International students in Turkey: A Survey-Based Exploration of Motivations, Expectations, and Satisfaction

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ABSTRACT

Even though there is a myriad of positive aspects to studying abroad and a growing trend of internationalization on high school and college campuses as well as authority efforts to promote international education, the number of international students who participate in study abroad programs in Turkey is still burgeoning. The study attempts to inspect the variables that determine international students' decision to study abroad in Turkey and their degree of contentment. Through a combination of surveys and interviews, this research investigates the role of financial stability, academic motivations, personal reasons, and cultural influences in shaping students' perceptions of Turkey as a study-abroad option. Additionally, the study will explore the level of satisfaction among international students studying in Turkey, as well as any challenges they face. The findings of this research will provide valuable insights for universities and other organizations that seek to attract and support international students in Turkey. Furthermore, it will contribute to the understanding of the factors that shape international students' perceptions of different study-abroad destinations, and the impact on their academic and personal life.

1. Introduction

In today's world of increased global interconnectedness and rapid technological advancement, people are seeking to equip themselves with a wide range of skill sets in order to surmount the challenges of the present day. Developing a greater understanding of different cultures and gaining diverse perspectives has become a crucial aspect of achieving success. Studying abroad is one major way in which students can expand their knowledge and improve their career prospects. This survey research project on studying abroad in Turkey examines various factors that influence a student's decision to study abroad, the impact it has on their social and academic life, and their level of contentment surrounding Turkey as a study abroad option and an opportunity to immerse oneself in a new horizon. Many universities around the world now offer exchange programs to give students the opportunity to gain international experience. According to a comprehensive study by Trujillo et al. (2020), the main incentives for studying abroad included financial considerations, career aspirations, familial influences, academic goals, and personal motivations. The availability of desirable scholarship and funding options motivate students to pursue foreign educational opportunities without placing a financial strain on their families. The study seeks to scrutinize the level of satisfaction among international students, with a particular emphasis on the impact of manifold determinants in the decision-

making process. Additionally, it intends to identify and analyze the miscellaneous factors that contribute to the overall satisfaction of international students.

2. Literature Review

Personal Motives: The major aspect of this study is to examine the key motivating factors for students to embark on their journey to pursue higher education in a foreign country. One of the biggest changes that students face is adapting to a new environment and culture. The silver lining to this circumstance is allowing individuals to test their potential to survive. As Trujillo et al. (2020) mention in their study, respondents attending university abroad got to learn more about themselves while attempting to adjust to their new region's customs and culture. Moreover, it improved their capability to embrace new surroundings and difficulties via problem-solving prowess. Foreign education often entails the scope to learn a new language that opens door to possibilities. A study by Sánchez et al. (2006) revealed that the desire to learn a new language was an incentive for US students. In addition, Teichler & Steube (1991, as cited in Nyaupane et al., 2020) believe that educational aims such as learning a second language, discovering a different teaching technique, boosting employment options and competitive intensity, all play vital roles in studying abroad' programs to prospective students. This demonstration of the student's capacity to tackle new challenges makes them ideal candidates in a professional atmosphere thus, unraveling a path to increasing the possibility to get new job opportunities. Most students acknowledged that going abroad may boost their professional prospects and prepares individuals in several ways, including the use of real-world experiences and the ability to collaborate with worldwide corporations (Trujillo et al, 2020).

Family Expectations and Recommendations: It is observed that most international students, regardless of their age or nationality, care significantly about their family's expectations and possess high feelings of responsibility. But it is worth mentioning that the way each individual reacts to these feelings is different. Some might consider these responsibilities as a burden that restricts their freedom, while some consider them as their duty and filial piety. It seems that the cultural background of each student is an important reason for the way they respond to the expectations of their family (Trujillo et al., 2020). In addition, it is shown that a noteworthy element with a significant influence on the decision of studying abroad is recommendations given by significant others. Such people usually include friends, peers, teachers, or family members. Interestingly, although family can

be very important in one's decisions, in the choice of an academic institute or country, the significance of opinions from a friend or not significant other might be even stronger.

Geo-academic Motives: Yet another decisive factor that drove international students to study abroad is the geo-academic motive. International students find studying abroad broadens their knowledge and increases their experience. Recent research by Trujillo et al. (2020) studied the motivations behind students studying abroad. They collected the data of 15 Master's and Doctoral students at the University of Debrecen through interviews and analyzed it descriptively to unveil the hidden patterns and motivations among the students studying abroad. Their results found that many students saw foreign countries as an excellent opportunity to continue their studies in a better educational system and environment. Most students in their research also believed that studying abroad would increase their English language proficiency, making their future career development easier.

2.1. Data description

In this project, we collected data from 17 Turkish universities that contained 300 observations with 87 variables. The observation in our data includes 22 variables related to the background information of each student before they came to Turkey. 51 variables about what motivated them to decide to study in Turkey. And 15 variables about the current experience and satisfaction of each student studying in Turkey. Furthermore, the data contains three numerical variables and 84 categorical variables. Some of the important variables are as follows:

Variable	Variable Description
Country of Citizenship	Country name – Categorical variable
Age	Discrete Variable
University Name	Name of the University – Categorical variable
Reasons to study in Turkey	A matrix of reasons with Likert scales
Factors concerning before moving to Turkey	A matrix of concerning factors with Likert scales
Would you live abroad after studies	Categorical - Yes and No
Need of financial aid to study abroad	Categorical - Yes and No
Number of time returned to home country	Categorical variable with four options
Social life of international students	A matrix of statements with Likert scales
Problems faced in Turkey	A matrix of Problems with Likert scales
Satisfaction level	Categorical variable with a Likert scale

3. Research questions

We had 6 main questions analyzed in our study:

- 1) Were most of the students wary of living in a new country before they came to Turkey?
- 2) Were most of the students worried about the new language before they came to Turkey?
- 3) Do international students of different gender have different satisfactions in Turkey?
- 4) Does the amount of communication with Turkish citizens influence the satisfaction of international students?
- 5) What are the effects of expectations in financial limitations, and Islamic culture on the satisfaction of international students?
- 6) What are the effects of expectations in language difficulties, and concerns about leaving the family on the satisfaction of international students?
- 7) Can the satisfaction level of international students be predicted using their motivation and expectation?

3.1. Aim of the study

Main Objective:

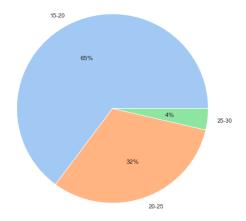
The primary aim of our survey and research project is to examine the motivations (personal, familial, financial, geo-academic, etc.) that may have played an important role in for the students to choose Turkey for their higher education. The previous expectations and the current levels of satisfaction were also inquired about and analyzed. We also plan to share all this information with other aspiring students and help them in deciding about a better and brighter future.

4. Methodology/Analysis

Statistical methods were used to analyze the data. These methods include proportion hypothesis testing, t-tests, one-way ANOVA, two-way ANOVA, and logistic regression. Furthermore, machine learning algorithms were utilized to find patterns between the variables; these algorithms used in this analysis were K-nearest Neighbors, Naïve Bayes, Kernel SVM, and Gradient boosting. Additionally, visualizations and crosstabs were used in tandem with the statistical analysis.

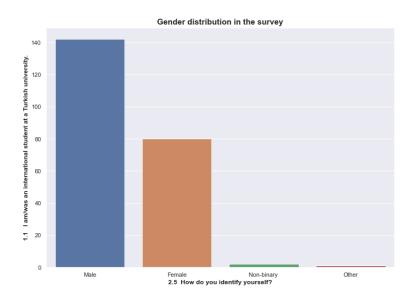
5. **DEMOGRAPHIC ANALYSIS:**

The survey was conducted with a sample of 1000 participants, with a balanced representation of gender (although the number of male participants was substantially higher) and age groups.

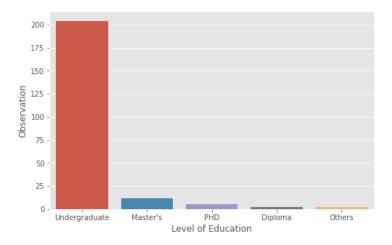


Most participants were between the ages of 20 and 25, followed by those between the ages of 15 and 20, and the remaining group belongs to the 25+ age range.

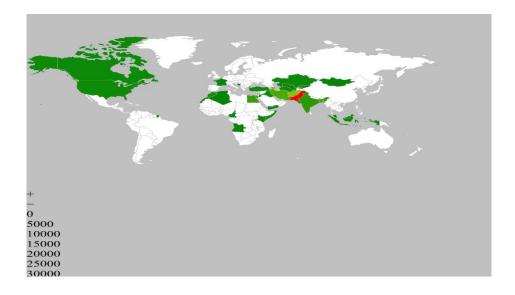
In terms of gender, 142 participants were male and 80 were female. In addition, the rest of them belong to non-binary and other groups.



The survey also collected data on participants' education level and marital status. Most participants are in the process of attaining undergrad and grad degree while all of them had completed either high school or college. In terms of education level, around 90% of the responders were undergraduates, 5% were graduates and the rest are doing PhD, diploma education, and others.



The survey participants were from a diverse group of nationalities consisting of individuals from 37 different countries while majority of them were from countries such as Pakistan, Afghanistan Azerbaijan, Iran, Bangladesh, Egypt.



6. Results and Findings

6.1. Were most of the students wary of living in a new country before they came to Turkey?

For this question, we used the answers collected for the question "What factors concerned you (before moving) to study in Turkey? - Wary to live in another country" to do the analysis. We predicted that before taking the decision to live in a new country, most students are expected to be extremely concerned about going to a new completely place to live and study. To test this hypothesis, we used a one-sample proportion test.

Our Test Hypothesis:

 $H_0: P_{\text{wary of new country}} \leq 0.5$

 H_A : P wary of new country > 0.5 (our claim)

Now we check our assumptions:

1. n*p = 123 > 10

2.
$$n*(1-p) = 77 > 10$$

As both conditions are met, we can now continue with our test.

Sample point estimate of p = 0.615

null Hypothesis = 0.5

alternative hypothesis: true p is greater than 0.5

95 percent confidence interval:

0.3278991 1.0000000

p-value = 0.0007 < 0.05

We can see that p-value < 0.05. So, with 95% confidence, we can reject the null hypothesis. This shows us that our claim is correct and more than 50% of international students were concerned about living in a new country.

6.2. Were most of the students worried about the new language before they came to Turkey?

Language is usually known as one of the most important elements to worry about when deciding to live in a new country. But is this also true for international students in Turkey? To test this, we used the answers given to the question "What factors concerned you (before moving) to study in Turkey? - Difficulty with the language". This question was a 3-Likert scale question with the options 'Not important', 'Moderately important', and 'Very important' to choose from. In order to see if more than half of the students thought of language as an important element of concern before they came to Turkey, we use a one-sample proportion test for the factor 'Very important'.

Our Test Hypothesis:

 $H_0: P \text{ wary of new language } \leq 0.5$

 H_A : $P_{\text{wary of new language}} > 0.5$ (our claim)

Now we check our assumptions:

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1. n*p = 87 > 10
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2.
$$n(1-p) = 113 > 10$$

As both conditions are met, we can now continue with our test.

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Sample point estimate of p = 0.435

null probability = 0.5

alternative hypothesis: true p is greater than 0.5

95 percent confidence interval:

0.3761577 1.0000000

p-value = 0.9 > 0.05
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We can see that p-value > 0.05. So, with 95% confidence, we fail to reject the null hypothesis. This shows us that our claim is not correct and more than 50% of international students were only moderately concerned or not concerned about the new language problems.

6.3. Do international students of different gender have different satisfactions in Turkey?

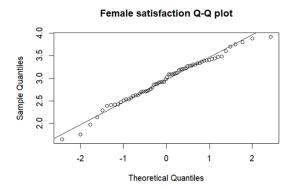
For the analysis of this question, we created a new variable named satisfaction based on the information gathered from our survey. To do this, we chose six variables related to the different aspects of satisfaction and problems of international students in Turkey. These variables include 'getting job problems', 'problem with the Turkish language', 'quality of teaching', 'problems of being away from family, 'satisfaction with health services', and 'overall experience satisfaction'. Then we took the mean value of these variables for each participator and generated a new continuous variable in our data called the 'satisfaction' variable. This variable consists of numbers from 1 to 4. The closer to 4, the more satisfied each participator is.

Now we analyze the above question using a Two-sample t-test.

Our Hypothesis:

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H_0: \mu_{male \ satisfaction} = \mu_{female \ satisfaction}
H_A: \mu_{female \ satisfaction} \neq \mu_{male \ satisfaction} (our claim)
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First, we check the normality assumption by the use of Q-Q plot and Shapiro-Wilk test:



- Shapiro-Wilk for Male p-value = 0.2817 > 0.05
- Shapiro-Wilk for Female p-value = 0.4471 > 0.05

As we observe, both methods conclude that the normality assumption is met for the following twosample t-test:

Two Sample t-test

Mean male satisfaction = 2.952966

Mean female satisfaction = 2.966066

alternative hypothesis: true difference in means is not equal to $\boldsymbol{0}$

95 percent confidence interval: -0.1497816 0.1235808

Test p-value = 0.8503 > 0.05

p-value>0.05 so by a 95% confidence we fail to reject the null hypothesis here. So, we conclude that here, our claim is not correct. Thus, based on the analysis above, there is no significant difference in the amount of satisfaction for international students in Turkey for different genders. We can also note that both males and females have a satisfaction very close to 3 which shows the fact that international students in Turkey are in general satisfied.

6.4. Does the amount of communication with Turkish citizens influence the satisfaction of international students?

For this question, we analyze if the amount of communication international studehave has with Turkish citizens feel has an effect on the satisfaction level they have in Turkey.

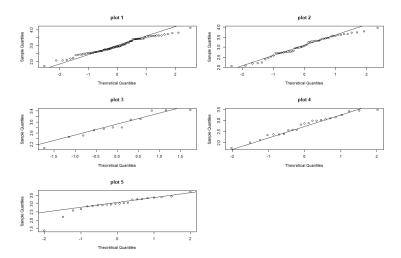
Our Hypothesis:

H₀: All factors have equal mean

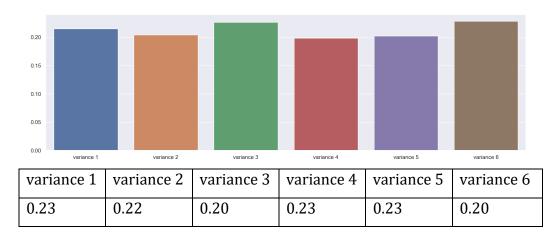
 H_A : The mean for at least one factor is not equal to others.

First, we check the assumptions of one-way ANOVA:

Normality for each category: we conclude normality by the following Q-Q plots:



Homoscedasticity: Equality of Variances for factors: we consider them to be approximately equal:



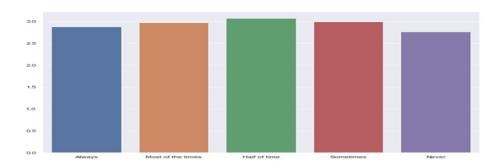
Independence of variables: The observations within each group were obtained by a random sample so we assume independence.

Thereafter the assumptions are met and we can carry out the one-way ANOVA test and reach the following conclusions.

One-way ANOVA test					
Null hypothesis: mean facto	rs in e	ach group ar	e equal		
	Df	Sum Sq	Mean Sq	F.value	Pr(>F)
Communicate.with.Turkish	4	1.62	0.4038	1.783	0.134
Residuals	192	43.49	0.2265		

Since the p-value = 0.125 > 0.05 there's not enough evidence to reject the Null Hypothesis at 95% Confidence level. As a result, we conclude that different amounts of communication with Turkish do not have an effect on the satisfaction level of international students in Turkey. To make sure of the credibility of our results, we also take a look at the following bar plot which shows us that different levels of communication with Turkish people seem to not really be an effect on the satisfaction of international students in Turkey:

6.5. What are the effects of expectations in financial limitations, and Islamic culture on the satisfaction of international students?



In this part, we want to check if the expectations of the international student before coming to turkey have any effect on their current satisfaction level with Turkey. These expectations consist of the expectations about financial limitations each student might experience, and the expectations they had about the Islamic culture. Each of these 2 variables, is a categorical variable that labels each of the above problems in 2 different factors. These factors show the amount of importance each of the financial limitations, and Islamic culture had for international students before they came to Turkey. We used a two-way ANOVA to analyze this information.

Our Hypothesis:

H₀₁, H₀₂: Mean satisfaction for different factors is equal for each variable

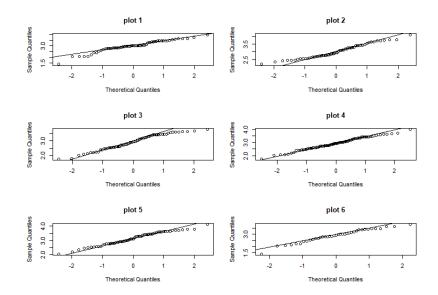
H_{A1}, H_{A2}: The mean for at least one factor is not equal to others.

H₀₃: two variables do not affect each other

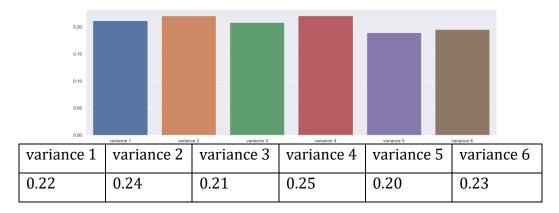
H_{A3}: two variables affect each other

First, we check the assumptions of two-way ANOVA:

1. Normality for each category: we conclude normality by the following Q-Q plots:



2. Homoscedasticity: Equality of Variances: we consider them to be approximately equal:



3. Independence of variables: The observations within each group were obtained by a random sample so we assume independence.

Thereafter the assumptions are met and we can carry out the two-way ANOVA test and reach the following conclusions.

Null hypothesis: factors means in each group are equal						
	Df	Sum Sq	Mean Sq	F.value	Pr(>F)	
Islamic.culture	3	0.38	0.1256	0.574	0.63297	
Financial.problems	3	2.63	0.8774	4.009	0.00857	
Islamic.culture:Financial.problems	8	2.26	0.2831	1.293	0.24933	
Residuals	182	39.83	0.2188			

Here, we can conclude with a 95% confidence that, different levels of expectation for financial problems affect the current levels of satisfaction of international students in turkey while the same could not be said about Islamic cultural expectations. In addition, these two variables do not seem to affect each other that much.

6.6. What are the effects of expectations in language difficulties, and concerns about leaving the family on the satisfaction of international students?

Similar to the previous question, here we use a two-way ANOVA test in order to check the effect of the expectations of the international student on their current satisfaction in turkey. These expectations consist of the expectations about having difficulties with the Turkish language, and the expectations about the problems they might have after leaving their family. Similar to the previous question, here we have 2 categorical variables. Each includes 4 factors that show the amount of importance each international student had for language difficulties and concerns about leaving family before they came to Turkey.

Our Hypothesis:

H₀₁, H₀₂: Mean satisfaction for different factors is equal for each variable

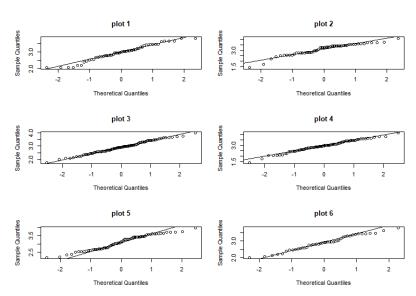
 H_{A1} , H_{A2} : The mean for at least one factor is not equal to others.

 H_{03} : two variables do not affect each other

H_{A3}: two variables affect each other

First, we check the assumptions of two-way ANOVA:

1. Normality for each category: we conclude normality by the following Q-Q plots:



2. Homoscedasticity: Equality of Variances: we consider them to be approximately equal:

variance 1	variance 2	variance 3	variance 4	variance 5	variance 6
0.21	0.27	0.21	0.26	0.20	0.23

3. Independence of variables: The observations within each group were obtained by a random sample so we assume independence.

Thereafter the assumptions are met and we can carry out the two-way ANOVA test and reach the following conclusions.

Null hypothesis: factors means in each group are equal						
	Df	Sum Sq	Mean Sq	F.value	Pr(>F)	
Away.from.family	3	1.69	0.5637	2.552	0.057.	
Turkish.language	3	1.21	0.4047	1.832	0.143	
Away.from.family:Turkish.language	6	1.56	0.2595	1.175	0.321	
Residuals	184	40.64	0.2209			

Here, we can conclude with a 90% confidence that, different levels of expectation for financial problems affect the current levels of satisfaction of international students in turkey while the same could not be said about expectations about the Turkish language. In addition, with 95% confidence, we can conclude that these two variables do not have any effect on each other.

6.7. Can the satisfaction level of international students be predicted using their motivation and expectation?

Data Preprocessing:

In this step of the analysis, thirty-two variables related to motivation and expectation were considered for the classification of the satisfaction variable. The satisfaction variable, or the response variable, was measured on a Likert scale, ranging from extremely satisfied to extremely dissatisfied. Of the 32 independent variables, 30 were categorical, and two were continuous variables. Less than 10% of the data were missing values; thus, the missing data were replaced with the most frequent value based on their columns. The 30 categorical variables were then turned into binary values of zeros and ones. At the end of binary classification, the model had 220 parameters to make predictions. This process ensured that the data was ready for analysis and modeling.

Methods and Assumptions:

1. Logistics Regression(Sigmoid function):

 Absence of multicollinearity: Two continuous variables exhibited multicollinearity with VIFs value of above 10. As a result, one of the continuous variables was removed from the analysis.

- Errors were assumed independent
- Continuous variables were assumed to be linear

2. Naïve Bayes algorithm:

For each variable in the training set, we used Categorical Naïve Bayes to calculate an estimate of the categorical distribution based on the sample's class (y). This process is repeated for all 220 variables of the training set, where the index set of the samples is defined as $J = \{1,2,...,m\}$, with m as the total number of samples. The only assumption for Naïve Bayes is that xi 's are conditionally independent given y.

3. K-Nearest Neighbor(K-NN):

The k-nearest neighbor (KNN) algorithm is a non-parametric method for classification, which assumes that similar instances tend to have similar labels or outcomes. The algorithm relies on similarity measures, as well as the assumption that points close to each other in feature space are more likely to have similar labels. These assumptions are assumed to be met during the implementation of the algorithm.

4. Kernel SVM:

The support Vector Machine (SVM) algorithm is a powerful tool for classification and regression problems, and the kernel SVM is a variation that utilizes a kernel trick to transform the input data into a higher dimensional space, making it more separable. The main assumptions of this algorithm include:

- Linear separability: The kernel SVM algorithm assumes that the input data can be separated by a linear boundary in a higher dimensional space.
- Use of kernel trick: The kernel trick is employed to transform the input data into a higher dimensional space, and commonly used kernels include linear, and polynomial kernels.

It is important to note that for the purpose of this analysis, we assumed that the above assumptions were met.

5. Gradient Boosting:

Gradient Boosting is an ensemble learning method used for classification and regression problems. It is based on the idea of iteratively adding weak models to improve the model's overall performance. It is important to note that the assumptions of the Gradient Boosting algorithm are different from other algorithms. They are unrelated to the underlying data distribution and missing values but rather have underlying mathematical assumptions.

After examining the assumptions, the models mentioned above were implemented. The results obtained are as follows:

Methods	Accuracy Rate
Logistic Regression	85.0%
Naïve Bayes	33.3%
K Nearest Neighbor (K-NN)	76.0%
Kernel SVM	71.6%
Gradient Boosting	72.6%

Logistic regression had the highest accuracy rate of 85%, followed by K-NN, kernel SVM, and gradient boost at 76%, 71.6%, and 72.6%, respectively. Naive Bayes had the lowest accuracy rate of 33.3%. Since logistic regression had the best performance, we can move on to examine the most important variables that influenced the model.

The table below gives a summary of significant survey questions that had a direct influence on our model.

Survey Questions	Coefficient -
How many times did you return to your country during your last academic year?	-0.75
Quality of Teaching	0.85
What were your main reasons to study in Turkey? My family was keen of Turkey's Islamic culture	-0.76
What were your main reasons to study in Turkey? I found Turkey economically affordable	0.84
Regarding your social life, which statement is correct? I generally socialize with other foreign students	-0.67
Regarding your social life, which statement is correct? I mostly socialize with Turkish people	0.84

From the table above, we can observe that the international students' travel to their home country is negatively correlated to satisfaction level; on the other hand, those international students whose quality of education is to their satisfaction tend to be more pleased. Furthermore, those international students who socialize with Turkish students are more likely to be satisfied with their experience than those who mainly mingle with other international students.

Crosstab of Satisfaction Level Versus Turkey Economical affordability

8.6 Are you satisfied with your overall experience in Turkey?	Extremely dissatisfied	Extremely satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Somewhat satisfied
5.8 What were your main reasons to study in Turkey? - I found Turkey economically affordable					
Moderately important			8		32
Not important					6
Very important		12	20		91

From the crosstab above it could be noted that those international students who said that the economic affordability of Turkey was very important to them had the most satisfied experience.

Conclusion

In all totality, one would assume that before coming to Turkey, most international students would be somewhat worried about the language barrier; however, based on the analysis done, less than 50 percent of the students were moderately concerned about the Turkish language. This is an exciting result since most people in Turkey are monolingual, and conversing with Turkish people in other languages would be difficult. Yet, international students didn't think it was an important factor in their decision. On the other hand, more than half of the international students were worried about moving to Turkey, and apparently, not all were direct effect by the Turkish language barrier. Furthermore, the satisfaction level of male and female international students was equal, and most were satisfied with their experience in Turkey. Based on these results, we could postulate that the opportunities given to male and female international students are equal. Another significant effect, based on the survey, was that the financial means of international students had a direct correlation with their satisfaction experience in Turkey. Those international students who find it hard to accommodate their financial means tend to have a lesser satisfaction rate than other international students.

In contrast, international students' parents who showed keenness in Turkish Islamic culture did not positively correlate with the satisfaction of those international students. In some cases, they were inversely correlated. This finding might need more thorough analysis since the general psychological idea is that people from countries with the same cultural and religious values find it easier to integrate into each other's communities. Furthermore, the quality of education in the host university was the other significant motivation and expectation variable that had the highest correlation with the satisfaction of international students. As the rate of education increases, so does international students' satisfaction. On the contrary, those students who traveled to their home countries more than once were not as satisfied with their experience. This might be due to their longing for their home country. Another interesting result was that those international students who mainly socialize with Turkish students had the highest satisfaction rate. This could be due to their integration into Turkish communities and a feeling of belonging in the host country

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