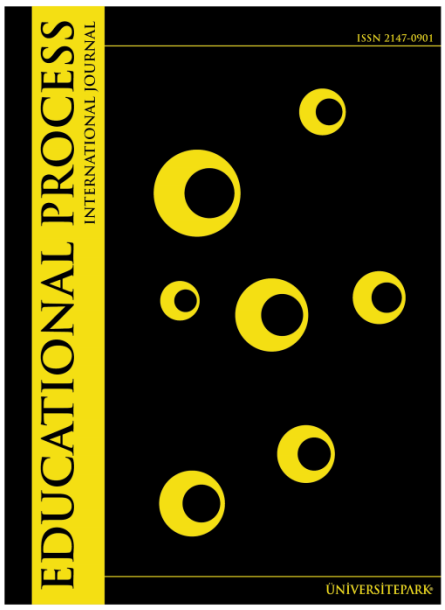


**Educational Process: International Journal**

ISSN 2147– 0901 (Print) Journal homepage: www.edupij.com

**EDUCATIONAL PROCESS: INTERNATIONAL JOURNAL**
**EDUPIJ / VOLUME 5 / ISSUE 1 / SPRING / 2016**

# Determining the Factors of Social Phobia Levels of University Students: A Logistic Regression Analysis

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**To cite this article:** Ozen, H. (2016). Determining the Factors of Social Phobia Levels of University Students: A Logistic Regression Analysis. *Educational Process: International Journal, 5*(1), 38-53.

**To link to this article:** http://dx.doi.org/10.12973/edupij.2016.51.3

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EDUPIJ / VOLUME 5 / ISSUE 1 / 2016 / pp. 38–53.

# Determining the Factors of Social Phobia Levels of University Students: A Logistic Regression Analysis

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**Abstract**

Experiencing social phobia is an important factor which can hinder academic success during university years. In this study; research of social phobia with several variables is conducted among university students. The research group of the study consists of total 736 students studying at various departments at universities in Turkey. Students are divided into two groups, as low and high level positive evaluation fear (PEF) as measured by the Positive Evaluation Fear Scale (PEFS). In respect to Odds rates, the most crucial factor about PEF of students is the time spent daily on the internet. Students who spend their time on the internet have PEF 2.4 times more than those who do not. As a secondary important factor according to negative evaluation fear scale (NEFS), students consider the home city where they lived before attending university increases phobia 30% more than the rate of people who think otherwise. Thus, results showed that spending long hours on the internet and home city lived in before university are significant factors resulting in social phobia.

**Keywords:** social phobia, university students, positive evaluation fear, negative evaluation fear, logistic regression.

DOI: 10.12973/edupij.2016.51.3

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## Introduction

An individual shows behaviors which comply with his or her social roles by passing through various phases of life. A person who has experienced positive socialization process widens his or her perspectives by gaining knowledge, skill and experience in his or her early ages for later life. But an individual who has not experienced positive socialization process, faces hardships to stand against difficult terms, cannot improve self-confidence and anxiety occurs often in their future life. Social phobia in DSM-IV is defined as an explicit and stubborn fear that occurs in social environments, in situations requiring performance or in front of other people (American Psychiatric Association, 2000). Social phobia is prone to affect a person's life in all fields. Socially phobic individuals come through major problems in their professional life, educational field, social and emotional relationships. Students with social phobias face failures, or leave school and university, due to trouble in speaking in front of classmates, anxiety emotion in the class and at school (Van Ameringen, Mancini, & Farvolden, 2003).

Various social, cognitive and biological factors play an active role in the creation of social phobia. All these factors are related and interact with each other. Thus, it is not possible to explain the reasons of social phobia with just one single factor. All theories, which approach social phobia in a cognitive perspective, come up with the idea that there are negative thoughts and non-functional cognitive processes in the background of experienced anxiety and fear. When social phobic individuals have to demonstrate a performance in front of other people, they intensely experience the thoughts of failing to satisfy the people, to be disgraced, and they think that they will be shown up as a fool (for example: I will disgrace myself by forgetting what I have to say, I am clumsy, my incompetency will come to light, they will think I am boring, I will blush and sweat). Things these people face increase the level of anxiety (Dogan & Sapmaz, 2008; Ekinci, 2012). According to researchers who investigate causes of social phobia, negative evaluation fear is located in essence of social phobia (Weeks, Heimberg, & Rodebaugh, 2008).

A social phobic individual lives in fear of being ashamed, blushing and embarrassment in front of others when there is a necessity for showing a performance in situations. They think that they are being examined by other people. Social phobic individuals are afraid of performing behaviors like making mistakes, making a fool of themselves, or behaviors they think are not suitable for themselves. These people are afraid and concerned of being pushed to the backstage, being behaved to in an unfriendly manner, appearing to be the fool, losing control, panicking, not knowing what to say, and realizing some physical and physiological changes regarding their relationships with people (Dogan & Totan, 2010).

Individuals going through social phobia usually are aware that intense fear and anxiety they have experienced are not realistic but when they get into a social environment or interact with other people, they cannot stop themselves feeling afraid and concerned that they cannot cope with this fear which totally controls their lives. Researchers attribute to a few reasons of relationship between social phobia and loneliness. First of all, socially worried individuals communicate less with other people. These individuals internalize trouble when in contact with people and generally keep themselves away from social relationships. Second, if social phobic individuals perform weak social skills, other individuals might show disapproval and denial reaction. Efforts of social phobic people with other individuals to

establish and to pursue a contact can be devastating, because these cause social phobic individuals feel loneliness (Subasi, 2007).

During university education, an individual tries to develop himself or herself as a self-governing person and to prove their personality. In this period, the quality of impression which a young person makes in social relationship is very important. Consequently, the individual creates big expectations about him or herself. If the individual cannot fulfill these expectations, the level of social phobia increases and social phobia starts to show itself. On the other hand, the individual enters into an environment where socialization is intense at the start of university life. Here, an individual who cannot experience socialization has problems like having trouble in difficult situations, not improving self-reliance and then identity confusion, can go on to improve in his or her future life (Dereboy, 1993; Baser & Kilinc, 2015). To Ericson (1950), a young person who experiences identity seeking in youth adulthood stage, is a willing volunteer to merge his or her identity with others, is ready to develop intimacy. However, if the young person is having a social phobia, he or she will face loneliness which is a danger of this stage and will try to avoid relationships developing intimacy.

In Turkey, there are few studies researching factors significant in extensity, appearance of social phobia in university students. In this current study, the investigation of connections between social phobia level and several variables of students is explored at two Turkish universities.

## Methodology

In this study, correlational model was used and the model looked for relations between two or more variables. Correlational design helps with disclosing relations between variables, determining the levels of these relations, providing necessary clues to perform higher level researches about these relations (Buyukozturk, Kilic-Cakmak, Akgun, Karadeniz, & Demirel, 2012; Cokluk, 2010). Independent variables are determined as age, gender, university department, socioeconomic status, daily period the individual spent online (virtual platform), whether or not the individual works part-time, whether or not the individual can express himself/ herself well in social media, and their home city. Meanwhile, the total score obtained from PEF *is* the dependent variable.

The research group of this study consists of total 736 students studying at different departments of Dumlupinar University and Balikesir University in Turkey. In terms of students' ages, 121 students (16.4%) are aged 17 years, 100 students (13.6%) are 18 years, 81 students (11%) are 19 years, 62 students (8.4%) are 20 years, 126 students (17.1%) are 21 years, 68 students (9.8%) are 22 years, 114 students (15.5%) are 23 years, 7 students (1%) are 24 years, 29 students (3.9%) are 25 years, 23 students (3.1%) are 26 years, 3 students (0.4%) are 27 years, and 2 students (0.3%) are 28 years old. Of the total 736 students, there are 358 male students (48.6%), and 377 female students (51.2%).

In the research, positive evaluation fear scale (PEFS), as developed by Weeks et al. (2008a) and Weeks et al, (2008b), was used to measure positive evaluation of individuals who experienced social anxiety. For translation of the scale into Turkish language, psychometric properties were investigated and Turkish adaptation was performed with a sample of Turkish university students by Dogan and Totan (2010). PEFS' psychometric

properties were examined via internal consistency coefficient, test repeat test, test halfway through, exploratory, and confirmatory factor analysis and criterion related validity methods. For criteria related validity, NEFS form and Rosenberg Self-Esteem Scale were used. To examine construct validity of NEFS, exploratory and confirmatory factor analyses were made. A single factor construct was obtained as a result of exploratory factor analysis. However; confirmatory factor analysis showed results which complied with factor structure belonging to the original form of the scale. NEFS's internal consistency coefficient was .73, test repeat test reliability coefficient was .75 and reliability coefficient obtained by test halfway through was .67. These results showed that PEFS was reliable and a valid scale to measure the PEF level of university students.

## Findings

Students were divided into two groups according to points obtained from PEFS, as low and high level negative fear level groups in this study. In realization of this division, according to scale scoring criteria, points were used by calculating the arithmetic mean of each item in the scale (Ozdamar, 2013). The point maximum points available on the scale was 40. The average points were found to be 20. Students who had 20 points and below were deemed to have low level negative evaluation of fear, whereas students who had 21 points and over were deemed to have high level negative evaluation of fear. According to appointments in respect to the mentioned criteria, a two-category dependent variable was obtained (Field, 2005). PEFS, as a dependent variable, was coded as 1 or 2 in analysis to perform category separation process. When the process was executed in SPSS, the program converted any coded category into values 1 and 2, and those categories that were converted to 1 or 2 were identified under the data process step. For this appointment, value 1 referred to the student group with low level negative evaluation of fear, and value 2 referred to the student group with high level negative evaluation of fear. In this study, the category which expressed value 1 referred to low level negative evaluation of fear as a reference category. Obtained coefficients regarding high levels of negative evaluation of fear were determined as the second category and the independent variable which was negative evaluation of fear reflected probability over dependent variable of PEF.

Explanation of dependent and independent variables are significant (Bircan, 2004). In this study, PEF is the dependent variable having two options. There are a lot of factors causing PEF, which is the aim of study. Independent variables effecting PEFs of students were; *(i)* Age (AGE) continuous variable, *(ii)* department of university (DoU) discrete variable, *(iii)* area of residence (AoR) discrete variable, *(iv)* daily period spent online (DPSO) continuous variable, *(v)* duration of full-time, part –time work (FT/PT): continuous variable, *(vi)* I express myself confidently in social media (IECinSM) discrete variable, *(vii)* gender (GEN) discrete variable, and (*viii)* place of school location (PoSL) discrete variable.

Power Calculations is performed by testing null hypothesis (Hsieh, Bloch, & Larsen, 1998). In order to execute power analysis, there is an opportunity to calculate some base values like number of samples, alpha with several formulas. In this study, power will be calculated by using PASS 13 program, together with determining the covariant effect of DPSO over PEFS. Before starting to calculate, some basic terms will be explained:

- Search for Solution: This option is used for separating the parameter finding for solution from a lot of parameters in the research. There are P1, N, Alpha and Power

and Beta among parameter options (Hintze, 2008). In case of performing power analysis, Power and Beta will be used.

- Using P1 or Odds Rate: This option helps P1 or Odds rate to be chosen as parameter. P1 or Odds rate and relation between P1 and $P_o$ is
  OR= $\frac{P1/(1-P1)}{P_o/(1-P_o)}$
  It is given determining OR and $P_o$ values. As we understand from the equality, P1 clearly states $P_o$ value. Thereby, in parameter selection, P1 or Odds rate is used to identify alternative hypothesis (Hintze, 2008).
- P1 (Feasibility Rate of First Stage Dependent Variable Y=1): This option resolves magnitude of effect via determining P1 at the same time. Independent variable's being normal or binominal provides an opportunity to take P1 as Odds rate when performing power analysis. In this case, logistic regression equation is taken as
  $R = e^{\beta_0+\beta_1} / 1+e^{\beta_0+\beta_1}$ (Hintze, 2008)
- Alpha Value (Relevance Value): This option determines one or more options for possibility of Type-1 Error. Type-1 Error rejecting of a true null hypothesis needs to be accepted, its possibility's being less than any preselects possibility. Alpha value has to be between 0 and 1. Alpha value in social sciences is 0.05 (Hintze, 2008).
- Baseline Probability $P_o$ (Fundamental Probability Y=1): This option determines one or more $P_o$ values. If predictor independent variable is continuous, P0 value is taken as normal covariant (Hintze, 2008).

Power analysis is performed according to BLOGREG logistic regression data. PEFS as a binary dependent variable has a power over DPSO. Table 1 shows that power ratio is 0.781 with the sample of 726 students and it is significant (P< .05).

**Table 1.** Logistic regression power analysis

| **Power** | N | $P_o$ | P1 | Odds | $R^2$ | Alpha | Beta |
|---|---|---|---|---|---|---|---|
| 0.78147 | 700 | 0.070 | 0.101 | 1.500 | 0.000 | 0.05000 | 0.21853 |

In logistic regression analysis, primarily model to be used has to be decided. If dependent variable has binary options, binary logistic regression (BLOGREG) analysis method is used to estimate the probability of binary response upon one or more predicting variables. Binary logistic regression explains the connection between one or more variables and binary response variable. Explanatory variables; can be factor variable, risk factors or a common variable. Risk factors or explanatory variables can be categorical or ordinal. Common variables have to be continuous variable. Model specification operations in BLOGREG analysis can be performed according to formed method (ENTER) or user-defined stepwise method (Ozdamar, 2013; Cokluk, 2010; Field, 2005). Forward selection or backward elimination methods can be practiced in stepwise model selection. In this study's logistic regression analysis, Feasibility Rate and Forward Likelihood Ratio-Forward: LR is used. In this method, all covariates as a block are in regression model, and parameter estimates are calculated separately for every block. Some researchers express that this method is convenient just to test theory. The reason for this is even though stepwise methods are affected from random changes and model is repeated by using the same samples, the same results are rarely obtained (Cokluk, 2010).

Pearson correlation is a coefficient which defines relation's degree and direction among variables. Some operation is executed in regression equation as correlation estimate for all variables in logistic regression. The reason for the execution is to prevent the possibility of multiple correlations in regression equation (George & Maller, 2003).

Correlation coefficients obtained among variables take a value between -1 and +1. Coefficient of r indicates the direction and force of the relation. When using correlation coefficient, *(i)* relation must not be linear, *(ii)* number of sample must not be low and, *(iii)* there must not be any outliers (Sipahi, Yurtkoru, & Cinko, 2010). When Table 2 is examined, it is seen that there is a change in correlation values of independent variables between 0.00<r<0.8 and mostly there is not a high level of correlation among independent variables.

**Table 2.** Correlation among dependent and independent variables

| | AGE | UD | AoR | DPSO | FT/PT | IECinSM | GEN | SLP | SF |
|---|---|---|---|---|---|---|---|---|---|
| PEF | .20 | .12 | .62 | .48 | -.25 | .05 | .15 | .16 | .38 |
| AGE | - | -.01 | -.00 | .06 | .09** | .06 | .02 | .06 | .05 |
| UD | -.01 | - | -.04 | -.01 | -.00 | -.14** | -.02 | .01 | -.05 |
| AoR | -.00 | -.04 | - | .00 | -.01 | .05 | -.04 | .25** | .01 |
| DPSO | .06 | -.01 | .00 | - | .80** | .03 | .03 | -.12** | .33** |
| FT/PT | .09** | -.00 | -.01 | .80** | - | .03 | .04 | -.09* | .26** |
| IECin SM | .06 | -.14** | .05 | .03 | .03 | - | .04 | -.03 | .01 |
| GEN | .02 | -.02 | -.04 | .03 | .04 | .04 | - | .02 | .03 |
| SLP | .06 | .01 | .25** | -.12** | -.09* | -.03 | .02 | - | -.10** |
| SF | .05 | -.05 | .01 | .33** | .26** | .01 | .03 | -.10** | - |

** $p$<.01

Correlation coefficient is important in terms of linear regression hypothesis. This is because there must not be multicollinearity, which can be defined with conditions like relation among variables which must be linear, there must not be collinearity among independent variables, and there must be normal distribution of error terms, error term variances must be fixed, and variance rates must not exceed 0.90 value.

Hence there are several criteria to determine multicollinearity. According to these criteria; *(i)* that if correlation among independent variables is (r>0.7), *(ii)* that if VIF (Variance Growth Factor) value is bigger than 10, *(iii)* that the ratio of the largest eigenvalue to the smallest one is between 100-1000, that eigenvalue is bigger than 10.000, *(iv) that the* condition index is bigger than 30 indicates possibility of multicollinearity (Kinnear & Gray, 2004; Sipahi et al., 2010). According to Table 3, eigenvalue is 7.693, VIF value is (VIF<10), condition index is (1,000<Condition Index>29.9). Those values indicate that there are no multiple correlations.

**Table 3.** Examination of multiple correlations

| | | | Nonstandard Coefficient | | Multicollinearity Statistics | | Multicollinearity Research | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Variance Rates | | | | | | | |
| | Eigen Value | Condition Index | B | SE | Tolerance | VIF | AGE | UD | AoR | DPSO | FT/PT | IECinSM | GEN | SLP |
| (Constant) | 7.693 | 1.000 | 1.348 | .155 | | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AGE | .465 | 4.067 | .008 | .006 | .979 | .00 | .26 | .00 | .07 | .07 | .00 | .00 | .01 | .01 |
| UD | .376 | 4.525 | -.005 | .004 | .978 | .00 | .63 | .03 | .02 | .02 | .03 | .01 | .01 | .01 |
| AoR | .153 | 7.102 | .022 | .026 | .923 | .00 | .00 | .42 | .00 | .00 | .37 | .04 | .05 | .05 |
| DPSO | .121 | 7.963 | .084 | .015 | .344 | .00 | .05 | .21 | .00 | .00 | .40 | .29 | .06 | .06 |
| FT/PT | .086 | 9.483 | -.005 | .015 | .345 | .00 | .00 | .28 | .00 | .01 | .02 | .34 | .56 | .56 |
| IECinSM | .055 | 11.822 | -.007 | .024 | .967 | .00 | .00 | .02 | .87 | .89 | .00 | .01 | .00 | .00 |
| GEN | .045 | 13.088 | .018 | .033 | .992 | .14 | .04 | .02 | .04 | .00 | .16 | .27 | .30 | .30 |
| SLP | .007 | 29.933 | -.082 | .041 | .908 | .85 | .01 | .02 | .00 | .00 | .01 | .03 | .01 | .01 |

As in multiple regression models, some alternatives can be used for model selection in logistic regression too. In this study, *Forward: LR* method was used. The primary aim of selecting this method is that there is no study on which variables are reliable predictor in the past. It must be decided first whether using categorical predictors as a first or last category of base model is necessary. Thus, there are two categories in this study, selecting first or last category is not so important and if there are categorical predictors which have more than two categories in the study, last option must be used by selecting maximum categorical code or first option must be decided by selecting minimum categorical code in control category (Field, 2005).

In this study, because low social phobia is coded as 1, high social phobia is coded as 2 for the purpose of control category, reference category is used as first category to define the variable. In the first analysis performed by forward step method, initial model is obtained with constant coming out from regression equation. Obtained iteration story gives information about the model in which all predictor variables are discarded and only the constant is added to the equation (Field, 2005). Iteration story gives us log-feasibility statistics of the base model.

According to Hair, Black, Babin, Anderson, and Tatham (2006), when -2LL or -2log likelihood is a model adaptation index, the highest estimate is likelihood value similar to total squares in multiple regression. Logistic regression measures estimated model adaptation by taking -2 log of the likelihood value. Minimum value which -2LL can have is 0 which is equaled for perfect adaptation, when -2LL=0, likelihood=1. Consequently -2LL value can be regarded as $R^2$ value in multiple regressions. Next, comment of comparing changes in adaptation is performed in three steps (Cokluk, 2010). These steps; *(i)* initial model is formed to compare development or reformation in model adaptation (baseline model/constant-only model). Most common null model is the model which is similar to calculated total squares by using averages in multiple regression, has no independent variable in, and has only constant

term. Null model indicates the initial condition providing comparison with the model in which the independent variable is input in further steps, *(ii)* estimated proposed model: This model is logistic regression model including predictor variables. Here, after null model, it is expected from adaptation to progress with predictor variables entering to the model, *(iii)* evaluation of -2LL difference *(iv)* in last step, it is evaluation of -2LL's statistical significance among two model (null/initial model and objective model). If statistical tests indicate that the difference is significant, it can be commented that predictor variable or variables in objective model contribute well to reformation of the estimated model's adaptation (Cokluk, 2010).

In respect to Table 4, -2LL value of initial model iteration story is demonstrated. In absolute terms, in direction of variability chance in further steps recalls that -2Log Likelihood value equaled to perfect adaptation is zero and it is beneficial to state that the model starts with pretty high -2LL value (277.239).

**Table 4.** Iteration story for initial model

| Iteration | | -2 Log likelihood (-2LL) | Coefficients Constant |
|---|---|---|---|
| Step 0 | 1 | 873.300 | .880 |
| | 2 | 872.676 | .944 |
| | 3 | 872.676 | .945 |

When Table 5 is studied, it is a model obtained in Step 0 and was formed by the coefficient called as constant. In independent variables formed of two options, according to the results obtained from positive evaluation scale, 72.0% of students feel a level high level fear, with 28.0% of the other student group feeling this fear at a low level. Consequently, according to the output of the research, all students are classified in high level social phobic individuals' category and with this data, correct classification percentage is 72.

**Table 5.** First classifications resulting from logistic regression analysis

| Real/Observed | | Expected PEFS Low | High | Correct Percentage Classification |
|---|---|---|---|---|
| PEFS | Low | 0 | 206 | .00 |
| | High | 0 | 530 | 100.0 |
| Total Percentage | | | | 72.0 |

Initial model variables in the equation are shown in Table 6. The model *($b_o$)* has variables in the equation that causes determination of the constant value equaled to 94. As we can see from the table, there are standard error with its constant term, Wald statistics testing relevance of variable, degree of freedom of Wald statistics and relevance level with Exp (β), in other words, exponentiated logistic coefficients that represents Odds rate.

**Table 6.** Initial model variables

| Step 0 | β | S.E. | Wald | df | Sig. | Exp(β) |
|---|---|---|---|---|---|---|
| Constant | .945 | .082 | 132.474 | 1 | .000 | 2.573 |

There are variables which are not present in the initial model shown in Table 6. The value which needs to be studied in this table is residual chi-square, given as overall statistics

at the end of the table (Field, 2005). As we can understand from the table, the value also named as first chi-square is relevant [$X^2b_o=280,659$, $p<.01$]. Relevance of this value indicates that coefficients regarding predictor variables, which is not present in the model, has a relevant difference from zero. In other words, adding one or more of these variables to the model increases the predictive power of it. If relevance level regarding error chi-square statistics is p>.05, this indicates that none of the predictor variables which are not added to the model contributes relevantly to the model's predictive power and analysis ends at this point (Cokluk, 2010). Also score statistics in the table are Roa's efficient score statistics for every variable and indicate whether or not all variables contribute relevantly to the model (Field, 2005). In researches having wide samples, if null hypothesis is correct, score statistics are equal to Wald value and likelihood rate statistic. In this case, Roa's efficient score statistics will be used because Wald value in contrast with Roa value (prohibitive) means an extremely high value (Field, 2005). Here, relevance of score statistics regarding all variables indicates that all predictor variables contribute potentially to the model. In addition to that variable, maximum score in stepwise methods is the predictor value in analysis. In our example, the maximum score statistic belongs to DPSO (Daily Period Spent Online) (171.598)" and hence it is understood that this variable will get into the analysis first.

**Table 7.** Variables not present in initial model

| | Variables | Score | df | p |
|---|---|---|---|---|
| Step 0 | AGE | .556 | 1 | .456 |
| | UD | .196 | 1 | .658 |
| | AoR | 163.773 | 2 | .000 |
| | AoR(1) | 160.944 | 1 | .000 |
| | AoR(2) | 48.822 | 1 | .000 |
| | DPSO | 171.598 | 1 | .000 |
| | FT/PT | .001 | 1 | .981 |
| | IECinSM | .030 | 1 | .863 |
| | GEN | .253 | 1 | .615 |
| | Overall Statistics | 280.659 | 8 | .000 |

Results of Omnibus Test regarding model coefficients are presented in Table 8. Relevance level of chi-square statistics is calculated for model, block, and step. Chi-square for model represents difference between the initial model which only constant term is in, and the objective model. When a stepwise method is used, objective model contains only selected predictors, while standard method produces a model containing all independent variables. Consequently, this comparison differs in respect to the method used. Generally, a relevant chi-square regarding the model predicts affiliation of produced the model's subjects better than the initial model having only constant term. If a stepwise method is used, every step is calculated for chi-square. This value shows preformation of the model as new variables selected in every step added to the model. In this direction, when we study values in the table, being relevant of p value regarding model chi-square values indicates presence of relation between predicted variable and combination of predictor variables. Being relevant of model of chi-square statistics, statements of there is no difference between the initial model containing only constant term and final model, denial of null hypothesis means that correlation is supported between predictive and predicted variable (Cokluk, 2010; Field, 2005).

**Table 8.** Omnibus test evaluation for model coefficients

| | | Chi-square | Df | Sig. |
|---|---|---|---|---|
| | Step | 300.257 | 1 | .000 |
| Step 1 | Block | 300.257 | 1 | .000 |
| | Model | 300.257 | 1 | .000 |
| | Step | 114.388 | 2 | .000 |
| Step 2 | Block | 414.644 | 3 | .000 |
| | Model | 414.644 | 3 | .000 |

It needs to be remembered first that -2LL value regarding the initial model was 277.239 before studying Table 9. Initial model or base model in logistic regression is a model that contains only a constant term. When one or more variables are added to the model, reformation in the model is determined by the help of the equation below (Cokluk, 2010; Field, 2005)

$$X^2 = 2\,[LL(NEW) - LL(BASE)]$$
$$sd = K(NEW) - K(BASE)$$

The reason for multiplying LL regarding new model, and LL difference regarding base or initial model, is for a result to give chi-square distribution. Degree of freedom (df) using in chi-square distribution is obtained by subtracting parameter number regarding base model from parameter number regarding new model. Parameter number of new model is always 1 because in this model only estimated parameter is the constant term. Degree of freedom (df) for any subsequent model equals to one more of predictor variable number. Here, added "1" value indicates that constant term is added to number of predictor variable (Field, 2005). When DPSO of PEF which provides maximum score statistics in first step is inputted to base model containing only constant term, -2LL difference becomes 300.217 (872.636 – 572.419). When AoR of PEF is inputt in the second step, forming -2LL difference becomes 114.382 (572.419 – 458.032). In both cases, the resultant change in the model's adaptation is relevant. Cox & Snell $R^2$ and Nagelkerke $R^2$ values, represent estimation of variance expressed by model in dependent variable in two different ways and are commented similar to $R^2$ in multiple regression (Field, 2005). In other words, both values indicate variance quantity expressed by logistic model and state 1.00 perfect model adaptations. Hence greater values equal better model adaptation (Hair et al., 2006). Because of Cox & Snell $R^2$ never to reach 1 and to comment to that is not easy, Nagelkerke $R^2$ is calculated (Field, 2005). Nagelkerke coefficient to ensure the ranges change between 0-1 is the form of the Cox & Snell coefficient undergone modification. Therefore Nagelkerke $R^2$ value is always higher than Cox & Snell $R^2$ value (Hair et al., 2006; Kinnear & Gray, 2004).

While DPSO (Daily Period Spent Online) predictor variable enters analysis, it expresses 33.5% of variance in PEFS (Positive Evaluation Fear Scale) predicted variable. When AoR predictor value enters the analysis, it expresses 43.1% of variance in PEFS predicted variable with two predictor variables. For the first step, Nagelkerke $R^2$ value is 48.2%, and for the second step it is 62.0%. According to student perceptions obtained from PEFS Scale AoR which tries to enter study as second variable strongly predicts PEFS. As mentioned before, Nagelkerke $R^2$ values are higher than Cox & Snell $R^2$ values.

**Table 9.** Evaluation of objective model data

| Step | -2 Loglikelihood | Cox & Snell R ² | Nagelkerke R ² |
|---|---|---|---|
| 1 | 572.419[a] | .335 | .482 |
| 2 | 458.032[b] | .431 | .620 |

In Table 10, the Hoshmer and Lemeshow tests are presented. Possibilities estimated from logistic regression analysis are used for this method. Estimated possibilities are sorted from small, to large. Sorted individuals are divided into k subgroups. Mostly k value is taken as 10. At last, values observed and expected from every sub group are calculated and known chi-square tests are applied.

$$\hat{C}=\Sigma\ (S-B)^2/B$$

Statistics adapt to chi-square distribution with degree of freedom. A large number of samples are needed for applying the Hoshmer and Lemeshow method. According to analysis results, a large chi-square value indicates that it is not a good model adaptation. Hence for the existing subgroup number 8 in the first step, $\hat{C}1$ statistic is distributed chi-square with 8-2=6 degree of freedom. Thus ($\hat{C}1$=9.7; P=0.053), according to the Hoshmer and Lemeshow test result, the model's adaptation to data is decided to be good. When the existing subgroup number is 10 in the second step, $\hat{C}2$ statistic is distributed chi-square with 10-2=8 degree of freedom. Thus ($\hat{C}2$=6.62; P:068), according to the Lemeshow test result, the model's adaptation to data is decided to be good. It is stated that in C statistics' calculation, the groups existed in sub groups are needed to be six at least in this study. So being in excess of obtained sub groups' group number results that it is susceptible in detecting difference between observer and expected frequencies (Alpar, 2011).

**Table 10.** Possible explanations for Hoshmer and Lemeshow test

| Sub Group | | PEFS = NO | | PEFS = YES | | Total |
|---|---|---|---|---|---|---|
| | | Observed | Expected | Observed | Expected | |
| Step 1 | 1 | 7 | 7.422 | 2 | 1.578 | 9 |
| | 2 | 130 | 132.180 | 72 | 69.820 | 202 |
| | 3 | 46 | 36.328 | 38 | 47.672 | 84 |
| | 4 | 7 | 11.032 | 40 | 35.968 | 47 |
| | 5 | 9 | 11.979 | 100 | 97.021 | 109 |
| | 6 | 4 | 4.829 | 98 | 97.171 | 102 |
| | 7 | 1 | 1.726 | 87 | 86.274 | 88 |
| | 8 | 2 | .504 | 93 | 94.496 | 95 |
| Step 2 | 1 | 7 | 7.338 | 1 | .662 | 8 |
| | 2 | 114 | 112.315 | 23 | 24.685 | 137 |
| | 3 | 44 | 42.746 | 29 | 30.254 | 73 |
| | 4 | 21 | 25.092 | 64 | 59.908 | 85 |
| | 5 | 14 | 11.995 | 72 | 74.005 | 86 |
| | 6 | 2 | 4.543 | 88 | 85.457 | 90 |
| | 7 | 0 | 1.043 | 59 | 57.957 | 59 |
| | 8 | 2 | .680 | 76 | 77.320 | 78 |
| | 9 | 1 | .221 | 72 | 72.779 | 73 |
| | 10 | 1 | .028 | 46 | 46.972 | 47 |

Hosmer and Lemeshow Test results are presented in Table 11. This test evaluates adaptation of logistic regression model as a whole. Being non-relevant of test results (*p*>.05) shows that model-data adaptation is at sufficient level. In other words, there is no relevant difference between observed values and values estimated by the model; model estimations are not different from the observed situation (Cokluk, 2010). When examined with a stepwise analysis method, DPSO and AoR values (P> .05) show that the model has an acceptable conformity, that is the data fits the model at an adequate level (Cokluk, 2010; Field, 2005 ).

**Table 11.** Hoshmer and Lemeshow adaptation benefaction index test

| Step | Chi-square | df | p |
|---|---|---|---|
| 1 | 12.455 | 6 | .05 |
| 2 | 44.039 | 8 | .06 |

Table 12 shows the classification analysis which is a presentation of regression model that regresses the group membership. To perform the evaluation of Table 12, firstly we have to look at corrected percentage rate in the first step of classification in Table 5 that shows 530 students experience high concern about PEF, and 206 students experience this at low rate. Thus, it is understood that the rate of true evaluation rate is 72%. When block 1 logistic regression analysis is studied, 137 students are classified AoR true, but 69 of them are classified AoR wrong. Hence; true classification rate is 66.5%. If the situation is examined from the students' perception that they express fear of AoR, 74 are classified AoR true, but 456 of them are classified AoR wrong, Thus, true classification rate is 86%. In the first step, while the rate of true classified percentage was 72%, but when AoR entered to study true classified percentage increased to 80.6%. In step 2, 159 students are classified AoR true, 47 students are classified AoR wrong. Hence, according to the results, true classification rate is 77.2%. In classification of the second step, 37 students are classified in the true category, and 493 students are classified in the category wrong. True classification rate in this case is 93%. When data is compared to the first classification rate, true classified zone increases to 80.6% by AoR (Area of Residence) independent predictor variable entering to statistic, objective true classification rate increases by DPSO (Daily Period Spent Online) variable joining the study. Findings can be expressed as a sign of model-data adaptation.

**Table 12.** Regression model classification

| Observed | | | Estimation PEFS AoR NO | AoR YES | True Classified Percentage |
|---|---|---|---|---|---|
| Step 1 | PEFS | AoR NO | 137 | 69 | 66.5 |
| | | AoR YES | 74 | 456 | 86.0 |
| | Total Percentage Zone | | | | 80.6 |
| Step 2 | PEFS | AoR NO | 159 | 47 | 77.2 |
| | | AoR YES | 37 | 493 | 93.0 |
| | Total Percentage Zone | | | | 88.6 |

When Table 13 analyzed, it is seen that AoR (Area of Residence) increases PEF 30%. Also, DPSO (Time Daily on the Internet) variable increases PEF of students 2.43 fold.

**Table 13.** Coefficient estimations of variables in objective model

| | | *B* | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I. for EXP(B) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lower | Upper |
| Step 1 | DPSO | .910 | .074 | 152.482 | 1 | .000 | 2.484 | 2.150 | 2.870 |
| | Constant | -1.548 | .183 | 71.517 | 1 | .000 | .213 | | |
| | UD | -1.176 | .583 | 4.063 | 1 | .044 | .309 | .098 | .968 |
| Step 2 | DPSO | .891 | .081 | 121.366 | 1 | .000 | 2.438 | 2.081 | 2.857 |
| | Constant | .939 | .550 | 2.918 | 1 | .088 | 2.558 | | |

In Table 14, 2LL value regarding model's predictor variable is removed, amount of change in these values, changes in degree of freedom and p values regarding relevance are presented. In case of analyzing difference of 2LL values given with P values at Step 1 and Step 2, significance value stating both models' adaptation is relevant. Thus removing DPSO and AoR variables from the model is not a good proposition (Cokluk, 2010; Kinnear & Gray, 2004).

**Table 14.** Model with predictor variables removed

| Variable | | Model Log Likelihood | Change in -2 Log Likelihood | df | P of Change |
|---|---|---|---|---|---|
| Step 1 | DPSO | -436.338 | 300.257 | 1 | .000 |
| Step 2 | UD | -286.210 | 114.388 | 2 | .000 |
| | DPSO | -344.452 | 230.872 | 1 | .000 |

## Conclusion and Discussion

Logistics regression analysis is a very useful method to evaluate data captured from questionnaires and scales. The aim was to research PEF which is an important issue among university students and studied abundantly. The dependent variable of this study was converted into a two-categorical level, as low- and high- level phobia, according to the perception levels of students. Obtaining eight independent variables, we formed a regression model. We used Feasibility Rate and Forward Likelihood Ratio-Forward: LR technique to examine independent variables as significant. It was seen that DPSO (Daily Period Spent Online) and AoR (Area of Residence) are two independent values that was included in the regression model. According to Odds rates, the most significant factor in students' positive evaluation concerns is daily period spent online (DPSO). In respect to obtained Odds coefficient, it is observed that DPSO makes students 2.4 times more socially phobic than people who do not spent their time online. In other words, students not aware of the time they spent online makes them asocial, lonely, and non-interacting individuals. Another independent variable is AoR. As a second important factor, perceptions of students regarding AoR increase in PEF is 30% more than people who believe in their AoR. Thus, DPSO and AoR variables indicate that area of residence has a significant importance about whether individuals improve social phobia or not.

Several exploratory analyses demonstrated that PEF forms a correlation between social anxiety and discomfort in response to feedback given by society. Fear of evaluation in general is important to social anxiety, which appears to lead to increased levels of phobia. Studies explaining the prevalence of social phobia find correlations among university students. Katzelnick et al. (2001) and Stein et al. (2005) found that level of social phobia was

moderate to very severe with prevalence rate of 9.1%, which agrees with international studies who have reported prevalence of social phobia ranging from 2-16%. Weeks, Heimberg, Rodebaugh, and Norton (2008b) found a .35 level of correlation between PEF and social phobia. In our study, social phobia source AoR, which is accepted as an independent variable, has a .62 amount of correlation with PEF. Findings suggest that social threat could entail any phobic experience in which the person might receive PEF. This explanation is indirectly supported by findings of a positive association between trait social anxiety affected by social status and variables of people (Bruch, Gorsky, Collins, & Berger, 1989; Hope & Heimberg, 1988; Canli & Canli, 2013). Our research pinpoints that AoR and DPSO increases the amount of social phobia of PEF because variables of AoR and DPSO are strong predictors of social anxieties. Trait social anxiety can be triggered by asocial situations and one of them is the media, internet and computer-based activities. Thus, our research can be found as a strong predictor for unearthing reasons of phobias. There are some studies finding answers for the correlation between self-esteem and social phobia. Self-esteem is mainly supported by social environment and family (Eksi & Katilmis, 2011; Papadopoulou & Yirci, 2013). Also, it is important for developing ethical values, so schools are important factors when students develop their personality boundaries. It is highly articulated that students should not be pushed out of play; on the contrary, they should be a partner of school and life. Negative correlation was found between self-esteem and social phobia which causes PEF. It can be claimed that if self-esteem is high, social phobia level is low (Eris & Ikiz, 2013). PEF also shown up by internet addiction decreases the level of self-esteem and students who reflect low self-esteem are apt to show a behavior of abstaining from social groups and life (Mazalin & Moore, 2004; Mehtalia & Vankar, 2004; Colak, Altinkurt & Yilmaz, 2014). Our study found that students face PEF, which is derived from DPSO and AoR. We have parallelities on research performed both within Turkey, and abroad.

There are some potential limitations of this study. The first point; although students were chosen randomly within the two universities assessed, the universities as a whole were not. Thus, the present findings may not be generalizable to all university students in Turkey. Second, about 120 of the student sample did return the questionnaire. The attrition analysis however, revealed that non-responders tended to be impaired to a larger extent in the nature of study. Third, we relied on self-report measures only. Although the PEFS (positive evaluation fear scale) has shown good psychometric properties, a resultant positive case of social phobia should be interpreted as an indicant of the disorder rather than a formal diagnosis via quantitative research. *As a conclusion*, Social phobia was found to be prevalent among university students in Turkey as in other countries. Some factors such as age, gender, socio-economic conditions contribute to high levels of social phobia. Another factor which is accepted as knowledge era issue, is usage of the internet and leading virtual lives on computers. Psychological health professionals, leaders, politicians, and the partners of school surrounds need to enhance the psychological wellbeing of university-aged individuals. In their policies, political maneuvers and periodic assessments have to screen students for risk behaviors and psychosocial health indicators from the perspectives of phobias and its triggers. In addition, the results indicate that the AoR of the students has been linked to high levels of social phobia creating a danger for equality of education and citizenship, thus; interventions targeting university students should also scrutinize healthy lifestyles and concentrate on helping students to overcome their anxiety and phobias, and look for alternative sources for help and support in the community.

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