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Personality Traits and Changes in Depression Symptoms in Female University Students

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The present study aimed to investigate the course of symptoms of depression in female university students over a four-year period, while also exploring the predictive value of four personality traits with regard to symptoms of depression. The sample comprised 74 female first-year university students. Symptoms of depression were assessed using the Zung Self-Rating Depression Scale and were collected twice over a four-year interval, while the personality traits of extraversion, neuroticism, psychoticism and lie tendencies were assessed by the Eysenck Personality Questionnaire only at the baseline. The results revealed that after a four-year period the depression symptoms increased in intensity/frequency on 10 out of 20 items as well as in the summary score, and decreased only in diurnal variations, which was a favourable outcome. Multiple regression analysis indicated that out of the four personality traits only neuroticism was a significant predictor of the summary depression score four years later. This means that young female students with higher scores in neuroticism, although still in the normal or average range, would very probably have a more pronounced and less well-regulated emotional response to a stressful period of their university education.

Keywords: depression symptoms, Eysenck Personality Questionnaire, female students, neuroticism, Zung Self-Rating Depression Scale

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Osebnostne lastnosti in spremembe simptomov depresije pri študentkah

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Cilja raziskave sta bila preučitev poteka simptomov depresije pri študentkah v štiriletnem obdobju in določitev napovedne vrednosti simptomov depresije pri štirih osebnostnih lastnostih. V raziskavo je bilo vključenih 74 študentk prvega letnika. Simptome depresije smo zajeli dvakrat v štiriletnem obdobju in jih ocenjevali z Zungovo lestvico za samooceno depresije; samo na začetku raziskave smo z Eysenckovim osebnostnim vprašalnikom ocenili osebnostne lastnosti ekstraverzije, nevroticizma, psihoticizma in nagnjenosti k laganju. Rezultati so pokazali, da so po štiriletnem obdobju simptomi depresije narasli glede intenzivnosti/pogostosti pri 10 od 20 postavk in v skupni vrednosti, zmanjšali pa so se le pri dnevnih nihanjih, kar je bil ugoden izid. Multipla regresijska analiza je pokazala, da je izmed štirih osebnostnih lastnosti samo nevroticizem pomemben napovednik skupne vrednosti depresije po štirih letih. Navedeno pomeni, da bi se mlade študentke z višje doseženimi vrednostmi pri nevroticizmu, čeprav še vedno v običajnem ali povprečnem razponu, zelo verjetno izraziteje in manj čustveno uravnovešeno odzivale na stresno študijsko obdobje.

Ključne besede: simptomi depresije, Eysenckov osebnostni vprašalnik, študentke, nevroticizem, Zungova lestvica za samooceno depresije

Introduction

Everyone experiences some unhappiness, sadness or anxiety during their lifetime, often as a result of unexpected, unwanted or just very important life changes. The transition from secondary school to university is usually a major challenge in one's life. Many students leave home for the first time, start living on their own and face the demands of adapting to a new cultural and social context. Many engage in various paid or unpaid jobs (e.g., voluntary work) for additional professional development and/or to meet existential needs. Furthermore, many have to cope with partnership issues, which is one of the vital tasks in this developmental period. Finally, all students have to deal with increased academic demands that require high levels of self-regulated behaviour. These circumstances may elicit a negative emotional response to challenges and stress, especially in persons with a high level of neuroticism (Fanous et al., 2002; Hutchinson & Williams, 2007). A recent study performed on a large sample of 697 high school students aged 14–19 years in Zagreb (Croatia) analysed the frequency of depression and auto-aggression. The results revealed that as many as 26.5% of the participants had depressive disorders of some degree, ranging from mild to very severe (Tripković et al., 2014).

It is well known that the personality dimension of neuroticism, i.e., emotional instability, is a good predictor of anxiety and depressive symptomatology (Gershuny & Sher, 1998; Kotov et al., 2010; Nolan et al., 1998) as well as of wellbeing (Butković et al., 2012; Diener & Lucas, 2009). Barnhofer et al. (2011) applied the well-known Eysenck Personality Questionnaire (EPQ – Eysenck & Eysenck, 1975) on a sample of 144 individuals at the first point of measurement and the Beck Depression Inventory (BDI-II – Beck et al., 1996) six years later. They found that scores on Neuroticism assessed six years earlier were positively correlated with the severity of symptoms of depression assessed by the BDI-II. In their recent study, Shi et al. (2015) also indicated that the trait of neuroticism was positively related to depression in a large sample of 2000 Chinese undergraduate medical students. The psychological and sociocultural adjustment of first-year international students in the USA was the focus of a study performed by Hirai et al. (2015), who concluded that the most consistent predictors of the process of adjustment were perceived control over academic stress and neuroticism. Longitudinal studies by Hirschfeld et al. (1989) and Krueger et al. (1996) also suggest that a high premorbid level of neuroticism is positively associated with the development of depression. The same was found by Roberts and Kendler (1999), who performed a study on a large sample of female subjects using the EPQ. In his

paper on the relevance of neuroticism to public health, Lahey (2009) stated that neuroticism was "a robust correlate and predictor of many different mental and physical disorders, comorbidity among them, and the frequency of mental and general health service use" (p. 241). As such, neuroticism has long been a topic of interest to many researchers in the broad fields of psychology, psychiatry and public health (Ormel et al., 2013).

Our previous research results have shown that women with a higher degree of neuroticism perceive the quality of their lives in the domain of environment as lower (Radošević-Vidaček et al., 2009), and that more emotionally stable adults perceive their life as better in quality and are in general more satisfied with their work environment (Bobić, 2012).

In addition to devoting attention to stable personality traits that may shape students' coping strategies in their new demanding environment, the awareness and management of subtle depression symptoms that do not exceed the boundaries of "normality" is also important. It is well known that besides difficulties in social adaptive processes depression symptoms can reduce intellectual performance crucial to learning abilities. Klein et al. (2011) stressed the importance of personality research in the prevention of depressive disorders, stating that "personality is at least somewhat malleable, especially in youth, but may forecast the onset of depression years in advance, which makes traits a potentially attractive means of identifying individuals at risk and informing selection of interventions" (p. 287).

In order to examine the relationship between personality traits, symptoms of depression and self-perceived health-related wellbeing among university students, we performed a study with 430 healthy students of both male and female gender in the first year of their university studies (Bobić et al., 2015). This study was a part of a larger cross-sectional study aimed at defining relationships between various genetic, environmental and life-style factors in the development of the atopic diseases rhinitis, asthma and dermatitis (Babić et al., 2016; Sabolić Pipinić et al., 2013; Sabolić Pipinić, 2015). We found that the trait of neuroticism (EPQ N) predicted the summary score on the Zung Self-Rating Depression Scale (SDS) and on health-related wellbeing better than any other personality trait assessed by the EPQ, and that neuroticism significantly contributed to increased scores on the SDS only in women. These results for the EPQ and the SDS were obtained at the same point of measurement. Approximately four years later, we approached the same participants to test the assumption that higher initial levels of neuroticism, although within the average range, would also be prospectively associated with more frequent or more pronounced depressive symptoms at follow-up. Additionally, we wanted

to assess the possible changes of depression symptoms over the course of university studies. Findings on differences in the mental health status of university students depending on the year of study are inconclusive, varying from more distress at the entry years to more distress before leaving the relative security of student life (Liu et al., 2019). In order to gain a more comprehensive insight into the areas of functioning in which vulnerabilities are most likely to develop, we wanted to examine the changes in each of the 20 symptoms that comprise the SDS separately.

Therefore, the aims of the present study were to explore how symptoms of depression fluctuate over time from the beginning to the end of university studies, and to estimate the tentative predictive value of four EPQ personality variables measured at the beginning of studies for the level of summary depression score after a period of approximately four years.

Method

Participants and procedure

We initially assessed 430 healthy first-year university students (males and females) from seven different public faculties of the University of Zagreb, with the goal of determining how personality traits may predict symptoms of depression and wellbeing assessed at the same time point. These results of the baseline study were published elsewhere (Bobić et al., 2015).

The second part of the study was performed approximately four years (47 months) after the first assessment, when we called all of the students from the first pool once again. All of the procedures were carried out in our institution. A total of 93 participants of both genders responded and we were able to assess their mood in relation to depression symptoms as measured by the SDS for a second time. Due to the very small number of male students who responded to our second invitation, we limited our analyses to female students. A detailed description of the number of students at each stage of the study and the reasons for their exclusion from the analyses is presented in Figure 1.

The mean age of the 74 female students who participated in the retest was 18.9 years, with a range of 18–29 years at the first point of measurement. At the second point of measurement, their mean age was 22.9 years with a range of 22–33 years.

Each participant was fully informed about the aims of the study and the study protocol, and a consent form was signed during the first phase of the study. The study was conducted in accordance with the Declaration of Helsinki

of 1997 (revised in Edinburgh in 2000) and was approved by the Ethics Committee of the Institute for Medical Research and Occupational Health.

Instruments

Zung Self-Rating Depression Scale (SDS)

The Zung Depression Scale (Zung, 1965) is a self-rating scale that comprises 20 questions on different depressive symptoms (affective, psychological and somatic). Each answer is scored on a Likert-type scale from 1 to 4, indicating the level of agreement to the respective statement, from minimal "None or a little of the time", to severe "Most or all of the time". Positively phrased items are reverse scored. The total score represents the sum of scores on all twenty items. It can range from 20 to 80, with higher scores indicating an increased number of depressive symptoms or more intensive symptoms. In the present study, raw scores were used for the statistical analysis. In addition to a number of studies including different patients groups, the SDS has proven itself as a useful instrument in young healthy adults (Gotestam et al., 2008; Kitamura et al., 2004), primary healthcare patients without any psychiatric disorder (Milanović et al., 2015) and healthy workers (Ikenouchi-Sugita et al., 2013). Furthermore, Shumway et al. (2004) found it to be one of the least complex measures of depression, being very easy to comprehend. The reliability ($\alpha = .81$) and validity of the SDS have been reported to be adequate to excellent (Overholser et al., 1993; Tate et al., 1993).

Eysenck Personality Questionnaire (EPQ)

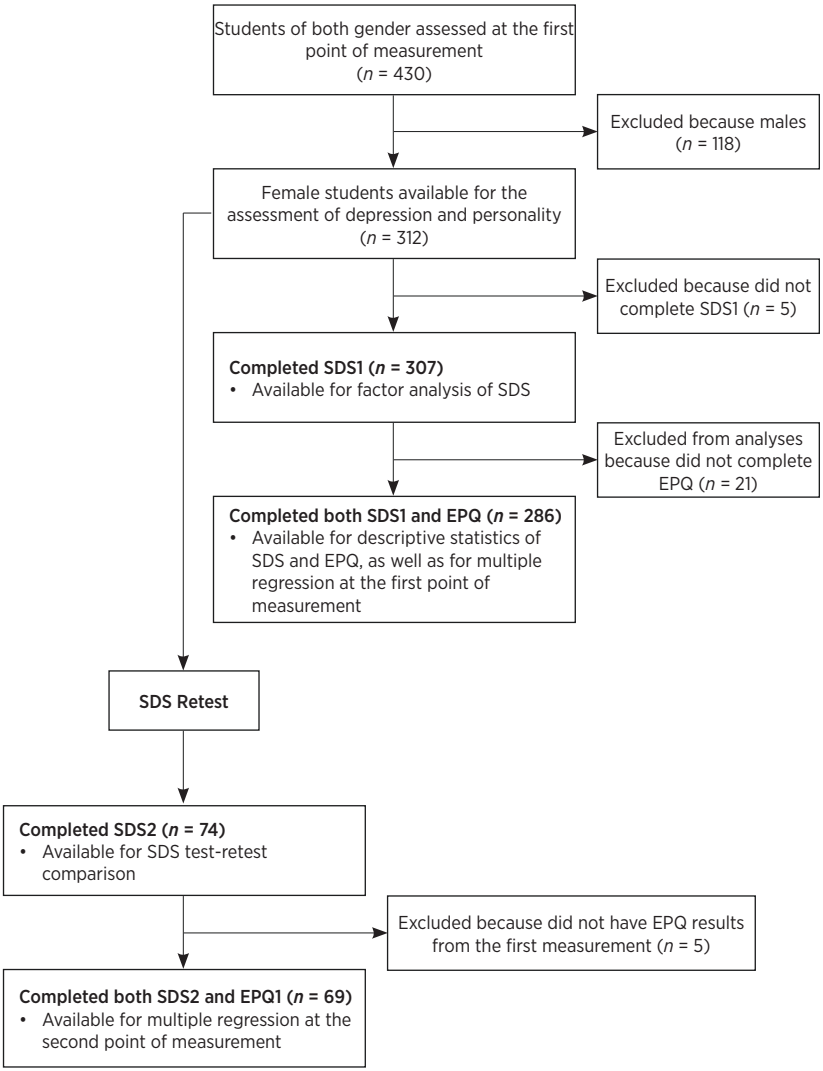
The Eysenck Personality Questionnaire is one of the most often used questionnaires for assessment of personality traits. The questionnaire was developed by Hans and Sybil Eysenck in 1975 (Lojk, 1984) and has demonstrated its validity and reliability as a standardised instrument in many countries. Lojk et al. (1979) reported a comparison between results obtained from ex-Yugoslavian subjects and English subjects and concluded that the organisation of personality was sufficiently similar to make national comparisons feasible. Its internal consistency ranges from 0.68 to 0.91 depending on scale and gender (Lojk, 1984). The EPQ was originally conceived to measure stable personality traits. It consists of 90 items to which participants respond in "yes" or "no" form. The scores are calculated separately for each of the four scales: Psychoticism (EPQ-P), which denotes aggressiveness, assertiveness, egocentrism, unhelpfulness, tough-mindedness and inclination toward manipulation comprises 25 items; Extraversion (EPQ-E), which denotes social dimensions of

personality: sociability, liveliness, domination, impulsiveness, irresponsibility, risk-taking, outgoing and talkative characteristics, comprises 21 items; Neuroticism (EPQ-N), which denotes emotional instability and anxiousness, irritability, feelings of guilt, depressed mood and low self-esteem, comprises 23 items; and Lie scale (EPQ-L), which denotes dissimulation, social naïveté, social conformity or social desirability, comprises 21 items.

Before running the statistical analyses, we tested whether there were any significant differences in the arithmetic means of the four EPQ personality variables and the sum result on the SDS at the first point of measurement (EPQ P, EPQ E, EPQ N, EPQ L, SDS 1) between those who later came to retest and those who did not. The means of those who did not come to retest were: SDS $1_{n=233}$ = 25.72; EPQ $P_{n=222}$ = 4.33; EPQ $E_{n=222}$ = 15.14; EPQ $N_{n=222}$ = 10.94; EPQ $L_{n=222}$ = 8.34. The means of those who did come to retest were: SDS $1_{n=74}$ = 25.85; EPQ $P_{n=69}$ = 3.62; EPQ $E_{n=69}$ = 14.14; EPQ $N_{n=69}$ = 10.65; EPQ $L_{n=69}$ = 8.38. We employed the t-test for independent samples and found only that those who came to retest had lower EPQ P values at the first point of measurement than those who did not retest, at a level of significance of $p = .046$.

Figure 1

Number of participants at each stage of the study



Note. ZDS1 = Zung Self-Rating Depression Scale at measurement point 1; ZDS2 = Zung Self-Rating Depression Scale at measurement point 2; EPQ1 = Eysenck Personality Questionnaire at measurement point 1.

Results and discussion

Changes in depression symptoms

The first aim of our study was to evaluate the course of 20 SDS items/symptoms after a four-year period. The mean values of all 20 SDS items for baseline and repeated measurements for the 74 female students who came for retest approximately four years later are presented in Table 1. The nonparametric statistical method Wilcoxon Matched Pairs Test was used for dependent groups in order to test differences between the mean raw scores on each item and the summary SDS raw score.

Statistically significant differences were found for 11 out of 20 items, as well as for the summary SDS score. The results show that the female students reported less diurnal variations of mood (item 2) on the retest, which may also be an indicator of the adaptation process to the academic schedule and of an age-related phase shift towards more pronounced morningness (Roenneberg et al., 2004), since it is the only symptom that showed improvement over time. At the second point of measurement, the students reported more sleeping disturbances (item 4); changed appetite – eating more or less than they used to eat (item 5); decreased sexual interest/libido (item 6); weight loss (item 7); more troubles with constipation (item 8); increased confusion/clouded reasoning (item 11); more frequent task difficulties (item 12); more emphasised personal devaluation/diminished self-esteem (item 17); more pronounced feeling of emptiness (item 18); and a more frequent feeling of dissatisfaction/anhedonia (item 20). Overall, our results are in accordance with the findings of Bostanci et al. (2005), who found an increase in the prevalence of depressive symptoms among older students (using Beck Depression Inventory) ranging from 25% to as much as 32%, i.e., a positive association between being a senior in school and the level of depressive symptoms. This somewhat unexpected result may be explained by the strain that emerges at the end of the schooling period, accentuated by expectations associated with the problem of finding proper employment. Students are aware of the high unemployment rate of young people in our society and are therefore put in a position of high uncertainty. Galanaki and Leontopoulou (2017) investigated the transition to adulthood on a large sample of university students in Greece and reported that more than two-thirds (71.4%) of young people exhibited ambivalence with regard to their perceived adult status.

Table 1

Differences between test and retest results for Zung Self-Rating Depression Scale raw scores

SDS Item (Content)		*M1*	*M2*	*p*
1.	Depressed mood/affect	1.46	1.46	-
2.	Diurnal variation	2.81	2.42	.012
3.	Crying	1.27	1.34	.402
4.	Sleep disturbance/insomnia	1.26	1.49	.014
5.	Appetite	1.12	1.39	.004
6.	Decreased libido/sexual interest	1.01	1.64	.001
7.	Weight loss	1.03	1.22	.001
8.	Constipation	1.12	1.24	.038
9.	Palpitation	1.11	1.12	.798
10.	Fatigue	1.31	1.24	.470
11.	Confusion/clouded reasoning	1.04	1.16	.012
12.	Task difficulties	1.04	1.16	.012
13.	Restlessness	1.34	1.47	.167
14.	Hopelessness/lack of hope	1.18	1.27	.196
15.	Irritability	1.37	1.38	.874
16.	Indecisiveness	1.95	1.93	.913
17.	Diminished self-esteem/personal devaluation	1.19	1.42	.012
18.	Emptiness	1.15	1.37	.004
19.	Suicidal ideation	1.08	1.04	.181
20.	Dissatisfaction/anhedonia	1.03	1.22	.002
Σ SDS		25.85	27.97	.001

Note. N = 74 female students; SDS = Zung Self-Rating Depression Scale; Σ SDS – Sum SDS result; *M1* = means at the first measurement point; *M2* = means at the retest.

We also explored the structure of the SDS scores obtained on female participants at the first measurement point (N = 308) in order to determine whether the items of the SDS would group around theoretical categories and consequently whether we could expect changes across time in a specific category. The internal consistency coefficient for this subsample of female students was α = 0.71. Item 2 (*Morning is when I feel the best*) was excluded from the analysis, as this was the only item that significantly decreased in mean value on the second time point, as mentioned above. We assumed that for the majority of participants in this age group the answer on this item would be related more to the concept of morningness-eveningness and sleep quality than to depression

(Bakotić et al., 2017). Furthermore, the participants often stated that they were forced by circumstances to get up earlier than they would otherwise like, as they tended to go to sleep later. It seems that later in the study period they adjusted to the requirements of the university regime and simply acquired new habits and went to bed earlier. Removing this item from the scale yielded a better internal consistency of the scale ($\alpha = 0.77$), which was not the case with other items.

We performed a principal-component analysis on 19 items. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.778, which is above the usual acceptable level of 0.5, and Bartlett's test of sphericity was significant (Chi-square = 1258.23; *d. f.* = 171; $p < 0.001$). Based on the Kaiser's criterion only (eigenvalues above 1), the initial unrotated solution yielded six components. The eigenvalues of the first two components were 4.36 and 1.78, explaining 23% and 9.3% of the variance, respectively. The following four components had eigenvalues of 1.3, 1.2, 1.2 and 1.1., and explained 6.6%, 6.3%, 6.2% and 5.9% of the variance, respectively. As the average communality for this solution was under the recommended 0.6 and a solution with so many components was difficult to interpret, we decided to use the scree test in conjunction with the eigenvalues to determine the number of components to be retained. The curve on the scree plot clearly began to tail off after three components, which together explained 39% of the variance. We performed both varimax and promax rotations with three extracted components, which yielded similar solutions. We kept the solution obtained by the promax rotation because it was somewhat simpler for interpretation (Table 2). An item was selected in the final solution if its primary component loading was at least .40 and it had no cross-loading of .40 or above (presented in Table 2 in bold script). Three items (7, 9 and 16) did not load at least .40 on any component and were therefore eliminated from the final solution. In the end, three components were identified: Component 1: cognitive symptoms (items: 8, 14, 17, 18, 19, 20); Component 2: affective symptoms (items: 1, 3, 4, 6, 10, 13, 15); and Component 3: somatic symptoms (items: 5, 11, 12).

Table 2

Component loadings based on principal component analysis with promax rotation for 19 Zung Self-Rating Depression Scale items

Content	Full item	Component 1 Cognitive	Component 2 Affective	Component 3 Somatic
18. Emptiness	My life is pretty full	**.80**	-.05	-.12
14. Hopelessness	I feel hopeful about the future	**.76**	-.01	-.17
17. Self-esteem	I feel that I am useful and needed	**.66**	.11	-.07
8. Constipation	I have trouble with constipation	**.62**	-.02	-.12
19. Suicidality	I feel that others would be better off if I were dead	**.59**	.17	.08
20. Dissatisfaction	I still enjoy the things I used to do	**.54**	-.07	.39
9. Palpitation	My heart beats faster than usual	.38	.19	-.01
6. Sexual interest	I enjoy looking at, talking to and being with attractive women/men	-.37	**.73**	-.19
13. Restlessness	I am restless and can't keep still	.29	**.58**	-.02
1. Depressed mood	I feel downhearted and blue	.20	**.52**	.10
4. Sleep disturbance	I have trouble sleeping at night	.07	**.51**	-.03
3. Crying	I have crying spells or feel like it	.03	**.48**	-.01
10. Fatigue	I get tired for no reason	.06	**.45**	.07
15. Irritability	I am more irritable than usual	.03	**.44**	.26
16. Indecisiveness	I find it easy to make decisions	.16	.19	.06
12. Task difficulties	I find it easy to do the things I used to	-.12	.06	**.74**
11. Confusion	My mind is as clear as it used to be	-.08	.09	**.72**
5. Appetite	I eat as much as I used to	-.16	-.06	**.64**
7. Weight loss	I notice that I am losing weight	.25	-.13	.27

Note. N = 308 female students.

Kitamura et al. (2004) performed a factor analysis on SDS results on a large sample of first-year university students of male and female gender and also found three factors: affective (7 items: 1, 3, 9, 10, 13, 15, and 19), cognitive (4 items: 14, 16, 17, 18) and somatic (3 items: 5, 6, 12). There are both similarities and differences between the particular items constituting each SDS factor in first-year students in Japan and Croatia. However, the huge difference in sample size and composition does not allow for detailed comparisons between the two studies. What is interesting to note is that some of the factors that constituted the affective factor in both studies, namely Depressed mood (1), Crying (3),

Fatigue (10), Restlessness (13) and Irritability (15), did not show a significant change during the four-year period and progression through the educational stages in our study.

A recent study by Romera et al. (2008) revealed that items 11 (confusion/clouded reasoning) and 12 (task difficulties) were the most frequent symptoms and the symptoms with the highest mean scores ($M_{11} = 3.28$; $M_{12} = 3.29$) observed in a sample of patients with major depression. Both of these items/symptoms showed a statistically significant increase in frequency over the four-year period in our sample. It seems that our students experience and express more cognitive and somatic disturbances over the course of time, spending more time studying and coping with different stressors and less time socialising, which makes them vulnerable to the development of depressive symptoms.

Personality traits as predictors of depression symptoms

In order to examine the predictive value of the EPQ personality variables (P, E, N and L) measured at the beginning of university studies for the total depression score after a four-year period (SDS2), we conducted multiple regression analyses. Descriptive statistics and the main results of the regression analyses are shown in Table 3.

Table 3

Correlation matrix, descriptive statistics (mean and standard deviation) and main results of multiple regression analysis with SDS2 as criterion variable

Variables	Zero-order correlations					Multiple regression weights	
	EPQ E	EPQ N	EPQ P	EPQ L	SDS2	*b*	*ß*
EPQ E	-	-.224	.043	-.331**	-.118	-.055	-.048
EPQ N		-	.387**	-.188	.463**	.402**	.441**
EPQ P			-	-.353**	.186	-.031	-.015
EPQ L				-	-.153	-.110	-.091
M	14.14	10.65	3.62	8.38	28.01		
SD	4.32	5.37	2.35	4.06	4.89		

Note. $N = 69$; ** $p < .001$; * $p < .005$; SDS2 = Zung Self-Rating Depression Scale at the second point of measurement; EPQ = Eysenck Personality Questionnaire at the first point of measurement; E = extraversion; N = neuroticism; P = psychoticism; L = lie scale.

Neuroticism was the only dimension that was significantly correlated

to the SDS summary score (SDS 2) in the subsample that came for retesting after a four-year period. Four personality variables together explained (only) 22.1% of the variance in the SDS 2 score ($F(4.64) = 4.546$; $p = .003$; $R = .470$; R square = .221; adjusted R square = .173), and in this model only the N scale was a significant predictor of the summary depression symptoms score (ß = .441, $p = .001$). In other words, female students with a higher degree of neuroticism would very probably report more depression symptoms as a reaction to specific circumstances and challenges and an overall stressful period of study at university, even if the symptoms do not exceed the boundaries of "normality" or average scores on any of the observed trait variables. This is why it is important to ensure the availability of adequate professional support and counselling in the institutional education system.

Conclusion

Our results showed that the mean result for the SDS summary score remained within expected boundaries. The course of depression symptoms after a four-year period measured by the SDS showed an increase in intensity/frequency on 10 items (sleep disturbance, appetite changes, weight loss, constipation, insomnia, decreased libido, confusion, task difficulties, personal devaluation, emptiness and dissatisfaction) as well as in the summary score, with the only decrease being in diurnal variations, which is a more favourable option. We also confirmed the three-factor structure of the SDS items.

Multiple regression analysis indicated that out of the four personality variables measured by the EPQ (Psychoticism, Extraversion, Neuroticism and Lie tendencies) only Neuroticism was a significant predictor of the summary depression score at the second time point (SDS2). This means that young female students with higher neuroticism scores, although in normal or average range, would very probably have a more pronounced and less well-regulated emotional response to a stressful study period. We can speculate that this prolonged response mechanism would most likely reflect itself in a lower overall quality of life.

As many reports show that the number of students seeking advice in relation to depression symptoms is rising, it would be helpful to take into account the personality characteristics of these students when designing and developing the best intervention procedures to be included in public health strategies. Young students navigate between being a freshmen and being a finalist a few years later and are inevitably faced with different stressors, which in turn may elicit a depressed mood. It might be beneficial for individuals with lower

emotional stability who are faced with stress to learn how to effectively manage stress and subsequently reduce the quantity and/or intensity of depressive symptoms.

The limitations of the present study are primarily in the small number of subjects who came to retest, which resulted in limiting the sample to females only. We can speculate that the differences between the test and retest results on the SDS, as well as the SDS factor profile, may have been different in the male student population. Another limitation is that we disregard socioeconomic status as an important factor, although our same-gender sample is homogenous in terms of age and education. Furthermore, the fact that assessments of personality traits and depression symptoms are based on self-reports may present a problem, as such reports can be influenced by current mood state.

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