Investigation of the Relationship between Psycho-social Factors and Psychological Symptoms by Canonic Correlation Analysis*

Mustafa Koç[1]   **Tuncay Ayas** [2]   **Fikret Soyer**[3]   **Tuğba S. Çolak**[4]   **Betül Düşünceli**[5]

Abstract

The purpose of this research is to examine the relationships between psycho-social variables and psychological symptoms through canonical correlation analysis, a multivariate analysis technique. Canonical correlation method was used in the analysis of the data. The first set (sex, department preference order, class level, department satisfaction level, university satisfaction level, request to change department, order of birth, accommodation type, previous psychological help, request for psychological help, eating habits, having chronic illness, suicide, having harmful habits) was found to disclose the second set (somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid thought, psychotic, guilt, insomnia and appetite) at 75%.

Keywords: Canonical Correlation, Psycho-social Factors, Psychological Symptoms

Introduction

Psychosocial factors consist of a combination of cognitive, emotional and social elements that affect the lives of individuals and are important elements in determining their position in relation to life. It was revealed by researches that there was a relationship between various psychological symptoms and various psychosocial factors. The determination of the psychosocial factors that are effective on human mental health has an active role in the prevention and remediation process.

Psycho-social factors predict many psychological symptoms of life. Psychosocial factors at work significantly predict depressive symptoms in male and female workers (Niedhammer et al., 1998). Life events are important predictors of depression during both pregnancy and menopause. In a study conducted with menopausal women, life events were found to strongly predict anxiety, depression, and somatic symptoms in general (Binfa et al., 2004). Psychosocial factors such as lack of social support for partner and family, except for economic factors, were found to be important in pregnancy for predicting depression (Dudas et al., 2012). Among the individuals who were diagnosed with bipolar disorder, the people those who reported a history of alcohol use and abused were found to be more prone to suicide (McGrady et al., 2017).

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[1] Prof. Dr., Düzce University, Turkey, mustafa.koc@duzce.edu.tr, ORCID: 0000-0002-8644-4109

[2] Prof. Dr., Sakarya University, Turkey, tayas@sakarya.edu.tr , ORCID: 0000-0003-2613-5643

[3] Prof. Dr., Balıkesir University, Turkey, fikretsoyer@gmail.com , ORCID: 0000-0002-9910-8198

[4] Assist. Prof. Dr., Düzce University, Turkey, tugbacolak@duzce.edu.tr , ORCID: 0000-0002-7219-1999

[5] Assist. Prof. Dr., Sakarya University, Turkey, bbayraktar@sakarya.edu.tr , ORCID: 0000-0002-6794-8811

Psychosocial factors are influential in obtaining harmful habits. Smoking habit of adolescents was found to be associated with psychosocial factors such as age, ethnicity, family structure, socio-economic level, parental attitude, sibling, peer, and parent smoking (Tyas & Pederson, 1998). Parental education and high family income mediates the relationship between internet usage and pathological internet usage in adolescents significantly (Lai & Kwan, 2017). The fact that adolescents had a conflicting parent-child relationship when they were 16 years old was associated with internalized problem behaviors when they reached the age of 21 years and with the problem of using both alcohol and drugs at the age of 27-32 years, while at age of 37 was associated with mood disorders, at an average age of 43 years was associated with the presence of internet addiction symptoms (Zhang et al., 2016). Psychosocial factors also have an influence on self-control skills. The most effective factor associated with a range of problem behaviors is personal control (Jesssor & Jessor, 1977). In a survey of dietary intake of adolescents, it was found that factors such as parental health behaviors, family functioning, single parenting, maternal education and family income were significantly related (Ambrosini et al., 2009). Research results in a poor regional school showed that a safe and supportive family environment is important to shaping adolescents' self-regulatory skills and that adolescents can influence their advanced academic performance in the development of self-regulation skills (Li et al., 2017). While the perceived academic control and anxiety play an important role in the academic success of university students (Respondek et al., 2017), they are also positively affected by the teaching skills of a teacher (Muntaner- Mas, et al., 2017).

The frequency of problem behaviors is lower in high school than in university (Jessor & Jessor, 1977). The research shows that the students who are studying at a university in their dreams or college and in the department have no psychological symptom (Gündoğar et al., 2007; Mayda et al., 2009). However, in the opposite case, it was found that the life satisfaction of the individuals who did not study at a university or college they dreamed was low (Gündoğar et al., 2007) and the problems such as meeting the education expenses caused the depression and hopelessness in the young people (Duman et al., 2009). While the depressive symptoms in college showed a proportional increase with the level of class (Özdel et al., 2002), university students had the highest level of submissive behavior during the third grade (Koç et al., 2010). It was found that the students of 4th class had a higher level of hopelessness than the students who were in the first grade (Özkan & Yılmaz, 2010). The most frequently observed psychological symptom among students during university period was obsessive compulsive symptoms, followed by interpersonal sensitivity and depression. At the same time, the third class was the period of highest level of psychological symptoms (Koç et al., 2013).

Current research has been conducted on university students. According to the relevant literature, the psychosocial factors that university students have during their education affect their mental health. This period is vital for professional and personal development and the psychological problems in this period have the risk of affecting the future life of the individuals negatively by domino effect. Although the psychological factors vary from individual to individual, revealing the psychosocial factors in the university period that produce psychological symptoms is thought to be a preventive mental health service.

Method

In this section, research design, study group, data collection tools and analysis of data was presented. Research Pattern was a relational research method. In this study, the relationships between psychosocial variables that were in the first set [f1 (sex), f2 (department preference order), f3 (class level), f4 (department satisfaction level), f5 (university satisfaction level), f6 (request to change department), f7 (order of birth), f8 (accommodation type), f9 (previous psychological help), f10 (request for psychological help), f11 (eating habits), f12 (having chronic illness), f13 (suicide), and f14 (having harmful habits)] and the variables which was in the second set [p1(somatization), p2 (obsessive-compulsive disorder), p3 (interpersonal sensitivity), p4 (depression), p5 (anxiety), p6 (hostility), p7 (phobic anxiety), p8 (paranoid thought) p9 (psychotic) and p10 (guilt, insomnia and appetite)] were examined. The relational research method is a research that aims to determine whether there is a relationship between two or more factors or to determine the level of the relationship (Fraenkel & Wallen, 2006; Karasar, 1999).

Participants

The research sample comprised of students who attended the Sakarya University in 2015-2016 academic year (n = 13802).

Instruments

Personal Information Form. The information on the personal information form was:

f1 (sex), f2 (department preference order), f3 (class level), f4 (department satisfaction level), f5 (university satisfaction level), F6 (request to change department), f7 (order of birth), f8 (accommodation type), f9 (previous psychological help), f10 (request for psychological help), f11 (eating habits), f12 (having chronic illness), f13 (suicide), and f14 (having harmful habits).

Psychological Symptom Screening Form (SCL 90). In order to determine the spiritual symptoms of university students, the SCL-90-R developed by Derogatis et al. was used in the research. SCL-90-R is a measurement tool that determines the level of mental symptoms in individuals and the extent to which they spread. The scale consisting of 10 symptom groups measures the psychological symptoms with four response categories (0-4). The reliability study of the scale was conducted by Kılıç (1987) and the reliability coefficients was determined as follows: Somatization 0.82, obsessive compulsive 0.84, interpersonal sensitivity 0.79, depression 0.78, anxiety 0.73, fatigue 0.79, phobic anxiety 0.78, paranoid thought 0.63, psychotic 0.73, attachment Scale is 0.77.

Data Analysis

Canonical correlation analysis was used to determine the relationship between psychosocial variables and psychological symptoms. Canonical Correlation Analysis is one of the multivariate statistical techniques aimed at determining the level of the relationship between more than one set of dependent (affected) variables and one or more set of independent variables (Tabachnick & Fidell, 2007). Before the canonical correlation analysis was performed, the data set obtained was examined and it was analyzed whether it met the assumptions. It is desirable that the number of observations to be included in the analysis of data sets is 20 times of the total number of variables. Since there were 24 variables in the data set, it was determined that 13802 students were sufficient. Histogram graphs were used for univariate normality of the variables, analysis of kurtosis and skewness coefficient was performed and it was tested to meet the

normal criteria of the variables. The LISREL package program was used to determine whether the variables met the multivariate variable normality and it was determined that the data was provided the multivariate variable normality. The autocorrelation assumption of the canonical correlation analysis was examined by the Durbin Watson coefficient and it was determined that the independence of the errors was provided. Canonical correlation analysis was performed by writing syntax to SPSS.

Findings

Table 1

Test That Remaining Correlations Are Zero

	Canonical Correlations	Wilk's Lamda	Chi-SQ	df	p
1	.462	.640	6147.509	140.00	.000
2	.320	.814	2831.517	117.00	.000
3	.212	.907	1341.906	96.00	.000
4	.125	.950	704.826	77.00	.000
5	.116	.965	486.928	60.00	.000
6	.103	.978	300.551	45.00	.000
7	.080	.989	154.267	32.00	.000
8	.056	.995	66.314	21.00	.000
9	.038	.998	23.596	12.00	.023
10	.017	1.000	3.837	5.00	.573

The square of the canonical correlation coefficients indicates the common variance explained between the dependent and independent variables. When the correlation coefficients calculated in table 1 were examined, it was determined that the first canonical correlation cluster was .46 (21% of the shared variance); the second canonical cluster correlation was .32 (.10% of the covariance variance); the third canonical cluster correlation was .21 (.04% of the shared variance), the fourth canonical cluster correlation was .12 (.01% of the shared variance) and the fifth canonical cluster correlation was .11 (.01% of the covariance variance). Wilks' Lambda and Chi-square values provide information on the level of significance of the calculated canonical correlation values. As can be seen in table 2, the correlation coefficients calculated for 10 canonical clusters were significant (p <0.05), while Wilk's lambda and Chi-square values were not significant. Table 2 shows standardized canonical coefficients showing the correlation between the canonical variables indicating the weight of each variable to form a linear combination and the real variables, the part of the canonical variables describing their set.

Table 2

Standardized Canonical Coefficients for Set-1

	1	2	3	4	5	6	7	8	9	10
f1	.307	-.710	-.363	.238	.337	-.083	.202	-.142	-.112	.292
f2	.088	-.092	-.033	.220	-.108	-.271	.383	-.004	.215	-.193
f3	.039	.049	.077	-.103	-.182	-.017	-.682	-.204	-.063	.224
f4	-.108	-.068	-.116	-.281	-.402	-.328	.199	.133	-.253	.297
f5	-.142	-.004	-.038	-.009	-.280	-.201	.175	-.188	.485	-.086
f6	.050	.157	.079	.123	.175	.220	.265	.305	.163	-.058
f7	-.044	.081	.002	.104	.146	-.007	-.050	-.432	.553	.339
f8	.010	-.057	.068	-.262	-.172	.167	.239	-.394	-.158	-.715
f9	.220	.084	-.077	.184	.170	-.185	-.332	-.394	-.010	-.399
f10	.481	-.010	.522	-.361	.011	-.475	.013	.360	.240	.016
f11	-.394	-.013	-.029	.409	.278	-.498	-.268	.237	-.129	-.243
f12	.241	-.068	-.498	.212	-.473	.205	-.249	.400	.294	-.161
f13	.199	.257	.139	.608	-.326	-.051	.244	-.289	-.449	.305
f14	.094	.312	-.693	-.357	.409	-.297	.121	-.110	-.145	.030

When the relationship between the variables in the first set and canonical variables was examined in table 2, it was seen that the desire to receive psychological help contributes most to the first canonical change; gender to the second canonical variant; substance dependence contributes to the third canonical variable, thought of suicide contributes to the fourth canonical variable; having chronic disease contributes to the fifth canonical variable; the need for psychological help for the sixth canonical change; class level for seventh canonical variable; having chronic disease for eighth canonical variable; the order of birth for the ninth canonical variable and the accommodation type contributes to the tenth canonical variable.

The standardized correlation coefficients for the second set of variables were given in table 3.

Table 3

Standardized Canonical Coefficients for Set-2

	1	2	3	4	5	6	7	8	9	10
p1	-.374	.583	.965	-.500	.613	-.370	.026	-.996	.147	-.005
p2	-.145	.302	.034	1.012	.072	-.027	.092	.251	-.998	-1.163
p3	.025	.940	-.851	.282	.749	-.150	.905	-.094	.410	.859
p4	-.603	.054	-.511	-.804	-1.380	.209	-1.135	-.634	.026	.151
p5	-.248	.042	.316	-.036	.227	1.982	.524	1.223	.376	.088
p6	-.193	-.813	.035	.138	-.300	-.100	.654	-.640	-.794	.726
p7	.280	.155	-.058	-.800	-.428	-1.251	.211	.886	-.631	-.177
p8	.036	-.249	.560	.315	-.692	-.325	.452	.076	1.251	-.576
p9	.427	-.881	-.732	-.266	.970	.145	-.529	-.718	-.031	-.963
p10	-.198	-.379	.063	.568	.380	-.481	-.937	.735	.305	.876

When the relationship between the variables in the second set and canonical variables was examined in table 3, Psychoticism was a variable which contributes most to the first canonical change; interpersonal sensitivity contributes to the second canonical variable; somatization and interpersonal sensitivity to the third canonical variable, obsessive-compulsive symptoms to the fourth canonical variable; change depression to the fifth canonical; anxiety to the sixth canonical variable; change depression to the seventh canonical; anxiety to the eighth canonical variable; paranoid thought to the ninth canonical variable and obsessive-compulsive to the tenth canonical variable.

In canonical analysis, canonical loads represent the part of the canonical variables described in their set (amount of variance). The variance ratio explained; refers to the average of the squares of the canonical loads of each canonical variable in the corresponding set (set1 or set2). The canonical loads of the variables of the first canonical set were given in table 4.

Table 4

Canonical Loadings for Set-1

	1	2	3	4	5	6	7	8	9	10
f1	.293	-.854	-.149	.178	.180	-.079	.121	-.154	-.031	.107
f2	-.134	.137	-.051	.232	-.150	-.309	.386	-.031	.245	-.166
f3	-.004	.004	.099	-.094	-.245	.014	-.633	-.277	-.028	.150
f4	-.205	-.219	-.153	-.293	-.489	-.452	.117	.002	-.197	.216
f5	-.242	-.106	-.075	-.026	-.366	-.291	.114	-.191	.465	-.031
f6	.195	.278	.133	.216	.262	.344	.168	.250	.199	-.081
f7	-.044	.070	.024	.098	.159	-.004	-.030	-.489	.568	.309
f8	.065	-.260	.103	-.188	-.185	.141	.130	-.443	-.157	-.602
f9	.479	.118	-.076	.169	.097	-.333	-.265	-.270	.024	-.368
f10	.699	.009	.407	-.173	.038	-.462	-.005	.207	.148	-.052
f11	-.481	-.154	.042	.402	.187	-.478	-.277	.189	-.110	-.247
f12	.404	-.008	-.516	.237	-.446	.120	-.227	.330	.233	-.189
f13	.407	.420	.105	.520	-.263	-.082	.185	-.205	-.361	.191
f14	.212	.580	-.591	-.291	.277	-.191	.091	-.055	-.109	.053

Each canonical variable and the cluster variables being above .30 (Tabachnick & Fidell, 2007) indicates that it is part of the cohort of that variable. As shown in table 4, the desire to receive psychological help in the first cluster; second cluster sex; substance dependence in the third cluster; suicidal thoughts in the fourth group; level of satisfaction in the fifth cluster; eating habits in the sixth cluster; class level in the seventh cluster; the order of birth in the eighth and the ninth cluster and type of shelter in the tenth cluster. Table 5 shows the canonical loadings of the variables for the second canonical set.

Table 5

Canonical Loadings for Set-2

	1	2	3	4	5	6	7	8	9	10
p1	-.834	.002	.213	-.268	.350	-.174	.094	-.059	.048	-.143
p2	-.834	.016	-.181	.241	.093	-.134	.100	.115	-.152	-.375
p3	-.712	.079	-.516	-.019	.200	-.185	.319	.053	.198	-.038
p4	-.890	-.046	-.358	-.176	-.107	-.057	-.032	.017	.091	-.146
p5	-.802	-.211	-.095	-.260	.205	.138	.228	.309	.069	-.149
p6	-.729	-.507	-.103	-.033	.040	-.120	.395	-.048	-.140	.074
p7	-.604	-.171	-.180	-.438	.126	-.347	.247	.380	-.049	-.196
p8	-.664	-.297	-.109	.040	-.062	-.255	.312	.081	.442	-.298
p9	-.597	-.411	-.366	-.237	.364	-.118	.103	.041	.139	-.327
p10	-.791	-.288	-.087	.097	.278	-.269	-.156	.281	.133	.064

As seen in table 5, in the second canonical set, depression in the first cluster; Hostility in the second cluster; sensitivity in the third; phobic anxiety in the fourth; psychoticism in the fifth group; phobic anxiety in the sixth cluster; hostility in the seventh cluster; phobic anxiety in eighth group; paranoid thought in the ninth cluster and obsessive-compulsive symptoms in the tenth cluster are parts of the cluster.

Table 6

Unnecessary Indexes of Canonical Variables

CV1-1	.112
CV1-2	.108
CV1-3	.064
CV1-4	.065
CV1-5	.072
CV1-6	.081
CV1-7	.063
CV1-8	.067
CV1-9	.067
CV1-10	.061
CV2-1	.565
CV2-2	.068
CV2-3	.068
CV2-4	.049
CV2-5	.046
CV2-6	.039
CV2-7	.052
CV2-8	.035
CV2-9	.033
CV2-10	.045

Examining table 6, ten canonical variables of the first cluster account for 75% of the variance in set 1; all of these variables showed a meaningful relationship. The tenth canonical variables of the second set account for 100% of the variance in set 1; the relations of these ten variables are equally significant.

Discussion

Relations between psychosocial variables and psychological symptoms were investigated in the study. The first set was organized as follows: f1 (sex), f2 (department preference order), f3 (class level), f4 (department satisfaction level), f5 (university satisfaction level), f6 (request to change department), f7 (order of birth), f8 (accommodation type), f9 (previous psychological help), f10 (request for psychological help), f11 (eating habits), f12 (having chronic illness), f13 (suicide), and f14 (having harmful habits). They

composed of psychological variables. The second set was organized as follows: p1 (somatization), p2 (obsessive-compulsive disorder), p3 (interpersonal sensitivity), p4 (depression), p5 (anxiety), p6 hostility), p7 (phobic anxiety), p8 (paranoid thought) p9 (psychotic) and p10 (guilt, insomnia and appetite).

The first set was determined that it explained the 75% of the second set. Explaining 75% of psychological symptoms by psycho-social factors was important as it showed that the most important factors affecting the positive or negative mental health were psychosocial variables. Explaining %75 of psychological symptoms psycho-social factors are important in terms of preventing impairment of mental health and creating an exit point for efforts to improve impaired mental health.

Research is important as it explained the 75% of the psychological symptoms of psycho-social factors and showed how much psycho-social factors have importance in achieving the targeted success in the education-teaching process. According to the results of studies that reveal effects of the psycho-social factors on academic achievement, the compulsive parental attitude was negatively related to academic achievement and school adjustment (Checa & Abundis-Gutierrez, 2017), also the studies suggested that teaching skills of teachers was a significant influence on reducing academic stress (Muntaner-Mas et al., 2017). When findings and literature information are summarized, academic achievement can be increased when psychosocial factors are controlled. The variables can be lined up according to the variance rate they explain; the status of getting psychological help before, the desire to receive psychological help, having chronic illness, suicidal thoughts, eating habits, and the way of getting married. Participants in the survey were asked whether they had received help and whether they wanted to take it or not. It seems inevitable that the psychological symptoms of individuals who have this desire but who do not know how and where to obtain such support are high. Arslantaş, Dereboy, Aştı and Pektekin (2011) found that individuals with the desire of seeking psychological help were more likely to share difficulties with relatives and have a close relative who take help. The strength of social support is an important factor in reducing psychological symptoms (Wu et al., 2011). Generally, when the psychological symptoms are thought to provide clues about the mental health of the individual, it can be said that when the variables affecting the psychological symptoms are evaluated, the students are in the call for help.

According to the related literature, the most common suicide causes among suicide attempters are familial problems in over 15 year olds (Köse et al., 2012), family problems in 12-18 year-olds are followed by gender problems and school problems (Gökçen & Köylü, 2011). Ekici, Savaş and Çıtak (2001) found higher suicide rates in non-health-related individuals living with internal or external migration, living subjects such as divorce, rape, and subtraction compared to the control group. Factors such as familial factors, important life events, cause as great a depression and individuals want to end their lives. This is why it is important to know these factors. Current research findings draw a general framework of psychosocial factor that constitute psychological symptoms in university students.

It may be suggested to investigate individuals at the age of university education in terms of these psycho-social factors, to determine the current situation and to carry out necessary preventive and remedial studies. Acquiring critical developmental characteristics in these developmental periods is only possible if these factors are appropriate and functional in the life of the individual. It is almost impossible for an individual with disrupted social relationships to heal her/himself or cope with the psychological symptoms that may arise from these negative relationships. This study supports the thesis that the recovery of the individual is only possible with the recovery of psycho-social factors.

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