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Regulation Systems State in Connection with Different Psychological Types, Defense Mechanisms and Health Behavior

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In research it was examined state of organism regulation systems by heart rate variability (HRV) analysis. It was hypothesized that various psychological types, defense mechanisms and healthy habits have specific relations with regulation systems. The purpose was to study regulation system state in connection with different psychological types, ego-defense mechanisms and healthy behavior of youth taking into account the gender. It is known that regulation systems disbalance and low HRV bring to decrease of life quality and longevity. At the sample of 217 university students (112 men) were measured HRV indexes, personality types by MMPI, defense mechanisms by Life Style Index and healthy habits by Health Style: A Self Test. It was found that men and women mostly have different correlations between HRV and psychological features. Only two general correlations were revealed: positive connection between lie scale and stress index (SI of HRV) and negative connection between psychological defense mechanism “projection” and sympathetic regulation. We conclude that men’s and women’s psychological features are differently connected with regulation systems. It can be explained by different adaptation strategies of men and women which were designed during evolution time. This fact should be taken into account at designing interventions for changing non-healthy behavior.

Keywords: heart rate variability, psychological types, defense mechanisms, health behavior.

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1. Introduction

In the evolutionary psychology (approach we follow) personality is understood as a result of dynamic interaction between genetic susceptibility and the social and ecological environment. A limited number of personality factors are explained by the fact that in this species there are only a limited number of behavioral types or personality predispositions with which the individual may be born. Behavioral types produce stable individual differences in patterns of emotional response, which is called the temperament. On this basis more stable and complex behavioral patterns called personality are forming (J. Palmer & L. Palmer, 2002).

Typological approach of describing personality is embodied in the diagnostic test model of MMPI (Hathaway & McKinley, 1940). We considered it promising in this study, as it is given a certain integrity to individual differences by it, in contrast to the approach of personality traits (Five Factor Model, 16 Personal Factors etc.), when a personality is describing by a set of differently expressed characteristics (Anastasi, 1997).

R. Plutchik in his evolutionary theory of emotions justifies that the links between affects, behavior, functions, personality traits, mental disorders and ego-defenses are derivatives from primary emotional reactions to the environment (Plutchik, 2001). The defense mechanisms help to settle the needs of the individual with the environment requirements and mitigate the emotional conflicts. Individual differences in the regulation of emotional responses to the environment are reflected in the features of HRV (Appelhans, 2006). As shown by J. F. Thayer et al. HRV may serve as a proxy for 'vertical integration' of the brain mechanisms that guide flexible control over behavior with peripheral physiology, and as such provides an important window into understanding stress and health (Thayer, 2012).

Personality types in fact are the various psychological adaptation ways of the individual in the environment (J. Palmer & L. Palmer, 2002; Gutiérrez et al., 2013), the defense mechanisms – are the additional adaptation means (Plutchik, 2001). We have hypothesized that another new and not fully formed kind of people's adaptation is a maintaining healthy lifestyle. In contrast to the long-existing environment pressures (cold, hunger, predators, natural disasters), in the last century, new challenges of the artificial environment (availability of fatty, sugary, salty foods, cigarettes, alcohol and drugs, physical inactivity, information load, etc.) have emerged (Roberts, 2011; Tybur et al., 2012). All this adaptation modes can differently involve the regulation systems, have different physiological procuring, or in other words, leads the different physiological costs of the body.

The purpose of our research is to study regulation system state in connection with different psychological types, ego-defense mechanisms and healthy behavior of youth taking into account the gender.

2. Method

2.1. Participants

Participants were 217 students of 1–3 years of studying of 19 departments of V.N. Karazin Kharkiv National University (Ukraine), among them 105 women and 112 men. Age range 16–24 years, mean age – 18 years. The participants voluntarily and with interest took part in the research. Design of this study was approved by Ethical Commission of V.N. Karazin Kharkiv National University School of Psychology.

2.2. Measures

We used the following physiological and psychodiagnostic methods. 1) The HRV-analysis, 5 minutes, sitting at rest, via hardware-software complex 'BOS-Pulse Professional' ('BOSLAB', Computer biofeedback systems, RF, Novosibirsk). Inter-beat-intervals were measured by photoplethysmographic sensor, which was attached on the distal phalange of second digit. It was fixed heart rate (HR), total power of the spectrum (TP), spectrum power of the respiratory/high-frequency waves (HF, 0.4–0.15 Hz), spectrum power of the low-frequency waves (LF, 0.15–0.04 Hz), spectrum power of the very low-frequency waves (VLF, 0.04–0.015 Hz), index of sympathetic-vagal interaction (LF/HF) and index of regulatory systems tension or stress-index (SI). The stress-index formula was proposed by R. M. Bayevsky: $SI = A_{mo} / 2M_o * MxDMn$, where A_{mo} – mode amplitude, M_o – mode, $MxDMn$ – variation range of cardio-intervals (Bayevsky, 1987). 2) Adapted Russian-language shortened test MMPI (Mini-Mult, version SMOL), 71 items, adaptation author – V. P. Zaitsev, which is assess 3 validity scales

(L, F, K) and 9 basic scales (Hs, D, Hy, Pd, Pa, Pt, Sc, Ma) (Zaitsev, 2004). 3) Test for assessing of ego-defense mechanisms 'Life Style Index' (Plutchik, Kellerman, & Conte, 1979), 92 items, author of the Russian adaptation is L. Vasserman et al., which assess 8 defense mechanisms: reaction formation, denial, displacement, regression, compensation, projection, suppression, intellectualization (Vasserman, 2005). 4) Health Style: A Self-Test, which assesses the tendency to maintain a healthy lifestyle by the following scales: smoking, alcohol, drugs, food, exercise, stress control, safety and the total index of a healthy lifestyle (G. S. Nikiforov's Russian version of Health Style: A Self-Test. Washington, PHS).

2.3. Procedure

During the psychology classes we have explained for students the objects of the research and proposed them to participate. All agreed students had the test blanks and complete them during the classes. Also they gave informed consent. After this the participants were invited at the Laboratory of Psychodiagnostic for measuring HRV.

2.4. Data analyses

We used the descriptive statistics, correlation analyses and means comparing for two independent samples (men and women). Basic statistics was used for analysis the interval indexes and nonparametric methods were used for analysis the rank indexes. Data processing was done in the StatSoft STATISTICA 7.0.

3. Results

3.1. Evaluation of the studied parameters

Almost all measured indices of HRV of Ukrainian students are in the normal range (see Table 1), which is understanding, according to R.M. Bayevsky (Bayevsky, 2001, 2004), as a functional optimum, that indicate on maintaining of sufficient level of the organism functionality. There is a balance of influences of sympathetic and parasympathetic divisions of the autonomic nervous system, with a slight predominance of sympathetic influence. This is typical for the waking state. Little higher than normal rate was only VLF% (35,1%), the norm of which is in the range of 15–30%.

Because the gender is a most important factor that modulate the psychological and physiological characteristics ('The 5th International Congress on Gender Medicine', 2010), we compared HRV indexes of women and men groups – see Fig. 1.

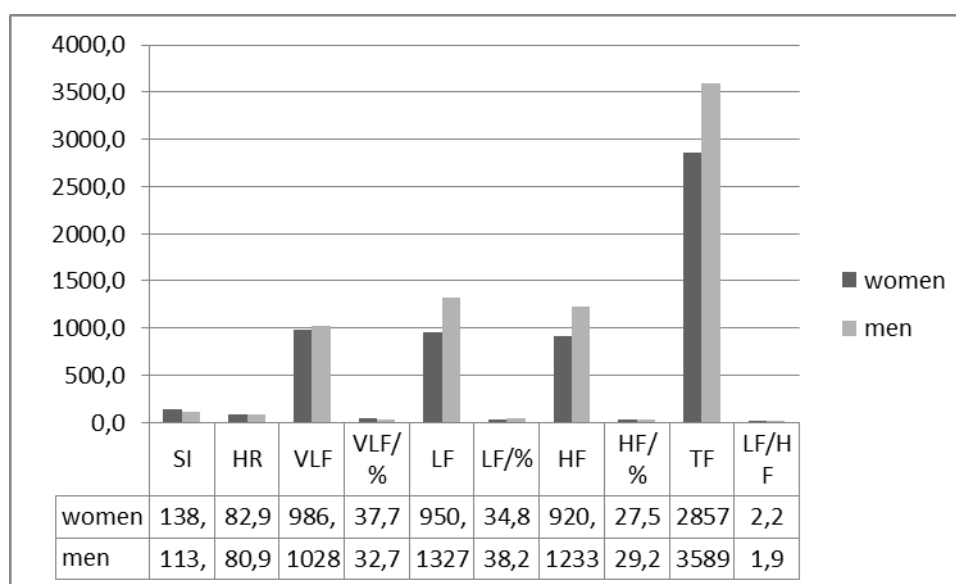


Fig. 1. Comparison of the average of HRV indexes in women and men.

Table 1

Descriptive statistics of HRV.

	N	Mean	Std.Dev.	Median	Mode	Minimum	Maximum	25 th percentile	75 th percentile
SI, conv.u.	217	125,3	243,2	101,3	127,2	11,4	3267,9	50,1	136,2
HR, beats/min	217	81,8	10,8	84,7	85,5	48,9	124,2	75,9	86,7
VLF, ms ²	217	1008,3	1165,3	703,8	multiple	52,3	9277,4	416,4	1144,9
VLF%	217	35,1	17,9	32,0	multiple	3,8	87,0	20,9	47,7
LF, ms ²	217	1145,3	1334,9	724,4	no mode	34,1	9817,3	516,4	1194,6
LF%	217	36,52	12,6	35,8	45,3	9,3	74,5	27,3	43,8
HF, ms ²	217	1081,5	1694,7	386,1	multiple	29,7	15900,8	204,4	1321,2
HF%	217	28,3	17,3	25,3	multiple	2,7	75,2	12,9	39,9
TP, ms ²	217	3235,2	3618,5	2107,2	no mode	127,7	33580,6	1441,0	3663,3
LF/HF	217	2,0	1,8	1,6	multiple	0,2	18,9	0,8	2,8

Check of the significance of the differences between men and women indicators of HRV confirmed significant prevalence of percent of humoral regulation involvement (VLF%) in women ($t=2.1$, $df=215$, $p=.040$) and the significant prevalence of sympathetic regulation (LFms²) in men ($t=-2.1$, $df=215$, $p=.037$).

Intensity of personality types in whole sample, and by gender is displayed on Fig. 2.

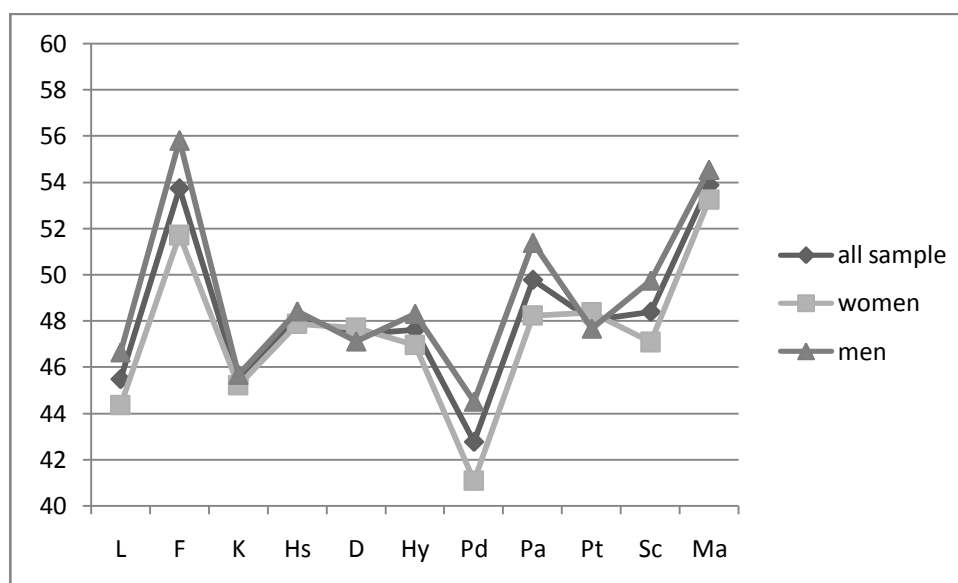


Fig. 2. Profile of MMPI psychological types.

All scales of MMPI profile of the students expressed in the normal range (less than 70 T-score). The less expressed scale was Pd (Psychopathic Deviate), and the highest rises are shown on the scale F (fake scale) and Ma (Hypomania). By three scales – L (lie scale) ($t = -2.2$, $df = 215$, $p = .003$), F (fake scale) ($t = -3.3$, $df = 215$, $p = .001$) and Pd (Psychopathic Deviate) ($t = -2.3$, $df = 215$, $p = .023$) found that men had significantly higher rates than women.

Intensity of the ego-defense mechanisms displayed on Fig. 3.

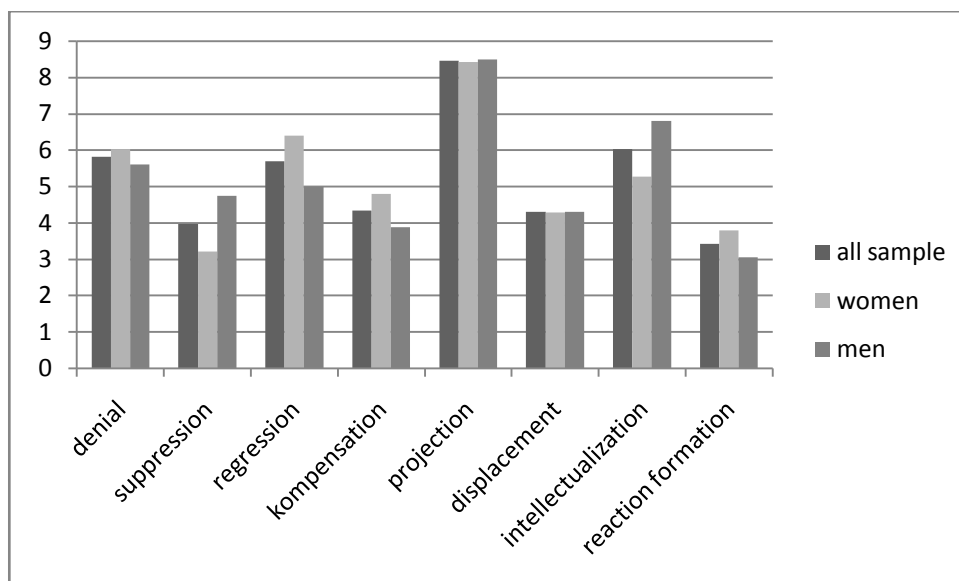


Fig. 3. Degree of use of the ego-defense mechanisms.

The dominant defense mechanism in our whole sample was a projection – the false attribution to others their own unacceptable feelings. The least used defense mechanism was the reaction formation, when the behavior, thoughts or feelings are completely opposite to the real unconscious desires. Between men and women found significant differences in the expression of such defense mechanisms as suppression, regression, compensation and intellectualization (Kolmogorov-Smirnov test, the differences are significant at $p < .001$). The suppression and intellectualization are more inherent to men and regression and compensation are more inherent to women.

On Fig. 4 it can see that the Ukrainian students adhere to a healthy lifestyle mainly in avoiding alcohol and drugs, and trying to maintain life safety. They disrupt healthy behavior mostly in the field of nutrition and smoking.

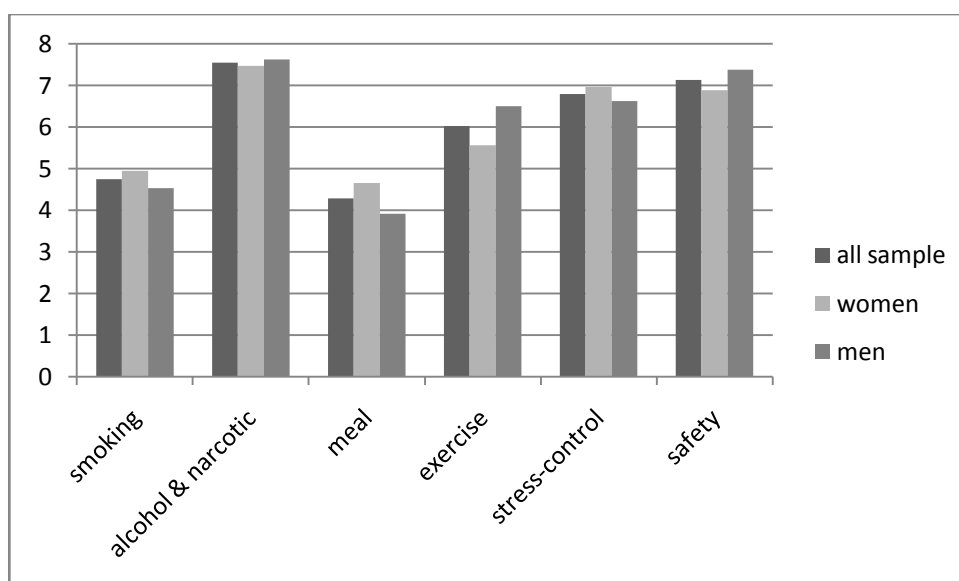


Fig. 4. Intensity patterns of healthy behavior.

Young women and men differ in their lifestyle in the fact that women pay more attention to healthy eating (Kolmogorov-Smirnov test, $p < .01$), while men lead more physically active lifestyle (Kolmogorov-Smirnov test, $p < .05$).

Thus, we evaluated the state of the studied psychological and physiological parameters for further analysis of the relationships between them.

3.2. Relationship between regulatory systems and personality types

First of all, correlation analysis was performed for the entire sample between personality types measured by MMPI and the state of regulatory systems measured by HRV. As a result it was found 6 direct links between the scales of MMPI (L, F, D, Pa, Pt, Sc) and the stress-index (SI) and an inverse link between psychasthenia (Pt) and the percentage of high-frequency waves (HF%, characteristic of restorative-trophic parasympathetic regulatory influence). However, it was found some differences when this correlation analysis was done separately for men and women – see Table 2.

Table 2

Relationship between MMPI scales and HRV parameters according to gender.

WHOLE SAMPLE, N=217		MEN, N=112		WOMEN, N=105	
Associated variables	r, p-level	Associated variables	r, p-level	Associated variables	r, p-level
SI & L	$r=.13$, $p=.055$ (trend)	LF/HF & L	$r=.21$, $p=.020$	SI & L	$r=.23$, $p=.020$
SI & F	$r=.19$, $p=.005$	HF ms^2 & D	$r=.20$, $p=.035$	SI & F	$r=.35$, $p<.001$
SI & D	$r=.18$, $p=.009$	TP ms^2 & D	$r=.19$, $p=.040$	SI & Hs	$r=.20$, $p=.040$
SI & Pa	$r=.15$, $p=.030$	LF% & Pd	$r= -.17$, $p=.075$ (trend)	SI & D	$r=.30$, $p=.002$
SI & Pt	$r=.19$, $p=.005$			SI & Pa	$r=.23$, $p=.020$
SI & Sc	$r=.17$, $p=.011$			SI & Pt	$r=.25$, $p=.010$
HF% & Pt	$r= -.013$, $p=.054$ (trend)			SI & Sc	$r=.25$, $p=.009$
				VLF ms^2 & D	$r= -.19$, $p=.047$
				VLF ms^2 & Pt	$r= -.20$, $p=.043$
				LF% & Pd	$r=.21$, $p=.033$
				HF ms^2 & Hs	$r= -.21$, $p=.032$
				HF ms^2 & Hy	$r= -.23$, $p=.016$
				TP ms^2 & Hs	$r= -.21$, $p=.028$
				TP ms^2 & Hy	$r= -.21$, $p=.029$

General tendencies of relation between the state of regulatory systems and psychological characteristics consist in the fact that an increased desire for self-presentation (the distortion of information about themselves) associated with the physiological stress. That is personal closeness is accompanied by a lot of regulatory systems tension, that can be explained by the necessity of increased vigilance when creating a false image.

There are clear gender differences in the relation of depressive way to respond to the environment with the regulatory mechanisms. In particular, the response of women is organized on the principle of increased sympathetic regulation and reduced humoral one and of men it is increased parasympathetic regulation. That is, for women depression leads to stress, tension of mobilization and exhaustion, and for men – to rest and recovery adaptive reserves, which results in an increase of the total energy (TP).

Another contrary effect in regulatory systems in men and women is associated with impulsivity and opposition (Psychopathic Deviate, Pd-scale). Pd in women is associated with an increased influence of the sympathetic mobilizing nervous system (direct correlation with LF%) and in men – with a decrease in sympathetic influences (inverse correlation with LF%).

Exclusively in women stress index (SI) is also connected with Pa (suspiciousness, rigid attitudes), Pt (psychasthenia), Sc (individualistic features, lateral thinking). Besides in women reducing VLF – humoral regulation (i.e., depletion of adaptive reserves) is associated with psychasthenia (Pt), and reduced parasympathetic regulation (HF) and total energy (TP) associated with emotional lability (Hy, hysteria) and hypochondriasis (Hs), that not present in men.

3.3. Relationship between regulatory systems and defense mechanisms

Correlation analysis on the total sample showed the connection of regulatory systems with three defense mechanisms – projection, denial, and the reaction formation. A differentiated analysis for men and women demonstrate several distinctions from the general results – see Table. 3.

Table 3

Relationship of defense mechanisms and HRV parameters according to gender.

WHOLE SAMPLE, N=217		MEN, N=112		WOMEN, N=105	
Associated variables	ρ , p-level	Associated variables	ρ , p-level	Associated variables	ρ , p-level
LF% & projection	$\rho = -.15$, $p = .018$	HR & projection	$\rho = -.19$, $p = .039$	LF% & projection	$\rho = -.19$, $p = .057$ (trend)
LF/HF & projection	$\rho = -.18$, $p = .007$	HR & reaction formation	$\rho = -.19$, $p = .043$	LF/HF & projection	$\rho = -.19$, $p = .055$ (trend)
HFms ² & projection	$\rho = .13$, $p = .054$ (trend)	VLF ms ² & intellectualization	$\rho = .18$, $p = .050$	HF% & denial	$\rho = -.19$, $p = .048$
HF% & projection	$\rho = .14$, $p = .033$			HR & suppression	$\rho = .20$, $p = .030$
HF% & denial	$\rho = -.16$, $p = .020$				
HFms ² & denial	$\rho = -.14$, $p = .035$				
VLF% & denial	$\rho = -.18$, $p = .007$				
HR & reaction formation	$\rho = .16$, $p = .016$				

Common to men and women is the reduction of sympathetic regulation and increased parasympathetic with greater use of projection. That is, attributing to others their own shortcomings and negative emotions effectively reduce the mobilization of the body tension. Exclusively in women using such defense mechanisms as suppression and denial associated with increased heart rate and decreased vagal influence. Exclusively for men it shown that using reaction formation is combined with decreased heart rate, and using intellectualization connected with increased humoral regulation.

3.4. Relationship between regulatory systems and lifestyle

Correlation analysis on the total sample revealed the connections of regulatory systems with physical activity, safety and common index of the healthy lifestyle. Separate analysis by men and women found that in gender groups it is little differently provided healthy behavior patterns – see Table 4.

Table 4

Relationship between lifestyle and HRV according to gender.

WHOLE SAMPLE, N=217		MEN, N=112		WOMEN, N=105	
Associated variables	ρ , p-level	Associated variables	ρ , p-level	Associated variables	ρ , p-level
HF% & exercises	$\rho = -.15$, $p = .029$	VLF% & safety	$\rho = -.19$, $p = .046$	HF% & exercises	$\rho = -.21$, $p = .029$
LF/HF & exercises	$\rho = .14$, $p = .032$	LF% & safety	$\rho = .20$, $p = .036$	VLF% & exercises	$\rho = .20$, $p = .042$
SI & safety	$\rho = .13$, $p = .065$ (trend)	LF% & alcohol	$\rho = .18$, $p = .054$ (trend)	VLF% & safety	$\rho = .19$, $p = .051$ (trend)
LF% & safety	$\rho = .15$, $p = .032$			HF & safety	$\rho = -.18$, $p = .059$ (trend)
LF/HF & safety	$\rho = .12$, $p = .086$ (trend)			HF% & safety	$\rho = -.20$, $p = .042$
HF% & life style	$\rho = -.13$, $p = .055$ (trend)			HF% & life style	$\rho = -.24$, $p = .016$
LH/HF & life style	$\rho = .13$, $p = .057$ (trend)			LH/HF & life style	$\rho = .19$, $p = .052$ (trend)
				VLF% & life style	$\rho = .23$, $p = .017$
				VLF & life style	$\rho = .19$, $p = .050$

The gender differences relate to the fact that the desire for security in men is associated with reduced humoral influences, and in women – with elevated ones. In men, the desire to avoid alcohol and drug use is accompanied by increased sympathetic regulation, which is not observed in women.

Exclusively for women physical exercise are accompanied by reduced parasympathetic regulation and increased humoral. This is consistent with the predictions of evolutionary psychology that for women avoidance of physical activity is more important, because pregnancy and lactation are energy intensive states of the body that increase the risk of dying from lack of calories (Tibur, 2012). The realization of a healthy lifestyle in women is characterized by the greater humoral regulation involvement.

In general physical training, maintain safety and healthy lifestyle in women and in men is associated greater with sympathetic than parasympathetic influences.

4. Discussion

In our study we got the sex-based pattern that men have greater level of sympathetic regulation (particularly higher LF) in comparing to women, which was already obtained in other studies (Sloan et al., 2008). The facts close to these results were revealed in several other studies. For example, J. M. Evans and al., Maria Rosa Conte showed that women have higher HF than men (Evans et al., 2001; Conte, 2003). But the fact obtained in our study that women have higher humoral regulation in comparison to men we had not found in the literature. It may be caused by specifics of our sample – perhaps women-students need higher hormonal support for their activity (university studying), i. e. they work with more tension, than men-students. Likely women worry more intensively about their academic performance that involves higher hormonal regulation. As is known females are significantly higher in test anxiety scores than males (Zeidner, 1990).

Generally for men and women personal closeness, concern about self-presentation leads to the regulator systems tension, respectively, a larger sincerity, openness and naturalness may reduce physiological stress. Such conclusion can be drawn from the

correlations of SI, LF/HF (HRV-indexes) with L-scale ('lie-scale') and F-scale ('fake-scale') of MMPI. As is known such rule is using for classical lie detection (Widacki, 2012).

Women have more intense relationship of the psychological reactions and the activity of regulatory systems in comparison with men. It is reflected in fact, than we found out twice more connections between psychological and physiological characteristics in female part of the sample than in male one. This tight integration between mental and physiological responses in women may cause greater susceptibility of women for psychosomatic illnesses and it is important to pay attention, first of all, to women's mental hygiene for the prevention of morbidity.

Positive relationship of parasympathetic regulation (HF) and total neurohumoral regulation (TP) with depression in men suggests that men's apathy and pessimism may fulfill function of a temporary respite for the future life activity. There are three conceptions in evolutionary psychology which can explain this result – 'disengaging from unattainable goals', 'social competition hypothesis' and 'resource holding potential' (Rossano, 2003, p. 179). Contrary women have connection of propensity for depressive personality type with stress-index increase and VLF decrease. That is for women such state is not connected with resource recovery but with tension and exhaustion. It can be connected with different reasons of depression for men and women from the point of view of evolutionary psychology. Notably in women deterioration in interpersonal relationships should often anticipate depression, whereas in men, the deterioration of social standing would be a more likely precursor (Rossano, 2003, p. 181). But now women also compete for social status with men. It is more natural and usual for men to compete for status than for women that bring latest to overstress. It means that depressive state is more dangerous for women and demands more attention from the psychotherapist.

Next gender different result concerns to connection of MMPI Pd-scale (Psychopathic Deviate) with sympathetic regulation (LF%) decrease in men and with sympathetic regulation (LF%) increase in women. Psychopathic Deviate like behavioral pattern has evolved to enhance fitness by exploit cooperative and altruistic behavior of others (J. Palmer & L. Palmer, 2002). By the different sources males are 3–4 or 20 times more likely to be sociopaths / psychopaths than females (J. Palmer & L. Palmer, 2002; Rossano, 2003). This discrepancy may underlie why women need more tension of regulation systems to maintain this adaptation strategy as it is more natural for men.

It was found several correlations between regulatory systems tension (SI increase, VLF, HF and TP decrease) and increase of such personality types as Sc (Schizophrenia), Pt (Psychasthenia), Pa (Paranoia), Hy (Hysteria), Hs (Hypochondriasis) only in women. Sc and Pa types are very close and can be explained together. Conservation of schizophrenia genes in evolution can exist because they give some advantages in unusual circumstances when population or group need of new creative ideas and decisions. In such transition periods the messiahs and leaders often appear and they can propose new ways of life when traditional ones do not work (J. Palmer & L. Palmer, 2002). The men get on themselves this function most of all. The creativity of men is percepts in societies like more preferable. That is why for women' organisms such behavioral pattern can bring more stress and overload. Three other personality types (Pt, Hy, Hs) include anxiety as important component. Well known than anxious-phobic states are more common in women than men because in our evolutionary past women probably had more to fear from different dangers, 'given the difficulties of trying to escape or hide with a child in tow' (Rossano, 2003).



Although some of the psychological defense mechanisms, in particular, projection, effectively free the body from stress (that was proved by increase of HF and decrease of LF and LF/HF), abuse of this mechanism stimulate interpersonal aggression and distrust, as observed in the Ukrainian society, which for a long time was characterized by a high degree of hostility (Golovakha, 2010). By R. Plutchik projection is a derivate from such base emotion as disgust, on a function language it's derivate is a rejection and on a trait language it's derivate is a hostile (Plutchik, 2001). Potentially dangerous defense mechanisms for women are 'suppression' and 'denial', because they connected with increased heart rate and decreased parasympathetic regulation. R. Plutchik consider that 'suppression' is a derivate of basic emotion 'fear' and 'denial' is a derivate of basic emotion 'acceptance'. Suppression is closely connected with aversive emotion of fear that can explain why heart rate increases in this condition. Denial is such ego-defense mechanism under which anybody denies some problems, information, signals that to accept situation or some person more like desirable than like real. According to men the 'reaction formation' not to bring the aggravation of the organism state so it connected with decrease of heart rate, but the 'intellectualization' is not so well for it, as this mechanism increases the hormonal regulation which indicates on additional regulatory system involvement – humoral regulation. By R. Plutchik 'reaction formation' is derivate of basic emotion 'joy', on functional language its derivate is 'reproduction' and on trait language its derivate is 'sociable' that explain its positive effect on organism especially for men who use quantitative reproductive strategy which is connected with low parental investment (Trivers, 1972). Given that mating bring more costs for females that cause to 'sexual conflict' (Tregenza et al., 2006). 'Intellectualization' as ego-defense mechanism is derivate of emotion 'expectation', on functional language its derivate is 'exploration', on trait language its derivate is 'demanding', but on diagnostic language its derivate is obsessive-compulsive personal disorder (Plutchik, 2001). As is known OCPD has higher prevalence among men then among women. This disorder include in its behavioral pattern overconscientious and scrupulous, perfectionism, excessively devotion to work and productivity to the exclusion of leisure activities and friendships that is energy-cost activity (De Reus & Emmelkamp, 2010).

Although the literature suggests that a healthy lifestyle contributes to the parasympathetic effects and reduce the tension of the body (Corrales, 2012), in our study we found opposite result. It seems that university students should support healthy lifestyle by willpower tension which requires active central regulation contour and the general state of mobilization of the body. R. M. Bayevsky (2004) created the heart rate regulation model which included two contours: central regulation contour, to which relate neocortex, higher autonomic centers and subcortical neural centers, cardiovascular center of the brain; and autonomous contour which includes the lungs, the respiratory center, the nucleus of the vagus and the sinus node. Spectral power of LF, LF/HF, VLF reflects the impact of central regulation contour and HF reflects the impact of autonomous contour (Bayevsky, 2004).

It is unlikely that realization of healthy behavior in today's environment based solely on autonomous contour, because the unconscious motivations are designed to save energy by reducing unnecessary movements, the use of as many sweet and fatty foods as possible, use of substances that cause positive emotions. This is described by mismatch hypothesis of modern conditions to which the body and mind evolved (Roberts, 2011). Perhaps only conscious volitional efforts can lead to realization of healthy lifestyle until the new adaptations to the changed contemporary environment is not created.

Vulnerability for women is connected with tendency to inactivity, and for men with use of alcohol and drugs. The maintaining of safety is differently involves regulation resources, e. g.

men worry about the safety when they near to the exhaustion as in the optimal state they probably tend to risk. For men, more natural is some level of risk, and the desire for security is relevant to them already at the state of exhaustion of physiological reserves. May be men need to make up for lack of physical risk by adventure sports, to avoid provocative desire to do risky behavior in everyday life. Contrary to men women more maintain the safety when they have increased tension (increased VLF). Perhaps women as more anxious than men often worry about their safety that requires additional energy involving.

5. Conclusions

Our research was devoted to study regulation system state in connection with different psychological types, ego-defense mechanisms and healthy behavior of youth taking into account the gender. We hypothesized that this various adaptation modes can differently involve the regulation systems and lead to the different physiological costs of the body. We found that for whole sample the most costly way of behavior from those which we have considered is the disposition to distort information about yourself ('lie scale' and 'fake scale' of MMPI) because they are connected with physiological stress increase (SI of HRV). From the other side the least costly for the organism is ego-defense mechanism 'projection' because it is connected with higher parasympathetic regulation and lower sympathetic one.

Also the tendency to maintain health behavior is connected with sympathetic regulation increase and decrease of the parasympathetic one. Especially this connection is relevant to women.

It was found a lot of gender differences in the ways of relations between psychological/behavioral patterns and regulation systems state. This can reflect evolutionary diverse adaptation strategies of men and women. For example in relation to our research we can apply such well known adaptation phenomena as tendency to save energy by avoiding of excess movements, eating sweet and fatty food, be more deviate for men and more anxious for women etc.

The interventions for changing unhealthy life style should be do with taking in account evolutionary, gender and physiological rules which underlie to people behavior. The necessity of this upholds such areas of medical and psychological practice as gender medicine, Darwinian medicine and evolutionary psychology.

In addition health education cannot be conducted in isolation from learning of self-regulation, as it is unlikely to expect from the individuals whose ancestors evolved into an uncomfortable environment with limited resources that they will easy refuse from the 'benefits of civilization'.

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