



## Correlation between somatic complaints, personality traits and positivity

### Odnos između somatskih tegoba, crta ličnosti i pozitivnosti

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#### Abstract

**Background/Aim.** Many recent studies have focused on investigation the differences in personality traits and its role in promoting health and in moderating vulnerability to adversities and illness. The aim of our study was to investigate the role of somatic complaints in moderating the relationship between personality traits operationalized in Cybernetic Battery of Conative Tests (KON-6) model and positivity. **Methods.** The sample consisted of 512 students, 23.83 years old in average, 56.3% were female, 23% reported the presence of somatic complaints. In investigation, the Positivity Scale measuring positivity and the KON-6 measuring the activity of 6 dynamic personality traits – activity regulation system ( $\epsilon$ ), organic function regulation system ( $\chi$ ), defense reactions regulation system ( $\alpha$ ), attack regulation system ( $\sigma$ ), homeostatic system coordination ( $\delta$ ) and regulation system integration ( $\eta$ ) were used. **Results.** All of the conative personality traits were significantly correlated with positivity, except for  $\sigma$ . The subsample with somatic complaints reported higher scores in  $\alpha$  and  $\eta$  traits, suggesting higher levels of anxiety and social reality impairment. The person-

ality traits together with presence of somatic complaints significantly explained 26% of positivity variance, positively predicting positivity with higher activity of  $\epsilon$ , and negatively with higher activity of  $\alpha$  and  $\delta$ . The moderating role of somatic complaints was found in two specific relations. Positivity can be predicted in a reverse manner by homeostatic system coordination ( $\delta$ ) but only in students with low somatic complaints, which was also the case for organic function regulation system ( $\chi$ ) but only in the presence of high somatic complaints. **Conclusion.** The positivity represents a good organizational and regulation disposition for regulating the cognitive, dynamic and motoric functions. It is also partially moderated by presence of somatic complaints. Practical benefit of these findings represents a concrete support for developing positivity in people, in order to empower people's health.

#### Key words:

personality; somatoform disorders; optimism; surveys and questionnaires.

#### Apstrakt

**Uvod/Cilj.** Nedavna istraživanja su se bavila utvrđivanjem razlika u crtama ličnosti i njihove uloge u promociji zdravlja i moderiranju osetljivosti na nesreće i bolest. Cilj ovog rada bio je da se istraži moderatorska uloga somatskih tegoba i relacija crta ličnosti operacionalizovanih putem modela Kibernetske baterije konativnih testova (KON-6) i pozitivnosti. **Metode.** Istraživanje je sprovedeno na uzorku od 512 studenata, prosečne starosti 23,83 godine, 56,3% ženskog pola, 23% sa somatskim tegobama. U istraživanju je korišćena Skala pozitivne orijentacije koja meri pozitivnost i KON-6 koja meri šest dinamskih crta ličnosti – Sistem regulacije aktiviteta ( $\epsilon$ ), Sistem regulacije organskih funkcija ( $\chi$ ), Sistem regulacije odbrambenih reakcija ( $\alpha$ ), Sistem regulacije napada ( $\sigma$ ), Homeostatsku koordinaciju sistema ( $\delta$ ) i Integrativnu regulaciju sistema ( $\eta$ ). **Rezultati.** Sve kona-

tivne dimenzije ličnosti značajno su i adekvatno korelirale sa pozitivnošću, izuzev  $\sigma$ , dok je poduzorak sa prisustvom somatskih tegoba demonstrirao više skorove crtama  $\alpha$  i  $\eta$ , upućujući na viši nivo anksioznosti i socijalne usklađenosti. Na kontrole efekata pola i starosti, crte ličnosti zajedno sa prisustvom somatskih tegoba objasnile su ukupno 26% varijanse pozitivnosti, koju pozitivno predviđa viša aktivnost  $\epsilon$ , te negativno viša aktivnost  $\alpha$  i  $\delta$ . Moderacioni uticaji prisustva somatskih tegoba bili su detektovani u dve specifične relacije. Pozitivnost se mogla negativno predvideti aktivnošću homeostatske koordinacije sistema ( $\delta$ ), ali samo kod studenata sa malim brojem somatskih tegoba, što je bio i slučaj sa sistemom regulacije organskih funkcija ( $\chi$ ), ali samo kod snažnog prisustva somatskih tegoba. **Zaključak.** Pozitivnost predstavlja dobru organizacionu i regulacionu dispoziciju za regulaciju kognitivnih, konativnih i motoričkih funkcija. Takođe, delom je moderira

na prisustvom somatskih tegoba. Praktične implikacije ovih nalaza predstavljaju konkretnu podršku za razvoj pozitivnosti kod ljudi kako bi se osnažilo zdravlje ljudi.

**Ključne reči:**

**ličnost; psihofiziološki poremećaji; optimizam; ankete i upitnici.**

## Introduction

An interesting question that attracted a researcher's attention for a long period of time was about the differences in personality traits and their role in promoting health and in moderating vulnerability to adversities and illness. A personality can be viewed as the self-regulating system that is responsible for many different ways that people manage themselves and interact with the outside world. Also, individual differences in personality traits, self-beliefs, attitudes and habits are in different levels associated with biological variations affecting health and well-being.

In a psychological literature, it is well-known that self-esteem<sup>1-3</sup>, life satisfaction<sup>4</sup> and dispositional optimism<sup>3</sup> are repeatedly associated to well-being and successful adaptation. Life satisfaction refers to a person's general evaluation of various activities and relationships that make someone's life worth living<sup>5</sup>. Self-esteem denotes an individual's general self-regard and the level of self-acceptance<sup>6</sup>. Optimism refers to one's perspective on future personal and social events, in which there will be an abundance of good things and a scarcity of bad things<sup>7</sup>.

Also, in a few studies were shown a relatively high level of inter-correlation among the judgments people hold about themselves, their life and their future<sup>8,9</sup>. Caprara et al.<sup>10</sup> further explored mentioned inter-correlation and discovered that this judgment leads to a common latent component affecting the ways people understand their experiences and prepare them to action. This component was originally named positive thinking and then positive orientation or positivity<sup>10-12</sup>.

A question that further attracted attention of the researchers was a relation of positivity with other basic dispositions like the ones that are commonly investigated under the Five-factor model<sup>13,14</sup>.

The results of research obtained on a large sample of Italian participants ( $n = 3,589$ ; 58% women) aged 17 to 75 years (mean = 39.01 years) suggested that all dimensions of the Five-factor model correlated with positive orientation<sup>15</sup>. The psychological instruments used in the study were: the Positivity Scale, a short measure of positive orientation<sup>15</sup> and a short version of the Big Five Questionnaire<sup>16</sup>. Results revealed positive correlations between positive orientation and: energy (equivalent of extraversion; 0.38), emotional stability (reverse of neuroticism; 0.30), agreeableness (0.29), conscientiousness (0.25) and openness (0.19) (all  $p < 0.01$ )<sup>15</sup>. Summarizing the results, we can see that positive orientation is correlated with all of the basic personality traits in the Five factor model. Similar research was done by Miciuk et al.<sup>17</sup>, although with somewhat

different results. In this research the strongest correlations were also obtained between positive orientation, neuroticism and extraversion. However, it is important to note, that Caprara et al.<sup>18</sup> emphasize that Positive orientation, differs from other basic dispositions like the ones that are commonly investigated under the Five-factor model<sup>13,14</sup>. Whereas the so-called Big Five is related to behavioral dispositions that enable people to deal with the fundamental tasks of agency and communion, positive orientation represents a basic attitude that is present and is important in facing major challenges of human life like illness, aging and death.

In our research we did not want to replicate previous research which used the so called Big Five Model, but deliberately, we used another model of personality. The idea behind this choice was to test the relation between positivity and personality in the context of another model and learn something more and further understand a status or a role of positivity. The model of personality traits used in this research is a reformulated basic cybernetic personality model<sup>19</sup>, originally formulated by Powell and Royce<sup>20</sup>. We chose this model as it is designed inside the conceptual frame of neurological systems of regulatory functions and has a good instrument which has been successfully and frequently used in Serbia and ex-Yugoslavia. The instrument assesses six personality dimensions which are conceptualized as manifestations of six neurological systems of regulatory functions. As we were interested also in the role that somatic complaints play in and its relation to personality dispositions and positivity, it looked like an interesting and good opportunity to use this model and understand better the relation between the positivity, personality and somatic complaints.

An important question for individual existence and functioning is on what structure, attitude, belief, view, individuals can rely on to sustain a good health. Having that in mind, an important question is, what is an impact of Positivity to human's health?

Research done in the context of biological base of positivity further supported the importance of Positivity for human health. Studies addressing biological base of Positivity attested biological underpinning of Positivity and its protective function under stress through immune response<sup>21</sup>. Also, an EEG study connected positive orientation to the activity of the brain structures that previous studies cite as mostly engaged in self-evaluative process<sup>22</sup>.

Having in mind all of the findings mentioned, the aim of our research was twofold: 1) investigation of the relations between personality traits and positive orientation in a Serbian sample, and 2) evaluation of potential

moderating effect of present somatic complaints in this relation.

## Methods

The total of 512 students were included in our investigation. All participants were Serbian speaking individuals, in average 23.83 years old [mod = 21, standard deviation (SD) = 3.92, ranging from 18 to 40 years], 56.3% were female. The research was organized by following the principles of voluntaristic participation, without any kind of compensation. The total sample was collected by students of the Faculty for Law and Business Studies "Dr Lazar Vrkatić" in Novi Sad, Serbia, engaged in the snowball sampling principle<sup>23</sup>. The study was approved by the local Ethic Committee.

In our investigation we used the Positivity Scale<sup>15</sup> and the Cybernetic Battery of Conative Tests (KON-6)<sup>24</sup>.

The Positivity Scale<sup>15</sup> is an 8-items self report questionnaire aimed to assess positive orientation, or in short the positivity. The respondents provide their responses by using a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree) for each of the items. All of the items are positively worded, except one (At times, the future seems unclear to me) which needed recoding into reverse values. The total score (ranging from 8 to 40) indicates the level of general positive orientation towards self (eg. On the whole, I am satisfied with myself), other people (eg. Others are generally here for me when I need them) and the future (eg. I have great faith in the future). The instrument was translated to Serbian by back-translation procedure with the consent of the author and under his supervision. In this research, the scale demonstrated an acceptable internal consistency (Cronbach  $\alpha = 0.77$ ).

The KON-6<sup>24</sup> was used to evaluate the conative personality dimensions. The instrument is designed to assess the 6 personality dimensions which are conceptualized as manifestations of 6 neurological systems of regulatory functions. The model was presented by Horga et al.<sup>19</sup>, as a result of reformulation of basic cybernetic personality model by Powell and Royce<sup>20</sup>. The activity of every system is operationalized with 30 items worded in the same direction, followed by a 5-point scale ranging from 1 (Not true at all) to 5 (Absolutely true), forming a score in a theoretical range from 30 to 150.

Activity regulation system (epsilon,  $\epsilon$ ) is conceptualized as the basic regulation system regulating the activation role of the reticular formation. The activity of  $\epsilon$  directly determines the activation levels of the other remaining subsystems, including the cognitive and motor processors. Its basic function is keeping the balance between excitation and inhibition of neural activity and is related to the speed of informational processing within the central nervous system. Dysregulation of  $\epsilon$  could lead to depressive or hypomanic reactions and could also affect the cognitive and motoric functioning. Behaviorally, this system is manifested throughout the extraversion-introversion dimension. Higher

scores on this dimension indicate extraverted personality operationalized by items like "I like to make people laugh" or "I like to make contacts with various unknown people".

Organic function regulation system (chi,  $\chi$ ) is conceptualized as a functional interaction of cortical systems for organic control and regulation with subcortical centers for the regulation of organ functions, predominantly located in the hypothalamic region. Dysregulation of  $\chi$ , indicated by higher scores on this dimension, could lead to functional disorders of the basic organic systems, disorders of the sensory and motor system, and also could lead to increase of ideas hypochondria and subsequent hypochondriac behavior. This system is operationalized with items like "Sometimes my hearts pounds so intensively that I have the impression it will explode" or "Something is wrong with my senses".

Defence reactions regulation system (alpha,  $\alpha$ ) is conceptualized as a defense reaction center located in the limbic system. It modules the tonic excitation, probably on the basis of reactions formed under the influence of various forms of conditioning. This system is responsible for all behavioral patterns caused or followed by anxiety, and regulates the reactions to situations which include explicit or implicit threat to the physical or psychological integrity. Most of the neurotic disorders could be associated to dysregulation of  $\alpha$ , especially various states characterized by high levels of fear, anxiety, as well as emotional and sensory hypersensitivity. Higher scores indicate potential dysregulation of the system, which is operationalized with items like "My feelings can be easily hurt" or "I am always frightened of doing something stupid".

Attack reaction regulation system (sigma,  $\sigma$ ) is conceptualized as an attack control center, also potentially located in the limbic system. It modulates and controls various behavioral patterns based on aggressive impulses, triggered by various stimuli and situations which a person interprets as a signal of frustrations. Dysregulation of this regulation system indicated by higher scores is manifested in various forms of aggressive reactions, externalizing behavior patterns, and also in poor control of impulses. The system is operationalized with items like "I like to participate in a fight" or "I often have trouble because I cannot keep my mouth shut" or "Even when they help others, people do so for their own advantage".

System for homeostatic coordination of regulation systems (delta,  $\delta$ ) is conceptualized as a system of higher order which coordinates the functions of the other cognitive and conative subsystems that differ, functionally of hierarchically, including the cognitive processors functions. This system is functionally superior to the organic functions regulators such as  $\alpha$  and  $\sigma$ . Its basic function is the homeostatic regulation of all behavior patterns, as well as synchronizing uncoordinated behavior. Dysregulation of this system indicated by higher scores on this dimension could cause disorganization and dissociation of both cognitive and conative functions, as well as disorders of motoric functions. The system is operationalized with items like "I absolutely

cannot do anything right” or “Someone is trying to influence my thoughts”.

System for integration of regulation systems ( $\epsilon$ ,  $\eta$ ) is conceptualized as the highest in hierarchy of conative regulatory functions, potentially located in the frontal cortex. Its basic function is to integrate conative processes into a coherent psychological field, as conceptualized in gestalt psychology. It is mainly determined by socialization and other social factors such as conditioning, reinforcement, internalization within the educational process. Dysregulation of this system indicated by higher scores on this dimension could cause various forms of social incompatibility. The system is operationalized with items like “I have entered the wrong public transport vehicle much more than once” or “I find it difficult to formulate what I want even in casual conversations”.

The presence of somatic complaints was assessed by an open ended question regarding the presence of an acute somatic complaints or chronic illness. The total of 118 participants (23%) reported the presence of somatic complaints. The results were summed into a binary variable indicating the presence of somatic complaints.

### Statistical analysis

In statistical analysis, descriptive data analysis was included calculating the mean value and SD.

In order to test whether the presence of somatic complaints moderates the relation between conative personality dimensions and positivity, a hierarchical linear regression analysis<sup>25</sup> was performed. Significant interaction effects were presented on two separate graphs. In order to reduce the possibility of data multicollinearity, the moderation analysis was performed on mean centered data<sup>26</sup>.

Statistical analysis was carried out using IBM SPSS (Statistical Package for the Social Sciences) software version 20.0.

### Results

As we can see from Table 1, positivity was significantly associated in an adequate manner with all of the personality traits, except for  $\sigma$ .

**Table 1**

#### Spearman product-moment correlation between positivity and personality traits

Parameters	$\epsilon$	$\chi$	$\alpha$	$\sigma$	$\delta$	$\eta$
Personality traits						
$\epsilon$	1	-0.14**	-0.28**	0.20**	-0.25**	-0.13**
$\chi$		1	0.66**	0.36**	0.63**	0.66**
$\alpha$			1	0.32**	0.55**	0.70**
$\sigma$				1	0.41**	0.39**
$\delta$					1	0.69**
Positivity	0.41**	-0.31**	-0.37**	-0.02	-0.36**	-0.26**

$\epsilon$  – activity regulation system;  $\chi$  – organic function regulation system;  
 $\alpha$  – defense reactions regulation system;  $\sigma$  – attack regulation system;  
 $\delta$  – homeostatic system coordination;  $\eta$  – regulation system integration.  
 \*\*  $p < 0.01$ .

The mean differences in positivity and personality traits between participants with somatic complaints ( $n = 118$ ) and without them ( $n = 394$ ) are presented in Table 2. The Levene's test of variance equality demonstrated the inequality only for  $\chi$  personality trait,

but not affecting the mean difference. As we can see, the subsample suffering from somatic complaints demonstrated significantly higher scores in  $\alpha$  and  $\eta$  traits, suggesting higher levels of anxiety and social reality impairment for this subsample.

**Table 2**

#### Mean differences in personality traits and positivity between subsamples

Parameters	Somatic complaints mean (SD)	No somatic complaints mean (SD)	F	$p$	$t$	$p$
Personality traits*						
$\epsilon$	111.69 (18.12)	111.76 (17.61)	0.62	0.42	-0.03	0.87
$\chi$	55.88 (14.53)	54.21 (18.58)	5.17	0.02	0.89	0.30
$\alpha$	76.41 (19.30)	70.92 (20.82)	0.36	0.55	2.53	0.01
$\sigma$	90.55 (18.72)	87.16 (18.86)	0.01	0.91	1.70	0.09
$\delta$	50.13 (17.17)	48.47 (16.31)	0.37	0.54	0.95	0.34
$\eta$	62.13 (15.37)	58.48 (16.76)	2.65	0.10	2.11	0.03
Positivity	32.01 (4.14)	31.93 (4.25)	0.55	0.46	0.19	0.84

\*For explanation see under Table 1.  
 SD – standard deviation.

The analyses tested tree subsequent hierarchical models are presented in Table 1. The purpose of the first and also the lowest model was to control the effects of gender and age to subsequent relations. The second model was built up to the first and aimed to evaluate the main effects of conative personality dimensions and presence of somatic complaints. The third model was built by adding the interactions between personality predictors and the presence of somatic complaints to the second model. The ANOVA suggested the significance of only two subsequent models (Table 3).

**Table 3**  
**The significance of the models predicting positivity**

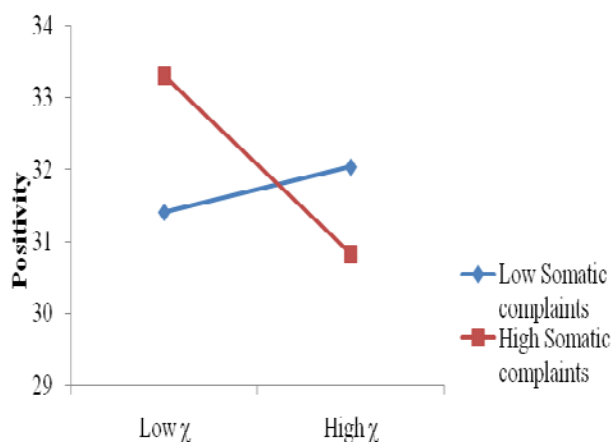
Model	Sum of squares	df	Mean square	F	p
Regression	30.68	2	15.34	0.90	0.41
1 Residual	8426.27	492	17.13		
Total	8456.95	494			
Regression	2242.83	9	249.20	19.45	0.00
2 Residual	6214.12	485	12.81		
Total	8456.95	494			
Regression	2477.08	15	165.14	13.23	0.00
3 Residual	5979.87	479	12.49		
Total	8456.95	494			

**Model 1: age, gender; Model 2: age, gender, personality dimensions, presence somatic complaints; Model 3: age, gender, personality dimensions, presence somatic complaints, interaction of personality dimensions and presence of somatic complaints.**

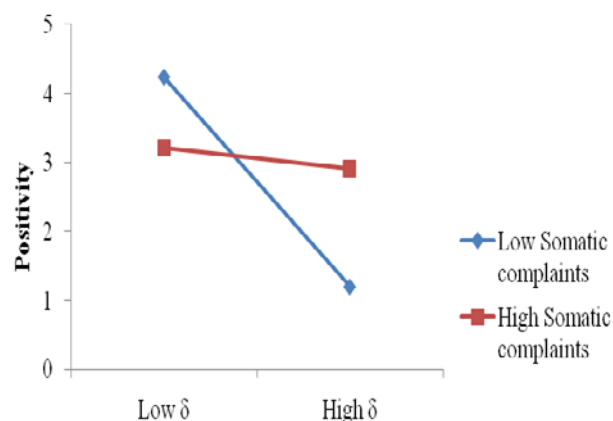
As we can see on Table 4, the personality dimension and somatic complaints explained 26% of positivity variance. By adding the interactions between the predictors, the total of the variance explained rose for 3% of additionally explained criterion variance. By reaching the statistical significance, this change in explained variance suggested the possible moderation role of somatic complaints.

In more details, the models are presented in Table 5. The second model suggested that the higher levels of  $\epsilon$  would predict the higher level of positivity, while the levels of  $\alpha$  and  $\delta$  predict positivity in the reverse manner. The activity of other systems as well as the presence of somatic complaints did not reach the statistical significance of prediction. On the other hand, there were some interesting points. First of all, the standardized regression coefficients of  $\epsilon$  and  $\alpha$  remained relatively unchanged, determining that their main effects on positivity were direct and not by any mean moderated by somatic complaints. Secondly, there was absence of main effects of other systems. This also included

$\delta$ , whose main effect was overtaken by the interaction with somatic complaints. Finally, there were two mild but significant interaction effects of  $\chi$  and  $\delta$  systems with the presence of somatic complaints. These moderation effects are illustrated in Figures 1 and 2.



**Fig. 1 – The moderation role of somatic complaints in the relation between the organic function regulation system ( $\chi$ ) and positivity.**



**Fig. 2 – The moderation role of somatic complaints in the relation between the homeostatic coordination of regulation systems ( $\delta$ ) and positivity.**

As presented in Figure 1, the higher activity of the organic function regulation system ( $\chi$ ) predicted lower positivity, but only in the case of presence of somatic complaints, while in the case of low somatic complaints, the relation between this system and positivity could not be detected.

**Table 4**  
**The parameters of models predicting positivity**

Model*	R	R <sup>2</sup>	AR <sup>2</sup>	SE	Change Statistics				
					$\Delta R^2$	F	df1	df2	p
1	0.06	0.00	0.00	4.14	0.00	0.90	2	492	0.41
2	0.52	0.26	0.25	3.58	0.26	24.66	7	485	0.00
3	0.54	0.29	0.27	3.53	0.03	3.13	6	479	0.00

\*For explanation see under Table 3.

**Table 5**  
**Standardized regression coefficients in models**  
**predicting positivity**

Model*	$\beta$	$t$	$p$
1			
Intercept		21.91	0.00
Gender	0.06	1.34	0.18
Age	0.00	0.07	0.95
2			
Intercept		25.56	0.00
Gender	0.08	2.03	0.06
Age	-0.04	-1.04	0.30
Personality traits			
$\varepsilon$	0.26	6.08	0.00
$\chi$	-0.06	-1.06	0.29
$\alpha$	-0.23	-3.62	0.00
$\sigma$	0.07	1.41	0.16
$\delta$	-0.18	-2.85	0.00
$\eta$	0.05	0.81	0.42
Somatic complaints	0.03	0.86	0.39
3			
Intercept		26.16	0.00
Gender	0.08	1.96	0.05
Age	-0.06	-1.43	0.15
Personality traits**			
$\varepsilon$	0.24	4.35	0.00
$\chi$	-0.23	-2.68	0.01
$\alpha$	-0.23	-3.11	0.00
$\sigma$	0.05	0.88	0.38
$\delta$	-0.09	-1.39	0.16
$\eta$	0.03	0.39	0.69
Somatic complaints	0.04	1.03	0.30
somatic complaints x $\varepsilon$	-0.05	-1.00	0.32
somatic complaints x $\chi$	-0.22	-2.56	0.01
somatic complaints x $\alpha$	0.00	0.06	0.95
somatic complaints x $\sigma$	-0.00	-0.11	0.91
somatic complaints x $\delta$	0.19	2.85	0.01
somatic complaints x $\eta$	-0.11	-1.55	0.12

\*For explanation see under Table 3;

\*\*For explanation see under Table 1.

On the other hand, the higher activity of the homeostatic coordination of regulation systems ( $\delta$ ) predicts lower positivity, but only in the case of absence of somatic complaints, while in the case of high somatic complaints, the relation between this system and positivity cannot be detected.

### Discussion

In this research, the correlation between personality traits and positive orientation in a sample of Serbian students was investigated and explored moderating effects of somatic complaints in the relation between personality traits and positivity.

Here is also worth to note that excellent psychometric properties and structural validity of the positivity scale

were confirmed across various cultural contexts including Brazil, China, Columbia, Germany, Izrael, Italia, Japan, Mexico, Poland, Pakistan, Spain, Turkey, the Netherlands, UK and the USA. In most of these contexts, the scale demonstrated an unidimensional structure as well as excellent psychometric properties<sup>27-31</sup>.

As it can be seen in the results, epsilon, which is conceptualized as the basic regulatory system which regulate the activating role of the reticular formation, has a direct relation to positivity, as the higher level of epsilon predicts the higher level of positivity.

Behaviorally, the epsilon system is manifested throughout the extraversion-introversion dimension. Having in mind that the activity of epsilon is defined in the model of personality dimensions that was used in this research, like the one that directly determines the activation

levels of the other remaining subsystems, including the cognitive and motor processors, the role of the positivity in relation to personality traits could be understood better like the one of the self-regulative system. Some kind of indirect support could be the findings obtained in a recent study that used the so called Big Five Model<sup>32</sup>. In that research, a latent variable representing the positivity construct fully mediated the relation of extraversion with happiness. Anyway, positivity and extraversion are directly related.

Alpha, defined like the regulation system of defense reactions is directly related with Positivity, but in different direction. It is expected results, as alpha is defined also as responsible for all behavioral patterns caused or followed by anxiety. According to Caprara et al.<sup>18</sup>, positive orientation represents a basic attitude that is present and is important in facing major challenges of human life like illness, aging and death. Positive attitudes and reactions in facing challenges are not related to fear and anxiety although they could represent defense reactions, but, of the opposite directions. And, according to authors of the Cybernetic battery of conative tests, most of the neurotic disorders could be associated to dysregulation of alpha. It seems that non-neurotic or emotionally stabile individuals are related to higher scores on Positivity.

Both findings, epsilon and alpha and their relation to Positivity are fully supporting the results obtained in previous research that explore relation between personality traits and Positivity<sup>15, 17</sup>.

Delta, in the model of the personality used in the research, is conceptualized as a system of higher order which coordinates the functions of the other cognitive and conative subsystems. Dysregulation of this system indicated by higher scores on this dimension could cause disorganization and dissociation of both cognitive and conative functions, as well as disorders of motoric functions. Results obtained in the research showed that delta predicts Positivity in the opposite manner. Following this finding, positivity could be understood as a good organizational and regulational concept which regulates cognitive, conative and motoric function.

The results revealed that activity of other systems presented in the model of personality used in this research, as well as the presence of somatic complaints did not reach statistical significance of prediction for Positivity. This means that chi, sigma and eta did not predict the Positivity. Chi mainly regulates organ functions and could lead to increase of ideas of hypochondria and subsequent hypochondriac behaviour. Sigma is mainly regulating attack reactions and is manifested in various forms of aggressive reactions and poor control of impulses. Eta, or system for integration of regulation systems, is mainly determined by process of socialization. Dysregulation of eta manifests itself in various forms of social incompatibility. To some extent these results were expected. It seems that Positivity was not in a direct relation with ideas of hypochondria, aggressive reactions and social incompatibility. On the other hand, it could be seen that the presence of somatic complaints did not relate directly to positivity in any manner.

But, the picture is changed in the light of the results of standardized regression coefficients. It became obvious that only epsilon and alpha were directly related to Positivity and not moderated by somatic complaints.

Commenting the relation of delta with Positivity, it could be seen that its main effect was overtaken by the interaction with somatic complaints. What is the meaning of this finding?

One hypothesis is that somatic complaints represent some kind of or are attempt to balance the disorganization and dissociation of both cognitive and conative functions, as well as disorders of motoric functions. In this case, where there is a presence of some somatic complaints, there is no relation between the Positivity and delta. Somatic complaints are supporting delta, or are a support for disorganization and dissociation in personality. It could be one more reason to conclude that Positivity represents a good organizational and regulation concept which regulates cognitive, conative and motoric function. Also, further hypothesis is that somatic complaints are a sign that there are some reasons to believe that there is no good organization in personality functions or there is some dissociation.

Further, commenting the relation of chi with Positivity, it is clear that the higher activity of the organic function regulation system ( $\chi$ ) predicts lower positivity, but only in the case of presence of somatic complaints, while in the case of low somatic complaints, the relation between this system and Positivity cannot be detected. Again, one could hypothesized that Positivity is protecting health, as there is no relation between chi and Positivity when there is a low level of somatic complaints. And, vice versa, when there is a higher chi, and higher somatic complaints, there is lower level of Positivity.

A crucial point of the discussion can be a hypothetical status of positive orientation and its relation to health. As Caprara et al.<sup>10, 15</sup> argue, positive orientation fulfills important biological functions, for example it underlies an individual's need to grow, to flourish, to successfully cope with life in spite of occurring adversities, failures, and losses, as well as to keep on caring about living in the face of aging and closeness of death. Authors of previous research already cite that Positive orientation is not a trait but it probably represents the same level of personality – basic dispositions or processes<sup>33-36</sup>. Results in this research give the base for the hypothesis that Positive orientation represents a good organizational and regulation dispositions or a process which regulate cognitive, conative and motoric function. Also, somatic complaints could be a sign that there are no good regulations of personality functions.

#### *Limitations of the study*

All of the presented findings should be viewed with having in mind a few shortcomings of this research. First of all, this study was performed predominantly on general population of students, with only 23% of them suffering from some kind of somatic complaints. Although they did not differ significantly from the rest of the sample in

personality scores or positivity, we must have in mind that to some extent different results could be gained if this subsample would be equally represented in the total sample. Secondly, the student population is generally healthy, so the somatic complaints within our sample are to great extent represented with minor health problems. This shortcoming should direct some future research to include more complex samples representing general population, especially elderly people, as we have in mind that the increase of somatic complaints will be pronounced both in frequency and in intensity as people get older. Thirdly, we are aware that these findings should be retested on various clinical samples suffering from some kind of acute or chronic somatic complaint, in order to investigate is there any specific connection between personality and positivity under these specific circumstances. The last but not the least, we find that the transversal research design is the biggest shortcoming of our research. As all of the variables were assessed at the same point in time, we could not make

any conclusion of potential causality or time sequence of their relation. For instance, it would be interesting to see does the appearance of somatic complaints alter positivity itself, as well as its relations to personality, so the biggest suggestion for future research is to investigate these relations by using a longitudinal research design.

### Conclusion

A better understanding of the relationship between positive orientation and the personality traits requires further explorations. The data about this relationship might help us to better understand even Positivity itself. Also, further exploration of the function and place of positive orientation for human's health is precious. This kind of research could strongly benefit psychological practices and psychotherapy aiming at inspiring people to be healthy, self-regulated, living good and full lives.

### R E F E R E N C E S

1. *Baumeister RF*. Self-esteem: The puzzle of low self regard. New York: Plenum; 1993.
2. *Greenberg J, Solomon S, Pyszczynski T, Rosenblatt A, Burling J, Lyon et al*. Why do people need self-esteem? Converging evidence that self-esteem serves an anxiety-buffering function. *J Pers Soc Psychol* 1992; 63(6): 913–22.
3. *Kernis MH*. Toward a conceptualization of optimal self-esteem. *Psychol Inq* 2003; 14: 1–26.
4. *Diener E, Emmons RA, Larsen RJ, Griffin S*. The satisfaction with life scale. *J Pers Assess* 1985; 49(1): 71–5.
5. *Diener E*. Subjective well-being. *Psychol Bull* 1984; 95(3): 542–75.
6. *Harter S*. The construction of the self: A developmental perspective. New York: Guilford; 1999.
7. *Carver CS, Scheier MF*. Optimism. In: *CR Snyder, JL Lopez*, editors. Handbook of positive psychology. New York: Oxford University Press; 2002. p. 231–43.
8. *Diener E, Diener M*. Cross-cultural correlates of life satisfaction and self-esteem. *J Pers Soc Psychol* 1995; 68(4): 653–63.
9. *Lucas RE, Diener E, Sub E*. Discriminant validity of well-being measures. *J Pers Soc Psychol* 1996; 71(3): 616–28.
10. *Caprara GV, Fagnani C, Alessandri G, Steca P, Gigantesco A, Cavalli-Sforza L*, et al. Human optimal functioning. The genetics of positive orientation towards self, life, and the future. *Behav Genet* 2009; 39(3): 277–84.
11. *Caprara GV, Steca P*. Affective and social self-regulatory efficacy beliefs as determinants of positive thinking and happiness. *European Psychologist* 2005; 10(4): 275–286.
12. *Caprara GV, Steca P, Alessandri G, Abela JR, McWinnie CM*. Positive orientation: explorations on what is common to life satisfaction, self-esteem, and optimism. *Epidemiol Psychiatr Soc* 2010; 19(1): 63–71.
13. *Digman JM*. Personality structure: Emergence of the five factor model. *Ann Rev Psychol* 1990; 41(1): 417–40.
14. *John OP, Srinastava S*. The Big Five trait taxonomy: history, measurement, and theoretical perspectives. In: *John OP, Robins RW, Pervin LA*, editors. Handbook of personality: Theory and research. 2nd ed. New York, NY: Guilford Press; 1999. p. 102–38.
15. *Caprara GV, Alessandri GA, Eisenberg N, Kupfer A, Steca P, Caprara MG*, et al. The Positivity Scale. *Psychol Assess* 2012; 24(3): 701–12.
16. *Caprara GV, Barbaranelli C & Borgogni L*. BFQ: Big Five Questionnaire. Firenze: O.S. Organizzazioni Speciali; 1993.
17. *Miciuk LR, Jankowski T, Laskowska A, Oleś P*. Positive Orientation and the Five-Factor Model. *Polish Psychol Bull* 2016; 47(1): 141–8.
18. *Caprara GV, Alessandri G, Caprara M*. Associations of positive orientation with health and psychosocial adaptation: A review of findings and perspectives. *Asian J Soc Psychol* 2019; 22(2): 126–32.
19. *Horga S, Ignjatović I, Momirović K, Gredelj M*. An attachment to the knowledge of the structure wof convective characteristics. *Psihologija* 1982; 15 (3–4): 3–34 (Serbian)
20. *Powell A, Royce JR*. An overview of a multifactor-system theory of personality and individual differences: I. The factor and system models and the hierarchical factor structure of individuality. *J Pers Soc Psychol* 1981; 41(4): 818–29.
21. *Caprara GV, Nisini R, Castellani V, Vittorio P, Alessandri G, Vincenzo Z*, et al. Lymphocyte subsets are influenced by positivity levels in healthy subjects before and after mild acute stress. *Immunol Lett* 2017; 188: 13–20.
22. *Alessandri G, Caprara GV, De Pascalis V*. Relations among EEG-alpha asymmetry and positivity personality trait. *Brain Cogn* 2015; 97: 10–21.
23. *Goodman LA*. Snowball sampling. *Ann Mathemat Stat* 1961; 32(1): 148–70.
24. *Momirović K, Wolf B, Džamonja Z*. KON-6. Cybernetic battery of conative tests. Belgrade: Centar za primenjenu psihologiju; 1992. (Serbian)
25. *Mededović J*. Analysis of predictor interactions in linear regression models: an example of a party evaluation. *Primenjena psihologija* 2013; 6(3): 267–86 (Serbian)
26. *Robinson C, Schumacher RE*. Interaction effects: Centering, variance inflation factor, and interpretation issues. *MLRW* 2009; 35(1): 6–11.
27. *Borsa JC, Damásio BF, Souza DSD, Koller SH, Caprara GV*. Psychometric properties of the positivity scale - Brazilian version. *Psicol Reflex Crit* 2015; 28(1): 61–7.



28. Çıkrıkçı Ö, Çiftçi M, Gençdoğan G. The Psychometric Properties of the Turkish Form of the Positivity Scale. *J Happ Well Being* 2015; 3(1): 57–76. (Turkish)
29. Heikamp T, Alessandri G, Laguna M, Petrovic V, Caprara MG, Trommsdorff G. Cross-cultural validation of the positivity scale in five European countries. *Pers Individ Diff* 2014; 71: 140–5.
30. Laguna M, Oles' PK, Filipiuk D. Positive orientation and its measure: Polish adaptation of the Positivity Scale. *Studia Psychologiczne* 2011; 49: 47–54. (Polish)
31. Tian L, Zhang D, Huebner ES. Psychometric Properties of the Positivity Scale among Chinese Adults and Early Adolescents. *Front Psychol* 2018; 9: 197.
32. Lauriola M, Iani L. Does Positivity Mediate the Relation of Extraversion and Neuroticism with Subjective Happiness? *PLoS ONE* 2015; 10(3): e0121991.
33. Larsen RJ, Buss DM. *Personality Psychology: Domains of knowledge about human nature*. 2nd ed. New York: McGraw-Hill; 2005.
34. McAdams DP, Pals JL. A New Big Five Fundamental principles for an integrative science of personality. *Am Psychol* 2006; 61(3): 204–17.
35. McCrae RR, Costa PT. Validation of the five-factor model of personality across instruments and observers. *J Personal Soc Psychol* 1987; 52: 81–90.
36. McCrae RR, Costa PT Jr, Martin TA. The NEO-PI-3: A More Readable Revised NEO Personality Inventory. *J Pers Assess* 2005; 84(3): 261–70.

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