

Prevalence of Nomophobia among University Students: A Comparative Study of Pakistani and Turkish Undergraduate Students

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ABSTRACT

This study focused on to examine prevalence of nomophobia among university students; and the relationship among nomophobia, self-esteem, loneliness and self-happiness with respect to gender and year of study of the university students in Pakistan and Turkey. The study subjects consisted of 729 students 368 (50.5%) of which were from Turkey and 361 (49.5%) from Pakistan. The data were collected by using Nomophobia Scale (NMP-Q), UCLA Loneliness Scale (ULS-8), Self-Happiness Scale, and Rosenberg' Self-Esteem Scale by the researchers from Pakistan and Turkey respectively. The relationship and the effect of each psychological structure on nomophobia were examined with multiple linear regression model. The difference across the categories of independent variables on each of the dependent variables (loneliness, self-happiness, self-esteem and nomophobia) and on linear combination of dependent variables for each country was examined by multivariate MANOVA. According to multivariate effects results, the main effect of gender on self-esteem and nomophobia was statistically significant which indicates that differences between male and female students with respect to self-esteem and nomophobia were significant. The study demonstrated differences between Turkish and Pakistani students' score on nomophobia, loneliness and self-happiness were significant, while difference on self-esteem across countries was not statistically significant.

Keywords: nomophobia, smart phones, internet addiction, information and communication technologies, loneliness

INTRODUCTION

The 21st century is regarded as the century of information and communication technologies (Hussain, 2005) with potential to enhance capacities and capabilities (Hussain, Çakir, Ozdemir, & Tahirkheli, 2017) and emerging application (apps), tools and devices. Amongst others mobile devices particularly the mobile phones have enhanced connectivity interactions of the users (Hussain & Adeeb, 2009). Apparently, one can observe mobile phones particularly, the smart phones to be popular connectivity devices & media among the youth predominantly, among university students. According to Netburn (2012) advancements in information and communication technologies have made communicating easier, but at the same time created new problems. Excessive use of mobile phones including smart phones seemingly has created problems and challenges for university students and concerns of their parents. The most pressing ones consist of physical or health, psychological and social problems (Hussain, 2005; Hussain, Çakir, Ozdemir, & Tahirkheli, 2017). Nomophobia is one of the psychological problems and it is demonstrated by addictive use smart/ mobile phones (Yildirim, 2014) by university students and other users as well.

Contribution of this paper to the literature

- This paper demonstrates relationship between nomophobia and other psychological structures of undergraduate university student;
- explains effects of self-esteem, loneliness and self-happiness on nomophobia among undergraduate university students;
- determines the mean interaction effect between students' gender and year with respect to nomophobia, self-esteem, loneliness and self-happiness.

Nomophobia is a term which is used to describe “the fear of being out of mobile phone contact” and the “anxieties mobile phone users suffer” (SecurEnvoy, 2012). Another definition of explains

nomophobia is considered a disorder of the modern world, and has only recently been used to describe the discomfort or anxiety caused by the non-availability of an MP [mobile phone], PC [personal computer] or any other virtual communication device in individuals who use them habitually (King, Valença, Silva, Baczynski, Carvalho & Nardi, 2013; p. 141).

Similarly, King, Valença, Silva, Sancassiani, Machado and Nardi (2014) regarded nomophobia as a modern fear when one is unable to communicate by using a mobile phone or Internet. It is “a situational phobia related to agoraphobia and includes the fear of becoming ill and not receiving immediate assistance” (p. 28). However, describing it comprehensively, Yildirim (2014) asserted that it as a

fear of not being able to use a smartphone or a mobile phone and/or the services it offers. It refers to the fear of not being able to communicate, losing the connectedness that smartphones allow, not being able to access information through smartphones, and giving up the convenience that smartphones provide (Yildirim, 2014; p. 74).

The prevalence of nomophobia was reported by King, Valença and Nardi (2010) as a disorder of the 21st century caused by new technologies [emerging information and communication technologies and their apps] and devices. In 2008, 53% of the mobile phone users in United Kingdom (UK) were reported to be suffered from nomophobia and it was higher among male (58%) users than female (48%) users (Mail Online, 2008). However, in 2012, it increased from 53% to 66% with increased nomophobia among women (70%) than their counterparts men (61%) users. It demonstrates that women are more susceptible to nomophobia as compared to men expressing feelings of anxiety when they are unable to use or lose their mobile phones (SecurEnvoy, 2012). Its prevalence was found more among (77% of the) users of the age group 18-24 years, followed by (68% of the) users of age group 25-34 years. However, the mobile uses of the age of 55 years and above appeared to be the third most nomophobic users (SecurEnvoy, 2012). Similarly, according to a web post, up to February 2015, 40% Americans were suffering from nomophobia with 58% men and 47% women. Even so, 91% of the young Americans used their mobile phones even in bathrooms whereas, 76% of the American women and 74% men were using their smart phones in bathrooms. The situation of nomophobia appears to be more alarming as 95% use their smart phones for texting, web browsing, or watching television before going to bed for a sleep; and 72% could not tolerate to move their smart phones five feet away from them (AddictionTips, 2015).

The study conducted by Pavithra, Madhukumar, and Murthy (2015) demonstrated that the use of social informatics [social media] and mobile phones by medical students developed addictive behavior among them as 93% of them appeared to be so crazy to use a mobile phone that they kept their devices with them even when they were sleeping. It also showed dependence of medical students on mobile phones as a strong determinant of boosting nomophobia among them. Similarly, Uysal, Özen, and Madenoğlu, (2016) found a positive correlation between nomophobia and social phobia among university students. It was observed that greater the family income, the higher nomophobia ratio. It was an indicative of nomophobia to becoming the emerging problem of the modern era. According to Krajewska-Kulak and her colleagues (2012) majority of the students from Poland and Belarus seemed to be convinced about harmful effect of mobile phone usage. The ratio of students knowing that the use of mobile phones could be addictive was greater in Poland than those from Belarus. Almost 1/5 of students from Poland and 1/10 from Belarus had the symptoms of mobile phone-addiction –nomophobia.

The meta-analysis of Nishad, and Rana (2016) described that mobile phone plays an important role in human life. The mobile phone devices enhance connectivity and have an impact on the lives of the users. Supplementary studies also highlighted mobile phones' addiction and its effects on the users [students]. It showed that socio-economic status has an effect on mobile phone addiction. The researchers recommended a mixed method (quantitative and qualitative) to provide a comprehensive understanding of addiction and its impact on students and their learning. Likewise, Shin (2014) found higher usage dependency level among Korean smart phone users

than US users. It was also demonstrated that students, unemployed, and younger generations appeared to be more inclined to mobile internet usage dependency. Similarly, higher level dependency was found among Korean females; whereas, in US the same was found among students and younger generation.

The study conducted by Gezgin, and Çakır (2016) revealed nomophobic behaviors of high school students to be above average. It found higher levels of nomophobia among female students than their counterparts –the male students. Similarly, the duration of mobile internet usage appeared to be closely related with gender but was not significantly associated with grade or class level, and educational level of parents. The study further showed interesting results as high school students used smartphones and mobile internet largely for social media, entertainment, communication, photography, education & research, games and videos. Even so, Spitzer (2015) reported some risks and side [negative] effects which were associated with the use of smartphones and internet. These include social effects (dependence and distractions), academic (low academic achievement, interruption in educational activities), psychological (personality disorder, dissatisfaction & loneliness, anxiety, depression, aggression, attention deficit-disorder and empathy disorder) and physical side effects (hypertension, obesity etc.).

The study of Tavalacci, Meyrignac, Richard, Dechelotte, and Ladner (2015) reported one third of the college students to be suffering from nomophobia. Furthermore, cyber addiction and sleeping problems also appeared to be associated with usage of mobile phones among women. Other physical, social and psychological problems may be related with addictive use of mobile phones. In this regard, the study conducted by Sharma, Benegal, Girish, and Thennarasu (2013) revealed interesting results of social nature. The results indicated that 86% of the internet addicted also had food addiction, shopping addiction, sex addiction & face book addiction. However, it was associated with marital status (unmarried > married > widowed > divorced) and family status (single > nuclear > single parenting > joint) at 0.001 level of significance. However, Altaf (2012) found boys to be crazier than girls in using smart phones and mobile internet as they used it for entertainment and charm. Mobile phones appeared as a status symbol for 43% who “cannot imagine life without a mobile phone” (p. 59).

Yildirim (2014) conducted a mixed method study to getting deeper insight into nomophobia. It reported nomophobia as a modern age phobia which occurred because of rapid proliferation of smartphones into human. The first, qualitative phase of the study identified four dimensions of nomophobia i.e. “not being able to communicate, losing connectedness, not being able to access information and giving up convenience” (p. iv, 40, 56). It is evident from the above discussion that nomophobia is a psychological problem which also cause physical and social problems, and therefore, needs to be addressed properly.

The study conducted by Çakır and Oğuz (2015) on Turkish high school students (N=540) in Ankara demonstrated “a significant and positive correlation between smart phone addiction and loneliness” (p.418). Similarly, another study (Gezgin & Çakır, 2016) conducted on nomophobic behavior of adolescents in Turkey found female high school students to be more nomophobic than their counterparts –the male students. However, a significant difference regarding grades of students, educational level of their parents was not affirmed. Likewise, a positive but medium level relationship between loneliness and internet addiction was observed among prospective teachers at Ankara University and Mimar Sinan Fine Arts University (Oğuz, & Çakır, 2014). However, in Pakistani context such studies are too meager to consult.

FOCUS OF THE STUDY

This study focused on to examine prevalence of nomophobia among Pakistani and Turkish undergraduate university students; and the relationship among nomophobia, self-esteem, loneliness and self-happiness with respect to gender and year of study of the university students; and to compare these factors related to Pakistan and Turkey; and to find out cross country relationship.

RESEARCH QUESTIONS

The research questions of the study were;

- What is the relationship between nomophobia and other psychological structures?
- How do the effects of self-esteem, loneliness and self-happiness on nomophobia differ?
- Is there a statistically significant difference in nomophobia, self-esteem, loneliness and self-happiness of Turkish students across gender and year variables?
- Is there a statistically significant difference in nomophobia, self-esteem, loneliness and self-happiness of Pakistani students across gender and year variables?

Table 1. Frequency distribution of students across independent variables

Variables		frequencies	Percentages (%)
Gender	Male	214	29.4
	Female	515	70.6
Year	First year	285	39.1
	Second year	155	21.2
	Third year	61	8.4
	Fourth year	228	31.3
Country	Turkey	368	50.5
	Pakistan	361	49.5

Table 2. Descriptive statistics of independent variables with respect to dependent variables

Variables	categories	loneliness		Self-happiness		Self-esteem		nomophobia	
		mean	sd	mean	sd	mean	sd	mean	sd
Gender	Male	16.68	3.75	15.47	4.27	30.40	4.93	87.68	27.49
	Female	15.27	6.41	16.32	5.60	31.81	4.20	88.27	28.49
Year	First year	14.90	5.11	17.89	5.54	29.74	4.41	83.77	25.59
	Second year	15.89	5.90	15.57	5.30	31.82	3.84	89.32	26.35
	Third year	12.46	4.45	18.34	4.57	30.12	4.37	80.16	24.52
	Fourth year	10.93	4.02	19.01	4.73	31.84	4.94	71.86	28.26
Country	Turkey	10.73	3.76	19.07	4.27	31.40	4.93	75.35	27.49
	Pakistan	20.71	4.041	12.98	5.14	31.38	3.29	101.16	22.25

- How does the mean interaction effect differ between students' gender and year with respect to nomophobia, self-esteem, loneliness and self-happiness?
- Is there a statistically significant difference between students from Turkey and Pakistan with respect to nomophobia, self-esteem, loneliness and self-happiness along with their interaction effects?

RESEARCH METHODOLOGY

Research Design

A quantitative relational survey method was employed in order to investigate behavior of dependent variables that are loneliness, self-happiness, self-esteem and nomophobia across the categories of independent variables. Cohen et al. (2000) suggested to use relational survey method when the study aims at examining relationship and interaction between two or more variables (Karasar, 2006).

Sample and Sampling

It was a small scale research which was conducted on students of two public sector universities i.e. one from Turkey and one from Pakistan. It was a self-sponsored study with time and money/ budget its main constraint. Therefore, in this study, the convenience sampling method was used which can be stated as a limitation of this study. Hence, the researchers selected one university from Pakistan and one university from Turkey. The sampled universities can be representative of differences of the two countries as long as analyses are conducted with sufficient sample sizes.

The study subjects consisted of 729 students 368 (50.5%) of which were from Turkey (Ankara University) and 361 (49.5%) from Pakistan (The Islamia University of Pakistan). The frequency distribution of students across independent variables, that are gender, year and country were provided in **Table 1**.

The study subjects comprised of 214 (29.4%) males and 515 (70.6%) females. For the levels of year, there were 285 (39.1%) first-year, 155 (21.2%), second-year, 61 (8.4%) third-year and 228 (31.3%) fourth-year students, respectively. The participation in the survey was on volunteer basis and hence, the participation of female students was greater than their counterparts –the male students. The trend indicates that female university students were more inclined towards the survey than male students.

Table 2 presents the mean scores and standard deviations of loneliness, self-happiness, self-esteem and nomophobia across the categories of independent variables that are gender, year and country.

RESEARCH INSTRUMENTS

Nomophobia Scale (NMP-Q)

A Nomophobia Scale (NMP-Q), which was developed by Yildirim and Correia (2015) and adapted to Turkish by Yildirim et al. (2016), was administered in this study. The scale is a 7 point Likert Type scale and has a total of 20 items. The Cronbach's Alpha reliability coefficient of the original scale was .95, and the reliability coefficient of Turkish version was .92. The scale has mainly four sub- dimensions: Not Being Able to Access Information (4 items), Losing Connectedness (5 items), Not Being Able to Communicate (6 items) and Giving up Convenience (5 items). In the original scale, the reliability coefficients of these sub-dimensions were, .94, .87, .83 and .81 respectively. The reliability coefficients of the scale were reported as .90, .74, .94 and .91. Cronbach alpha (α) coefficient was found as .91 for the reliability of the study. The Cronbach alpha value of .70 and above indicates that the data collection tool used is reliable (Pallant, 2005). In addition, the reliability coefficients of these sub-dimensions were found to be .83, .79, .85, and .87 respectively.

UCLA Loneliness Scale (ULS-8)

Developed by Hays and DiMatteo (1987) and adapted into Turkish by Yildiz and Duy (2014), the UCLA Loneliness Scale consists of seven items and one dimension. Whether or not the original one-dimensional structure of the scale would be confirmed in Turkish culture was examined by Yildiz and Duy (2014) through Explanatory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). As a result of the EFA, scale items were observed to be placed under a single dimension. The one-dimensional structure was examined through CFA. The CFA results indicated that the ULS-8 had a good fit to the Turkish culture ($\chi^2 = 27.12$, $SD = 14$, $\chi^2 / DF = 1.94$, $RMSEA = .06$, $RMR = .03$, $SRMR = .04$, $GFI = .97$, $AGFI = .95$, $CFI = .98$, $NFI = .96$, $NNFI = .97$). The internal consistency coefficient of the scale was .74 and the test-retest reliability coefficient was .84. Among seven items, only one item of the scale was scored reversely. The scores that can be obtained from the scale range from 7 to 28. The high scores obtained from the scale indicate a high level of loneliness (Yildiz & Duy, 2014). Cronbach Alpha Internal Consistency Coefficient was found as .77 for this study.

Self-Happiness Scale

In this study, the "Self-Happiness Scale", which was developed by Akin and Satici, was used to determine the self-happiness levels of prospective teachers. For construct validity, CFA was applied and the fit indexes of the model were examined to verify the validity of original structure of the scale. The fit indexes values were found as $RMSEA = .000$, $NFI = .99$, $CFI = 1.00$, $IFI = 1.00$, $RFI = .98$, $GFI = 1.00$, $AGFI = .99$ and $SRMR = .015$. Factor loads of items ranged from .34 and .84. For the Reliability analysis of the scale, the Cronbach's alpha coefficient and item-total score correlations were calculated. According to the results, the Cronbach's α reliability coefficient was found as .86 and item -total score correlations of the scale range from .55 and .76.

Rosenberg' Self-Esteem Scale

In this study, Rosenberg Self-Esteem Scale was used to determine the self-esteem levels of prospective teachers. The scale was developed in 1965 by Rosenberg. It consists of 10 items in 4 Point- Likert type. The total points obtained from all items range from 0 to 40. The high points indicate individuals with higher self-esteems (Ko, Yen, Chen, Chen, & Yen; 2005). Adaptation process of the scale into Turkish was carried out by Cuhadaroglu (1986) and Çelik (2004). In the validity process of the scale, loading factors of the scale items, factor eigen value (3.792) and explained variance were found to be at acceptable range. Cronbach Alpha coefficient for reliability was equal to .81. Students' higher score on loneliness scale and self-happiness scale indicate higher degree of loneliness and self-happiness, while higher score on Rosenberg' self-esteem scale and nomophobia scale indicate lower degree of self-esteem and nomophobia, respectively.

THE PROCEDURE OF IMPLEMENTATION OF THE SCALES -THE RESEARCH TOOLS AND DATA COLLECTION

The data were collected by the researchers and the data collectors from undergraduate students of the two universities i.e. The Islamia University of Bahawalpur, Pakistan and the Ankara University, Turkey. The researcher from Pakistan trained data collectors in a session on "data collection" by him and similarly, by the researchers in Turkey. The data collectors were visiting teachers in Pakistan and M.Phil/ MS Scholars in Turkey. They were trained through briefing sessions followed by process of pilot testing. The principal researcher got consent of the respondents and mutually decided time for administration of the tools in Pakistan. Afterwards, the data collectors

Table 3. Multiple linear regression results associated with nomophobia and other predictor variables

Predictors	Correlation coefficients			β	<i>b</i>
	Self-happiness	Self-esteem	Nomophobia		
Loneliness	-.517**	.481*	.627*	.346*	1.904*
Self-happiness		-.262 [†]	-.574*	-.336*	-1.455*
Self-esteem			.478*	.223*	1.511*
				Intercept=	33.188
				$R^2 =$.517**

** $p < .01$

administered research tool and collected data from the respondents. The same process was adopted in Turkey for data collection.

The respondents participated in the survey on volunteer basis. They were briefed once again about objectives of the study and the survey mechanism by the data collectors. They were also assured about the confidentiality of information provided by them. The tools were administered on 729 students 368 (50.5%) were from Turkey and 361 (49.5%) from Pakistan.

ETHICAL CONSIDERATIONS

The researchers and data collectors observed all ethical considerations of conducting social science research. This study followed the three principles of the Belmont Report, namely beneficence –above all do no harm; respect for human dignity –the right to self-determination and full disclosure; and as well as justice i.e. the right of the participants to fair treatment and privacy (Polit, Hungler, & Beck, 2001:75).

RESULTS OF THE STUDY

Correlation and multiple linear regression analyses were used to examine relationship between nomophobia and other psychological structures; and to determine relative effects of loneliness, self-happiness and self-esteem on nomophobia. Moreover, the multivariate Analysis of Variance (MANOVA) was conducted so as to see if loneliness, self-happiness, self-esteem and nomophobia scores of students differed across the categories of independent variables for each country. Before conducting the analyses, the preliminary assumption of MANOVA that are the outliers, normality, multicollinearity, the homogeneity of covariance, and variances were checked. The results show that the Mahalanobis distance for dependent variables were smaller than the threshold which indicates that there was no multivariate outliers in the data.

Both ANOVA and MANOVA are parametric tests and, therefore, the number of students in each category of independent variables has to be larger than 30 which is the case in this study (Table 1) for the accuracy of results.

The normality assumption was checked with Kolmogorov-Smirnow test and the result of test showed that dependent variable scores were normally distributed ($p > .5$). The correlation between the dependent variables ranged from .11 to .65 indicating small to moderate correlation between variable. The correlation coefficients reveal that there was no multicollinearity between the dependent variables. Moreover, the results of Levene's test of equality of error variances for each dependent variable and Box's test of equality of covariance between the dependent variables were not statistically significant which indicates the homogeneity of covariance, and variances assumptions were met. These findings indicate that the all assumptions of MANOVA test were met for the data.

Table 3 provides correlation coefficients between nomophobia and other psychological structures and the result of multiple linear regression.

Results in Table 3 indicate that nomophobia had highest correlation with loneliness and it was followed by self-happiness and self-esteem. Moreover, nomophobia appeared to be positively correlated with loneliness and self-esteem, while negatively correlated with self-happiness.

All correlation and regression coefficients shown in Table 3 were statistically significant at $p = 0.01$. Standardized linear regression coefficients indicate that loneliness had largest effect on nomophobia and it was followed by self-happiness and self-esteem, respectively. As like correlation coefficients, standardized regression coefficient (β) of loneliness and self-esteem were positive, whereas it was negative for self-happiness. These results indicate that when students' nomophobia level increase, students' loneliness and self-esteem tend to increase, while students' self-esteem tend to decrease. Moreover, the three-predictor variable explained 51.7% of the variance in nomophobia.

For Turkey sample, MANOVA results indicate that there was a significant difference across the levels of *gender variable* (Pillai Trace = .027, $F(4, 355) = 2.477$, $p = 0.04 < .05$, $\eta^2 = .027$), *year variable* (Pillai's Trace = .064, $F(12, 1071) = 1.939$, $p = 0.027 < .05$, $\eta^2 = .021$) and interaction of *gender* and *year* variables (Pillai's Trace = .073, $F(12, 1071) =$

Table 4. Significant multivariate effects for each country

Country	Variables	Dependent Variable	df	Mean square	F	sig	Effect size
Turkey	Gender	Self-esteem	1	116.599	4.990	.026	.014
		Nomophobia	1	3228.064	4.492	.035	.012
	Year	Nomophobia	3	3927.411	5.465	.001	.044
	Gender*Year	Nomophobia	3	2230.128	3.103	.027	.025
Pakistan	Year	Nomophobia	3	146.749	9.703	.000	.076
		Loneliness	3	210.317	8.640	.000	.069
		Self-happiness	3	77.877	7.855	.000	.063
		Self-esteem	3	7820.027	18.335	.000	.135

2.224, $p=0,00 < .05$, $\eta^2 = .024$) on the linear combination of dependent variables that are nomophobia, self-esteem, loneliness and self-happiness. On the other hand, for Pakistan sample, only the main effect of year variable was statistically significant (Pillai's Trace = .178, $F(12,1053)= 5.530$, $p=.000 < .05$, $\eta^2 = .059$), indicating that there was statistically significant difference across the levels of year variable. The main effect of *gender* and interaction effect between *gender* and *year* variables on the linear combination of dependent variables were not statistically significant. Multivariate effects (ANOVA results), which enable us to examine significant main and interaction effects of independent variables on each dependent variable were presented in [Table 4](#).

The significant main effects and interaction effects of independent variables on four dependent variables for both Turkey and Pakistan were illustrated in [Table 4](#). Moreover, significant difference between categories of independent variables for each country were given in [Appendix A](#). Therefore, one can easily observe where these differences occurred.

For Turkey sample, multivariate effects results indicate that gender effect on nomophobia was statistically significant. Moreover, main effect of gender on self-esteem and nomophobia was statistically significant which indicates that differences between male and female students with respect to self-esteem and nomophobia were significant. Thus, female students' self-esteem was higher than male students while male students' nomophobia level was higher than female students since higher score on nomophobia scale indicates lower level of nomophobia (see [Appendix A](#)). It was also found that there was significant difference between first-year and fourth-year and between third-year and fourth-year students' nomophobia levels indicating that the degree of nomophobia level of students tended to increase from first year to fourth year. Moreover, interaction effect between gender and year variables was statistically significant which indicates that the difference in nomophobia was brought about by the interaction between the categories of gender and year.

For Pakistan sample, multivariate effects results indicate that *year* main effect on loneliness, self-happiness, self-esteem and nomophobia was statistically significant, while gender effect on these dependent variables was not. Non-significant results with respect to gender indicate that differences between male and female students with respect to dependent variables were not significant (see [Appendix A](#)). According to results in [Appendix A](#), especially differences between first-year and third-year students and, first-year and fourth-year students with respect to each dependent variable were statistically significant. Results also indicate that from first-year to fourth-year, students' nomophobia and loneliness tended to increase, while students' self-esteem and self-happiness tended to decrease for Pakistani students.

One of the ultimate goals of this study was to also investigate how dependent variable scores of students differed across two countries and interaction effect of *country* variable with other independent variables. The results of multivariate MANOVA indicated that the main effect of *country* variable (Pillai's Trace = .234, $F(4,707)= 54.088$, $p=.000 < .05$, $\eta^2 = .023$) and the interaction effect of *country* and *year* variables (Pillai's Trace = .095, $F(12,2127)= 5.779$, $p=.000 < .05$, $\eta^2 = .032$) on dependent variables were statistically significant. These results indicate that mean difference between Turkey and Pakistan on dependent variables and mean difference of countries across years on dependent variables were statistically significant.

The multivariate effects, which enable us to examine significant main and interaction effects of country variable on each dependent variable, were presented in [Table 4](#).

According to the multivariate effects results in [Table 5](#), the main effect of country on nomophobia, loneliness and self-happiness were statistically significant which indicate that the differences between Turkish and Pakistani students' score on nomophobia, loneliness and self-happiness were significant, while difference on self-esteem across country was not statistically significant. Moreover, the interaction effect between country and year variables on each dependent variable was statistically significant indicating that the differences in nomophobia, loneliness, self-esteem and self-happiness were brought about by the interaction between the categories of country and year variables. The significant mean difference between categories of country on loneliness, self-happiness and nomophobia were given in [Table 6](#) so that one can easily observe where these differences occurred and in favor of which country.

Table 5. The significant MANOVA results associated with country comparison

Main/Interaction effects	Dependent Variable	df	Mean square	F	sig	Effect size
Country	Nomophobia	1	9712.501	16.927	.000	.023
	Loneliness	1	3135.456	215.535	.000	.233
	Self-happiness	1	822.300	39.859	.000	.053
Country*year	Nomophobia	3	7736.333	13.483	.000	.054
	Loneliness	3	72.788	5.004	.002	.021
	Self-esteem	3	87.195	5.222	.001	.022
	Self-happiness	3	140.348	6.803	.000	.028

Table 6. Significant mean difference between Turkey and Pakistan on dependent variables

Dependent variable	Independent variable	Categories (I vs J)	Mean difference (I -J)	Std. error	sig. Value (p)
Loneliness	Country	Turkey vs Pakistan	7.870	.536	.000
Self-happiness	Country	Turkey vs Pakistan	4.031	.638	.000
Nomophobia	Country	Turkey vs Pakistan	-13.852	3.367	.000

According to **Table 6**, Turkish students had higher scores on loneliness scale than Pakistani student which indicates that Turkish students had higher level of loneliness compared to Pakistani students. Likewise, in general, Turkish students had higher scores on self-happiness scale than Pakistani student indicating that Turkish students had higher level of self-happiness compared to Pakistani students. When it comes to nomophobia, Pakistani student had higher scores on nomophobia compared to Turkish students. This result indicates that Pakistani students showed lower level of nomophobia than Turkish students, since higher score on nomophobia scale indicates the lower level of nomophobia.

Figure 1 depicts the loneliness, self-happiness, self-esteem and nomophobia scores as a function of country and year variables. In other words, **Figure 1** presents the interaction effect of country and year variables on loneliness, self-happiness, self-esteem and nomophobia variables, respectively.

The inspection of **Figure 1** reveals that the loneliness levels of students remained almost same across years for Turkish students, while these scores tended to decrease across years for Pakistani students. Moreover, Pakistani students had higher level of loneliness than Turkish students regardless of their years.

For self-happiness scores, Turkish students had higher self-happiness than Pakistani students except for third-year students in which Pakistani students had somewhat higher score. Furthermore, Pakistani students' self-happiness tended to increase from first-year to fourth-year, while Turkish students' self-happiness remained almost unchanged.

The differences between male and female students with respect to self-esteem and nomophobia are significant taking country into account as independent variable. For self-esteem variable, Pakistani students had higher self-esteem than Turkish students within the first two years of university, while Turkish students had higher self-esteem than Pakistani students within the last two years of university (third-year and fourth-year). These results also indicate that Pakistani students' self-esteem levels tended to decrease across the years, while Turkish students' self-esteem tended to increase.

For nomophobia variable, Pakistani students had higher nomophobia score indicating lower level of nomophobia, than Turkish students except for third-year students in which Turkish students had somewhat higher score. Moreover, Pakistani students' nomophobia level tended to increase across the year, while there were no certain patterns for Turkish students. Furthermore, country effect on nomophobia was much larger for the first-year and second-year students than it was for third-year and fourth-year students.

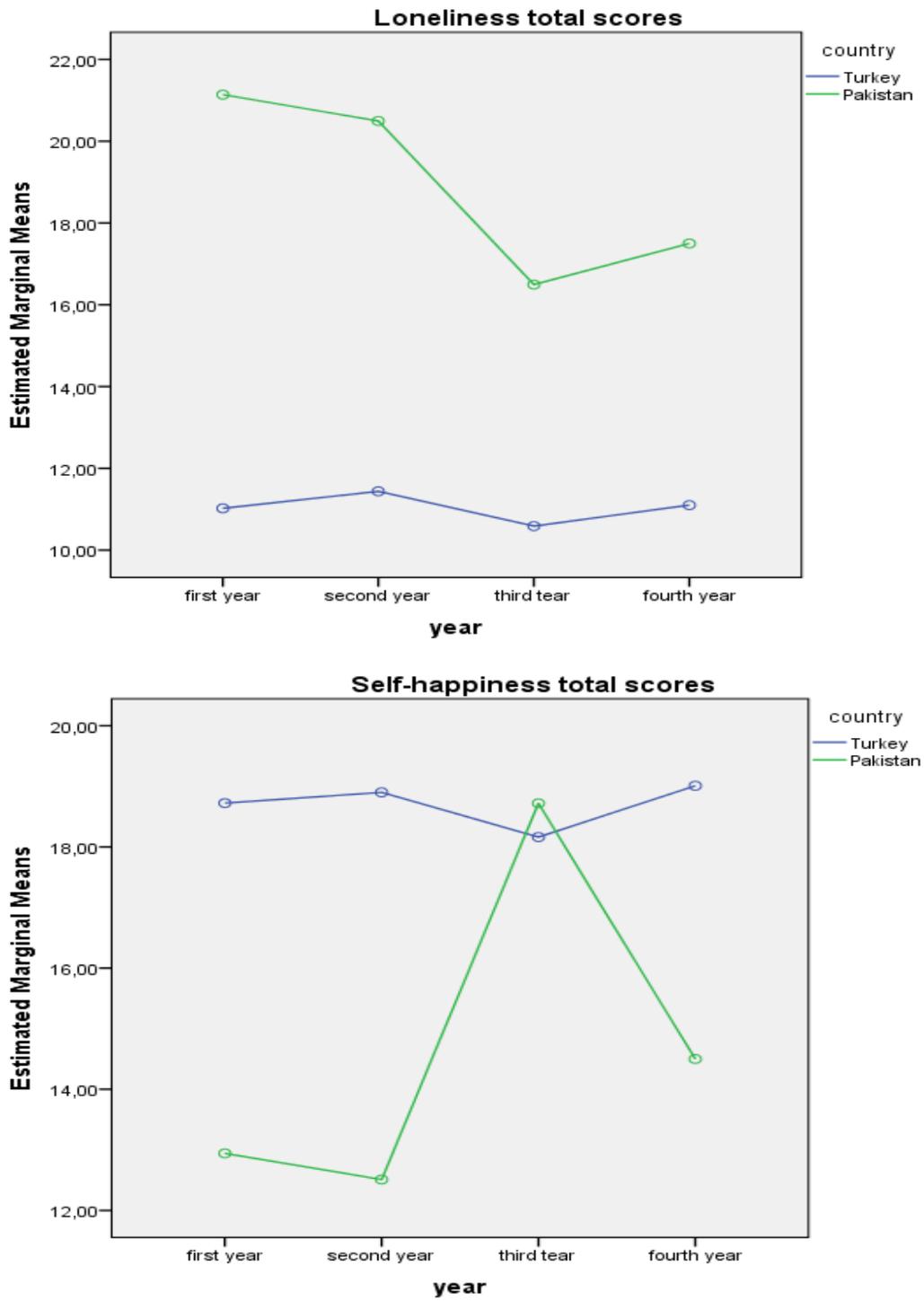


Figure 1. The distribution of the dependent variable scores as a function of country and year variables (country*year interaction plot)

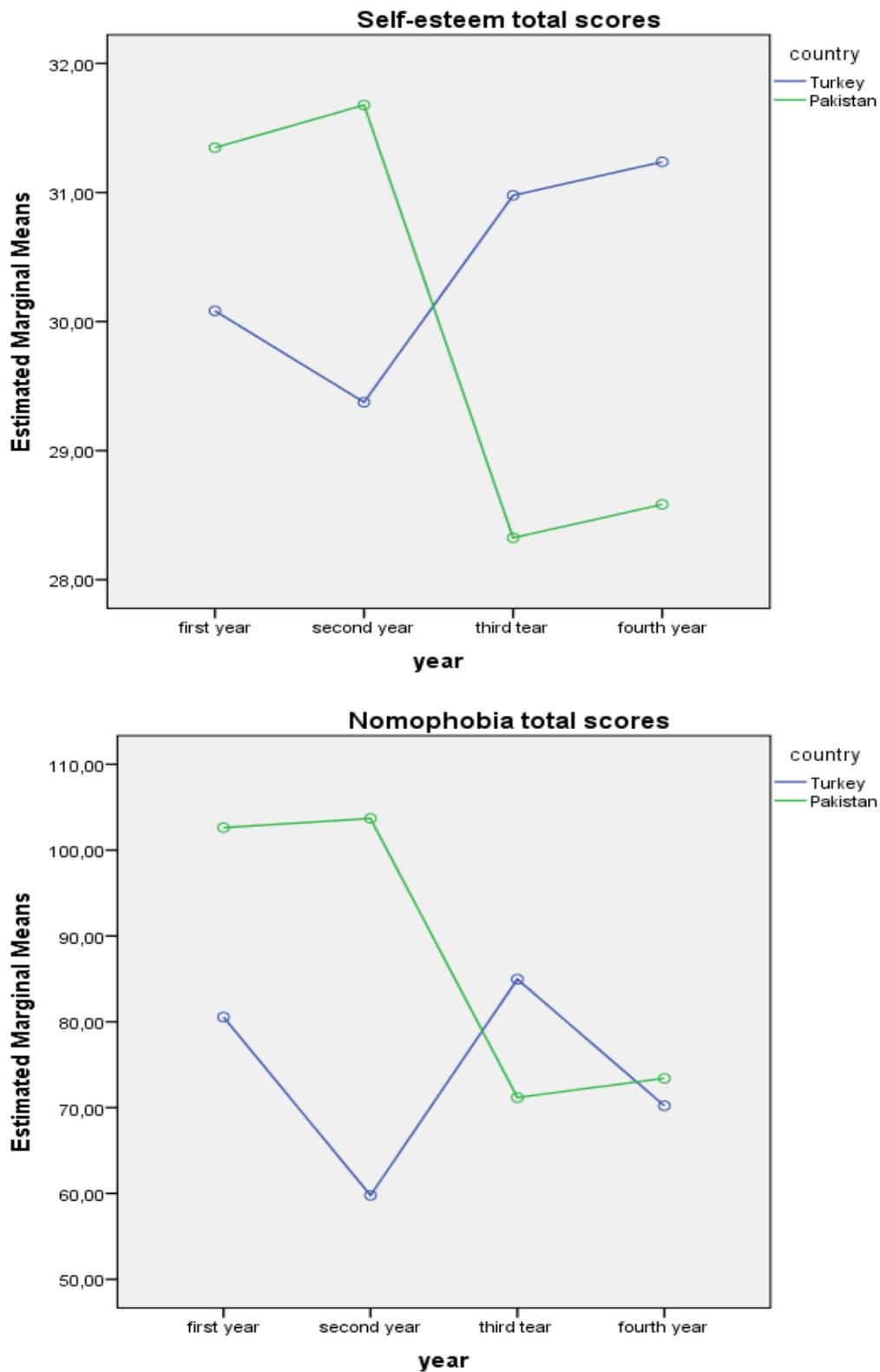


Figure 1 (continued). The distribution of the dependent variable scores as a function of country and year variables (country*year interaction plot)

DISCUSSION AND CONCLUSION

Information and communication technologies (ICT), such as Smart phones, facilitates our daily life in many different aspects by means of providing different services that used to be more time consuming. Especially, activities like connecting internet, online banking, reading writing, making reservation and shopping has become much easier with the help of smart phones. However, misuse, uncontrolled overuse might lead to psychological problems called nomophobia and increase the prevalence of this disorder (Chòliz, 2012; Gezgin et al., 2017).

In this study, relationship between nomophobia and other psychological structures; and the effects of loneliness, self-happiness and self-esteem on nomophobia were examined. Moreover, the main and interaction effect of gender and year of study of the university students on nomophobia, self-esteem, loneliness and self-happiness were examined. For comparison reason, these main and interaction effects were examined across two countries that are Pakistan and Turkey, respectively, in order to find out cross country relationship. The difference across the categories of independent variables on each of the dependent variables (loneliness, self-happiness, self-esteem and nomophobia) and on linear combination of dependent variables for each country was examined by multivariate MANOVA.

Results indicate that nomophobia had highest correlation with loneliness and it was followed by self-happiness and self-esteem. Moreover, nomophobia appeared to be positively correlated with loneliness and self-esteem, while negatively correlated with self-happiness. Moreover, standardized linear regression coefficients shows that loneliness had largest effect on nomophobia and it was followed by self-happiness and self-esteem, respectively. These results suggest that when students' nomophobia level increases, students' loneliness and self-esteem tend to increase, while students' self-esteem tends to decrease.

The MANOVA results for Turkey indicate that the differences between male and female students with respect to self-esteem and nomophobia were significant. Thus, female students' self-esteem was higher than male students while male students' nomophobia level was higher than female students since higher score on nomophobia scale indicates lower level of nomophobia. The degree of nomophobia level of students tended to increase from first year to fourth year. Moreover, interaction effect between gender and year variables was statistically significant which indicates that the difference in nomophobia was brought about by the interaction between the categories of gender and year. For Pakistan sample, multivariate effects results indicate that *year* variable's main effect on loneliness, self-happiness, self-esteem and nomophobia were statistically significant, while gender effect on these dependent variables was not significant meaning that differences between male and female students with respect to dependent variables were not significant. Results also indicate that from first-year to fourth-year, students' nomophobia and loneliness tended to increase, while students' self-esteem and self-happiness tended to decrease for Pakistani students.

Although male Turkish students tended to have higher level of nomophobia compared to male students, there was no significant difference between the gender of Pakistani students. Parallel to the finding of this study with respect to gender effect, there are studies in which female students tend to have higher level of nomophobia (Gezgin & Cakir, 2016; Gezgin et al., 2016; SecurEnvoy, 2012; Tavolacci et al., 2015; Yildirim et al., 2016), while some of them reports the higher nomophobic behavior for male students (Mail Online, 2008), which is the case for Turkish students in this study. On the other hand, similar to Pakistani students in this study, some studies findings suggest the non-significant difference across the gender with respect to nomophobia (Adnan & Gezgin, 2016; Dixit & et al., 2010; Uysal, Özen, & Madenoğlu, 2016).

When it comes to country level comparisons with respect to dependent variables, Pakistani students had higher level of loneliness than Turkish students regardless of their years. Additionally, the loneliness levels of students remained almost same across years for Turkish students, while these scores tended to decrease across years for Pakistani students. The significant interaction effect between year and country reveals that, for self-happiness scores, Turkish students had higher self-happiness than Pakistani students except for third-year students. Furthermore, Pakistani students' self-happiness tended to increase from first-year to fourth-year, while Turkish students' self-happiness remained almost unchanged. For self-esteem variable, the results also indicate that Pakistani students' self-esteem levels tended to decrease across the years, while Turkish students' self-esteem tended to increase.

For nomophobia structure, on the other hand, Pakistani students had lower level of nomophobia than Turkish students except for third-year students in which Turkish students had somewhat higher score. Moreover, Pakistani students' nomophobia level tended to increase across the year and country effect on nomophobia was much larger for the first-year and second-year students than it was for third-year and fourth-year students. These results signal the fact that the students' nomophobia level tends to increase throughout university education for both countries. Moreover, these results indicate that Pakistani students showed lower level of nomophobia than Turkish students, since higher score on nomophobia scale indicates the lower level of nomophobia. The main reason of this finding might be less exposure of ICT of Pakistani students compared to Turkish students.

Studies carried out in different countries with different cultures have shown the existence and prevalence of nomophobia and its relationship between the other psychological structures (Oksman & Turtiainen, 2004; Toda et al., 2006; Chóliz, 2010; King et al., 2013; Sharma et al., 2015; Tavolacci et al., 2015; Yildirim et al., 2015; Adnan & Gezgin, 2016; Gezgin et al., 2017). The findings of this study indicate that students with higher nomophobia level tended to suffer from loneliness, lack of self-esteem and self-happiness. These nomophobic students are more likely to face obstacles throughout their academic life. Therefore, both stakeholders in education and parents should take responsibilities in order to protect students from nomophobic behaviors. Moreover, it is suggested to conduct more studies on nomophobia structure, relationship between the nomophobia and other psychological structures: and its' effect on students' behaviors.

It was a small scale study conducted on students of two universities and participation in the survey was on volunteer basis. The female students outnumbered their counterparts –the male students. Therefore, findings of the study may be generalized very carefully.

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APPENDIX A

Significant Difference between Levels of Independent Variables on Each Dependent Variable for Each Country

Country	Dependent variable	Ind. variable	Categories (I vs J)	Mean difference (I-J)	Std. error	Sig. Value (p)
Turkey	Self-esteem	Gender	Male vs female	-2.829	.845	0.001
			Nomophobia	Gender	Male vs female	-9.903
	Nomophobia	Year	First year vs fourth year	27.214	6.500	.000
			Third year vs fourth year	27.684	6.627	.000
			First year vs third year	4.689	.8778	.000
			First year vs fourth year	3.734	1.278	.022
Loneliness	Year	Second year vs third year	3.936	.913	.000	
		First year vs third year	-5.844	1.086	.000	
Pakistan	Self-happiness	Year	Second year vs third year	-6.177	1.131	.000
			First year vs third year	3.360	.725	.000
	Self-esteem	Year	First year vs fourth year	2.944	1.055	.034
			Second year vs third year	3.413	.754	.000
			Second year vs fourth year	2.997	1.076	.034
	Nomophobia	Year	First year vs third year	31.847	4.463	.000
			First year vs fourth year	27.214	6.501	.000
			Second year vs third year	32.318	4.647	.000
			Second year vs fourth year	27.684	6.628	.000

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