

Perceived stress, emotional ill-being and psychosomatic symptoms in high school students: the moderating effect of self-regulation competences

Romana Kadzikowska-Wrzosek

Summary

Aim. Researchers have proved detrimental effect of stressful life events on physical and mental health. On the other hand psychologists have identified a number of personality variables that exert stress-buffering effect. According to Personality Systems Interactions (PSI) theory, stressful life events (differentiated into demands and threats) are expected to reduce subjective well-being when the ability to self-regulate affect is impaired. The aim of the present research was to verify a hypothesis that in the stressful demanding situation action oriented individuals, due to their high self-regulation competences, will display less mental health problems than state oriented individuals.

Methods. The group of participants included 92 persons at the age of 18-19. The research had been carried out one month prior to the high school finals. The Action Control Scale (ACS-90) was used to measure self-regulation competences, perceived stress was assessed with the Perceived Stress Scale (PSS-10), Goldberg's General Health Questionnaire (GHQ-28) was administered to assess emotional ill-being and psychosomatic symptoms.

Results. Higher levels of perceived stress were associated with significantly higher indexes of emotional ill-being and somatic symptoms. However, the influence of perceived stress on psychological well-being seems to be moderated by self-regulation competences. State-oriented individuals showed substantially more mental health problems than action-oriented individuals when perceived stress increased.

Conclusions. The relation between perceived stress and mental health problems varied as a function of self-regulation competences. The findings suggest the importance of developing self-regulation competences to minimize the risk of harmful effect of stressful situation on mental and physical health.

stress / mental health / psychosomatic symptoms / self-regulation competences / self-motivation

INTRODUCTION

Detrimental effect of stressful life events on physical and mental health has been studied extensively both in medicine and psychology. Cohen, Janicki-Deverts and Miller pointed out that the longer a stressful experience lasts, the great-

er the risk to health becomes [1]. Some authors suggest that stressful experiences can act as cofactors in predisposed persons and can trigger disease among persons with underlying disease [1, 2].

An individual perceives situation as stressful when he or she believes that there is a discrepancy between the demands of the situation and the available psychosocial resources and competences. It is important to emphasize that it is critical how the situation is assessed. Cognitive assessment of the situation is closely linked to emotional response, which in turn induces

Romana Kadzikowska-Wrzosek: Warsaw School of Social Sciences and Humanities, Faculty in Sopot, Poland. Correspondence address: Romana Kadzikowska-Wrzosek, 141 Piastowska Str., 80-358 Gdańsk, Poland. E-mail: rkadzikowska-wrzosek@swps.edu

This work was supported by grant: NN 106 282039.

physiological reactions [3, 4]. The hippocampus plays an important role in emotional reactions and concomitant physiological responses. There are several potential pathways for the effect of psychological distress on physical and mental health [2].

The human body produces physiological and behavioural responses to perceived stressors in an attempt to overcome them and protect itself. These reactions to stress involve responses of the triad of the endocrine system, the autonomic nervous system, and the immune system. To make it simpler, the negative life experiences lead to changes in the physiology of the body, which in turn helps the body respond effectively to stressful events. However, these physiological responses may lead to disturbances of mental and physical functioning over the long term. There is considerable evidence that bodily system responses to stress through increase of the levels of hormones such as adrenaline, norepinephrine, and cortisol. Chronic cortisol elevation can have the following detrimental effects on health: it increases the risk of atherosclerosis and heart disease, can lead to osteoporosis, may contribute to diabetes, psychoses among the elderly and to depression in the general population, it also can hamper immune function [2, 5, 6]. There is also evidence that this stress hormone has been associated with variety of psychosomatic symptoms, such as eating disorders, headaches [7].

Additionally, negative emotional states associated with stress experience contribute to health problems also through evoking such potentially harmful behaviours as smoking, drug use, excessive alcohol consumption, overeating. This kind of behaviour is a way to regulate affect – people believe that this behaviour have the ability to repair their mood [8]. Studies have also confirmed that negative emotions hinder the acquisition of social support, which allows to minimize adverse health effects of stress [4]. Consistent with psychological approach to stress is the assumption that physiological and behavioural effects of emotions are an important part of the link between stressful life events and health outcomes [9, 10, 11].

It is important to differentiate two kinds of emotional responses to a situation: the primary response relates to people's immediate reaction to events and the secondary response relates to

people's ability to self regulate their initial emotional reaction [11, 12]. Nowadays, psychologists point out that human beings are agents, shaping their lives rather than passively responding to stressful life events [13]. This view highlights that individuals may play an active role also in stressful situations [4]. On the basis of many empirical results, psychologists have assumed that people vary in the way how they interpret, cope with, and react to stressful life events. Following this it can be concluded that individuals differ in the degree to which they are adversely affected by stressful experiences. There is an evidence that many personality variables such as self-esteem, neuroticism, extraversion, and social skills exert stress-moderating effect [5, 14, 15, 16].

It is expected that some of these personal characteristics affect the primary response to stressful events; the others determine self-regulatory processes. The primary reaction to stressful events concerns the ease in which individuals create specific emotional state, the secondary response refers to people's ability to leave this emotional state [12]. For these reasons primary response is associated with emotional sensitivity whereas secondary responses depend to a large extent on the self-regulation processes. For instance, empirical results proved that extraversion is associated with high sensitivity to positive affect while neuroticism is related to increased sensitivity to negative affect [16]. On the other hand the abilities to regulate affect according to Kuhl – author of Personality Systems Interactions (PSI) theory – are associated with self-relaxation and self-motivation [17, 18].

It is assumed that there are two kinds of stressful life events: demands and threats. Demanding life events (e.g. high task difficulty, goal conflicts, duties, unpleasant tasks) are associated with reducing the positive affect. Inhibited positive affect is experienced as passivity, lethargy, or listlessness. Previous studies have shown that low positive affect is associated with an increased procrastination, passive goal rumination, an increased propensity to take action contrary to the objective (e.g. overeating rather than comply with the diet) and task – irrelevant intrusions [7, 18]. Having such difficulties with the adoption of intentions can, in turn, reduce one's well-being [7, 16]. When implementation intentions are perceived as difficult and de-

manding, the ability to self-motivation is of particular importance. Self-motivation is the ability to increase positive affect and overcome discouragement through generating any positive aspect that may be associated with intention to act. According to PSI-theory the ability to self-motivation refers to self-determination, initiative and volitional self-efficacy [18, 19].

Threatening life events, such as major changes, failures, losses, painful experiences cause the appearance of negative emotional states like anxiety, worry, sadness. Within the PSI framework activation of the self-system during or after threatening experience supports down-regulation of negative emotions. As a consequence, threatening event is processed in holistic manner and can be integrated into self-system. This, in turn, facilitates reappraisal, ascribing a meaning or – if it is possible to change the situation – finding solution. Activation of the self-system is associated with ability to self-relaxation. If an individual in the situation of threatening experience is aware of self-referential representation, it increases the ability to reduce negative affect. Previous results have confirmed that the self-complexity and affect regulation processes based on the self-system strengthen the capacity to cope with negative events [20]. High levels of negative emotions triggered by threatening life events cause the appearance of a variety of psychosomatic symptoms [18].

According to PSI-theory, self-regulation abilities are more crucial to well-being and symptom formation than affective sensitivity [16]. High sensitivity to negative affect (e.g. neuroticism) may increase the risk of psychosomatic problems only when both the ability to down-regulation of negative affect (self-relaxation) is low. Correspondingly, low sensitivity to positive affect (e.g. schizoid-like-personality) may have detrimental effect on well-being only if both the ability to up-regulation (self-motivation) is low [16, 19]. According to the PSI framework, the abilities associated with self-motivation and self-relaxation depend on the personality disposition of action and state orientation. The action oriented individuals, due to their high efficiency of action control mechanisms, are better than state oriented individuals in self-motivation and self-relaxation. Action orientation in contrast to state orientation supports the enactment of intentions, enables detachment from an unrealistic goal and also helps to stop be-

ing preoccupied and ruminate about threatening event. Many empirical results supported the association between state versus action orientation and the abilities to self-regulate affect. For instance, action orientation is a strong predictor of reduction of negative affect, depression, physiological arousal and tension in response to threatening or demanding real-life situations and laboratory manipulations [15, 20, 21, 22, 23]. In addition, previous research confirmed that emotional and physical well-being of action oriented individuals, due to their ability to reduce feelings of anxiety and to overcome feeling of listlessness are less adversely affected by stressful life events than well-being of state oriented individuals [7, 16].

The aim of study was to investigate the relationship between self-regulation competences and psychological well-being in the demanding stressful situation. Specifically, I was interested in the question whether state vs. action oriented individuals differ with respect to psychological well-being when coping with demands. Based on the PSI-theory characterization of action vs. state orientation, as associated with abilities in self-regulation of affect, I hypothesized that in the stressful demanding situation action oriented individuals will display less mental health problems than state oriented individuals.

MATERIAL AND METHODS

Participants

The group of participants included 92 high school students (50 females and 42 males), aged from 18 to 19 years ($M=18.5$; $SD=0.50$). The research had been carried out one month before the high school finals started. It was assumed that preparation period prior to the high school finals is demanding situation, especially for participants with low ability to self-motivation. For those people, because of their inability to effectively implement intentions, confrontation with high demands may be stressful and detrimental to their well-being.

Method

Action versus state orientation was measured using the Action Control Scale (ACS-90), in the

Polish adaptation by Marszał-Wiśniewska [24]. The ACS-90 has been developed and validated by Kuhl and colleagues [25]. One subscale (AOD) of the ACS-90 was administered. The AOD scale has 12 items that relate to coping with demanding situation. Each of the items of this subscale describes a demanding situation and two alternative ways of coping with this situation. The following is an example item: "When I know I must finish something soon: a) I have to push myself to get started, or b) I find it easy to get it done and over with". Option "a" refers to a state-oriented way of coping with demands, option "b" represents an action-oriented kind of reaction to such situation. Participants were asked to choose one of the options. Action-oriented choices were coded as "1", state-oriented choices were coded as "0". The scale ranges from 0 to 12 with lower scores indicating state-oriented hesitation and higher scores indicating action-oriented initiative [25]. In the present study AOD scale had internal consistency (Cronbach's alpha) of $\alpha = 0.65$.

Levels of perceived psychological stress were assessed with the 10-item Perceived Stress Scale (PSS-10) [26], in the Polish adaptation by Juczyński and Ogińska-Bulik [27]. Items of this scale refer to the extent to which people find their lives to be unpredictable, uncontrollable, and unmanageable. The following is an example item: "In the last month, how often have you felt that you were unable to control the important things in your life?". A 5-point Likert scale (ranging from 0-never to 4-very often) was used to grade levels of perceived stress, a higher score indicates higher levels of perceived stress. The PSS-10 showed internal consistency (Cronbach's alpha) of $\alpha = 0.82$ in this study.

Emotional ill-being and psychosomatic symptoms were measured using 28-item version of Goldberg's General Health Questionnaire (GHQ-28) [28], in the Polish adaptation by Makowska and Merez [29]. This version is used most widely in various countries and with various types of population. The GHQ-28 has four 7-item scales: somatic symptoms (A), anxiety and insomnia (B), social dysfunction (C) and depression (D). The following are examples of some of the items: "Have you found everything getting on top of you?"; "Have you been getting scared or panicky for no good reason?" and "Have you been

getting edgy and bad tempered?". Each item is accompanied by four possible responses, typically being "not at all", "no more than usual", "rather more than usual" and "much more than usual", scoring from 0 to 3, respectively. The total possible score on the GHQ-28 ranges from 0 to 84 and allows for means and distributions to be calculated, both for the global total, as well as for the four subscales. In the present study, all four sub-scales (somatic symptoms (A), anxiety and insomnia (B), social dysfunction (C) and depression (D)) had internal consistencies (Cronbach's alpha) of $\alpha = 0.78$; $\alpha = 0.86$; $\alpha = 0.76$; $\alpha = 0.86$, respectively.

The questionnaires were self-administered, and were personally distributed by the researcher after explaining the purpose of the research to the participants.

Statistical analysis: Student's t-test was used for preliminary analysis of the data. To test the research hypotheses, a hierarchical regression analysis was conducted on psychological well-being, with AOD and perceived stress entered as the first block, and their interaction term entered as the second. In all analyses, predictor variables were standardized before their interaction term was calculated [30].

RESULTS

According to their PSS-10 scores, 46 participants were classified as perceiving low levels of stress because their scores were below the sample median (i.e. lower than 21.50, $M = 13.70$, $SD = 5.27$) and 46 as perceiving high levels of stress because their scores were above the median (i.e. a score of 21.50 or higher, $M = 27.39$, $SD = 4.23$). Gender did not differentiate PSS-10 scores.

The t-test results indicated that there were significant differences in means scores of all four subscales of the GHQ-28 between participants perceiving lower and higher levels of stress. Tab. 1 presents descriptive statistics for the all four subscales of the GHQ-28 and t-value for participants who perceived low and high levels of stress.

Participants who perceived low levels of stress had significantly lower indexes of mental health problems than participants who perceived high-

Table 1. Differences in levels of somatic symptoms, anxiety and insomnia, social dysfunction and depression between participants perceived low (N=46) and high (N=46) levels of stress.

Stress levels	Somatic symptoms				
	M	SD	df	t	p<
Low	5.96	2.30	90	-5.24	0.001
High	9.57	3.58			
Stress levels	Anxiety and insomnia				
	M	SD	df	t	p<
Low	5.39	3.64	90	-7.59	0.001
High	11.57	4.16			
Stress levels	Social dysfunction				
	M	SD	df	t	p<
Low	6.17	2.31	90	-4.10	0.01
High	8.87	3.82			
Stress levels	Depression				
	M	SD	df	t	P<
Low	1.87	3.15	90	-5.23	0.01
High	6.35	4.86			

er levels of stress. Higher levels of perceived stress were associated with significantly higher indexes of somatic symptoms, anxiety and insomnia, social dysfunction and depression.

Regression analysis indicated significant main effect of perceived stress, $\beta=0.56$, $t(89)=5.98$, $p<0.001$ on the level of somatic symptoms, main effect of AOD and AOD X perceived stress interaction were not significant. However, the relation between the perceived stress and other aspects of psychological well-being varied as a function of state and action orientation. There was significant main effect of perceived stress, $\beta=0.73$,

$t(89)=10.34$, $p<0.001$ and significant AOD X perceived stress interaction: $\beta=-0.17$, $t(88)=-2.62$, $p<0.05$ on the level of anxiety and insomnia. When interaction term (AOD X perceived stress) was added as predictor, this increased the level of explained variance (adj. $R^2=0.61$, $F(3,88)=6.85$, $p<0.05$). Furthermore, regression analysis proved significant main effect of perceived stress: $\beta=0.53$, $t(89)=5.60$, $p<0.001$ and significant AOD X perceived stress interaction, $\beta=-0.22$, $t(88)=-2.44$, $p<0.05$ on the level of social dysfunction. When interaction term (AOD X perceived stress) was added as predictor, this increased the level of explained variance

(adj. $R^2=0.29$, $F(3,88)=5.97$, $p<0.05$). In similar manner there was a significant main effect of perceived stress, $\beta=0.64$, $t(89)=7.61$, $p<0.001$ and significant AOD X perceived stress interaction: $\beta=-0.19$, $t(88)=-2.41$, $p<0.05$ on the level of depression. When interaction term (AOD X perceived stress) was added as predictor, this increased the level of explained variance (adj. $R^2=0.45$, $F(3,88)=5.79$, $p<0.05$).

Additionally regression analysis indicated that there are main effect of perceived stress on global total of the GHQ-28 scores: $\beta=0.77$, $t(89)=11.23$, $p<0.001$ and also significant AOD X perceived stress interaction: $\beta=-0.19$, $t(88)=-3.05$, $p<0.05$. When interaction term (AOD X perceived stress) was added as predictor, this increased the level of explained variance (adj. $R^2=0.64$, $F(3,88)=9.29$, $p<0.05$). These results confirm the hypothesis. Psychological well-being is under the influence of both perceived stress and action vs. state orientation (Fig. 1).

moderated by the individual differences in self-motivation associated with state vs. action orientation.

DISCUSSION

The obtained results proved that higher levels of stress are associated with higher indexes of mental health problems. Individuals showed substantially higher levels of somatic symptoms, anxiety and insomnia, social dysfunction and depression when perceived stress increased. However the consistent with expectations, findings showed also that relation between perceived stress and mental health problems varied as a function of state vs. action orientation. Action vs. state orientation, a personality construct derived from Personality System Interactions the-

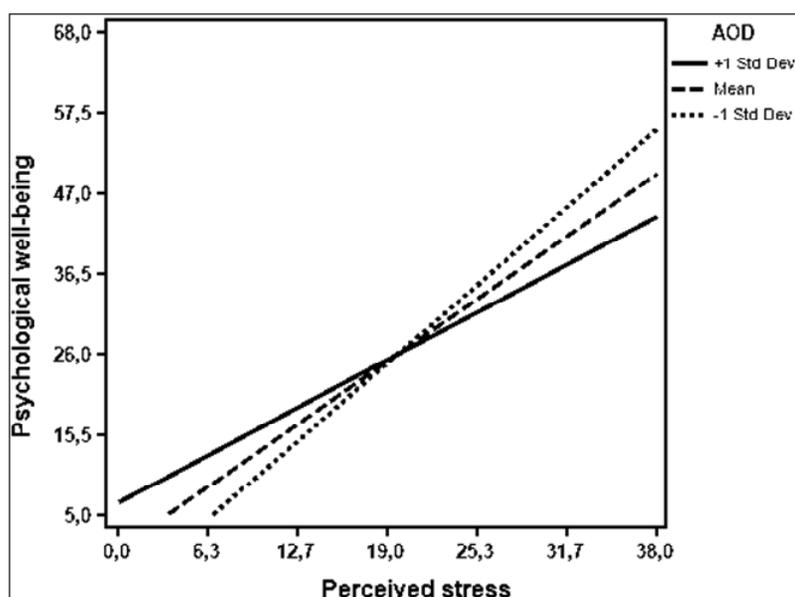


Figure 1. Increase in psychological symptoms as a function of perceived stress and action vs. state orientation (as measured with the AOD).

There was no significant difference in overall psychological well-being between state-oriented participants, $M=10.67$ and action-oriented participants, $M=14.44$ for low perceived stress, $t(88)=-1.59$, $p<0.31$. However for high perceived stress there was significant difference in psychological well-being between state-oriented participants, $M=48.08$ and action-oriented participants, $M=38.45$, $t(88)=2.15$, $p<0.05$. To sum up the findings support the hypothesis that the influence of perceived stress on psychological well-being was

moderated by the individual differences in self-motivation associated with state vs. action orientation [31] exerts a moderating effect on the relation between perceived stress and mental problems such as: anxiety and insomnia, social dysfunction and depression.

On the other hand, the study demonstrated that the action vs. state orientation associated with ability to self-generate positive affect did not have an influence on the level of somatic symptoms. One possible explanation is that this dimension of action vs. state orientation is associated with ability to up-regulate positive affect

but not to down-regulate negative affect. This is in accordance with PSI theory which distinguishes between two independent self-regulation competences: coping with hesitation and coping with preoccupation. In this way the present results contribute to the discriminative validity of the self-motivation and self-relaxation [7, 16, 22]. Demanding situations, such as high school finals, may lead to a reduction of positive affect as a result of an excessive burden and difficulties in the implementation intentions. Inhibited positive affect might cause hesitation, procrastination, rumination and task-irrelevant intrusion [16, 18]. Perceived discrepancy between what students do and what they have to do, dissatisfaction with their progress toward the goal can lead to psychological problems such as anxiety, insomnia, social dysfunction and depression [32]. Hence, in line with PSI theory, demanding situations require self-motivation in order to restore positive affect and to facilitate the enactment of intentions that are adequate to the context [7, 18].

It is also likely that for some students high school finals are not only demanding, but also threatening situation and therefore the present findings show that increased perceived stress is associated with higher indexes of somatic symptoms. It is in accordance with previous results proving that anticipation of a stressful situation is sufficient to elicit negative emotional reactions and concomitant physiological responses [33]. The increased cortisol concentration has been associated with a variety of somatic problems. Hence the preparation period prior to the high school finals might require not only competences associated with coping with inhibited positive affect, but also competences associated with coping with increased negative affect. In other words, in the face of the demands students need not only competence in self-motivation, but also in self-relaxation.

In line with the PSI theory self-regulation competences associated with self-motivation and self-relaxation are more shaped by educational factors than by heredity. This assumption is based on results from a study comparing identical and fraternal twins [34]. The genetic component in self-regulation competences appears to be modest, significantly smaller, compared to the genetic component of more traditional personality variables (e.g. extraversion, neuroticism)

[19]. Therefore, it is important to identify educational factors conducive to the development of self-regulation competence, which seems to minimize the negative effects of stress on physical and mental health [19, 35, 36].

The present study is limited in several ways. First, this study relied only on self-report measures as opposed to more objective measures of stress, emotional ill-being and psychosomatic symptoms. Second, this is cross-sectional study and therefore causal interpretation must be formulated with caution. Third, it is unclear to what extent the obtained results could be generalized to other samples, and other stressful situations. The presented results, however, provide a promising perspective for further research on the role of self-regulation competences in coping with stress and related health outcomes. Future researches should investigate the generalizability of the obtained results. To determine the causal relations, the cross-sectional findings should be replicated in a prospective design. It would be interesting also to test what role in the stressful demanding situation plays the other proposed by Kuhl dimension of action vs. state orientation – ability for self-relaxation.

CONCLUSIONS

The level of perceived stress seems to be a strong predictor of mental health. The increase of perceived stress might cause problems such as: somatic symptoms, anxiety and insomnia, social dysfunction and depression.

Self-regulation competences associated with self-motivation possibly exert a moderating effect on the relation between perceived stress and outcomes such as: anxiety and insomnia, social dysfunction, depression.

The results suggest the importance of identifying the conditions conducive to the development of self-regulation competences.

REFERENCES

1. Cohen S, Janicki-Deverts D, Miller GE. Psychological stress and disease. *JAMA*, 2007; 298(14): 1685–1687.
2. Weiner H. *Perturbing the organism: The biology of stressful experience*. Chicago: The University of Chicago Press, 1992.

3. Lazarus RS, Folkman S. *Stress, appraisal and coping*. New York: Springer-Verlag, 1984.
4. Taylor SE. Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist*. 1983; 38: 1161–1173.
5. Segerstrom SC, Taylor SE, Kemeny ME, Fahey JL. Optimism is associated with mood, coping, and immune change in response to stress. *Journal of Personality and Social Psychology*. 1998; 74: 1646–1655.
6. Epel ES, McEwen BS, Ickovics JR. Embodying psychological thriving: Physical thriving in response to stress. *Journal of Social Issues*. 1998; 54: 301–322.
7. Baumann N, Kaschel R, Kuhl J. Striving for unwanted goals: Stress -depend discrepancies between explicit and implicit achievement motives reduce subjective well-being and increase psychosomatic symptoms. *Journal of Personality and Social Psychology*. 2005; 59(5): 781–799.
8. Faber RJ, Vohs KD. Self-regulation and spending: Evidence from impulsive and compulsive buying. In: Vohs KD, Baumeister RF, editors. *Handbook of self-regulation. Research, theory, and applications*. New York: The Guilford Press, 2011. p. 537–550.
9. Salovey P, Rothman AJ, Detweiler JB, Steward W. Emotional states and physical health. *American Psychologist*. 2000; 55: 110–121.
10. Taylor SE, Kemeny ME, Reed GM, Bower JE, Gruenewald TL. Psychological resources, positive illusions, and health. *American Psychologist*. 2000; 55: 99–109.
11. Gross JJ, Munoz RF. Emotion regulation and mental health. *Clinical Psychology: Science and Practice*. 1995; 2: 151–164.
12. Koole SL, van Dillen LF, Sheppes G: The self-regulation of emotion. In: Vohs KD, Baumeister RF, editors. *Handbook of self-regulation. Research, theory, and applications*. New York: The Guilford Press; 2011. p. 22–40.
13. Kofta, M., Weary, G., Sędek, G. *Personal control in action: Cognitive and motivational mechanisms*. New York: Plenum; 1998.
14. Martin RA, Kuiper NA, Olinger J, Dobbin J. Is stress always bad? Telic versus paratelic dominance as stress-moderating variable. *Journal of Personality and Social Psychology*. 1987; 37: 953–969.
15. Beckmann J, Kellmann M. Self-regulation and recovery: Approaching an understanding of the process of recovery from stress. *Psychological Reports*. 2004; 95: 1135–1153.
16. Baumann N, Kaschel R, Kuhl J. Affect sensitivity and affect regulation in dealing with positive and negative affect. *Journal of Research in Personality*. 2007; 41: 239–248.
17. Kuhl J. A functional-design approach to motivation and self-regulation: The dynamics of personality systems interactions. In: Boekaerts M, Pintrich PR, Zeidner M, editors. *Handbook of self-regulation*. San Diego: Academic Press; 2000. p.111–169.
18. Kuhl J, Quirin M. Seven steps toward freedom and two ways to lose it. Overcoming limitations of intentionality through self-confrontational coping with stress. *Social Psychology*. 2011; 42(1): 74–84.
19. Kuhl J. Adaptive and maladaptive pathways of self-development: Mental health and interactions among personality systems. *Psychologia Rozwojowa*. 2011; 16(4): 9–31.
20. Linville PW. Self-complexity as a cognitive buffer against stress-related illness and depression. *Journal of Personality and Social Psychology*. 1987; 52: 663–676.
21. Koole SL, Fockenberg DA. Implicit emotion regulation under demanding conditions: The moderating role of action versus state orientation. *Cognition and Emotion*. 2011; 25: 440–452.
22. Koole SL, Jostmann NB. Getting a grip on your feelings: Effects of action orientation and external demands on intuitive affect regulation. *Journal of Personality and Social Psychology*. 2004; 87(6): 974–990.
23. Heckhausen H, Strang, H. Efficiency under record performance demands: Exertion control-an individual difference variable? *Journal of Personality and Social Psychology*. 1988; 55: 489–498.
24. Marszał-Wiśniewska M. The Action Control Scale (ACS-90) by J.Kuhl. Polish adaptation. *Studia Psychologiczne*. 2002; 40: 77–102.
25. Kuhl J. Action versus state orientation. Psychometric properties of the Action Control Scale (ACS-90). In: Kuhl J, Beckmann J, editors. *Volition and Personality: Action versus state orientation*. Göttingen, Germany: Hogrefe; 1994. p. 47–59.
26. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *Journal of Health and Social Behavior*. 1983; 24: 385–396.
27. Juczyński Z, Ogińska-Bulik N. *Narzędzia pomiaru stresu i radzenia sobie ze stresem*. Warszawa: Pracownia Testów Psychologicznych; 2009.
28. Goldberg DP, Gater R, Sartorius N, Ustun TB, Piccinelli M, Gureye O, et al. The validity of two versions of the GHQ In the WHO study of mental illness In general health care. *Psychol Med*. 1997; 27: 191–197.
29. Makowska Z, Merez D. Polish adaptation of General Health Questionnaires, GHQ-12 and GHQ-28 by David Goldberg. In: Dudek B, editor. *Mental health assessment based on researches with questionnaires by David Goldberg*. Łódź: Instytut Medycyny Pracy. 2001. p. 211–262.
30. Aiken LS, West SG. *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage; 1991.
31. Kuhl J. A theory of action versus state orientations. In: Kuhl J, Beckmann J, editors. *Volition and personality*. Seattle: Hogrefe and Huber. 1995. p. 47–59.

32. McIntosh WD. When does goal nonattainment lead to negative emotional reactions, and when doesn't it? The role of linking and rumination. In: Martin LL, Tesser A, editors. *Striving and feeling. Interactions among goals, affect, and self-regulation*. New Jersey: Lawrence Erlbaum Associates, Inc.; 1996. p. 53–77.
33. Feldman PJ, Cohen S, Hamrick N, Lepore SJ. Psychological stress, appraisal, emotion and cardiovascular response in a public speaking task. *Psychology and Health*. 2004; 19(3): 353–368.
34. Kuhl J, Fuhrmann A. Decomposing self-regulation and self-control: The volitional components checklist. In: Heckhausen J, Dweck C, editors. *Life span perspectives on motivation and control*. Cambridge: University Press. 2009; 15–49.
35. Kuhl J, Keller H. Affect-regulation, self-development and parenting: A functional-design approach to cross-cultural differences. In: Sorrentino RM, Yamaguchi J, editors. *Handbook of motivation and cognition across cultures*. Academic Press Elsevier Publications. 2008. p.19–48.
36. Kadzikowska-Wrzosek R. Parenting and the self-regulation abilities: Educational antecedents of the degree satisfaction of basic needs, standards internalization and strength of volition. *Psychologia Rozwojowa*. 2011; 16(4): 89–108.