices before the modification									
RMESA	**NFI**	**CFI**	**IFI**	**TLI**	**GFI**	**AGFI**	**X^2**	**DF**	**CMIN/DF**
0.076	0.759	0.827	0.828	0.815	0.747	0.713	1514.5	524	2.890
Fit Indices after the modification									
RMESA	**NFI**	**CFI**	**IFI**	**TLI**	**GFI**	**AGFI**	**X^2**	**DF**	**CMIN/DF**
0.077	0.765	0.831	0.832	0.818	0.752	0.717	1442.3	492	2.932

There are a number of indices used to assess model fit and various opinions on which indicesneed to be reported. According to Brown (2015), fit indices are divided into three groups, videlicet the absolute fit indices (χ2, SRMR and RMR), parsimonious indices (RMSEA), and comparative indices (CFI-IFI, TLI-NNFI); at least one index from each group should be used in reporting. Hu and Bentler (1999) propose using the couples of NNFI (min. 0.96) and SRMR (max. 0.09), or RMSEA (min. 0.06) and SRMR (max. 0.09), or CFI min. 0.96) and SRMR (max. 0.09) in line with the two-index strategy. Although GFI and AGFI are frequently used, they are not recommended due to their poor performance in simulation studies (Hu & Bentler, 1998; Marsh, Hau, Balla, & McDonald, 1988). It is not appropriate to

line up definite criteria for fit indices as they are affected by a range of factors such as sample size, model complication level, estimation method, data type, normality of data, misdefinition of model, etc. (Brown, 2015).

When Table 8 is examined, the GFI value was 0.75 and the AGFI value is 0.71. The normal value for GFI is >0.95, and the acceptable value is >0.90. The AGFI value ranges from 0-1 and is above 0.90 expected to be above. Although these values were not captured in some of the studies examined, GFI and AGFI are not the only goodness of fit index, and it would be more accurate to evaluate them together with others.

Research has shown that the GFI and AGFI are mainly affected by sample size and have a certain degree of downward bias, especially when sample sizes are less than 150, which is consistent with the conclusions of Gerbing and Anderson (1992) and Marsh et al. (1988). Both the GFI and AGFI mainly utilize the information of the covariance matrix, which is not stable in small samples and gradually becomes stable with the increase of sample size. This may explain the dependence of the GFI and AGFI on sample sizes. The results revealed that both the GFI and AGFI were not influenced by the estimation method in the correctly specified models, which is accordant with the findings of Wang, Fan, and Willson (1996). Sugawara and Maccallum (1993) also pointed out that the GFI and AGFI tend to behave relative consistently across different estimation methods, especially for well-fitting models. Although different estimation methods yield different values in discrepancy function, this has little effect on the values of the two indexes. The GFI and AGFI were much more sensitive to small sample size (≤500).The GFI and AGFI values were acceptable. In the final analysis, the normed fit index (NFI) was 0.76, and the comparative fit index (CFI) was 0.83. This study's NFI and CFI values indicated acceptable goodness of fit. After the CFA, the scale was finalized with 3 subscales and 33 items.

Table 9. The CFA factor loads for the emphasis on grammar learning subscale

Items	Expressions	Factor loads
i17	Grammar lessons are fun.	.857
i29	I like grammar.	.852
i25	Grammar is one of my favorite classes.	.822
i15	It makes me happy to get a different perspective on grammar and experience emotions that I have not felt before.	.676
i4	I enjoy learning grammar subjects.	.811
i26	It makes me happy to use what I have learned in grammar lessons in my daily life.	.659
i14	It makes me happy when a new grammar subject is useful to me.	.645
i34	I find grammar useful because it affects other skills.	.653
i16	I like grammar although I get a little anxious while I'm learning something new about it.	.639
i44	Grammar subjects are easy to learn because they are based on specific rules.	.682
m43	I like grammar despite its difficulty and complexity.	.637
i12	Although being introduced to a new grammar subject for the first time may be boring, trying to learn makes me happy like solving a puzzle.	.514
i45	I work on grammar as I like it.	.572
i36	I am curious about learning grammar.	.537

The factor loads of the 14 reverse-scored items on the emphasis on grammar learning subscale are shown in Table 9. They range from 0.514 to 0.857. The lowest possible score on the emphasis on grammar learning subscale is 14, and the highest is 56. The mean factor score is 41. For emphasis on grammar learning subscale,

- Scores of 14 to 28 indicate low level of anxiety,
- Scores of 29 to 43 indicate moderate level of anxiety, and
- Scores above 44 indicate high level of anxiety.

Table 10. The CFA factor loads for the learner beliefs subscale

Items	Expressions	Factor loads
i38	When I learn grammar, I am most afraid of not being able to succeed.	.685
i40	It worries me that my previous learning about grammar subjects was insufficient.	.716
i10	I do not like memorizing grammar subjects.	.588
i27	I find it difficult to break old patterns in learning grammar.	.670
i18	I think memorization is an obstacle to my learning of grammar subjects.	.575
i8	The difficulty of grammar subjects makes me anxious.	.682
i31	Teaching rules, not language, in grammar lessons overwhelms me.	.609
i22	The difference between teaching grammar and related practices makes me feel negative emotions.	.629
i41	My suspicion that I may not understand grammar subjects makes me nervous.	.616
i30	Thinking that I cannot learn because grammar is prescriptive makes me unhappy.	.682

Table 10 shows that the factor loads of the 10 items on the learner beliefs subscale range from 0.575 to 0.685. The highest possible score on this scale is 40, and the lowest is 10. The mean factor score is 28.

For learner beliefs subscale are:

- Scores of 10 to 20 indicate low level of anxiety,
- Scores of 21 to 31 indicate moderate level of anxiety, and
- Scores above 32 indicate high level of anxiety.

Table 11. The CFA factor loads for the grammar learning experience subscale

Items	Expressions	Factor loads
i13	Although I know the importance of grammar, I do not like it.	.857
i28	I always approach grammar with prejudice.	.852
i7	I feel nervous when I learn grammar subjects.	.822
i9	I don't like grammar.	.676
i42	I always feel troubled in grammar lessons.	.811
i32	I have a hard time translating grammar rules into practice.	.659
i35	I often avoid learning grammar.	.645
i33	Grammar, is a nightmare for me.	.653
i23	Grammar subjects do not apply to daily life.	.639

The factor loads of the 9 items on the grammar learning experience subscale range from 0.639 to 0.857, as Table 11 shows. The highest possible score on this subscale is 36, and the lowest is 9. The mean factor score is 26. For grammar learning experience subscale;

- Scores of 9 to 18 indicate low level of anxiety,
- Scores of 19 to 27 indicate moderate level of anxiety, and

- Scores above 28 indicate high level of anxiety.

The lowest possible score on the GAS is 33, and the highest is 132. The mean GAS score is 94. For Grammar Anxiety Scale:

- Scores of 33 to 66 indicate low level of anxiety,
- Scores of 67 to 100 indicate moderate level of anxiety, and
- Scores above 101 indicate high level of anxiety.

Table 12. The correlations of the GAS subscales

Scale Factors	Emphasis on Grammar Learning	Learner Beliefs	Grammar Learning Experience	Total
Emphasis on Grammar Learning	1	.278**	.501**	.834**
Learner Beliefs	.278**	1	.455**	.692**
Grammar Learning Experience	.501**	.455**	1	.794**
GAS Total	.834**	.692**	.794**	1

** p<.001

Pearson's correlation between the GAS and its subscales found a weak correlation between emphasis on grammar learning and learner beliefs (r=.27, p<0.001) and a moderate correlation between emphasis on grammar learning and grammar learning experience (r=.50, p<0.001). A moderate correlation was found between learner beliefs and grammar learning experience (r=.45, p<0.001). There were also significant correlations between GAS scale scores and emphasis on grammar learning (r=.83, p<0.001) and between GAS scale scores and grammar learning experience (r=.79, p<0.001), and a moderate correlation between GAS scale scores and learner beliefs (r=.69, p<0.001).

Three factors were determined after EFA analysis of the Grammar Anxiety Scale, which first had 45 items. As a result of the CFA analysis performed afterwards, it was seen that model data fit was achieved. The final form of the scale consists of 33 items. When scale score ranges are examined, it is seen that high scores indicate high level of anxiety, and low scores indicate low level of anxiety. It was verified as a result of the analysis that the subscales of the scale are the components of this structure, which is called grammar anxiety, and that they form the determined structure together. It was concluded that the model and goodness of fit indices are at acceptable levels. Findings regarding reliability were also found to be quite high. Cronbach's Alpha internal consistency coefficient of the scale subscales is .92 for "emphasis on learning grammar", .87 for "learner beliefs", and .88 for "grammar learning experience". The internal consistency coefficient obtained for the whole scale was determined to be .92. The values obtained also show that this scale is a reliable measurement tool for measuring grammar anxiety.

Results and Discussion

When language anxiety is mentioned, foreign language anxiety usually comes to mind, and it is the subject of most of the studies in the literature. Most of the language learning anxiety scales assess speaking anxiety, writing anxiety, listening anxiety, and reading anxiety. Specifically, there are grammar attitude scales. This study developed a valid and reliable scale for assessing learners' grammar anxiety in their native language.

This scale is important because it is the first scale with a validity and reliability study

performed in its field. Scales that lack sufficient validity cause heterogeneous measurements, reducing the power of statistical tests and making it difficult to determine the significant differences between groups. Therefore, it is important to know that scales are highly valid and reliable. Scale development studies require knowledge, research and time. Making accurate judgements to produce valid data and plausible solutions are only possible with valid and reliable measurement tools. The entire Grammar Anxiety Scale's internal consistency coefficient was found to be high in the reliability study, which indicates that it is a reliable tool for measuring grammar learning anxiety.

Anxiety is an affective variable that affects learning negatively by impeding cognitive progress (Bailey, Onwuegbuzie & Daley, 2000; Eysenck, Derakshan, Santos & Calvo, 2007; MacIntyre & Gardner, 1994; MacIntyre, 1995) Anxiety is associated with learners' individual differences such as beliefs, attitudes, expectations, motivation and emotions (Buğra & Zengin, 2008). The GAS items were determined on the basis of anxiety being an implicit feature and considering the literature related to the affective domain of learning. The scale items were grouped in three subscales with names that have been discussed in the literature and shown to cause anxiety.

The first subscale is emphasis on grammar learning. Negative evaluations of grammar and grammar teaching can cause anxiety. The participants in this study were undergraduate candidate Turkish teachers. They made positive or negative evaluations about their experiences of grammar teaching and put emphasis on grammar learning. Examinations and teachers' attitudes toward grammar and teaching grammar can also affect emphasis on grammar or grammar learning. The second subscale is learner beliefs, which can cause grammar anxiety. Learner beliefs are among the factors that can lead to grammar anxiety (Borg & Burns, 2008; Horwitz et al. 1986; Young, 1991; MacIntyre, 2017).

The third subscale is grammar learning experience. Experiences with grammar learning can also cause grammar anxiety. Language learners' experience is a factor that can lead to anxiety (Aida, 1994; Akay & Toraman 2015; Brown, 2008; Horwitz, 2001; Young, 1991). According to MacIntyre and Gardner (1989), beginning language learners do not have anxiety. Language anxiety is an emotional reaction that develops over time with the formation of attitudes and feelings towards language learning. Students may or may not be anxious at different stages of learning grammar. A teacher does not encounter anxious students from the first lesson in the classroom. Anxiety can arise as students form impressions and attitudes about language learning. If students' first impressions of language learning are negative, anxiety may begin to occur and if negative experiences continue, anxiety may lead students to form negative self-perceptions (Kılıç, 2017). Learners' implicit characteristics should also be known and monitored throughout learning process for effective and successful language teaching. This scale can contribute to re-organizing teaching activities by determining existing or potential concerns of students about grammar teaching as a part of language teaching as a part of their language learning processes.

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Appendix 1

Grammar Anxiety Scale

Items	Expressions	1	2	3	4
1.	Grammar lessons are fun.				
2.	I like grammar.				
3.	Grammar is one of my favorite classes.				
4.	It makes me happy to get a different perspective on grammar and feel emotions that I have not felt before.				
5.	I enjoy learning grammar subjects.				
6.	It makes me happy to use what I have learned in grammar lessons in my daily life.				
7.	It makes me happy when a new grammar subject is useful to me.				
8.	I find grammar useful because it affects other skills.				
9.	I like grammar although I get a little anxious while I'm learning something new about it.				
10.	Grammar subjects are easy to learn because they are based on specific rules.				
11.	I like grammar despite its difficulty and complexity.				
12.	Although learning a new grammar subject for the first time may be boring, doing so makes me happy like solving a puzzle.				
13.	I work on grammar as I like it.				
14.	I am curious about learning grammar.				
15.	When I learn grammar, I am most afraid of not being able to succeed.				
16.	It worries me that my previous learning about grammar subjects was insufficient.				
17.	I do not like memorizing grammar subjects.				
18.	I find it difficult to break old patterns in learning grammar.				
19.	I think memorization is an obstacle to my learning of grammar subjects.				
20.	The difficulty of grammar subjects causes me to feel anxious.				
21.	Teaching rules, not language, in grammar lessons overwhelms me.				
22.	The difference between teaching grammar and related practices makes me feel negative emotions.				
23.	My suspicion that I cannot understand grammar subjects makes me nervous.				
24.	Thinking that I cannot learn because grammar is prescriptive makes me unhappy.				
25.	Although I know the importance of grammar, I do not like it.				
26.	I always approach grammar with prejudice.				
27.	I feel nervous when I learn grammar subjects.				
28.	I don't like grammar.				
29.	I always feel troubled in grammar lessons.				

30.	I have a hard time translating grammar rules into practice.				
31.	I often avoid learning grammar.				
32.	Grammar is a nightmare for me.				
33.	Grammar subjects do not apply to daily life.				

Appendix 2

Dil Bilgisi Kaygısı Ölçeği

Madde No	İfadeler	1	2	3	4
1.	Dil bilgisi eğlenceli bulduğum bir derstir.				
2.	Dil bilgisini severim.				
3.	Dil bilgisi en sevdiğim derslerden biridir.				
4.	Dil bilgisi ile ilgili farklı bakış açısı kazanmak ve daha önce hissetmediğim duygular hissetmek beni mutlu eder.				
5.	Dil bilgisi konularını öğrenmekten zevk alırım.				
6.	Dil bilgisi dersinde öğrendiklerimi gündelik hayatımda kullanmak beni mutlu eder.				
7.	Dil bilgisi ile ilgili yeni bir konu benim için faydalı olduğunda mutlu olurum.				
8.	Dil bilgisini diğer beceri alanlarını etkilediği için faydalı bulurum.				
9.	Dil bilgisi ile ilgili yeni bir şey öğrenirken biraz kaygılansam da bu durum hoşuma gider.				
10.	Dil bilgisi konuları belirli kurallara dayandığı için öğrenilmesi kolaydır.				
11.	Dil bilgisini zorluğuna ve karmaşıklığına rağmen severim.				
12.	Dil bilgisi ile ilgili yeni bir konuyu ilk defa öğrenmek sıkıcı gelse de kavradıktan sonra bulmaca çözer gibi hissetmek beni mutlu eder.				
13.	Dil bilgisini sevdikçe çalışırım.				
14.	Dil bilgisini öğrenmeye karşı meraklıyımdır.				
15.	Dil bilgisini öğrenirken en çok yapamama ve başaramama korkusunu hissederim.				
16.	Dil bilgisi konuları ile ilgili önceki öğrenmelerimin yetersiz olması beni endişelendirir.				
17.	Dil bilgisi konularını öğrenirken ezber yapmayı sevmem.				
18.	Dil bilgisini öğrenmede eski kalıpları yıkmakta zorlanırım.				
19.	Ezberlemenin dilbilgisi konularını öğrenmemde engel olduğunu düşünürüm.				
20.	Dil bilgisi konularının zorluğu bende endişe yaratır.				
21.	Dil bilgisi dersinde dilin değil kurallarının öğretilmesi beni bunaltır.				
22.	Dil bilgisi konularının öğretimi ile ilgili uygulamaların farklı olması olumsuz duygular hissettirir.				
23.	Dil bilgisini öğrenirken konuları anlayıp anlayamama şüphesi				

	beni tedirgin eder.				
24.	Dil bilgisi kuralcı olduğu için öğrenemeyeceğimi düşünmek beni mutsuz eder.				
25.	Dil bilgisinin önemini bilmeme rağmen dil bilgisini sevmem.				
26.	Dil bilgisine hep ön yargı ile yaklaşırım.				
27.	Dil bilgisi konularını öğrenirken gerginlik hissederim.				
28.	Dil bilgisinden hoşlanmam.				
29.	Dil bilgisi derslerinde kendimi her zaman sıkıntılı hissederim.				
30.	Dil bilgisi kurallarını uygulamaya aktarmakta zorlanırım.				
31.	Dil bilgisini öğrenmekten çoğu zaman kaçarım.				
32.	Kuralları olan dil bilgisi benim için korkulu bir rüyadır.				
33.	Dil bilgisi konuları gündelik hayatımızda işe yaramaz.				