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PERSONALITY AND SELF-PERCEPTION OF PHYSICAL AND EMOTIONAL HEALTH AMONG FIRST-YEAR UNIVERSITY STUDENTS

Jasminka BOBIĆ, Selma CVIJETIĆ, Jelena MACAN
Institute for Medical Research and Occupational Health, Zagreb

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The aim of this study was to determine the four personality traits: psychoticism (P), extraversion (E), neuroticism (N) and lie tendencies (L) measured by the Eysenck Personality Questionnaire, depression symptoms measured by the Zung Depression Scale (ZDS) and self-perceived health-related well-being measured by SF-36 in a sample of 430 healthy first-year university students of both sexes. We also wanted to determine which personality variable best predicts depression symptoms (ZDS) and well-being (SF-36). The obtained results showed that students rated their health and health-related quality of life as good, although they scored lower than same aged adults from the general population. Women had significantly higher scores on ZDS, N and L than men, while men scored higher on P and six out of eight SF-36 scales. N, among all of the other included personality variables, best predicts depression symptoms on ZDS and self-perceived physical and emotional health on SF-36. We also found that gender was not a moderator in any of the personality traits in their influence on well-being, but that N in females only adds significantly to the expression of depression symptoms. We concluded that personality plays an important role in subjective health-related well-being together with objective life circumstances.

Keywords: personality, well-being, extraversion, neuroticism, SF-36



Jasminka Bobić, Institute for Medical Research and Occupational Health, Ksaverska cesta 2, 10 000 Zagreb, Croatia.
E-mail: jbobic@imi.hr

INTRODUCTION

Much has been said about personality as a relatively stable behavioral and psychological characteristic unique to a person, which exerts a consistent influence on behavior patterns across qualitatively different situations and over time. Personality plays an important role in perceived physical and emotional health, as its numerous characteristics affect a person's cognitive and emotional judgments of one's health-related quality of life or well-being and, in turn, moderately influence health status or health outcomes. This powerful impact of different personality traits on self-perception has been shown in multiple studies (Diener, 1996; DeNeve & Cooper, 1998; Bal & Sahin, 2011; Otonari et al., 2012). More than three decades ago, Costa and McCrae (1980) indicated that components of neuroticism and extraversion, and not temporary moods or states, can serve to predict individual differences of subjective well-being even over a period of ten years. They also pointed out that the association between physical symptom reports and measures of neuroticism may reflect neuroticism-related styles of perceiving and reporting psychological experiences (Costa & McCrae, 1987). Self-reported measures of health or well-being have become widespread and regular methods especially in epidemiological studies, which provide useful information on actual health status (Page et al., 2009).

Extraversion and neuroticism show different patterns of relationship, so many authors hold extraversion to be the principal trait of psychological well-being or happiness since Costa and McCrae (1980) demonstrated that positive affect correlates with E and negative with N (Larsen & Ketelaar, 1989; Lu, Shih, Lin, & Ju, 1997; Pavot, Fujita, & Diener, 1997; Pavot, Diener, & Fujita, 1990). Steel, Schmidt, and Shultz (2008) illustrated that personality is one of the strongest and most consistent predictors of well-being and that up to 39% of the variance in subjective well-being can be explained by this relation. They found significant correlations between subjective well-being and emotional stability, as well as subjective well-being and extraversion using three different personality inventories. In a recent study, Kokko, Tolvanen, and Pulkkinen (2013) found a strong association between low neuroticism and high extraversion with psychological well-being across time in middle adulthood. Butkovic, Brkovic, and Bratko (2012) performed a study on adolescents and older adults in Croatia, focusing on the prediction of well-being from personality traits. They too concluded that emotional stability and extraversion appeared as the most pronounced predictors of well-being. Self-perceived health and its strong association with personality, both in subjects with and without self-reported medical problems,

was shown in a study on a representative sample of adults by Goodwin and Engstrom (2002). Among those without medical problems, they found that openness to experience, extraversion and conscientiousness were associated with good health, while neuroticism was associated with the perception of poor health. A growing number of authors stress the importance of the dimension neuroticism-emotional stability as a dominant predictor of psychological well-being (DeNeve & Cooper, 1998; Ryan & Frederick, 1997; Pavot et al., 1997; Vittersø, 2001; Hills & Argyle, 2001; Tok, Tatar, & Morali, 2010). Götestam, Svebak, and Jensen (2008) included only the N scale from the Eysenck Personality Questionnaire (EPQ) in a study that investigated the association of personality, mood, subjective health and stress in depressive symptoms among high school students. Additionally, a study of a large family-based sample from Croatia found a high genetic correlation between neuroticism and psychological distress using the EPQ (Ivkovic et al., 2007). A more recent study by Feng, Ji, and Yin (2013) on a sample of 330 Chinese judges showed that only neuroticism among the Big Five personality traits had both a direct and indirect effect on health-related quality of life. The indirect effects were particularly seen through the mediating role of perceived occupational stressors. Similarly, Gomez, Krings, Bangerter, and Grob (2009) found that only neuroticism, together with positive and negative life events, is a direct predictor of well-being through life, while extraversion influences well-being only in early adulthood and then disappears with aging. Vittersø (2001) emphasized that the relationship between extraversion and well-being interacts with cultural norms and values, so it seems that it adds more to well-being in cultures where this kind of personality fits in with common customs and *vice versa*.

The impact of personality traits on self-perception was well documented by Tok et al. (2010), showing that emotional stability as the opposite of neuroticism was the only among the Big Five personality factors to significantly predict body image satisfaction in a college student sample. Our recent study on a sample of 262 older subjects demonstrated that people with higher scores on the neuroticism scale were more inclined to report a lower functional disability and quality of life caused by chronic back pain than those who were more emotionally stable (Cvijetic et al., 2014). We also found that middle-aged healthy persons – office workers of both sexes with more pronounced emotional stability (less neuroticism) – perceived their life as being better in quality, their work environment healthier, and their work organization more adequate (Bobić, Gomzi, Radošević-Vidaček, & Kanceljak-Macan, 2009).

Gender differences

The published norms for the four EPQ scales are Psychoticism (P), Extraversion (E), Neuroticism (N) and Lie tendencies (L) and they show standard gender differences in personality traits; females having higher values on N and L, and males on P and E (Lojk, 1984). Jorm (1987) performed a meta-analysis on published studies reporting sex- and age-specific norms for different neuroticism inventories. He found that females had higher scores, and that the difference was greater in young and middle-aged than older adults. Lynn and Martin (1997) compared mean EPQ values for E, N and P for 37 nations, and found that women obtained higher means on neuroticism in all countries, while men obtained higher mean values on psychoticism in 34 countries, as well as on extraversion in 30 countries.

A review of the literature on gender differences and self-perception of well-being suggests that men usually score higher than women on most scales, perceiving their functional physical and emotional health and well-being better in quality (Jenkinson, Coulter, & Wright, 1993; Jureša et al., 2000; Hopman et al., 2000; Marshall, Allison, Nykamp, & Lanke, 2008). However, one group of authors found gender differences in a reference group (non-patient group), with women showing higher values than men (Shulte-van Maaren et al., 2012). Page et al. (2009) conducted a survey on a large number of Central and East European adolescents and found a significantly higher proportion of boys *vs.* girls rating their health as very good, and a higher proportion of girls than boys rating themselves as not healthy. Posadzki, Musonda, Debska, and Polczyk (2009) performed a study using SF-36 on a random sample of undergraduate students from 5 different faculties and also found that female students reported lower scores than males on role limitations due to emotional problems (RE), social functioning (SF) and vitality (VT). Rakovac, Pedisic, Pranic, Greblo, and Hodak (2013) recently performed a study on a random sample of Croatian university students using the 12-item Short-Form Health Survey and found that male students scored significantly higher than females on all scales.

Our interest here was primarily on a specific time in young peoples' lives; the period when the process of maturation happens. This is the breaking point at which, for some, their lives take a new turn toward studying at university, while they are still struggling with issues of identity. We hypothesized, according to Eysenck's theory of neuroticism, that a higher level of N would be associated with a significant growth of depression symptoms and a lower self-perception in quality of life when under psychological distress. We assumed

that this stressful transition could yield adjustment problems, reflecting in the self-perception of physical and psychological health. Self-perception of well-being and health is to some extent relevant to actual health, and can have positive or negative long term influence. There are research reports about life satisfaction (Babinčák & Bačová, 2008) and some depression characteristics among first-year students (Taşkin, Yüksel, & Özmen, 2009; Göttestam et al., 2008) that may be linked to concurrent adjustment problems, since some had changed not only their school level upon enrolling in university, but also their places of residence after leaving their homes. This period in life is characterized by the transition to higher education, as well as by an increased responsibility as well as by stronger autonomy from family, leading to independence and greater importance of relationships among friends and colleagues.

AIM

The aim of this study was to assess the personality traits of neuroticism, extraversion, psychoticism and lie tendencies in a sample of Croatian first-year university students and determine their association with symptoms of depression as well as with the self-perception of physical and emotional health in circumstances that could cause a shift in subjective well-being. Furthermore, we were interested in potential gender differences regarding personality and its relevance to differences in self-perception of health.

METHOD

Subjects

The study sample included 430 first-year students from 7 different Faculties within the University of Zagreb: The Faculty of Food Technology and Biotechnology: 108 students; Faculty of Mining, Geology and Petroleum Engineering: 30; Faculty of Philosophy: 10; Faculty of Veterinary Medicine: 83; Faculty of Forestry: 13; Faculty of Textile Technology: 151; and Faculty of Kinesiology: 35 students. Age range was 18 to 29 years and Mean = 19.15+/-1.52 years, with no gender difference. The majority of our sample comprised females: 312 female and 118 male subjects. This gender discrepancy is primarily attributable to the inclusion of Faculties that traditionally attract more female students. All of the testing procedures were performed at the beginning of the 2008 and 2009 school years. Each student interested in participating was informed about the study protocol, and signed a consent form. The study design was approved by our institution's Ethics Committee.

Procedure and instruments

All of the subjects underwent the same testing procedure. The Zung Depression Scale (ZDS) was administered by a trained psychologist after personal data collection in conditions suitable for psychological testing. The other two questionnaires (EPQ and SF-36) were given to the participants with detailed instructions and a request to complete them at home and return them in a closed envelope the following day. The few subjects that declared psychiatric treatment at the time of testing were omitted from statistical analysis.

Zung Depression Scale (ZDS)

The Zung self-rating depression scale (Zung, 1965) contains 20 questions covering affective, psychological and somatic symptoms associated with depression. Each item is scored on a Likert scale ranging from 1 to 4, specifying the level of agreement to a given statement. Scores can range between 20 and 80, higher scores denoting a greater number of depression symptoms. Alongside its standard use as an instrument in numerous studies on different patient groups, the ZDS has also proven itself useful in young healthy adults (Götestam et al., 2008; Kitamura, Hirano, Chen, & Hirata, 2004). Additionally Shumway, Sentell, Unick, and Bamberg (2004) listed it among the least complex measures and very likely to be easiest to comprehend.

Eysenck Personality Questionnaire (EPQ)

Personality traits were assessed by EPQ, one of the most used questionnaires developed by Hans and Sybil Eysenck in 1975 (Lojk, 1984). It was originally devised to measure enduring personality traits. Internal consistency ranges from 0.68 to 0.91 depending on scale and gender (Lojk, 1984). EPQ consists of 90 items and subjects are required to respond in yes/no form. It has four scales: Psychoticism (aggressiveness, assertiveness, egocentrism, tough-mindedness and inclination toward manipulation; 25 items); Extraversion (social dimensions of personality: sociability, liveliness, domination, impulsiveness, irresponsibility, risk-taking, outgoing and talkative characteristics; 21 items); Neuroticism (emotional instability and anxiousness, feelings of guilt and depressed mood, high levels of negative affect such as depression and anxiety; 23 items); and Lie scale (dissimulation, social naïveté, social conformity; 21 items). Scores are calculated for each scale.

SF-36 Health Survey Questionnaire (SF-36)

SF-36 is a multipurpose self-administered questionnaire that comprises 36 questions, covering two general health concepts: physical and emotional, and their two general manifesta-

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tions, functioning and well-being (Seršić & Vuletić, 2006). Each of the 35 items refers to one of eight health indicators: Physical functioning (PF); Role-physical (RP) referring to the limitations due to physical health; Bodily pain (BP); General health (GH); Vitality (VT), energy/fatigue ratio; Social functioning (SF); Role-emotional (RE) referring to limitations due to emotional problems and Mental health (MH) referring to emotional well-being and the absence of anxiety and depression. Each item is used in scoring only on one scale. One question is not used in the score of any of the scales and refers to the estimation of average change in health status over the last year. The SF-36 questionnaire measures self-reported functional health and well-being.

Subscales scores were calculated as the sum of the relevant items. SF-36 Total score was calculated as the mean of all eight domains. Higher scores represent a more favorable state. Published reliability statistics have exceeded the recommended minimum standard of 0.70 (Ware, Kosinski, & Keller, 1994). Also, numerous studies have successfully confirmed different aspects of validity of the SF-36 questionnaire (Ware & Gandek, 1998). The questionnaire was translated and validated throughout the world under the International Quality of Life Assessment (IQOLA) Project (Ware & Gandek, 1998; Ware et al., 1994). The Croatian version of SF-36 was licensed to Andrija Štampar School of Public Health, and has proven to be a valid and reliable research instrument (Jureša et al., 2000; Seršić & Vuletić, 2006; Pavlović, Lauri Korajlija, Šimić, Bobić, & Čorović, 2010; Bobić, 2012). The original SF-36 0-100 scoring system was used. Higher scores define a more favorable health state.

Statistical analysis

We calculated means, standard deviations, minimum and maximum values, t-test for gender differences, one sample t-test for differences between EPQ mean values and norms, Pearson product-moment correlation, and multiple regression analysis.

RESULTS AND DISCUSSION

Table 1 presents the means, standard deviations, minimal and maximal values for age, Zung Depression Scale, EPQ Psychoticism, Extraversion, Neuroticism and Lay Scale as well as for eight SF-36 scales, for the whole sample and for male and female subjects separately. Additionally, Cohen's *d* as an effect size was used to indicate the standardized differences between males' and females' mean values. T-test and *p* values were calculated for gender differences on all variables.

Variable	N	Mean	Min	Max	SD	M Males	M Females	Cohen's d	t-test	p
Age	430	19.15	18	29	1.52	19.14	19.16	-0.009	-0.08	0.937
ZDS	424	25.10	20	53	4.23	23.50	25.71	-0.533	-4.93	0.000
EPQ P	394	4.39	0	17	2.65	5.01	4.16	0.322	2.81	0.005
EPQ E	394	15.08	1	21	3.89	15.59	14.90	0.178	1.56	0.121
EPQ N	394	10.03	0	23	5.47	7.65	10.87	-0.607	-5.31	0.000
EPQ L	394	8.02	0	29	3.96	7.08	8.35	-0.323	-2.82	0.005
PF	371	83.87	10	100	24.59	83.21	84.06	-0.075	-0.28	0.782
RP	372	79.97	0	100	31.24	81.25	79.60	0.053	0.43	0.671
BP	369	77.11	10	100	20.15	83.30	75.29	0.403	3.25	0.001
GH	370	68.36	10	100	17.23	71.87	67.35	0.263	2.11	0.035
VT	370	56.15	5	100	17.23	60.48	54.90	0.327	2.62	0.009
SF	367	78.48	25	100	19.37	84.79	76.64	0.427	3.42	0.000
RE	372	66.85	0	100	38.85	80.16	62.96	0.450	3.63	0.000
MH	370	66.61	4	96	16.32	71.86	65.09	0.420	3.37	0.000

Legend: ZDS = Zung Depression Scale; EPQ P = Psychoticism; EPQ E = Extraversion; EPQ N = Neuroticism; EPQ L = Lie scale; PF = Physical functioning; RP = Role-physical; BP = Bodily pain; GH = General health; VT = Vitality; SF = Social functioning; RE = Role-emotional; MH = Mental health

TABLE 1
Descriptive statistics
for the whole sample
(Mean, Standard
Deviation, Minimum,
Maximum, Gender
difference)

Regarding ZDS results, we need to underline that our sample comprised only nonclinical young subjects. Consequently, we found only 6 (1.41%) ZDS "positive" students additionally validated through direct diagnostic interview. We used a cut-off point of 42 as suggested by Kitamura et al. (2004), who found as many as 22% of ZDS "positive" students on a larger and somewhat younger sample. Had we used a cut-off point of 40, the result would have again amounted to only 6 "positive" students.

All of the mean EPQ values fall into normal range. In order to compare our mean values with published norms (Lojk, 1984), for the age group of 16 to 19 years we employed one sample t-test. The obtained results showed that our male and female students scored significantly ($p < 0.005$) higher on E and L, lower on N, and only females higher on P than their male age counterparts (Table 2).

Analyses of our results regarding gender and personality traits on EPQ (P, E, N, L) indicated that male students scored significantly higher on P, and significantly lower on N and L than female students, while E did not differentiate these two groups, although men scored higher (Table 1). Male students also scored lower on depression symptoms measured by ZDS. Götestam et al. (2008) performed a study on a large number of Swedish high school students, and also showed that boys reported less depression symptoms on ZDS than girls of the same age. Our data demonstrate that women

tend to score considerably higher on N and L scales, which is in accordance with earlier findings of Lajunen and Scherler (1999). The observed tendency of L results to be relatively constant over time was reported by McCrae & Costa in 1983. They confirmed the assumption that a dimension measured by the Lie scale is in fact a stable personality characteristic, rather than a response set, or a tendency to fake, which was indicated earlier by Hans and Sybil Eysenck in 1975 (Lojk, 1984).

TABLE 2
Differences between our sample (M1 +/- SD1) and published norms (M2) (Lojk, 1984) for mean values on P, E, N and L for males and females

	M1	M2	SD1	N1	N2	t	p
P m	5.01	4.63	2.72	103	540	1.4179	0.1600
E m	15.59	14.46	3.35	103	540	3.4233	0.0009
N m	7.65	10.69	4.88	103	540	-6.3222	0.0000
L m	7.08	6.05	3.56	103	540	2.9363	0.0042
P f	4.16	2.99	2.59	291	590	7.7061	0.0000
E f	14.9	13.31	4.05	291	590	6.6971	0.0000
N f	10.87	13.28	5.43	291	590	-7.5712	0.0000
L f	8.35	6.78	4.05	291	590	6.6129	0.0000

Legend: Our sample – M1 (mean), SD1 (standard deviation), N1 (number of subjects); Lojk – M2 (mean), N2 (number of subjects); m = males, f = females.

Table 3 shows the mean values of our subjects' results on eight SF-36 subscales and published norms (Ware et al., 1994; Ware & Gandek, 1998). It is obvious that there were no significant differences for four physical health variables (PF, RP, BP and GH), while four mental component variables showed substantially lower values in our group of subjects. Similarly, norms for age matched with a sample of a Croatian population (Jureša et al., 2000) were substantially higher than results for our students, most highly for RE, VT and SF domains (15.1; 6.8 and 5.1 points respectfully). Also, the average physical health variables score of 77.33 points (PF, RP, BP and GH) is much higher than the average mental health variable score of 67.02 points (VT, SF, RE and MH). Expectedly, our mean subscale values were higher than in the general population in Croatia, since previous studies showed a clear decline of self-reported measures of health with age (Jureša et al., 2000; Seršić & Vuletić, 2006).

These results point to the conclusion that our subjects had a range of social and role difficulties caused by emotional problems at the time of testing. This leads to the impression that the specific period of adolescence where young students enter the university system brings about substantial emotional pressure that mirrors itself in a lower estimation of vitality (VT) and social functioning (SF), strong feeling of experiencing difficulty with day-to-day activities (RE), as well as ner-

TABLE 3
Mean values for SF-36
subscales

	Ware & Gandek (1998)		Jureša (2000) Age = 24, N = 510		Our subjects Age = 19, N = 371	
	M	SD	M	SD	M	SD
PF	84.2	23.3	88.3	23.8	83.9	24.6
RP	80.9	34.0	83.1	31.1	78.0	31.2
BP	75.2	23.7	81.1	22.6	77.1	20.2
GH	71.9	20.3	70.1	17.7	68.4	17.2
VT	60.9	20.9	63.4	18.3	56.2	17.2
SF	83.3	22.7	83.6	19.0	78.5	19.4
RE	81.3	33.0	82.4	31.9	66.9	38.9
MH	74.7	18.1	69.4	16.0	66.6	16.3

Legend: M = mean; SD = standard deviation; PF = Physical functioning; RP = Role-physical; BP = Bodily pain; GH = General health; VT = Vitality; SF = Social functioning; RE = Role-emotional; MH = Mental health

vousness and depressed mood (MH). Our data also show that, although the female subjects obviously significantly contributed to this conclusion, especially on BP, SF and RE subscales, even the male subjects did not reach published norms. Statistically significant differences between male and female students were found in six out of eight SF-36 scales, where male students had higher scores, all except Physical functioning (PF) and limitations due to physical health (RP). These gender differences are also congruent with the results published in previous studies by Hopman et al. (2000), Marshall et al. (2008), Posadzki et al. (2009), and Rakovac et al. (2013).

Table 4 shows Pearson product-moment correlations between four personality traits (EPQ), depression symptoms (ZDS) and eight self-perceived health indicators (SF-36). As our sample was characterized by a relatively small age range from 18 to 29 years, we did not expect a strong effect of age on any specific test result. Nevertheless, we found a correlation coefficient of 0.17 between age and summary score on ZDS, indicating that our older subjects expressed a larger number of depression symptoms. This is in accordance with previous studies that have also shown that among the working population, depression symptoms on ZDS and its correlates increase with age (Klemenc-Ketiš & Peterlin, 2013).

We found that overall neuroticism and psychoticism correlated negatively with different SF-36 scales, i.e. higher N and P are accompanied with lower self-perceived physical and emotional health or well-being. Thus N showed significant correlations with seven SF-36 variables (all except PF), among them a very strong negative correlation with Mental health and Vitality (-0.69 and -0.56), showing that the subjects with elevated N (lower emotional stability) felt less full of

energy and more downhearted and unhappy. Extraversion, on the other hand, correlated positively with 4 out of 8 SF-36 scales (VT, MH, SF and GH), and only two had coefficients greater than 0.30: Vitality (0.39) and Mental health (0.35). Out of the eight SF-36 scales, MH had the strongest negative correlation with Psychoticism (-0.26). Since personality is regarded as one of the most prominent predictors of self-rated well-being, this was expected. Furthermore, E expectedly negatively correlated with N (-0.30). Lie tendencies showed only two positive significant correlations with SF-36 (RE and MH), but both were weak. Steel et al. (2008) also obtained higher correlation coefficients between well-being and N (0.56) than between well-being and E (0.35) using the EPQ.

	EPQ P	EPQ E	EPQ N	EPQ L	PF	RP	RE	VT	MH	SF	BP	GH	Age
ZDS	<u>0.23</u>	<u>-0.33</u>	<u>0.58</u>	-0.02	-0.05	<u>-0.25</u>	<u>-0.38</u>	<u>-0.58</u>	<u>-0.64</u>	<u>-0.46</u>	<u>-0.23</u>	<u>-0.45</u>	<u>0.17</u>
EPQ P		-0.04	<u>0.25</u>	<u>-0.35</u>	-0.06	<u>-0.15</u>	<u>-0.21</u>	<u>-0.24</u>	<u>-0.26</u>	<u>-0.17</u>	-0.04	<u>-0.12</u>	0.04
EPQ E			<u>-0.30</u>	-0.07	-0.08	-0.03	<u>0.12</u>	<u>0.39</u>	<u>0.35</u>	<u>0.19</u>	-0.04	<u>0.14</u>	-0.08
EPQ N				-0.10	-0.04	<u>-0.22</u>	<u>-0.51</u>	<u>-0.56</u>	<u>-0.69</u>	<u>-0.45</u>	<u>-0.24</u>	<u>-0.39</u>	0.02
EPQ L					-0.08	0.03	<u>0.15</u>	0.06	<u>0.13</u>	0.08	0.01	0.01	0.08
PF						<u>0.39</u>	<u>0.09</u>	<u>0.14</u>	<u>0.07</u>	<u>0.20</u>	<u>0.24</u>	<u>0.11</u>	-0.05
RP							<u>0.27</u>	<u>0.35</u>	<u>0.26</u>	<u>0.42</u>	<u>0.54</u>	<u>0.32</u>	-0.07
RE								<u>0.46</u>	<u>0.56</u>	<u>0.57</u>	<u>0.26</u>	<u>0.27</u>	-0.03
VT									<u>0.73</u>	<u>0.54</u>	<u>0.37</u>	<u>0.47</u>	-0.04
MH										<u>0.54</u>	<u>0.30</u>	<u>0.39</u>	-0.07
SF											<u>0.40</u>	<u>0.38</u>	-0.01
BP												<u>0.38</u>	-0.02

Legend: ZDS = Zung Depression Scale; EPQ P = Psychoticism; EPQ E = Extraversion; EPQ N = Neuroticism; EPQ L = Lie scale; PF = Physical functioning; RP = Role-physical; RE = Role-emotional; VT = Vitality; MH = Mental health; SF = Social functioning; BP = Bodily pain; GH = General health. (Coefficients at the level of $p < 0.05$ are underlined)

TABLE 4
Correlation matrix
(Pearson's coefficients)

All correlations between eight scales within the SF-36 questionnaire were significant at the level of $p < 0.05$, except between PF and MH, and PF and RE. This was to some extent expected since our sample comprised young healthy students with no significant history of illness or injury. The overall correlation matrix shows a very strong link between ZDS and Mental health results (-0.64), and Vitality (-0.58), as well as between N and again Mental health (-0.69), and Vitality (-0.56) (Table 4). Pekmezovic et al. (2011) also found a significant negative correlation between general depressive status and all domains of SF-36 on a sample of 1624 university students.

Multiple regression analysis was employed in order to examine the relative importance of four personality traits (P, E, N and L), age and gender as independent variables, and results on eight SF-36 subscales and depression symptoms (ZDS) as dependent variables (Table 5). Due to the small range, we

expected that age would not be a good predictor of results on any of the SF-36 scales or ZDS. Gender effect was observed on ZDS, BP, SF and RE, male students having more favorable results, i.e. reporting less depression symptoms and bodily pain, and also perceiving their social functioning and emotional health better in quality than female students. Psychoticism, expectedly, predicts results on ZDS, VT and MH.

	ZDS	PF	RP	BP	GH	VT	SF	RE	MH
R	0.633	0.169	0.276	0.308	0.405	0.633	0.475	0.536	0.723
R ²	0.401	0.026	0.076	0.095	0.164	0.401	0.226	0.288	0.523
F	F(6.369) =41.156	F(6.354) =1.735	F(6.355) =4.863	F(6.353) =6.153	F(6.353) =11.524	F(6.353) =39.401	F(6.351) =17.079	F(6.355) =23.913	F(6.353) =64.487
p ≤	0.000	0.112	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Intercept	<u>17.13</u>	<u>114.78</u>	<u>135.15</u>	<u>110.37</u>	<u>100.08</u>	<u>60.31</u>	<u>93.04</u>	<u>135.63</u>	<u>88.77</u>
Age (% var)	0.08 (0.59)	-0.50 (0.09)	-1.13 (0.30)	-0.08 (0.00)	-0.91 (0.62)	0.04 (0.00)	0.09 (0.00)	-1.00 (0.14)	-0.60 (0.29)
Sex (% var)	<u>0.10</u> (0.98)	1.36 (0.05)	0.47 (0.00)	<u>-6.14</u> (1.44)	-1.00 (0.05)	-1.92 (0.19)	<u>-5.16</u> (1.07)	<u>-9.55</u> (0.91)	-2.10 (0.25)
EPQ P (% var)	<u>0.12</u> (1.36)	-0.90 (0.72)	-1.28 (0.94)	-0.23 (0.07)	-0.25 (0.11)	<u>-0.90</u> (1.52)	-0.55 (0.44)	-1.18 (0.51)	<u>-0.53</u> (0.57)
EPQ E (% var)	<u>-0.16</u> (2.55)	<u>-0.72</u> (1.22)	<u>-0.87</u> (1.10)	<u>-0.61</u> (1.29)	0.06 (0.02)	<u>1.12</u> (5.87)	0.44 (0.71)	-0.06 (0.00)	<u>0.75</u> (2.87)
EPQ N (% var)	<u>0.42</u> (17.98)	-0.31 (0.39)	<u>-1.34</u> (4.40)	<u>-0.93</u> (5.08)	<u>-1.17</u> (11.13)	<u>-1.42</u> (16.32)	<u>-1.33</u> (11.25)	<u>-3.30</u> (17.03)	<u>-1.80</u> (28.41)
EPQ L (% var)	0.04 (0.12)	<u>-0.73</u> (1.20)	-0.23 (0.07)	-0.15 (0.08)	-0.06 (0.02)	0.00 (0.00)	0.26 (0.24)	0.84 (0.62)	0.30 (0.44)

Legend: EPQ P = Psychoticism; EPQ E = Extraversion; EPQ N = Neuroticism; EPQ L = Lie scale; ZDS = Zung Depression Scale; PF = Physical functioning; RP = Role-physical; BP = Bodily pain; GH = General health; VT = Vitality; SF = Social functioning; RE = Role-emotional; MH = Mental health. Significant regression coefficients (b) at the level $p < 0.05$ are underlined; % var = squared semi-partial correlation multiplied by 100 indicating the percentage of explained variance.

TABLE 5
Multiple regression
results: summary for 9
dependent variables
(ZDS and SF-36)

Neuroticism, among all of the included personality variables, showed the strongest predictive value for as many as 7 out of the 8 SF-36 health indicators as well as for ZDS results. In other words, only self-perceived physical functioning (PF) showed no dependence on emotional stability, while the positive estimation of all other functions and qualities or self-perceived well-being significantly tended to fall as the neuroticism score rose. Additionally, we checked the moderator effect of sex by introducing an interaction term into the model of multiple regression. Interaction terms were not significant, except for sex and EPQ N in the model of ZUNG D as depen-

dent variable ($b^* = 0.907$; $b = 0.327$; $p < 0.000$; $R = 0.657$; $R^2 = 0.432$; Adjusted $R^2 = 0.416$; $F(10.365) = 27.709$; $p = 0.000$). This points to the conclusion that sex was not a moderator in any of the personality variables, i.e. that the score on the SF-36 scales was evenly influenced by P, E, N and L in male and female students. The above mentioned exception shows that neuroticism in our female subjects added significantly more to the expression of depression symptoms on ZDS than in the male subjects.

Our findings support the results of authors who emphasized the dominant role of the stable dimension "neuroticism-emotional stability" over the "extraversion-introversion" trait in the prediction of self-reported indicators of well-being and depression symptoms (DeNeve & Cooper, 1998; Ryan & Frederick, 1997; Vittersø, 2001; Hills & Argyle, 2001; Tok et al., 2010). The rationale for this principle was offered by Vittersø (2001), who stressed the importance of potentially culturally diverse norms and values that may affect the link between extraversion and subjective well-being. These sociological factors can to some extent explain the discrepancies found by this study, but even in our "southern-mentality" culture, extraversion is a markedly less important predictor of positive affect presence and self-perception of appropriate well-being and health than emotional stability.

CONCLUSIONS

This study describes four personality characteristics among young healthy first-year students (Psychoticism, Extraversion, Neuroticism and Lie tendencies) in a specific stage of their lives. Their mean values were, on average, within expected range. Furthermore, we assessed depression symptoms, and self-reported functional health and well-being using ZDS and SF-36. Overall, they rated their health and health-related quality of life as good, although they scored lower than adults of the same age from the general population. Statistically significant gender differences were as expected, female students having higher scores on depression symptoms, neuroticism and lie scale, and lower on psychoticism than male. Female students also obtained lower scores on as many as six SF-36 scales (RE, VT, MH, SF, BP and GH) than their male colleagues.

Several multiple regression analyses indicated that, on average, neuroticism predicts depression symptoms and health-related well-being stronger than any other EPQ personality trait. Furthermore, we found that gender was not a moderator in any of the EPQ variables in their impact on well-being, and that neuroticism significantly increased scores on Zung Depression Scale only in women.

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Our study confirms the assumption that personality characteristics together with stressful situation are crucial in predicting people's subjective well-being. We could expect that, after the first relatively short accommodation phase, the students will return to a stable baseline state determined by their personality, and thus perceive their physical and emotional health as other adults of the same age. These conclusions may help to better understand the impact of emotional variables on how well students adjust to the demands of the university system in the first year, and consequently how these factors affect their retention and academic success.

LIMITATIONS

Methodological limitations should be considered when interpreting our results. First, we used only one relatively short personality questionnaire, and thus left out some potentially important personality traits that could influence the self-perception of physical and emotional well-being. Secondly, as our study had a cross-sectional design, some stronger conclusions could probably be made after a follow-up study. Another limitation concerns the problem of self-reported measures of health-related quality of life which were not cross-checked with the students' medical records or interviews with relatives.

Next, our assumed direction of causality, from personality traits towards facets of self-perceived health follows the concept of stable traits and variable indicators of physical and emotional well-being that can be arguable.

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Ličnost i samoprocjena fizičkoga i emocionalnoga zdravlja u studenata prve godine fakulteta

Jasminka BOBIĆ, Selma CVIJETIĆ, Jelena MACAN
Institut za medicinska istraživanja i medicinu rada, Zagreb

Cilj ove studije bio je odrediti četiri osobine ličnosti: psihoticizam (P), ekstraverziju (E), neuroticizam (N) i tendenciju laganju (L) primjenom Eysenckova upitnika ličnosti, depresivnih simptoma primjenom Zungove skale depresije (ZDS) te samoprocjenu osjećaja dobrobiti primjenom upitnika SF-36 na uzorku od 430 zdravih studenata prve godine fakulteta obaju spolova. Željeli smo ispitati i koja varijabla ličnosti najbolje predviđa simptome depresije (ZDS) i osjećaj dobrobiti (SF-36). Rezultati su pokazali kako su studenti procijenili svoje zdravlje i kvalitetu života vezanu za zdravlje kao dobre, iako su njihove samoprocjene lošije od skupine iste dobi iz opće populacije. Žene su postigle značajno više rezultate na ZDS, N i L nego muškarci, a muškarci na P i šest od osam skala SF-36. Među svim uključenim varijablama ličnosti N najbolje predviđa depresivne simptome na ZDS kao i samoprocijenjeno fizičko

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i emocionalno zdravlje na SF-36. Našli smo i kako spol nije moderator crta ličnosti u njihovu utjecaju na osjećaj dobrobiti, ali kako N samo u žena značajno utječe na povećanu ekspresiju depresivnih simptoma. Zaključili smo da ličnost uz objektivne okolnosti ima važnu ulogu u subjektivnoj procjeni dobrobiti vezanoj uz zdravlje.

Ključne riječi: ličnost, osjećaj dobrobiti, ekstraverzija, neuroticizam, SF-36