

Full Length Research Paper

Analyzing the psychological symptoms of students in undergraduate program in elementary mathematics teaching

Ercan Masal, Mustafa Koç, Tuğba Seda Çolak and Mithat Takunyaci*

Sakarya University, Turkey.

Accepted 1 July, 2013

The main purpose of this research is to analyse whether there is a difference or not in levels of having psychological symptoms of the students of undergraduate program in elementary mathematics teaching. Another aim of the research is to determine whether the levels of having psychological symptoms of the students differ or not regarding various variables during undergraduate program in elementary mathematics teaching. Relational screening model was used in the study and it was carried out with 154 female, 76 male and in total 230 participants. The data were obtained by using personal information form and SCL-90-R scale. The data were tested with t-test and variance analysis methods in independent groups. Findings are as follows; 1) The levels of having psychological symptoms of the students during undergraduate program in elementary mathematics teaching differ according to gender variable. 2) Education type was found to be a factor in terms of depression in levels of having psychological symptoms of students. 3) The levels of having psychological symptoms of the students studying in elementary mathematics teaching differ according to grade variable. 4) The levels of having psychological symptoms of the students studying in elementary mathematics teaching differ according to the order of preference of department in terms of hostility. 5) When the levels of having psychological symptoms of the students studying in elementary mathematics teaching are analysed according to the reasons of choosing the department, it was seen that the differentiation occurs in terms of interpersonal sensibility and paranoid ideation. 6) Order of being born of the students studying in elementary mathematics teaching is not a factor in having psychological symptoms.

Key words: Mathematics, elementary mathematics, psychology, symptom, mental health.

INTRODUCTION

Mental health is one of the main criteria for the individual to effectively be in harmony with both himself/herself and the others around, to find proper solutions against the stressful factors he/she encounters while going on with his/her life and to maintain a peaceful life. According to the definition of the World Health Organization, health requires the person to be in a complete welfare physically, psychologically and socially (WHO, 2001). When considered from that point of view, being psychologically

unhealthy drives the individual away from being healthy and ruins his/her harmony.

Youth constitutes the most active and unstable period of the human life biopsychosocially. This activity and instability are seen both in physical and mental dimensions. Youth is entered into with a rapid physical change. This change is followed by a mental and psychological change and development. Youth is a period in which basic personality features which develop during the

*Corresponding author. E-mail: mithat1981@gmail.com

childhood are dealt with and evaluated again in the lights of newly-obtained mental and psychological capabilities and world view in this rapid change and development period. The young individual reevaluates these processes within newly-developed environment and friend relations and as a result he/she forms an adult identity which is permanent and which relatively does not change (Çevik, 2010).

Being a student at university and university life have the nature of an environment which may produce anxiety and stress generally in our country and other countries. University student is an individual who has his/her own problems, development problems. The age of most university students places them between adulthood and childhood. He/She carries the difficulties of passing from childhood to adulthood. The individual should find his/her identity, to adopt and reconcile the values of socially local and childhood and national and international values of the society, to accommodate himself/herself with society values and to reach social maturity.

When the problems set forth in some studies carried out on the university students and the environment they live in are considered together with the development and adaptation problems, it can partially be understood in how hard conditions the university students maintain their efforts to prepare for the profession and the life. University period is a beginning in which individual responsibilities of the young increase after an intensive preparation period, most of young people become independent from their families and as a result they undertake new responsibilities. Especially, in this period which coincides with the end of adolescence, the young encounter with a difficult adaptation process. Difficult duties such as becoming harder of the adaptation, increase of responsibilities with independence from family, forming an identity, catching the success in interpersonal relations in the new environment may cause the levels of psychological symptoms in university students to increase. Therefore, mental health of university students has an importance.

Today when the psychological disorders are too common, it is clear that the researches and findings on this area will be very useful in individual's coping with these disorders. Knowing themselves, their emotions, frames of mind better has an important place in individuals' controlling these thoughts and emotions and developing functional coping skills.

The research done in inland and abroad emphasizes that mental and academic developments of the students focus on the university level; however, opportunities for physical development, social development, recreation and meeting personal needs are limited and physical. Health, social and personal developments should be parallel to the mental and academic developments (Tan, 1971; Baymur, 1969; Özgüven, 1974; Köknel, 1979; Ekşi, 1982; Hirose, 1985; Özgüven, 1988).

Kartal et al. (2009) found the average score of

psychological symptom level of the students as 1.05 in the study scanning psychological symptoms of vocational health school. There is no statistically significant difference between the age, gender and grade statuses and average score of psychological symptom level. The average score of the psychological symptom level of students who evaluate their relationship with their family as very good is $.97 \pm .56$, while the average score of students who have a bad family relationship is $1.65 \pm .67$.

As a result of the research by Aktaş (1997) analyzing the adaptation levels of the university students, it was found that personal, social and general adaptation levels of fourth grade university students was significantly higher than the adaptation levels of the first grade university students. In addition, it was found that personal adaptation levels of males were higher than females' and social adaptation levels of females were higher than males' and general adaptation levels of males in fourth grade were higher than females'.

In Epidemiologic Catchment Area (ECA) which is one of the biggest epidemiologic studies and which was carried out by "National Institute of Mental Health" in USA, it was determined that one month prevalence of at least one psychological disorder in the society is 15.4%. In the same study, it was stated that the most common psychological disorders are anxiety disorders and they are seen in 7.3% of the society. Anxiety is a behavioral, psychological, and physiological reaction all at once (Bourne, 2011). When analysed according to genders, it was found that anxiety disorders in females and alcohol and drug abuse in males are most common diagnoses. Most of the studies in the world unlike the ECA study claim that the most common psychological disorders are mood disorders and especially depression is very common in the society (as cited in Keskin, 2008).

"Turkey Mental Health Profile Research" (Kılıç, 1987) was carried out on a sample of 7479 people in Turkey and published by Ministry of Health. According to the results of this study, prevalence of psychological disorders in adult population is 17.2%. All psychological disorders other than alcohol addiction are more in females. Depression and anxiety disorders are the most common psychological disorders. Referring to doctors because of psychological problems are low (Öztürk, 2004).

Trollor et al. (2007) found the following results in their researches in which they examined the prevalence of psychological disorder in adults: In the test applied, 13% of 1792 old participants stated symptoms regarding one psychological disorder in the last 1 month and 16% of them stated these symptoms in the last 12 months. When females are compared to males, they experienced more mood disorders and common anxiety disorders and their drug addiction rates are lower. Increasing age is less relevant with the probability of having any psychological disorder symptom except for cognitive disorder.

Sapmaz (2006) analysed adaptive and maladaptive

perfectionism features of university students in terms of psychological symptom levels and found that there is a relation based on the difference between determined perfectionism classifications and all psychological symptoms other than somatization in the study. Psychological symptom levels of maladaptive perfectionists were found as the highest. They were followed by imperfectionists and the group with lowest psychological symptom levels was found as adaptive perfectionists. The relation of gender variable with perfectionism attitudes of the students was not found as significant.

In the research carried out by Benk (2006), the relation between perfectionist personality traits and psychological symptoms of the university students was studied. In the study, a significant relation was found between perfectionism and gender, type of high school graduated, number of siblings, birth order, educational background of parents, perceived income level of the family, formality, criticism, supportiveness, sharing, peace, perceived parent relations, perceived mother father attitudes of the parents and perfectionism levels. A significant difference was found between psychological symptom list and perceived parent child raising attitude, interest, mutual understanding, warmth, sharing, peace and conflict which are among the parent-child relations.

University is not only academic life. A success of a student is not only to have enough credit to graduate from school but to have the development which may help him/her obtain objectives socially and personally. University students should adapt to a gradual increase in self-control and independence above all. This is only possible by gaining the problem solving skill. Program content of education faculties which educate prospective teachers aims to guide students as individuals who access knowledge, who know how to access knowledge, who can use it, who can produce knowledge, who can adapt knowledge to new situations and who know where and how to use knowledge. At the end of this process, it is aimed that the student takes an active part in problem solving process and who can apply the resources efficiently towards the work (Koç et al., 2008).

In our country where millions of university students live, the biopsychological processes experienced by the youth should be well known. This is the only possible way to know and understand the youth better. As a result, it is ensured that the youth are guided in a positive way and the country blooms (Çevik, 2010).

In accordance with the abovementioned, the analysis on the students of the undergraduate program in elementary mathematics teaching reveals that psychological symptoms of the students which are accepted as dependent variable according to gender, grade level and education type (regular and evening education) variables constitutes the aim of the study.

METHOD

This study was performed with relational screening method. In this

method, the current situation is presented as it is. The psychological symptoms of the students studying in undergraduate program in elementary mathematics teaching during the undergraduate education were taken as dependent variable and gender, grade level and education type (regular and evening) were taken as independent variable.

Universe and sample

The universe of the research is constituted by the students studying in undergraduate program in Sakarya University, Education Faculty, Elementary Mathematics Teaching in 2010 to 2011 Education Year. Since the numbers of class students are different, sample was determined with cluster sampling in the research. The study is constituted by 154 females (67%) and 76 males (33%) in terms of gender; 74 first grade students (32.2%), 70 second grade students (30.4%), 63 third grade students (27.4%) and 23 fourth grade students (10%) in terms of grade distribution; and 124 regular education students (53.9%) and 106 evening education students (46.1%) in terms of education type and in total 230 students.

Procedure

For the survey 290 students were chosen from Grade I (freshman) to Grade IV (senior) in undergraduate program in elementary mathematics teaching. To collect quantitative data, Personal Information Form (PIF) and Psychological Symptom Check List (SCL-90-R) were administered on students and 230 out of 290 students answered the PIF and SCL-90-R.

Data collection tools

The data in the research was obtained by two scales.

Personal information form (PIF)

In the personal information form, questions were asked to help obtain information on gender, grade level and education type of the students.

Psychological symptom check list (SCL-90-R)

Developed by Derogotis in 1977, SCL-90-R is a psychological symptom scanning tool with self evaluation. The validity-reliability studies of the scale, which was developed to measure the psychological and physical symptoms, the level of compulsion experienced by the individual or the negative stress reaction lived, were carried out by Dağ (2000). The test which consists 90 items is based on five-point Likert type evaluation, namely never (0), little (1), medium level (2), quite much (3), high level (4). The test has 10 subscales in total.

Somatization: This subscale reflects the anxieties regarding function disorders which recur and often change in gastrointestinal, respiratory, cardiovascular and other systems of the body. The followings are the questions of the test of 12 items: 1, 4, 12, 27, 40, 42, 48, 49, 52, 53, 56 and 58.

Obsessive-compulsive: This scale reflects the symptoms of the standard clinical syndrome of the same name. Focusing on the existence of thoughts which continuously and irresistibly recurs, this scale consists 10 items in total. The items of this subscale are questions no 3, 9, 10, 28, 38, 45, 46, 51, 55 and 65.

Interpersonal sensibility: This subscale focuses on the symptoms such as feeling insufficient and weak, reflecting these feelings to the social relations and feeling uncomfortable because of these relations. The 9 items of this subscale are questions no 6, 21, 34, 36, 37, 41, 61, 69 and 73.

Depression: This subscale is for reflecting clinical depression symptoms such as depressive mood, decreasing of living energy, pessimism, despair, lack of motive, suicidal thought. The items of this subtest of 13 items are the questions no 5, 14, 20, 22, 26, 29, 30, 31, 32, 54, 71 and 79.

Anxiety: This subscale includes the symptom and behaviors which are the indications of clinical anxiety such as continuous anger, stress, nervousness, never being able to rest. The 10 items of this sub test are the questions no 2, 17, 23, 33, 39, 57, 72, 78, 80 and 86.

Anger-hostility: This subscale emphasizes the features such as being angry, being restless, opposition, hostility, aggression, anger, fury, jealousy. The 6 items of this subscale are questions no 11, 24, 63, 67, 74 and 81.

Phobic anxiety: This subscale includes items which reflect the fears that are persistent but meaningless for a certain object or situation. Total number of items are 7 and these items are the questions no 13, 25, 47, 50, 70, 75 and 82.

Paranoid ideation: This subscale reflects items such as hostility, doubt, reflective thoughts, superiority, fear of losing independency. Including 6 items, this subscale includes the questions no 8, 18, 43, 68, 76 and 83.

Psychoticism: This subscale reflects symptoms which indicate a schizoid life style such as autism, being alone, moving away from social life. The questions which include 10 items are no 7, 16, 35, 62, 77, 84, 85, 87, 88 and 90.

Additional items: This subscale including 7 items reflects symptoms such as sleep, appetite disorders, feelings of guilt other than the mentioned dimensions. The questions no 19, 44, 59, 60, 64 and 89 are the items of this subscale.

Scoring

Scoring of the scale is made by giving a score between 0 and 4 for the choices on each item (0=None, 1=Little, 2=Medium level, 3=Much, 4=Too much). The score of the individual regarding the subscale is found by adding the scores given to the items of that subscale dividing into the number of items in the subscale. Therefore, the score of the individual regarding each subscale is found. Increase of the score indicates the increase of psychological symptom level.

The first of the adaptation studies of the scale was carried out by Kiliç (1987) in Turkey. In the study carried out with 122 university students, invariance coefficients of subtests obtained with Pearson product moment technique are .82 for somatization, .84 for obsessive-compulsive, .79 for interpersonal sensitivity, .78 for depression, .73 for anxiety, .79 for anger and hostility, .78 for phobic anxiety, .63 for paranoid ideation, .73 for psychoticism and .77 for additional scale (Öner, 1997). Turkish translation of the scale was used on samples in some researches in our country and it was observed that it distinguishes used and examined groups in a significant level. Reliability study of the scale was carried out by Dağ in 1989 and its Cronbach's alpha value was found ".97". A correlation between .10 to .77 was found between general symptom average and MMPI (Bozkurt, 1996).

In our study, invariance coefficients of subtests obtained with Pearson product moment technique are .824 for somatization, .738 for obsessive-compulsive, .810 for interpersonal sensitivity, .842 for depression, .784 for anxiety, .756 for anger and hostility, .725 for phobic anxiety, .714 for paranoid ideation, .764 for psychoticism and .723 for additional scale.

Interpretation of scores

Interpretation of each subscales score and the overall symptom test scores obtained from the SCL-90-R is as follows: Scores from 0.00 up to 1.50 is *Normal Symptom*, scores from 1.51 up to 2.50 is *High Level Symptom*, scores from 2.51 up to 4.00 is *Very High Level*

Symptom

The results of the study on the validity of SCL-90-R are interpreted in a way that this test can generally measure psychopathology, however the subscales cannot distinguish between the different psychiatric symptom groups, but a structure validity which can show "psychiatric symptomatic situation" as a whole is found (Dağ, 2000).

Data analysis techniques

The data were analyzed using a package statistic program. As analysis methods, t-test (Independent t-Test) was used to compare the averages in the independent groups and variance (One-Way ANOVA) analysis was used to compare the averages of more than two groups.

In analysis of the data, if the number of groups is more, its leads to increase the margin of error in bilateral correlations. So Bonferroni adjustment (correction) was done. Bonferroni adjustment (correction) is determined by the formula p/k , significance level/group number (Miller, 1991; IFA, 2003; RCSE, 2003) adjustment (correction) values are calculated for each analysis.

FINDINGS

Problem I: Is there any difference between the levels of having psychological symptoms of the students of undergraduate program in elementary mathematics teaching according to gender variable?

The findings regarding psychological health levels of the students studying in undergraduate program in elementary mathematics teaching according to "gender" were examined in Table 1. In the examination, it was found that there is no significant difference between scores of somatization, obsessive-compulsive, depression, anxiety, phobic anxiety, paranoid ideation, psychoticism and total mental health levels and gender variable.

As a result of the independent sample t-test carried out to determine if there is a significant difference between interpersonal sensitivity level score averages of the students according to gender, a significant difference was found in favour of male students [$t_{(227)} = 2.422$, $p < .025$]. While the interpersonal sensitivity level score average of

female students was ($\bar{X} \pm sd$; $1.44 \pm .63$) the interpersonal sensitivity level score average of male students was found as ($1.22 \pm .66$). According to this result, interpersonal sensitivity levels of male students are lower compared to female students.

As a result of the independent sample t-test carried out to determine if there is a significant difference between hostility level score averages of the students according to gender, a significant difference was found in favour of

Table 1. Unrelated independent sample t-Test results of the mental health level score of the students studying in undergraduate program in elementary mathematics teaching according to gender variable.

Variable	Gender	N	\bar{X}	sd	df	t	p
Somatization	Female	154	.87	.46	227	.64	.519
	Male	75	.83	.45			
Obsessive-compulsive	Female	154	1.55	.54	228	2.81	.005
	Male	76	1.33	.58			
Interpersonal sensitivity	Female	153	1.44	.63	227	2.42	.016**
	Male	76	1.22	.66			
Depression	Female	154	1.36	.61	228	2.69	.008
	Male	76	1.13	.61			
Anxiety	Female	154	.99	.52	228	-.00	.993
	Male	76	.99	.52			
Hostility	Female	154	.78	.53	228	-3.27	.001*
	Male	76	1.03	.60			
Phobic anxiety	Female	154	.78	.56	228	-.75	.451
	Male	76	.84	.57			
Paranoid ideation	Female	154	1.31	.65	228	.37	.706
	Male	76	1.27	.62			
Psychoticism	Female	154	.91	.55	228	-.40	.689
	Male	76	.94	.54			
Total mental health	Female	152	1.15	.47	226	.31	.752
	Male	76	1.13	.50			

*p<.005, **p<.025, The level of significance has been considered as $\alpha=.01/2=.005$ and $\alpha=.05/2=.025$ after Bonferroni correction for each comparison.

female students [$t_{(228)} = -3.272$, $p < .005$]. While the hostility level score average of female students was ($\bar{X} \pm sd$; $.78 \pm .53$) the hostility level score average of male students was found as ($1.03 \pm .60$). According to this result, hostility levels of female students are lower compared to male students.

Problem II: Is there any difference between the levels of having psychological symptoms of the students of undergraduate program in elementary mathematics teaching according to education type variable?

The findings regarding mental health levels of the students studying in undergraduate program in elementary mathematics teaching according to "education type" were examined in Table 2. In the examination, it was found

that there is no significant difference between the somatization, obsessive-compulsive, interpersonal sensitivity, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism levels scores in terms of education type.

As a result of the independent sample t-test carried out to determine if there is a significant difference between depression level score averages of the students according to education type, a significant difference was found in favor of evening education students [$t_{(228)} = 2.310$, $p < .025$]. While the depression level score average of regular education students was ($\bar{X} \pm sd$; $1.37 \pm .63$) the depression level score average of evening education students was found as ($1.18 \pm .59$). According to this result, depression levels of evening education students are lower compared to regular education students.

Table 2. Unrelated independent sample t-Test results of the mental health level score of the students studying in undergraduate program in elementary mathematics teaching according to education type variable.

Variable	Education type	N	\bar{X}	sd	df	t	p
Somatization	Regular Edu.	123	.88	.46	227	.93	.352
	Evening Edu.	106	.83	.45			
Obsessive-compulsive	Regular Edu.	124	1.52	.58	228	1.35	.178
	Evening Edu.	106	1.42	.55			
Interpersonal sensitivity	Regular Edu.	123	1.44	.64	227	1.77	.077
	Evening Edu.	106	1.28	.65			
Depression	Regular Edu.	124	1.37	.63	228	2.31	.022**
	Evening Edu.	106	1.18	.59			
Anxiety	Regular Edu.	124	1.02	.53	228	.88	.380
	Evening Edu.	106	.96	.51			
Hostility	Regular Edu.	124	.85	.52	228	-.30	.761
	Evening Edu.	106	.88	.61			
Phobic anxiety	Regular Edu.	124	.83	.56	228	1.05	.293
	Evening Edu.	106	.75	.57			
Paranoid ideation	Regular Edu.	124	1.32	.67	228	.69	.489
	Evening Edu.	106	1.26	.61			
Psychoticism	Regular Edu.	124	.94	.51	228	.75	.451
	Evening Edu.	106	.89	.58			
Total mental health	Regular Edu.	124	1.05	.46	226	-3.38	.001*
	Evening Edu.	104	1.26	.47			

* $p < .005$, ** $p < .025$, The level of significance has been considered as $\alpha = .01/2 = .005$ and $\alpha = .05/2 = .025$ after Bonferroni correction for each comparison.

As a result of the independent sample t-test carried out to determine if there is a significant difference between total mental health level score averages of the students according to education type, a significant difference was found in favor of regular education students [$t_{(226)} = -3.389$, $p < .005$]. While the total mental health level score average of regular education students was ($\bar{X} \pm sd$; $1.05 \pm .46$) the depression level score average of evening education students was found as ($1.26 \pm .47$). According to this result, total mental health levels of regular education students are lower compared to evening education students.

Problem III: Is there any difference between the levels of having psychological symptoms of the students of undergraduate program in elementary mathematics teaching according to grade level variable?

The results of ANOVA test carried out in order to determine if each of mental health levels of the students

studying in undergraduate program in elementary mathematics teaching according to "grade level" variable are given in Table 3.

When Table 3 was analysed, a significant relation was found between the hostility levels according to grade levels and score averages [$F(3, 226) = 4.151$, $p < .0125$]. The results of post hoc analysis showed that the difference between hostility levels of Grade I to Grade III and Grade I to Grade IV students was significant in favour of Grade I. According to this result, hostility levels of Grade I students are lower compared to Grade III and Grade IV students.

When Table 3 was analysed, a significant relation was found between the psychoticism levels according to grade levels and score averages [$F(3, 225) = 3.104$, $p < .0125$]. The results of post hoc analysis showed that the difference between psychoticism levels of Grade I to Grade II and Grade I to Grade III students was significant in favor of Grade I. According to this result, psychoticism levels of Grade I students are lower compared to Grade II and Grade III students.

Table 3. ANOVA test results of the mental health level score of the students studying in undergraduate program in elementary mathematics teaching according to grade level variable.

Variable	Source	Sum of squares	df	Mean of squares	F	p	Grade	\bar{X}	Sd	Significant groups
Somatization	Between	2.40	3	.80	3.97	.009	I	.72	.41	I-III
	Within	45.35	225	.20			II	.88	.47	
							III	.95	.46	
	Total	47.75	228				IV	1.0	.44	
Obsessive-compulsive	Between	3.09	3	1.03	3.26	.022	I	1.33	.54	I-II I-III I-IV
	Within	71.32	226	.31			II	1.55	.58	
							III	1.52	.52	
	Total	74.41	229				IV	1.65	.64	
Interpersonal sensitivity	Between	3.85	3	1.28	3.10	.027	I	1.18	.64	I-II I-III I-IV
	Within	93.09	225	.41			II	1.44	.68	
							III	1.43	.59	
	Total	96.94	228				IV	1.55	.65	
Depression	Between	3.81	3	1.27	3.39	.019	I	1.12	.57	I-IV
	Within	84.56	226	.37			II	1.37	.64	
							III	1.30	.55	
	Total	88.38	229				IV	1.51	.75	
Anxiety	Between	2.81	3	.93	3.47	.017	I	.85	.50	I-IV
	Within	61.08	226	.27			II	1.01	.56	
							III	1.07	.50	
	Total	63.89	229				IV	1.19	.47	
Hostility	Between	3.88	3	1.29	4.15	.007*	I	.69	.42	I-III I-IV
	Within	70.45	226	.31			II	.90	.58	
							III	.95	.63	
	Total	74.33	229				IV	1.07	.65	
Phobic anxiety	Between	3.29	3	1.09	3.53	.016	I	.65	.54	I-III I-IV
	Within	70.28	226	.31			II	.79	.59	
							III	.90	.54	
	Total	73.57	229				IV	1.00	.52	
Paranoid ideation	Between	3.97	3	1.32	3.26	.022	I	1.12	.63	I-II
	Within	91.67	226	.40			II	1.44	.70	
							III	1.31	.57	
	Total	95.65	229				IV	1.39	.57	
Psychoticism	Between	5.03	3	1.67	5.84	.001*	I	.70	.47	I-II I-III
	Within	64.87	226	.28			II	.99	.59	
							III	1.04	.55	
	Total	69.90	229				IV	1.03	.45	
Total mental health	Between	1.07	3	.35	1.54	.205	I	1.11	.46	
	Within	52.09	224	.23			II	1.07	.49	
							III	1.21	.47	
	Total	53.16	227				IV	1.27	.50	

* $p < .0125$, ** $p < .0025$, The level of significance has been considered as $\alpha = .05/4 = .0125$ and $\alpha = .01/4 = .0025$ after Bonferroni correction for each comparison. I- Freshman, II- Junior, III- Sophomore, IV-Senior

When Table 3 was analysed, a significant relation was not found between the somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, phobic anxiety, paranoid ideation and total mental health levels according to grade levels and score averages.

Problem IV: Is there any difference between the levels of having psychological symptoms of the students of undergraduate program in elementary mathematics teaching according to department preference order variable?

The results of ANOVA test carried out in order to determine if each of mental health levels of the students studying in undergraduate program in elementary mathematics teaching according to "department preference order" variable are given in Table 4. According to the results, no significant difference was found between score averages of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism and total mental health levels of the students according to department preference order.

Problem V: Is there any difference between the levels of having psychological symptoms of the students of undergraduate program in elementary mathematics teaching according to reason for choosing the department variable?

The results of ANOVA test carried out in order to determine if each of mental health levels of the students studying in undergraduate program in elementary mathematics teaching according to "reason for choosing the department" variable are given in Table 5. According to the results, no significant difference was found between score averages of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, psychoticism and total mental health of the students according to reason for choosing the department.

When Table 5 was analyzed, a significant relation was found between the paranoid ideation levels according to reasons for choosing the department and score averages [$F(3, 226) = 5.031, p < .0025$]. The results of post hoc analysis showed that the difference between the paranoid ideation levels of the students whose reasons for choosing the department are "because I like and "family pressure" Mean difference: "Because I like" – "family pressure" = $-.46457$) is significant in favor of the ones whose reasons for choosing the departments are "because I like". According to this result, paranoid ideation levels of the students whose reason for choosing the department is "because I like" are lower compared to the ones whose reason is "family pressure".

Problem VI: Is there any difference between the levels of having psychological symptoms of the students of undergraduate program in elementary mathematics teaching according to birth order variable?

The results of ANOVA test carried out in order to determine if each of mental health levels of the students studying in undergraduate program in elementary mathematics teaching according to "birth order" variable are given in Table 6. According to the results, no significant difference was found between score averages of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism and total mental health levels of the students according to birth order.

DISCUSSION AND CONCLUSION

In this part, the results obtained in this research, comments on these results and literature information which supports and does not support the said comments are included.

The levels of having psychological symptoms of the students during undergraduate program in Elementary Mathematics Teaching differ according to gender variable. This differentiation constitutes the interpersonal sensitivity and anger-hostility. Interpersonal sensitivity symptoms (Schraedley et al., 1999) are seen more in females than the males. This is consistent with previous studies of gender differences in depression and stress (Rosenthal and Schreiner, 2000; Brooks et al., 2002). However, hostility symptoms are seen in males more. When the psychological symptoms are classified, interpersonal sensitivity is included in mood disorders. When the literature is examined, the psychological symptom which will accompany the moods of the individuals with interpersonal sensitivity symptoms is depression. Individual's seeing himself desperate and inferior to other people when he/she relates himself/herself with others causes the individual to experience the feelings of insignificance, aimlessness and uselessness. The reason why the female students experience interpersonal sensitivity symptoms more than the males is the interpersonal interaction which is the basic determinant of the identity feeling they have to gain in this progressive period they are in and the quantity and quality of this interaction. The fact that the males precede the females for a few years in terms of development can be regarded as a main element which causes this difference. It can be assumed that the females are affected by the negative life events more and accordingly they can be hurt and thereby they exhibit more depressive traits compared to the males (Erözkan, 2009).

Education type was found to be a factor in terms of depression in levels of having psychological symptoms of

Table 4. Contd.

Paranoid ideation	Between	1.35	4	.33			I	.63
							II	.62
	Within	94.29	225	.41			III	.68
							IV	.71
	Total	95.65	229				V	.60
Psychoticism								.64
	Between	1.19	4	.29			I	.53
							II	.50
	Within	68.70	225	.30			III	.59
							IV	.64
	Total	69.90	229				V	.50
Total mental health								.55
	Between	1.36	4	.34			I	.52
							II	.45
	Within	51.79	223	.23			III	.50
							IV	.45
	Total	53.16	227				V	.43
								.48

* $p < .002$, The level of significance has been considered as $\alpha = .01/5 = .002$ after Bonferroni correction for each comparison. **I-** between 1 and 3, **II-** between 4 and 6, **III-** between 7 and 9, **IV-** between 10 and 12, **V-** 13 and after.

Table 5. ANOVA test results of the mental health level scores of the students studying in undergraduate program in elementary mathematics teaching according to reason for choosing the department variable.

Variable	Source	Sum of squares	df	Mean of squares	F	p	Reason for choosing the department	Sd
Somatization	Between	.19	3	.06	.30	.823	I	.46
							II	.47
	Within	47.56	225	.21			III	.47
	Total	47.75	228				IV	.39
Obsessive-compulsive					1.39	.245		.45
	Between	1.35	3	.45			I	.54
							II	.61
	Within	73.05	226	.32			III	.63
Interpersonal sensitivity	Total	74.41	229		3.15	.026	IV	.50
								.57
	Between	3.90	3	1.30			I	.63
							II	.66
Depression	Within	93.04	225	.41	1.54	.204	III	.65
	Total	96.94	228				IV	.62
								.65
	Between	1.77	3	.59			I	.62
Depression					1.54	.204	II	.63
	Within	86.60	226	.38			III	.57
	Total	88.38	229				IV	.63
								.62

Table 5. Contd.

Anxiety	Between	1.40	3	.46	1.68	.170	I	.51
							II	.54
	Within	62.49	226	.27			III	.58
							IV	.45
	Total	63.89	229					.52
Hostility	Between	1.55	3	.51	1.60	.188	I	.59
							II	.48
	Within	72.77	226	.32			III	.57
							IV	.50
	Total	74.33	229					.56
Phobic anxiety	Between	.88	3	.29	.91	.436	I	.55
							II	.65
	Within	72.69	226	.32			III	.53
							IV	.53
	Total	73.57	229					.56
Paranoid ideation	Between	5.98	3	1.99	5.03	.002*	I	.60
							II	.74
	Within	89.66	226	.39			III	.54
							IV	.71
	Total	95.65	229					.64
Psychoticism	Between	1.68	3	.56	1.85	.138	I	.54
							II	.60
	Within	68.22	226	.30			III	.55
							IV	.49
	Total	69.90	229					.55
Total mental health	Between	.74	3	.24	1.05	.368	I	.51
							II	.41
	Within	52.42	224	.23			III	.50
							IV	.39
	Total	53.16	227					.48

* $p < .0025$, The level of significance has been considered as $\alpha = .01/4 = .0025$ after Bonferroni correction for each comparison; I- Because I like, II-Family Pressure, III-Not to be left out, IV-Friend Pressure

students. It was found that regular education students have more depressive symptoms than evening education students. The followings can be listed as reasons for this:

1) It can be said that regular education students cannot adopt the positions they have and thereby they experience aim uncertainty, on the other hand regular education students adopt the positions they have and thereby they form an aim.

2) Regarding leisure time activities, it can be said that evening education students spend their time more efficiently to maintain their mental health compared to the regular education students.

3) Since evening education students pay more school fee compared to the regular education students it can be said that they behave more sensitive to the process and they are more aware of their responsibilities. In other words, personal responsibility levels of evening education students are higher than the regular education students.

The levels of having psychological symptoms of the students studying in undergraduate program in elementary mathematics teaching differ according to grade variable. The levels of having hostility symptoms of the third grade students significantly differ from the first grade students. As a result, as the grade levels of the students

Table 6. ANOVA test results of the mental health level scores of the students studying in undergraduate program in elementary mathematics teaching according to birth order.

Variable	Source	Sum of squares	df	Mean of squares	F	p	Birth order	Sd
Somatization	Between	1.18	3	.39	1.90	.130	I	.40
							II	.49
	Within	46.57	225	.20			III	.42
							IV	.43
	Total	47.75	228					.45
Obsessive-compulsive	Between	.13	3	.04	.13	.939	I	.72
							II	.61
	Within	74.27	226	.32			III	.51
							IV	.54
	Total	74.41	229					.57
Interpersonal sensitivity	Between	.43	3	.14	.33	.799	I	.75
							II	.62
	Within	96.51	225	.42			III	.66
							IV	.66
	Total	96.94	228					.65
Depression	Between	1.29	3	.43	1.11	.343	I	.60
							II	.64
	Within	87.09	226	.38			III	.62
							IV	.58
	Total	88.38	229					.62
Anxiety	Between	.48	3	.16	.57	.631	I	.60
							II	.55
	Within	63.41	226	.28			III	.51
							IV	.49
	Total	63.89	229					.52
Hostility	Between	1.55	3	.51	1.60	.188	I	.45
							II	.53
	Within	72.77	226	.32			III	.65
							IV	.51
	Total	74.33	229					.56
Phobic anxiety	Between	1.55	3	.51	1.62	.185	I	.51
							II	.60
	Within	72.02	226	.31			III	.58
							IV	.47
	Total	73.57	229					.56
Paranoid ideation	Between	1.309	3	.43	1.04	.373	I	.72
							II	.63
	Within	94.34	226	.41			III	.69
							IV	.59
	Total	95.65	229					.64

Table 6. Contd.

Psychoticism	Between	.88	3	.29		I	.47
						II	.55
	Within	69.02	226	.30	.965	III	.55
						IV	.55
	Total	69.90	229				.55
Total mental health	Between	.700	3	.23		I	.55
						II	.46
	Within	52.46	224	.23	.996	III	.48
						IV	.50
	Total	53.16	227				.48

* $p < .0125$, The level of significance has been considered as $\alpha = .05/4 = .0125$ after Bonferroni correction for each comparison. I- Only Child, II- First Child, III- Middle Child, IV- Last Child.

studying in undergraduate program in elementary mathematics teaching increase, their levels of having psychological symptoms also increase. The reason is that

- 1) They have no clue
- 2) No complicated clues
- 3) No conflictive clues which may eliminate the uncertainties regarding the situations to be experienced in the future.

In this situation, student's intolerance of uncertainty increases. Intolerance of Uncertainty refers to an unpredictable component that is future oriented. Intolerance of Uncertainty refers to an apprehension of future negative events (Grenier et al., 2005). There are two methods to be applied to deal with intolerance to uncertainty. First one is denial (distorting the truth) and second one is yielding. Dealing methods of denial and giving in cause students to experience many psychological symptoms. Individuals who are intolerant of uncertainty, therefore, may believe that they lack sufficient coping or problem solving skills to effectively manage threatening situations that have the potential to evoke discomfort and negative emotionality (Holaway et al., 2006).

When the levels of having psychological symptoms of the students studying in undergraduate program in elementary mathematics teaching are analyzed according to the reasons of choosing the department, it was seen that the differentiation occurs in terms of paranoid ideation. This differentiation is significant in favor of the students who prefer the program of elementary mathematics teaching because they like. It was found that the symptoms of paranoid ideation in students who chose the elementary mathematics teaching program because of family pressure, not to be left out and family pressure are higher than the students who chose this profession because they like. One of the main factors applied in understanding and making sense of the human behaviors

in psychology is the choices made by the individual. In the process of making a decision, if the individual is aware of his/her

- a) position
- b) aims
- c) possible results of his/her choices,

The level of reaching the resources in which he/she can use his/her potential to the maximum and using these resources will increase. At the end of this process, the individual makes his/her own choices, and behave according to the result of these choices and takes the responsibility of these behaviours. This situation increases the tolerance of what the individual experiences and the circumstances occurring as a result of what he/she has experienced. This idea is supported by existentialist approach. According to existentialist approach, the individuals are free to choose from different choices. Therefore, the individuals undertake substantial responsibility and role in determining their own destinies. What the individual will become and how he/she lives are a result of his/her own choice. Since all the individuals are free to choose, they have to accept the responsibility to direct their own lives (Karahan and Sardoğan, 2004).

Order of being born of the students studying in undergraduate program in elementary mathematics teaching is not a factor in having psychological symptoms. Alfred Adler is the first theorist who says that the children perceive their position in the family according to their birth order and they develop a life style according to this perception. According to Adler, there are 5 different positions within a family and these are first child, second child, middle child, last child and only child. Each child develops a method to deal with the obstacle he/she encounters according to the style of perceiving his/her position. For instance, second child observes the deficiencies of the older sibling and gains competences

for these deficiencies and thereby he/she tries to establish superiority (Corey, 2009). These different positions within a family are not a factor in having psychological symptoms during the undergraduate education of the students in elementary mathematics teaching.

REFERENCES

- Aktaş Y (1997). Üniversite öğrencilerinin uyum düzeylerinin incelenmesi: Uzunlamasına bir çalışma. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi 13:07-110.
- Baymur F (1969). Yurtlarda kalan yüksek öğrenim öğrencilerinin başlıca sorunları. Hacettepe Üniversitesi Sosyal ve İdari Bilimler Dergisi 1(1).
- Benk A (2006). Üniversite öğrencilerinde mükemmeliyetçi kişilik özelliğinin psikolojik belirtilerle ilişkisi. Yayınlanmamış Yüksek Lisans Tezi, Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü, İstanbul.
- Bourne EJ (2011). The anxiety & phobia workbook. Oakland: Raincoast Books
- Bozkurt A (1996). Erkek cinsel işlev bozukluklarında psikopatolojinin araştırılması. Uzmanlık Tezi, Gülhane Askeri Tıp Akademisi, Ankara.
- Brooks TL, Harris SK, Thrall JS, Woods ER (2002). Association of Adolescent Risk Behaviors With Mental Health Symptoms in High School Students. J. Adolesc. Health 31:240-246.
- Corey G (2009). Theory and practice of counseling and psychotherapy. Thomson Brooks/ Cole, USA.
- Çevik A (2010). Üniversite gençliği ve ruh sağlığı, psikopolitik bir değerlendirme. Retrieved September 26, 2011 from http://gdb.comu.edu.tr/index.php?option=com_content&view=article&id=61:uenverste-gencl-ve-ruh-salii&catid=35:etim&Itemid=.
- Dağ N (1989). Çalışmaları ve Genel Sorunlar, Araştırma Sonuçları Toplantısı VIII, 1990, 193-201.
- Dağ İ (2000). Belirti Tarama Listesi (SCL-90-R). Ö. Aydemir ve E. Köroğlu (Eds.). Psikiyatride kullanılan klinik ölçekler. Ankara: Hekimler Yayın Birliği pp.33-40.
- Ekşi A (1982). Gençlerimiz ve sorunları. İstanbul: İstanbul Üniversitesi Yayınevi.
- Erözkan A (2009). Üniversite öğrencilerinin mükemmeliyetçilik eğilimleri ve depresyon düzeyleri. Cypriot J. Educ. Sci. 3(2):76-88.
- Grenier S, Barrette AM, Ladouceur R (2005). Intolerance of uncertainty and intolerance of ambiguity: Similarities and differences. Pers. Individ. Differ. 39:593-600.
- Hirose T (1985). Japonya'da gençliğin durumu ve sorunları gençliğin eğitimi ve sorunları. Ankara: Türk Eğitim Derneği Yayınları.
- Holaway RM, Heimberg RG, Coles ME (2006). A comparison of intolerance of uncertainty in analogue obsessive-compulsive disorder and generalized anxiety disorder. J. Anxiety Disorders 20(2):158-174.
- Karahan TF, Sardoğan ME (2004). Psikolojik danışma ve psikoterapide kuramlar. Samsun: Deniz Kültür Yayınları.
- Kartal A, Çetinkaya B, Turan T (2009). Sağlık yüksekokulu öğrencilerinde ruhsal belirtilerin taranması. TAF Preventive Medicine Bulletin 8(2):161-166.
- Keskin A (2008). Eskişehir ilinde ruhsal hastalıkların sıklığı ve sosyodemografik değişkenlerle ilişkisi. Tıpta Uzmanlık Tezi, Eskişehir Osmangazi Üniversitesi, Eskişehir.
- Kılıç M (1987). Değişik Psikolojik Arazilara Sahip Olan ve olmayan Öğrencilerin Sorunları, Doktora Tezi, Hacettepe Üniversitesi, Ankara.
- Koç M, İskender M, Çolak TS, Bayraktar B (2008). Üniversite öğrencilerinin duygusal dışa vurum düzeyleri ve psikopatolojileri. 17. Ulusal Eğitim Bilimleri Kongresi, Sakarya Üniversitesi, Sakarya.
- Köknel Ö (1979). Cumhuriyet gençliği ve sorunları. İstanbul: Cem Yayınları.
- Özgüven E (1974). Üniversite öğrencilerinin akademik başarılarını etkileyen zihinsel olmayan faktörler. Ankara: Hacettepe Üniversitesi Basımevi.
- Özgüven E (1988). Yurtkur yurtlarında barınan öğrencilerin beklenti ve problemleri. Ankara: Yüksek Öğretim Kredi ve Yurtlar Kurumu Genel Müdürlüğü.
- Öztürk MO (2004). Ruh sağlığı ve bozukluklar (10th ed.). Ankara: Nobel Tıp Kitapevleri.
- Rosenthal BS, Schreiner AC (2000). Prevalence of psychological symptoms among undergraduate students in an ethnically diverse urban public college. Journal of American College Health 49(1):12-18.
- Sapmaz F (2006). Üniversite öğrencilerinin uyumlu ve uyumsuz mükemmeliyetçilik özelliklerinin psikolojik belirti düzeyleri açısından incelenmesi. Yayınlanmamış Yüksek Lisans Tezi, Sakarya Üniversitesi, Sosyal Bilimler Enstitüsü, Sakarya.
- Schraedley PK, Gotlib IH, Hayward C (1999). Gender differences in correlates of depressive symptoms in adolescents. J. Adolesc. Health 25:98-108.
- Tan H (1971). Öğrenci ihtiyaçlarını tarama listesi ve el kitabı. İstanbul: İstanbul Millî Eğitim Basımevi.
- Trollor JN, Sachdev PS, Brodaty H, Andrews G (2007). Prevalence of mental disorders in the elderly: the Australian national mental health and well-being survey. Am. J. Geriatr. Psychiatry 15(6):455-466.
- WHO (2001). Basic documents. 43rd Edition. Geneva, World Health Organization:1.