Factors Predicting Foreign Language Anxiety Among University Students[1]

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Abstract

The study aims to determine the significance of variables that effectively classify university students' levels of foreign language anxiety. A total of 1,121 students enrolled during the 2018–2019 academic year participated in the study. The research is a correlational study using a predictive correlational method. The Foreign Language Anxiety Scale was used to determine the anxiety levels of the students. The predictor variables used in the classification of foreign language anxiety were English self-confidence, school climate, attitude towards English course, English self-efficacy, value given to English course, interest in English course, English course motivation, mother's education status, father's education status, family income status, gender, grade, and school type. Data analysis was conducted using SPSS. In the data analysis, the average significance of each variable in classifying the relevant dimension was calculated across 100 different models to create an importance ranking of the variables. According to the findings obtained from the research, it was determined that the variable with the highest effect on classifying students' foreign language speaking anxiety levels was English self-confidence, while the variable with the lowest effect was grade level; that the variable with the highest effect on classifying the level of negative evaluation anxiety in foreign language was English self-confidence, while the variable with the lowest effect was grade level; and that the variable with the highest effect on classifying the level of foreign language test anxiety was school type, while the variable with the lowest effect was English self-confidence. The classification accuracy ranged from 79.00% to 92.92%.

Keywords: Foreign language anxiety, university students, artificial neural networks, classification

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Introduction

With the impact of globalization, interaction between societies has become increasingly important. The most crucial element of this interaction is the language that countries share. English, considered a global language, is significant in international communication. Therefore, many countries include English as a foreign language (FL) in their curriculum. However, learning and communicating in English are challenging and time-consuming. Learning and teaching an FL are difficult because students are unfamiliar with the target language (Anning, 1998; Baş, 2012; Harmer, 2001; Oğuz, 1999; Spada & Lightbown, 2000). The pronunciation of English words, the structure of the language, and the appropriate words or sentences in different situations can differ significantly from an individual's native language (Anyadubalu, 2010).

In Turkey, FL teaching programs primarily focus on English. Most students take English courses from primary school through higher education, yet fail to achieve the desired level of proficiency (Işık, 2008). One reason is students' inadequate affective skills (Kara, 2004). Today, it is known that individual differences in the learning process are significant, and learning, as individual as a fingerprint, manifests differently in each individual (Batumlu, 2006; Boydak, 2008; Horwitz, 1986). Furthermore, an individual's affective characteristics, such as behavioral patterns, motivation, interest, self-confidence, and self-efficacy (Schunk, 2008; Senemoğlu, 2005; Yeşilyaprak, 2011), which have significant effects on the learning process, can directly or indirectly have positive or negative effects on an individual's learning process.

Taking students' affective characteristics into account during the instructional process and striving to develop them positively are crucial for ensuring learning. Students' positive attitudes toward learning English and high motivation, interest, and self-efficacy positively impact their English language achievement (Pajares, 1996; White & Bowers, 2008). In other words, students who are enthusiastic about learning English, participate in classes, enjoy learning English, and believe they can be successful are more likely to learn English (Yan & Horwitz, 2008, p. 172). Furthermore, students with high self-efficacy also positively impact their motivation and interest in English classes (Emeksiz, 2006; Hsieh, 2008).

Students' self-confidence is another effective characteristic that influences their success in learning English. Students who believe they can learn English best, who persevere in the face of challenges, and who believe they can overcome the difficulties they face are more successful. A lack of self-confidence can lead to anxiety. A favorable school climate increases students' self-confidence and reduces their anxiety. A classroom environment where students are encouraged and supported, where they are not criticized negatively for making mistakes, where they are not pitted against each other, and where they can express themselves freely builds students' self-confidence, boosts their motivation and attitudes, and reduces their anxiety (Kirova, Petkovska, & Koceva, 2012, p. 3478). Students struggle to stay motivated in overcrowded classrooms lacking adequate technical equipment (Anyadubalu, 2010). Because it is difficult for all students to speak in overcrowded classrooms, not all students can participate in speaking activities and communicate with their peers in a foreign language. In classrooms lacking technical equipment such as

computers, video recording devices, projectors, and smart boards, lessons are often taught using traditional methods, preventing students from adequately developing their listening and speaking skills. This can lead to a decline in student motivation. Students whose motivation decreases due to ineffective learning can also experience a decline in academic achievement over time. Research shows that a favorable school climate positively impacts students' academic development (Cohen, Pickeral, & McCloskey, 2009). Positive relationships among school stakeholders and among students themselves, as well as students' feelings of security in and around the school, can impact English language achievement.

A review of research indicates that numerous affective factors influence students' English language learning, achievement, and anxiety (Clément, Dörnyei, & Noels, 1994; Humphreys, 2002; Kirova, Petkovska, & Koceva, 2012; Kurtuldu, 2007). However, the significance of these affective factors on FL learning anxiety is unknown. Therefore, it is important to reveal the impact of affective variables when examining FL learning anxiety. The literature includes studies demonstrating the effects of variables such as English self-confidence, school climate, attitudes toward English, English self-efficacy, the value placed on English, interest in English, motivation for English, parental education, family income, gender, grade, and school type on FL learning anxiety (Cohen, Pickeral, & McCloskey, 2009; Klimova, 2011; Pajares, 1996; Quiles, 2009; White & Bowers, 2008). However, the extent to which these variables affect FL learning anxiety is unknown. Identifying the significance of these variables will guide researchers in correctly addressing anxiety-related variables and determining which factors should be prioritized in reducing anxiety. From this point of view, the research aim was to determine the degree of importance of the variables thought to be effective in classifying university students' FL learning anxiety levels.

Foreign Language Anxiety (FLA)

Anxiety, in its broadest definition by Aydın and Zengin (2008), is "an emotional state experienced when a person perceives danger and prepares for it, accompanied by a sense of powerlessness". According to Taş (2006), anxiety is a state of arousal manifested by physical, emotional, and mental changes experienced when confronted with a stimulus. According to Sapir and Aranson (1990), anxiety can be defined as an unpleasant emotional state resulting from uncertainty, fear, apprehension, distress, restlessness, loss of control, and the expectation that something bad will happen. Although anxiety has been defined differently in the literature, most researchers agree that anxiety is associated with concepts such as fear, apprehension, and discomfort (Brown, 1994).

When looking at definitions of FLA, Young (1999) defines it as a negative emotional response and apprehension that arises when using or learning a FL. MacIntyre and Gardner (1994) defined FLA as fear and tension associated with FL environments, affecting listening, speaking, and learning. Horwitz, Horwitz, and Cope (1986), who first addressed FLA as a concept specific to FL learning, argued that this anxiety stems from the uncertainties of the FL learning process and represents a complex of emotions, behaviors, and self-perceptions specific to FL classrooms.

The anxiety students experience in classes is often associated with that particular subject. In other words, the anxiety students experience in

English and math classes differs. Even if individuals lose motivation in a FL, they can still be highly motivated and enthusiastic in science, music, mathematics, and art. Therefore, FLA is examined separately in the literature from anxiety in other subjects. Horwitz, Horwitz, and Cope (1986) first established the conceptual basis for FLA, arguing that this anxiety is specific to FL learning. FLA differs from general forms of anxiety because it is linked to an individual's perceptions, beliefs, and behaviors regarding the language learning process. FL classrooms are environments prone to high levels of anxiety (Horwitz, Horwitz, & Cope, 1986).

The literature also includes various types of anxiety, including situational anxiety, personality-related anxiety, and facilitative anxiety. While situational anxiety is anxiety experienced only in a specific situation and time, such as before an exam, personality-related anxiety is anxiety in all situations (Brown, 1994, p. 151). Personality-related anxiety has become a part of an individual's personality. FLA, on the other hand, is considered situational anxiety because it occurs when an individual is learning or speaking a FL (Zhanibek, 2001).

The type of anxiety that positively impacts students' performance and keeps them constantly alert is referred to in the literature as "facilitative anxiety". A review of the relevant literature reveals that some researchers believe anxiety can have positive effects, while others do not. Brown (1994, p. 151) argues that facilitative anxiety motivates students to tackle new situations and positively affects their performance. Horwitz (1991, cited in Avcı, 2008, p. 8) argues that facilitative anxiety facilitates simple learning activities, whereas FL learning is a complex process; therefore, FLA negatively impacts language learning. Considering these two perspectives, it can be argued that students who are aware that they will not find a good job if they cannot learn a FL or that they will not pass their classes if they cannot pass exams, and who experience low levels of anxiety, are more likely to be motivated and successful in their studies. On the other hand, students' anxiety about not succeeding can negatively affect their psychological well-being and motivation. It may leave them unable to answer the questions they can answer in the exams, leading them to fail.

Anxiety, thought to impact the language learning process negatively, is one of the most frequently studied variables in psychology and education. In the 1970s, some studies found a positive relationship between anxiety and FL learning, while others found a negative relationship and others found no relationship (Chastain, 1975; Kleinmann, 1977). It has been suggested that this discrepancy in findings stems from the lack of a language-learning-specific scale. With the "FLA Scale" developed by Horwitz, Horwitz, and Cope in 1986, research results began to resemble those of earlier studies, and the belief that anxiety negatively impacts language learning became widespread (Horwitz, 2001).

Many studies in the literature emphasize the negative relationship between FLA and success. In many of these studies, a significant and negative relationship between FL success and anxiety levels has been observed (Akpur, 2005; Dalkılıç, 2001; MacIntyre & Gardner, 1994; Oya, Manola, & Greenwood, 2004; Sarıgül, 2000). The first study using the FLA Scale (Horwitz, Horwitz, & Cope, 1986) found a negative relationship between anxiety and the grades students expected to receive in an FL course and the final grades they received. It was found that students with high anxiety had both lower grades than they expected to receive and lower grades than

they received. In other words, as anxiety levels increased, success in learning a FL decreased. Awan et al.'s (2010) study also found a negative relationship between success and anxiety. However, Chen and Chang's (2004) study found a positive relationship between learning difficulties and anxiety. According to them, students who are slow learners or have learning difficulties experience higher anxiety. Sparks and Ganschow (2007) argue that anxiety is a consequence of not being able to learn a FL and that students are anxious because they cannot learn a FL. However, even successful students can experience anxiety from time to time. Therefore, it can be said that the relationship between anxiety and success is bidirectional. While anxiety negatively impacts a student's language learning, it can also increase anxiety in students who experience persistent language failure. In other words, anxiety can be both a cause and a consequence of students' language learning difficulties.

FLA is divided into three categories: test anxiety, anxiety about negative evaluation, and speech anxiety (Horwitz, Horwitz, & Cope, 1986). First, speech anxiety occurs when individuals communicate with others, whether in pairs, groups, or public speaking. This type of anxiety makes it difficult to understand the message being heard and to respond to it. Especially in FL classes, when students attempt oral communication in the target language, the fact that they employ both listening and speaking skills can exacerbate communication anxiety. Second, assessment is an integral part of the learning process, and students are frequently assessed through exams. According to Horwitz, Horwitz, and Cope (1986), test anxiety stems from the fear of failure. Students with test anxiety, in particular, desire to perform flawlessly and perceive even the slightest mistake on an exam as a significant setback, thus increasing their anxiety levels. Finally, although the fear of negative evaluation is similar to test anxiety, individuals experiencing this anxiety are anxious not only about being evaluated through exams but also about any social situation in which they might be evaluated.

Causes of Foreign Language Anxiety

Experts and academics explain that many factors can cause FLA. The most frequently emphasized factors in the relevant literature include students' motivation to learn, their level of proficiency in a FL (Bandura, 1997; Ryan & Deci, 2002), the FL teacher's communication and behavioral style with students (Deci & Ryan, 1985; Vygotsky, 1986), students' personalities (Dewaele & Furnham, 2000; Ehrman & Oxford, 1990; 1995), students' adopted ideas about language acquisition, cultural differences (Gregersen, 2003; Horwitz, 1986), learning in cooperative groups (Oxford, 1997; Slavin, 1991), and students' knowledge and experience with a FL (Frantzen & Magnan, 2005).

Students' perceptions of their language learning abilities as being lower or higher than normal are one cause of FLA (MacIntyre, Noels, & Clément, 1997, pp. 266-267). Spark and Ganschow (1991; 1993) concluded in three separate studies that language ability is one of the individual differences that directly affects FL learning and that this level is closely related to anxiety. Students with high self-efficacy and self-confidence begin to worry when they fail to achieve their desired success. On the other hand, students with low self-confidence and self-efficacy begin to worry because they fail to recognize their language learning abilities and do not perceive themselves as competent in this area. A study by MacIntyre, Noels, and

Clément (1997) found a negative correlation between students' self-efficacy perceptions and anxiety. According to this study, students with high anxiety levels do not perceive themselves as competent, and as a result, their participation rates in class decrease. Despite knowing the answers to the teacher's questions, some students choose not to answer because they fear being criticized by their peers. FLA shares common factors, such as the need to speak flawlessly and the fear of making mistakes (Horwitz, Horwitz, & Cope, 1986). Students who fear ridicule rather than making mistakes experience increased anxiety when the teacher gives them the floor (Yan & Horwitz, 2008, p. 162). Teachers' attitudes and behaviors toward students and how they correct students' mistakes can also contribute to FLA. Teachers' harsh corrections of students' mistakes can cause students to become anxious, fearful of making mistakes, and to avoid participating in class out of this fear. Students who see their teachers criticizing their peers also experience anxiety due to the fear of being criticized (Aydın, 1999). Therefore, it can be assumed that anxious students with low self-efficacy and a fear of negative evaluation by their teachers and peers may be reluctant to participate in English class activities. Students who do not participate in classroom activities, especially those involving skills such as speaking and listening, become more anxious (Horwitz, Horwitz, & Cope, 1986; MacIntyre & Gardner, 1994).

Palacios (1998) states that classroom climate influences students' FLA levels. FL learning, which typically takes place in a classroom, can be much more anxiety-provoking for students. Students are often distressed by their lack of knowledge of language structure and pronunciation. They lack security and comfort in these environments, which creates psychological barriers to the language. In this situation, the level of anxiety students experience can become a significant obstacle to the language learning process. A hostile classroom climate can cause students to experience anxiety. Students in a classroom where teachers and students lack mutual respect can experience stress and may be reluctant to learn. The more teachers trust their students, respect their ideas, and care about them, the lower students' anxiety levels can decrease. It can be argued that a favorable classroom climate, where students are connected and foster cooperation rather than competition, will reduce student anxiety.

Another cause of FLA is students comparing themselves to other students and competing with them. Students may sometimes compare themselves to their friends and believe they are better than them. Students' perception of themselves as inadequate and their competition with other students increases their anxiety (Yan & Horwitz, 2008). Due to individual differences, each student's learning pace varies. Students who see their friends learning faster than they are may perceive themselves as inadequate, which can increase their anxiety. Therefore, teachers should tailor their curriculum to individual differences and maintain a balance between slow and fast learners. When the instruction of slow learners is supported with additional activities, these students can also achieve success and reduce their anxiety.

Teachers also want to understand the causes of FLA to reduce student anxiety during their lessons. However, each student experiences anxiety for different reasons. Students react differently to classroom activities (Horwitz, 2001). An activity that is quite enjoyable for some students can

be stressful for others. Therefore, teachers need to tailor activities to students' interests. Young (1990) argues that students prefer speaking in small groups rather than speaking in a FL in front of the entire class, as this reduces anxiety. Suwantarathip and Wichadee (2010) also concluded that cooperative learning reduces anxiety and increases student achievement in university students. Students in cooperative learning may experience less anxiety because they share their ideas with a small group rather than presenting them to the entire class. Some students are reluctant to speak in class because they fear criticism, as their ideas may be incorrect. Students who work in small groups can express their ideas freely, boosting their self-confidence. Furthermore, students who work in groups fill in their gaps and help each other. Therefore, it can be argued that cooperative learning can increase students' motivation and achievement while reducing anxiety.

Coming to class prepared can also reduce FLA. Researching the meanings of unfamiliar words in the reading text or studying grammar before class can boost students' self-confidence. Students with high self-confidence and self-efficacy experience less anxiety. Students also become more relaxed when they realize they are not the only ones experiencing difficulties and anxiety while learning a FL (Ying-Ling & Kondo, 2004, p. 262). For students to succeed, they need a strong desire and interest in learning a language and experience less anxiety (Yan & Horwitz, 2008). Therefore, students who enjoy their lessons, show interest, and believe they can learn English effectively experience less anxiety and are more successful.

Method

Research Design

This is a predictive correlation study, a type of predictive correlational research. In these studies, if a relationship exists between variables, the value of one variable can be predicted from the others (Fraenkel, Wallen, & Hyun, 2015).

Research Group

Participants in the study were 1,121 university students studying in two metropolitan cities in Central Anatolia during the fall and spring semesters of the 2018-2019 academic year. Of the students, 577 (51.5%) were female, and 544 (48.5%) were male; 316 (28.2%) were first-year students, 232 (20.7%) were second-year students, 285 (25.4%) were third-year students, and 288 (25.7%) were fourth-year students.

Data Collection Tools

In the study, a personal information form was used to collect participants' personal information, and a measurement tool was used to assess eight psychological characteristics. The explanations regarding these tools are presented in order.

Personal information form

Using this form prepared by the researchers, data on participants' mothers' and fathers' education status, family income status, gender, class, and school type were collected.

Foreign language anxiety scale

The FLA Scale was developed by Horwitz, Horwitz, and Cope (1986) and updated with four dimensions by Cao (2011). The five-point Likert-type scale consists of speaking anxiety, test anxiety, negative evaluation anxiety, and course anxiety. Çekirdek (2014) adapted the scale into Turkish, and the original four-factor structure was confirmed in the Turkish version.

Motivation scale

Motivation is an individual's internal drive to complete a task (Harmer, 2001). The scale was developed as a 15-item, five-point Likert-type draft based on the Academic Motivation Scale (Vallerand et al., 1992) to reveal students' motivation for English lessons. In creating the items, motivation was defined as an individual's drive to complete a task (Harmer, 2001). Çekirdek (2014) adapted the scale to Turkish and first assessed the draft form's content validity based on the opinions of three field experts. Following this content validity assessment, the draft scale was reduced to 12 items. Following the content validity assessment, the construct validity of the draft scale was assessed in two stages: exploratory factor analysis and confirmatory factor analysis.

Attitude scale towards the English course

The items from a four-item, five-point Likert-type scale developed by TIMSS (2011) to assess students' attitudes toward English language instruction were adapted for use in English language instruction. The scale has been applied to students of different age groups in various studies (Dorde, 2008; Kosko & Wilkins, 2011; Macnab, 2000; Ndlovu & Mji, 2012). The Turkish adaptation of the scale was carried out by Çekirdek (2014).

Interest scale for the English course

A five-item, five-point Likert-type scale, adapted for the English course and based on the Mathematics Interest Scale developed by Shoffner (2006), was used as the Interest Scale. The scale was adapted to Turkish by Çekirdek (2014).

Self-confidence scale

Items from a four-item, five-point Likert-type scale developed by TIMSS (2011) to assess students' self-confidence in English were adapted for the English course. The Turkish adaptation of the scale was carried out by Çekirdek (2014).

Self-efficacy scale

The scale is a 10-item, five-point Likert-type draft based on Bandura's Social Learning Theory to assess students' self-efficacy. The draft form was first evaluated for content validity by Çekirdek (2014) based on the opinions of three field experts. Following this, the draft scale's construct validity was assessed with factor analysis.

English course value scale

The four-item, five-point Likert-type scale developed by TIMSS (2011) to assess students' value for the English course was adapted by Çekirdek (2014) for the English course.

School climate scale

The scale was developed as a 10-item, five-point Likert-type draft to reveal students' perceptions of school climate. In developing the items, school climate was defined as students' feelings about school and the school's interactive life (Welsh, 2000). It was adapted by Çekirdek (2014).

Data Collection Process

Scales for FLA, motivation, attitude, interest, self-confidence, self-efficacy, values, and school climate, along with a personal information form, were administered to students at two state and two foundation universities in two major cities in the Central Anatolia Region during the spring semester of the 2018-2019 academic year. Participants were informed in detail about the purpose and content of the scales, and those who volunteered to participate were allotted approximately 25–35 minutes to complete them.

Data Analysis

In the study, FLA was examined through the "FL speaking anxiety, anxiety of negative evaluation, and test anxiety" sub-dimensions of the FLA Scale. During the data analysis process, based on the students' FL learning anxiety scores, two separate groups were created: students with low anxiety and students with high anxiety, according to each of the sub-dimensions of speaking anxiety, anxiety of negative evaluation, and test anxiety. While creating the groups, according to the speaking anxiety sub-dimension, which consists of eight items and in which a minimum of eight and a maximum of 40 points can be obtained, students with a score between eight and 24 were included in the low group, and students with a score between 25 and 40 were included in the high group; according to the anxiety of negative evaluation sub-dimension, which consists of nine items and in which a minimum of nine and a maximum of 45 points can be obtained, students with a score between nine and 27 were included in the low group, and students with a score between 28 and 45 were included in the high group; According to the test anxiety sub-dimension, which consists of five items and can be scored from five to 25, students with scores between five and 15 were included in the low group. Students with scores between 16 and 25 were included in the high group. In addition, "English self-confidence, school climate, attitude towards English course, English self-efficacy, value given to English course, interest in English course, English course motivation, mother's education status, father's education status, family income status, gender, grade, and school type" were selected as predictor variables in the classification. To assess the classification accuracy of the predictor variables and the significance of the variables in classifying the level of FL learning anxiety, an artificial neural network (ANN) was used, and data analysis was conducted in SPSS.

ANNs are "computer systems developed for automatically performing, without any assistance, capabilities inherent in the human brain, such as deriving, creating, and discovering new information through learning" (Öztemel, 2012, p. 29). The use of ANN in educational applications has increased significantly in recent years (Çırak, 2012; Gonzalez & DesJardins, 2002; Tepehan, 2011; Toprak & Gelbal, 2017). The primary reasons for employing Artificial Neural Network (ANN) analysis in this study were its independence from strict statistical assumptions, its robustness in handling incomplete or imperfect data, and its ability to

produce accurate results when dealing with multidimensional, nonlinear datasets or those with a high potential for error (Çırak, 2012; Tepehan, 2011).

A "Multilayer Perceptron" model was used to classify FL learning anxiety into two subgroups with an ANN. Three separate models were constructed, each with a dichotomous dependent variable (Low/High): foreign language speaking anxiety, negative evaluation anxiety, and test anxiety. In the first model, the dependent variable comprised two subgroups (Low/High) representing anxiety levels in foreign language speaking. In the second model, the dependent variable consisted of two subgroups (Low/High) reflecting the levels of negative evaluation anxiety in foreign language learning. In the third model, the dependent variable included two subgroups (Low/High), indicating levels of foreign language test anxiety. The independent variables used in the classification consisted of "English self-confidence, school climate, attitude towards English course, English self-efficacy, value given to English course, interest in English course, English course motivation, mother's education status, father's education status, family income status, gender, grade, and school type".

In the ANN analyses, the Hyperbolic Tangent Function was used as the activation function for the hidden-layer neurons. At the same time, the Softmax Function was used for the neurons in the output layer. The dataset was split into 70% for the training set and 30% for the test set. Since the ANN algorithm randomly reselects new training (70%) and test (30%) subsets for each iteration, 100 distinct ANN models were generated during the analysis. The predictor variable importance ranking was determined by averaging each variable's importance across the 100 models used to classify anxiety levels.

In the ANN analyses, the Hyperbolic Tangent Function was used as the activation function for the hidden-layer cells. At the same time, the Softmax Function was used for the cells in the output layer. Of the total dataset, 70% was randomly assigned as the training sample and 30% as the test sample. Since the ANN procedure automatically resamples the data by selecting new training (70%) and test (30%) subsets for each run, 100 distinct ANN models were generated for the analysis. The variable importance ranking was determined by averaging the importance values for each predictor across the 100 models, reflecting their overall contribution to classifying anxiety levels.

Findings

Findings for Model 1

The variables used to classify students' FL speaking anxiety in the study, along with their types, are given in Table 1.

Table 1. Variables used in classifying FL speaking anxiety

An examination of Table 1 reveals that the dependent variable in the study is FL speaking anxiety, which is divided into two subgroups: low and high. Furthermore, among the variables used for classification, "English self-confidence, school climate, attitude toward English, English self-efficacy, value placed on English, interest in English, and motivation for English" are continuous variables. In contrast, the variables "mother's education level, father's education level, family income, gender, grade, and school type" are categorical variables. Based on the findings from Model 1, the

classification accuracy obtained with the ANN and the variable importance order are presented in Table 2.

Table 2. The accuracy of the classification made by an ANN

To determine the ANN's performance in classifying students' FL speaking anxiety into two subgroups, 100 analyses were conducted. As shown in Table 2, across 100 ANN analyses, the average classification performance of students in the training sample for FL speaking anxiety was 82.35%, and in the test sample, 79.00%. Accordingly, the method's average classification accuracy in Model 1 was 80.68%. The variable importance in classification is shown in Figure 1.

Figure 1. The order of importance of the variables in classification for Model 1

The variable importance shown in Figure 1 was calculated as the mean prediction across 100 models trained on Model 1. Accordingly, it was seen that the variable with the highest effect in classifying students' FL speaking anxiety into two sub-groups was English self-confidence (16.59%), followed by school climate (12.86%), attitude towards English course (10.49%), mother's education level (8.97%), English self-efficacy (7.88%), value given to English course (7.29%), family income level (6.73%), gender (6.27%), interest in English course (5.88%), school type (5.35%), father's education level (4.67%), motivation towards English course (3.97%), and grade (3.03%).

Findings for Model 2

The variables used in the study to classify students' anxiety about being negatively evaluated in a FL, and the types of these variables are given in Table 3.

Table 3. Variables used to classify negative evaluation anxiety in an FL

An examination of Table 3 reveals that the dependent variable in the study is anxiety about negative evaluation in FL learning, which is divided into two subgroups: low and high. Furthermore, among the variables used for classification, "English self-confidence, school climate, attitude toward English, English self-efficacy, value placed on English, interest in English, and motivation for English" are continuous. In contrast, the variables "mother's education level, father's education level, family income, gender, grade, and school type" are categorical variables. Based on the findings from Model 2, the classification accuracy obtained with the ANN and the variable importance order are presented in Table 4.

Table 4. The accuracy of the classification made by an ANN

To determine the ANN's performance in classifying students' anxiety about being negatively evaluated in a FL into two subgroups, 100 analyses were conducted. As shown in Table 4, across the 100 ANN analyses, the average classification performance of students in the training sample regarding anxiety about being negatively evaluated in an FL was 92.92%. The average classification performance of the students in the test sample regarding the anxiety about being negatively evaluated in an FL was 89.63%. Accordingly, the method's average classification accuracy was 91.27%. The variable importance in classification is shown in Figure 2.

Figure 2. The order of importance of the variables in classification for Model 2

The variable importance shown in Figure 2 was calculated as the mean of the predictions across 100 models for Model 2. Accordingly, it was seen that the variable with the highest effect in classifying the students' anxiety of being negatively evaluated in FL into two sub-groups was English self-confidence (14.15%), followed by school climate (12.15%), attitude towards English course (9.68%), mother's education level (8.90%), English self-efficacy (8.24%), value given to English course (7.69%), family income level (7.18%), gender (6.70%), interest in English course (6.19%), school type (5.67%), father's education level (5.18%), motivation towards English course (4.58%), and grade (3.70%).

Findings for Model 3

The variables used to classify students' FL test anxiety in the study, along with their types, are given in Table 5.

Table 5. Variables used in classifying FL test anxiety

An examination of Table 5 reveals that the dependent variable in the study is FL test anxiety, which is divided into two subgroups: low and high. Furthermore, among the variables used for classification, "English self-confidence, school climate, attitude toward English, English self-efficacy, value placed on English, interest in English, and motivation for English" are continuous variables. In contrast, the variables "mother's education level, father's education level, family income, gender, grade, and school type" are categorical variables. Based on the findings from Model 3, the ANN's classification accuracy and the variable importance order are presented in Table 6.

Table 6. The accuracy of the classification made by an ANN

To determine the ANN's performance in classifying students' FL test anxiety into two subgroups, 100 analyses were conducted. As shown in Table 6, across 100 ANN analyses, the average classification performance for students in the training sample for FL test anxiety was 83.94%, and the average classification performance for students in the test sample for FL test anxiety was 81.57%. Accordingly, the method's average classification accuracy was 82.75%. The variable importance in classification is shown in Figure 3.

Figure 3. The order of importance of the variables in classification for Model 3

The variable importance shown in Figure 3 was calculated from the average predictions across 100 models. Accordingly, it was found that the variable with the highest effect in classifying students' FL test anxiety into two sub-groups was school type (19.88%), followed by attitude towards English course (9.67%), mother's education status (9.00%), family income status (8.91%), grade (8.35%), interest in English course (6.66%), gender (6.08%), father's education status (6.08%), English self-efficacy (6.03%), motivation towards English course (5.28%), school climate (5.16%), value given to English course (4.98%), and English self-confidence (3.93%).

Discussion

In this study, which used a multilayer perceptron model created with ANNs in order to classify FLA, the accuracy rate was 80.68% on average for the dimension of FL speaking anxiety, 91.27% on average for the dimension of negative evaluation in FL learning, and 82.75% on average for the

dimension of FL test anxiety. When the variables that are effective in classifying the sub-dimensions of FLA are examined, it is seen that in order of importance, the most effective variable in classifying the sub-dimension of "FL speaking anxiety" is English self-confidence, and the variable with the least effect is grade; in classifying the sub-dimension of "negative evaluation in FL learning" the most effective variable in classifying the sub-dimension of "English self-confidence", the variable with the least effect is grade. In classifying the sub-dimension of "FL test anxiety", the most effective variable is school type, and the variable with the least effect is English self-confidence. The variables used to classify FL speaking anxiety and the anxiety of negative evaluation in a FL are as follows: "English self-confidence, school climate, attitude towards English course, mother's education status, English self-efficacy, value placed on English course, family income status, gender, interest in English course, school type, father's education status, motivation for English course, classroom". The variables used to classify FL test anxiety are as follows: "school type, attitude towards English course, mother's education status, family income status, classroom, interest in English course, gender, father's education status, English self-efficacy, English course motivation, school climate, value placed on English course, English self-confidence".

Among the variables discussed in the research and mentioned above, the most influential factor in classifying university students' anxiety about speaking a FL and facing negative evaluations was "English self-confidence" at 16.79%. No studies have been found in the literature directly examining the relationship between English self-confidence and FLA; however, one study found that a decrease in students' self-confidence leads to an increase in anxiety because students with low self-confidence fear the reactions of their teachers and classmates when they participate in class and make mistakes. Consequently, these students are reluctant to participate in classroom activities. Students who do not participate in activities or answer the teacher's questions due to anxiety also have lower achievement (Çelebi, 2009). The literature also discusses the negative consequences of students' low or excessively high self-confidence. Students with low self-confidence are unaware of their abilities and believe they will not succeed, while students with very high self-confidence may fail by believing the course is easy and not studying (Çelebi, 2009; Kurtuldu, 2007). MacIntyre, Noels, and Clément (1997) also noted that as students' anxiety increases, they underestimate their abilities, resulting in lower self-confidence and self-efficacy. This study also demonstrated that students' motivation, self-confidence, and self-efficacy decrease when their anxiety is high, as they fear making mistakes, are unable to concentrate, and are unable to utilize their abilities. Self-confidence was the most significant variable in classifying FL speaking and negative evaluation anxiety. Conversely, English self-confidence was the least significant variable in classifying FL test anxiety. A review of the literature revealed that Öner (1990) found that individuals with high test anxiety have negative self-concepts and low self-confidence.

Students' perception of school climate is the second most influential variable in classifying their anxiety about speaking a FL and being negatively evaluated. It is important for students who spend most of their time at school to have a positive perception of school climate and to learn in an environment of trust, justice, and respect (Perkins-Gough, 2008). A literature review reveals that research on school climate perceptions

primarily examines teachers' and administrators' perceptions. Özdemir et al. (2010) conducted a study on students' perceptions of school climate and found positive perceptions. It is believed that the adequateness of school facilities, student satisfaction with the academic program, and the support provided by school administrators and teachers contribute to students' positive perceptions of the school climate. Among school stakeholders, the teacher is the person students communicate with most often. Because teachers influence students' behavior, affective characteristics, and achievement, students' relationships with their teachers are crucial (Yörükoğlu, 1986). Research indicates that a favorable school climate positively affects students' academic performance (Tubbs & Garner, 2008). As school stakeholders, teachers effectively ensure student success (Darling-Hammond, 1997; Kaplan & Owings, 2002). Therefore, positive relationships between teachers and students, students' ability to ask questions freely when they do not understand in class, and teachers' involvement in students' development outside of school can positively impact students' anxiety levels. Student behavior also significantly impacts school climate (Creemers & Reezigt, 1999). Positive friendships among students and students' appreciation of each other's opinions can contribute to a favorable school climate. In a positive school climate, student achievement is high because administrators and teachers prioritize and support students' academic development (Özdemir et al., 2010). Therefore, it is possible to say that a favorable school climate is an important variable that affects the anxiety level of speaking a FL and being evaluated negatively, by enabling students to express their thoughts without fear of being criticized in English classes, and to ask questions about things they do not understand.

Students' attitudes toward English are more important than other predictor variables in classifying FL speaking anxiety and negative evaluation, ranking third. Similarly, it also has the second-highest importance in classifying FL test anxiety. Studies indicate that when students' attitudes toward learning a FL are high, their FL learning anxiety decreases and their success increases (Çolak, 2008; Rifai, 2010; Pineda, 2011; Yanar, 2008). It is believed that when attitudes toward learning a FL are high, students listen to the teacher's instructions, participate in class, are eager to learn English, are determined and attentive during classroom activities, and strive to seize opportunities to achieve their goals. Based on the research findings, attitudes toward English are expected to be an effective variable in classification, as students who have a positive attitude toward learning English and enjoy the language are likely to have high levels of interest, self-confidence, and self-efficacy. Students who recognize the importance of English proficiency for career success and job security are expected to exhibit a positive attitude toward learning English. A review of the relevant literature reveals that students' interest in English lessons influences their attitudes toward English lessons (Çelebi, 2009). Therefore, it can be argued that students who enjoy learning English and want to work in a job where they can use English in the future will likely exhibit a positive attitude toward learning English. The learning environment and teachers also significantly influence students' positive attitudes toward learning English. Çelebi (2009) notes in his study that teachers who use everyday-life examples, teach students vocabulary and structures they can use in everyday life, teach English through dialogues and songs, and engage in translation positively impact students' attitudes. Students often

become bored with the same activities, working individually, and studying dictionaries. Therefore, it can be argued that learning in a fun and democratic classroom and school environment will positively impact students' attitudes. Students with a positive attitude toward learning English can enjoy a variety of activities, which can lead to greater success. This study showed that attitude towards English was an important predictor in classifying FL learning anxiety.

Students' maternal education levels were found to be more significant than other predictive variables in classifying FL speaking anxiety and anxiety about being negatively evaluated, ranking fourth. Similarly, it had the third-highest significance in classifying FL test anxiety. While there is no study in the literature solely on maternal education as a variable for classifying FLA, there are studies on variation in FLA based on both parents' educational backgrounds. Pan and Akay (2015) reported that parental education level affects FL test anxiety, and that students with lower fathers' educational levels are more anxious. In individuals with lower mothers' educational backgrounds, a general lack of self-confidence, as reflected in their mothers' experiences, can lead to feelings of insecurity and anxiety around foreigners. Furthermore, because the home environment is the primary setting for students to practice a foreign language, if the mother's level of education is insufficient, students cannot apply what they have learned in their daily lives and are expected to experience high anxiety in real-life situations.

Another variable, English self-efficacy, was found to be the fourth most important predictor of FL speaking anxiety and anxiety about being negatively evaluated. In contrast, it was found to be the ninth most important predictor of FL test anxiety. Self-efficacy influences how individuals think, feel, behave, and motivate themselves. Therefore, when students with low self-efficacy are given a task, they focus on their own shortcomings and the obstacles they will face, underestimate their abilities, and give up easily. On the other hand, students with high self-efficacy are self-confident, strive for success, and succeed (Bandura, 1994; cited in Dörnyei, 1998). The results of Zhao's (2012) study are consistent with the finding that self-efficacy is a significant predictor. The study suggests that students' self-efficacy is not high enough to withstand challenges and fail. Because students believe they cannot speak English fluently, pronounce words correctly, and use grammar correctly, their self-efficacy decreases, and their speaking anxiety increases (Kitano, 2001). Students who do not want to speak English and do not attend classes due to speaking anxiety also experience a decline in their academic achievement (Batumlu & Erden, 2007; Liu, 2006). Price (1991) emphasized in his study that anxious students believe they lack FL skills, are dissatisfied with their performance, and lack self-confidence. Students with high self-confidence and self-efficacy do not shy away from responsibility, do not give up easily when faced with challenges and failures, and do not experience anxiety (Bandura, 1994; Kurtuldu, 2007; Pajares, 1996). These characteristics positively affect students' academic achievement. Most studies emphasize that self-confidence and self-efficacy positively affect achievement and reduce anxiety (Gardner, Tremblay, & Masgoret, 1997; Hsieh, 2008; Weiser & Riggio, 2010). Considering English language courses, it can be argued that students' voluntary participation in class activities, their confidence in speaking English, their commitment to fulfilling their responsibilities to the best of their ability, and their lack

of anxiety when faced with complex topics or rules will all positively impact students' English language achievement. Based on studies in the literature on English self-efficacy and the importance of self-efficacy in classifying FLA revealed in this study, it is possible to argue that when students experience learning anxiety, teachers and families encourage them, ask questions they can answer, and encourage them to believe they can succeed, and foster awareness of their abilities, this will positively impact students' self-efficacy and reduce anxiety.

Another variable, family income, was found to be the seventh most important variable in classifying FL speaking anxiety and negative evaluation anxiety. In contrast, it was the fourth most important variable in classifying FL test anxiety. While no research has been found in the literature on whether family income affects FLA, it is expected to be a significant variable in classifying students as having low or high FLA.

It was determined that students' gender ranked eighth in importance in classifying FL speaking anxiety and negative evaluation, and seventh in importance in classifying FL test anxiety. It can be noted that research examining the relationship between the anxiety levels of FL learners and their gender is relatively limited in the literature. In Aydın and Takkaç's (2007) study, a 22-item test anxiety scale was administered to 114 students, and the collected data were statistically analyzed. The results of the study revealed that there was no significant correlation between gender and test anxiety, other than the insecurity, discomfort, and negative motivation caused by test anxiety. Considering the studies conducted internationally on test anxiety, it is observed that female students are more anxious than male students (Onwuegbuzie, Bailey, & Daley, 1997). Finally, Berger and Shechter's (1996) study found that female students were more vulnerable to anxiety and discomfort than male students. They noted that female and male students exhibit different behaviors in coping with anxiety and emphasized that female students are more vulnerable to anxiety and discomfort than male students. While gender-based differences in FLA are observed in the literature, this study found that gender is a less influential variable in classifying FLA.

It can be assumed that students value learning English to follow courses in their fields and succeed, follow studies in various fields to improve themselves, secure a good job in the future, and make their daily lives easier. Bradford (2007) also emphasized in his study that most students learn English because they believe it will benefit them in the future. Students know that those who speak English well attain higher positions in the workplace. Therefore, they value learning English to secure high-paying jobs in the future. Krapp (1999) states that students with high interest are eager to learn in class and enjoy researching topics that interest them. He emphasizes that these students learn more easily and quickly than others because they focus on the teacher's instruction. Kurumehmetoğlu (2008) also reported in his research that teachers found students' interest in English to be low at both the elementary and high school levels. As seen in the literature, researchers have examined interest in learning English, and this study demonstrates the importance of interest in classifying FLA. Based on the findings, it can be emphasized that interest supports FL learning and can also reduce FLA. This study's role in FL learning anxiety aligns with findings in the literature. Interest in

a foreign language, in particular, has been identified as a significant predictor in classifying FL test anxiety.

Another variable, school type, was found to be the tenth most important factor in classifying FL speaking anxiety and negative evaluation. In contrast, it was found to be the most important factor in classifying FL test anxiety. No research has been found on whether school type affects FLA. However, based on these findings, school type is the most influential variable in classifying FL test anxiety levels among students at public and foundation universities. This suggests that future studies on FL test anxiety among university students could be addressed within the context of school type.

When the relevant literature is examined, studies indicating that motivation positively affects FL success are found (Chang, 2010; Huffman, 2010; Oroujlou & Vahedi, 2011; Rifai, 2010). Studies indicate that when students' motivation is high, their success is positively affected because they are eager to learn, work diligently, enjoy conducting research, and fulfill assigned tasks and responsibilities on time (Demir, 2011; Pineda, 2011). Therefore, students with high motivation can positively affect their success in English classes when they pay attention, are eager to learn, participate, want to learn more, and try to use what they have learned outside of class. Students who believe that success and failure are within their control exhibit higher motivation, while those who believe that success is uncontrollable and permanent failure exhibit lower motivation (Hsieh, 2008). Therefore, it is possible to argue that students who understand the subject matter's importance and learn best from it will be highly motivated and more likely to succeed. This study, unlike the literature, found that motivation is less significant than other variables in classifying FLA.

Another variable, grade level, was found to be the least important in classifying FL speaking anxiety and negative evaluation anxiety. In contrast, it was the fifth most important in classifying FL test anxiety. A review of the literature revealed that Aydın (2013) shared research findings that higher-grade students are more anxious when considering the relationship between grade level and anxiety. However, when Hismanoğlu (2013) examined the relationship between grade level and anxiety, he found that senior university students had lower anxiety levels than first-year students. Bailey, Onwuegbuzie, and Daley (2000) determined that first-year and senior university students had the lowest anxiety levels compared to students in other grades.

The current study examines the impact of each variable on the classification of university students with high and low levels of FLA. It is believed to make a significant contribution to the literature. It is believed to shed light on the selection of variables for future FLA studies. The findings of this study will be an important source of scientific information in developing programs designed to prevent FLA among university students.

It is important to evaluate the findings within the context of the study's limitations. The first limitation of this study is that it examined only 13 variables related to FLA. However, there are undoubtedly many more variables that influence FLA. In this context, new studies can be planned to address different variables in classifying FLA.

The most striking finding from the study concerns the impact of "English self-confidence" on FLA. In classifying FLA, English self-confidence was found to be the most influential variable in the sub-dimensions of FL speaking anxiety and anxiety about negative evaluation. Therefore, increasing self-confidence has a significant impact on reducing anxiety. Based on this finding, the elements of the English language curriculum should be designed to positively impact students' affective characteristics. Experimental research can be conducted between a class implementing the prepared curriculum and a class implementing the current curriculum to determine how effective characteristics affect students' success in practice.

School type is the most influential variable in the sub-dimension of FL test anxiety. In this regard, communication among school stakeholders is crucial for students' positive perceptions of school climate. Therefore, regular meetings can be held among university administrators, academics, and classroom representatives to clarify expectations for school stakeholders and address existing problems. Teachers should be informed about how students' affective characteristics, classroom management, and perceptions of school climate affect their English language learning. For this purpose, information about the impact of these factors on English language achievement can be provided in teacher training programs and seminars organized for teachers.

When assessing students' readiness to learn English, affective entry behaviors should be considered alongside cognitive entry behaviors. This study focused on affective characteristics, among the factors affecting students' English language learning. Structural equation modeling can examine other factors that influence English language learning. This will help identify the impact of other factors on students' English language achievement. Future research may focus on identifying the underlying causes of students' English language anxiety and developing effective strategies to mitigate it.

Because studies on students' perceptions of English self-efficacy are scarce, further research could examine ways to improve students' perceptions of English self-efficacy and the role of teachers in shaping students' self-efficacy. Additionally, more academic studies could be conducted on university students' perceptions of classroom management and school climate, and the impact of these variables on English language learning.

The research results suggest a strong correlation between FL speaking anxiety and the fear of negative evaluation. Given the similarity in the rankings of importance for the variables, it is plausible that reducing the fear of negative evaluation will also reduce students' speaking anxiety. Consequently, activities that enhance students' speaking skills can be prioritized, thereby eliminating factors that contribute to negative evaluations in speaking instruction and educational programs.

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Appendix

Table 1. Variables used in classifying FL speaking anxiety

VARIABLES		
Dependent Variable	**Independent Variables**	
	English self-confidence School climate Attitude towards English lessons English self-efficacy The value given to English lessons Interest in English lessons English lesson motivation	Continuous variable
Speaking anxiety • Low • High	Mother's education status • Primary school and below • Middle school • High school • Undergraduate • Graduate Father's education status • Primary school and below • Middle school • High school • Undergraduate • Graduate Family income status • Up to 2000 TL • 2001-4000 TL • 4001-6000 TL • 6001 TL and above Gender • Female • Male Grade • 1 • 2 • 3 • 4 School type • Official • Private	Categorical variable

Table 2. The accuracy of the classification made by an ANN

Classification accuracy
Training sample: %82,35 Test sample: %79,00 Average: %80,68

Table 3. Variables used to classify negative evaluation anxiety in a FL

VARIABLES	
Dependent Variable	**Independent Variables**
Negative evaluation anxiety • Low • High	English self-confidence School climate Attitude towards English lessons English self-efficacy Continuous variable The value given to English lessons Interest in English lessons English lesson motivation

	Mother's education status
	  • Primary school and below
	  • Middle school
	  • High school
	  • Undergraduate
	  • Graduate
	Father's education status
	  • Primary school and below
	  • Middle school
	  • High school
	  • Undergraduate
	  • Graduate
	Family income status
	  • Up to 2000 TL
	  • 2001-4000 TL Categorical variable
	  • 4001-6000 TL
	  • 6001 TL and above
	Gender
	  • Female
	  • Male
	Grade
	  • 1
	  • 2
	  • 3
	  • 4
	School type
	  • Official
	  • Private

**Table 4.** The accuracy of the classification made by an ANN

Classification accuracy
Training sample: %92,92 Test sample: %89,63 Average: %91,27

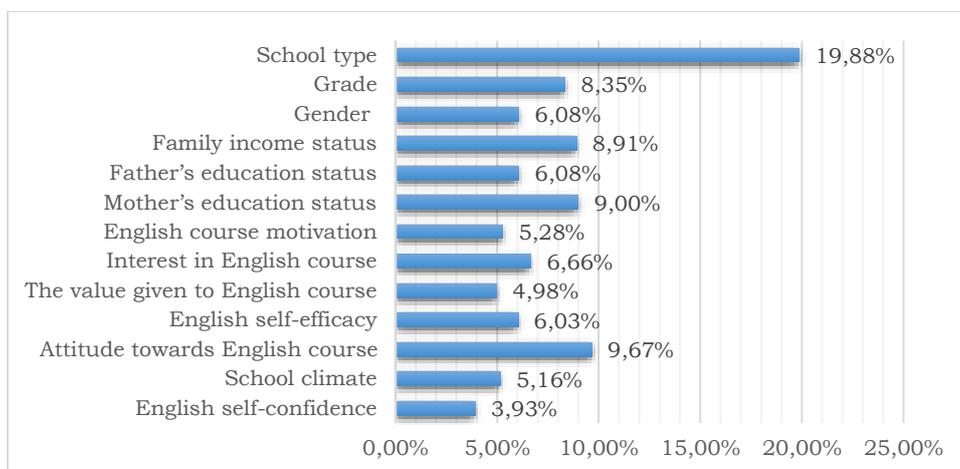**Table 5.** Variables used in classifying FL test anxiety

VARIABLES		
Dependent Variable	**Independent Variables**	
Test anxiety • Low • High	English self-confidence School climate Attitude towards English lessons English self-efficacy The value given to English lessons Interest in English lessons English lesson motivation	Continuous variable
	Mother's education status • Primary school and below • Middle school • High school • Undergraduate • Graduate Father's education status • Primary school and below • Middle school • High school • Undergraduate • Graduate Family income status • Up to 2000 TL • 2001-4000 TL • 4001-6000 TL • 6001 TL and above Gender • Female • Male Grade • 1 • 2 • 3 • 4 School type • Official • Private	Categorical variable

Table 6. The accuracy of the classification made by an ANN

Classification accuracy
Training sample: %83,94
Test sample: %81,57
Average: %82,75
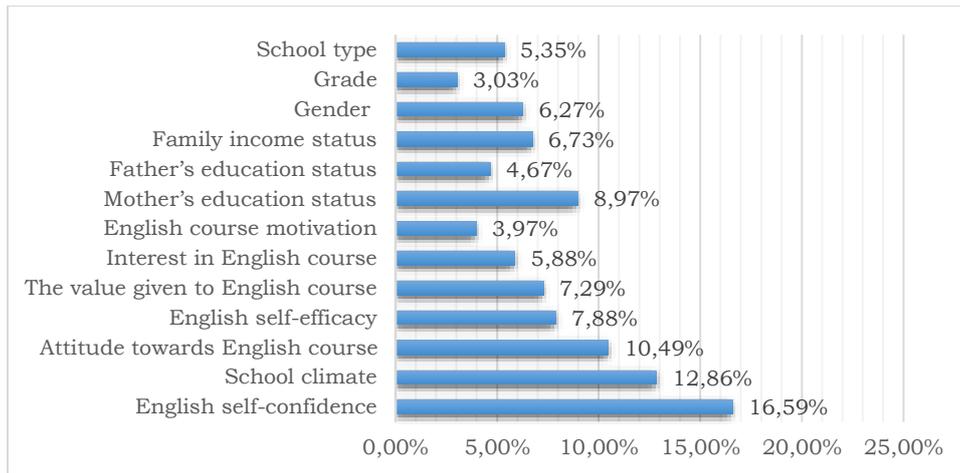
Figure 1. The order of importance of the variables in classification for Model 1
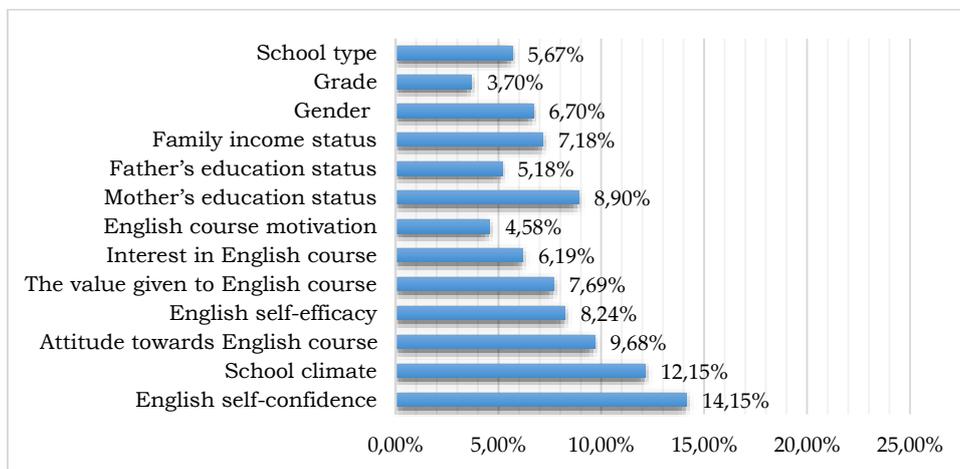
Figure 2. The order of importance of the variables in classification for Model 2

Figure 3. The order of importance of the variables in classification for Model 3