

# Stress Load of University Students in Terms of Health Economics

Věra STRNADOVÁ \*, Petr VOBORNÍK and Kateřina PROVAZNÍKOVÁ

University of Hradec Králové, Hradec Králové, Czech Republic; vera.strnadova@uhk.cz;  
petr.vobornik@uhk.cz; katerina.provaznikova@uhk.cz

\* Correspondence: vera.strnadova@uhk.cz

**Abstract:** The aim of the study is to clarify the causes and consequences of stress factors of the young people's current lifestyle in the period of adolescence. The authors proceed from the theoretical background of the fields of health economics, psychology of health, psycho hygiene, psychosomatic and behavioural medicine. The research part is based on the evaluation of their own research conducted in 2011 - 2018 among more than eighteen hundreds of university students. The methodology of the research was based on the questionnaire survey in which the rate of ability to cope with stress-load situations was being found out. We focused on three ways of handling stress factors, malcoping practices evoking negative emotions (33.6%), health damaging ways of behaviour (24.9%) and coping strategies which represent a healthy management of stress stimuli (58.5%). The research has shown that the differences between individual stress handling techniques are statistically significant. In the vast majority of cases, the measured values of healthy stress management methods outweighed the values of other less suitable methods of dealing with stress. Thus, positive coping strategies of behaviour in stressful situations prevailed significantly over negative malcoping strategies in the surveyed sample of respondents. The research thus confirmed a considerable increase in students' adaptation skills throughout their university studies.

**Keywords:** health economics; psychosomatic medicine; university students; stress factors; coping and malcoping strategies

**JEL Classification:** I120; I110; I150

---

## 1. Introduction

The studied areas, that are the subject of our empirical research, belong to the field of health economics, psychohygiene, psychosomatic medicine, behavioural medicine and psychology of health. When we consider the differences between these fields, health economics deals with the objective determinants of health relating to lifestyle and the quality of life, while psychohygiene deals with the principles of mental health. Psychosomatic medicine is based on the assumption of the psychogenic origin of diseases and was influenced significantly by psychoanalytic solutions and the theory of stress findings. Behavioural medicine emphasizes the use of behavioural analysis in the way of diagnostics, treatment, prevention and rehabilitation of diseases. In contrast to the aforementioned fields, psychology of health, despite the interdisciplinary nature of its focus, remains a psychological discipline that seeks to apply the results of psychological knowledge in relation to health (Kebza 2005).

One of many studies has focused on individuals that are the most resistant to stress and do not show signs of emotional or physical weakness even in severe stress situations (Kobasa 1979; Maddi 2006). This attribute is referred to as *hardiness*. Hardiness has two components: the determination to *engage* in the struggle against difficulties, the ability to perceive difficulties as a *challenge* and the ability to see *possibilities* how to influence the development of situations. Highly committed individuals believe that it is important to be interested in events and people, no matter how demanding and stressful the circumstances are. People determined to manage the course of their lives do not give up the conviction that they can influence the situation despite obstacles. Individuals who consider obstacles to be challenging perceive stress as a normal part of their life and as an *opportunity to learn, develop and gain wisdom*. Hardiness is therefore one of the prerequisites for better physical and mental

health. The personality of resilient individuals resistant to stress, is characterized by determination, control and challenge. These properties are linked to the factors that affect the perceived intensity of stressors. For example the feeling that a person is in control of his/her life reflects the trust in his/her own abilities and also affects the evaluation of stress events. The challenge also includes cognitive assessment and the opinion that the change is a common part of life and that it must not be seen as a threat but as an opportunity for growth.

Emotions and psychological activation caused by stressful situations are very uncomfortable and one is motivated to do something to alleviate this inconvenience. The process by which a person tries to cope with stress states is called *coping*. It has two basic forms. The first option is to focus on a specific problem or situation and try to find a way of changing it or avoiding it in the future. This is called *problem-oriented coping*. Another option is to focus on relieving the emotions associated with the stressful situation, even if the situation itself cannot be changed. This procedure is called *emotion-oriented coping* (Lazarus and Folkman 1984). Most people use both approaches to manage situations with increased stress load.

## 2. Theoretical Background

### 2.1. Economics of health

The subject of study in the field of health economics are objective determinants, which can affect positively, but also negatively, the person's health or illness (Barták 2005). Beaglehole (in Detels et al. 2005, p. 83) presents four ways of looking at these determinants. He distinguishes a *biomedical* perspective, a *lifestyle-based* approach, a broad *socio-economic* approach and a *public-health* perspective.

In addition to basic biological characteristics, health is a social and cultural concept and, according to Beaglehole, there are three basic sources of differences in human health. These are innate prerequisites, socio-economic life conditions and lifestyle, thus behaviour-related factors. These three areas concern gender differences as well as cultural and economic factors which also play an important role in determining the health of the population. Individual determinants are summarized by Beaglehole as follows:

- genetic determinants affecting approximately 20-25% of our health,
- social and economic determinants that include an individual's labour market position, working conditions and safety at work, education, housing and family conditions
- lifestyle and other behavioural determinants – they include eating habits (high or low fruit and vegetable consumption), smoking, alcohol consumption, self-care, social contacts and style of work
- male or female gender
- cultural determinants (e.g. in relation to older people)
- political determinants, which include the social and economic environment and health system
- global factors, especially environmental, which are related to the state of the environment and can affect human health

According to this concept we can see that a good health condition of a person is not only an individual matter but also a society-wide one. Health is a vital prerequisite for an individual's participation in social activities, enabling them to realize primary and secondary needs and thus to develop human and social potential.

### 2.2. Concept of health in psychological fields

The scientific discipline of *psychohygiene* is closely related to human health and, in particular, to disease prevention. It provides important principles that help to achieve mental health and mental balance. According to Křivohlavý (2001) mental hygiene means the care for optimal functioning of mental activity. In this sense, also the World Federation for Mental Health headquartered in Geneva defines its main role. It is the successor to the International Mental Hygiene Committee created by the extension of the Connecticut Society for Mental Health, founded as early as in 1908. Attention is paid

to interpersonal relationships, environmental regulation, changes in study and work conditions and principles of healthy living. One of the main areas of psychohygiene is *the art of relaxation*. There are various ways of easing mental or physical tension. Nowadays, anti-stress exercises are gaining in importance, combining the perception of movement with the perception of breath such as in yoga practices and Asian exercises. Psychohygiene also places great emphasis on interpersonal interaction, realistic perception of others and interpersonal relationships. Various *methods of mental health diagnostics* can also be included in this field. They focus on the quality of life of an individual, life satisfaction and the state of vitality – the overall feeling of health. On the other hand, experiencing anxiety and depression states in connection with serious life problems can be mentioned. As Kebza states (2005) in the 20th century *psychosomatic medicine* brought a change in the view of the patient – looking at the patient as a mental and physical unity in the context of the environment. It implemented the basics of multicausal view of the relation between health and disease in medicine. Apart from other things, it introduced into medicine and psychology the research of personality profiles for particular nosological groups, description of intrapsychic conflicts and further developed the theory of stress.

*Behavioural medicine*, on the other hand, emphasizes the interaction of biological and behavioural factors. The basic methodological starting point here is a behavioural analysis, i.e. the detection of deviations from health which are related to human behaviour. This tradition of the comprehensive vision of the relationship between physical, mental and social factors in relation to health is now followed by *psychology of health*, understood as a systematic application of psychological knowledge into the area of health, disease and health care system (Kebza and Šolcová 2000).

### 2.3. Lifestyle-related stress

Current research shows that human behavioural patterns and the level of social conditions can significantly increase susceptibility to mental disorders or physical illnesses. For example, if a university student prepares for tomorrow's very difficult exam till late night, in fact, due to the lack of sleep, they endanger their performance during the exam itself (Wolfson 2002). In people who already suffer from cancer or cardiovascular disease, stress conditions can reduce the motivation to behave in a way that is beneficial for their recovery or survival (Schneiderman et al. 2005). Many people, for example, do not go to the doctor for medical checks or do not follow prescribed medication.

They ignore the diets that are vital for their health – e.g. some diabetics do not watch their sugar intake. Studies of people infected with HIV indicate that stressed patients are more likely to indulge themselves in unprotected sexual activities or use drugs intravenously (Fishbein et al. 1998). On the other hand, people with a healthy lifestyle – who have a low-fat diet, drink alcohol moderately, have enough sleep and exercise and have created a safe family background – they often report that they can handle even very difficult stress situations and have their lives under control (Ingledeu and McDonagh 1998). These approaches suggest that healthy behaviour patterns can alleviate the feelings of everyday stress and reduce the risk of a number of serious diseases.

Strong emotional movements affect human health, which has been shown by the closer examination of negative emotions – *anger, anxiety and depression* in connection with experiencing stress. The tendency to anger as a personality trait may hasten death at younger age more accurately than the presence of other risk factors such as smoking, hypertension or high blood cholesterol. Occasional manifestation of negative emotions does not represent any danger to human health. The problem arises only when animosity and anger last long enough to become the part of the character – then people are often cynical and distrustful, prone to sarcastic remarks and criticism, they are moody and have fits of rage. When it comes to unpleasant situations, it is necessary to learn to understand things also from other peoples' perspective – to learn *empathy*. The best remedy for enmity is to bring more trust in others into your heart. All we need is the right motivation. When people understand that their anger can lead to premature death, they are willing to try (Goleman 1997). Another negative emotion – anxiety – is an emotional response to excessive demands of current hectic lifestyle. The connection between this emotion and the onset of a disease is supported by very convincing scientific evidence. Repeated anxiety attacks are the manifestation of intense stress. The harmful effects of stress on human health are so damaging that *relaxation techniques* are beginning to be used to alleviate the symptoms of

a wide range of chronic diseases. It turns out that in melancholic seriously ill patients would be worthwhile to treat not only their physical disease but also their depression – pathological states of sadness. Depressed patients show unhealthy behaviour – they much less adhere to medical procedures and violate the prescribed diet.

The accumulating evidence of adverse effects of anger, anxiety and depression on human health is very serious. While negative emotions are harmful in many ways, positive emotions, on the other hand, can strengthen us. The favourable effect of positive emotions is very subtle, but through studies conducted on large numbers of people, this effect can be seen against the background of many other factors that affect the course of a disease. These are mainly positive emotions of *mutual trust, emotional support, understanding, consolation and hope awakening*. They are applied between a teacher and a student, between a doctor and a patient, between a coach and an athlete, between friends or close family members. Social isolation, i.e. knowing that you have no one to share your inner feelings with is doubling the probability of illness. The quality of our relationships and their number are therefore important factors for stress relief. A study of university students living together in one room at dormitory showed that the less they get on with each other the more susceptible they were to infectious diseases and more often they visited a doctor (Goleman 1997).

### **3. Methodology of Research**

#### *3.1. Questionnaire survey*

The method of our research was a questionnaire survey concerning the treatment of stress conditions in higher education. The research was adjusted to the needs of student population according to the previous survey among students of Faculty of Informatics and Management, University of Hradec Králové (FIM UHK) in accordance with the manual by Micková et al. (2004). The choice of research methods was professionally consulted with researchers from the Institute of Psychology of Masaryk University in Brno. The items of distributed questionnaire forms are listed below.

- SMA – Procedures evoking negative emotions (malcoping)
- SMB – Harmful (malcoping) ways of behaviour
- SMC – Coping strategies (healthy coping)

#### *3.2. Sample of respondents*

A total of 1848 university students participated in the research in 2011–2018. The file consists of 2572 questionnaires (some respondents answered repeatedly). There were 910 men, 919 women and in 19 questionnaires the gender box was left blank. The average age of respondents was 20.11 years, with full-time students aged 20 on average and part-time (distant) students aged 26.57.

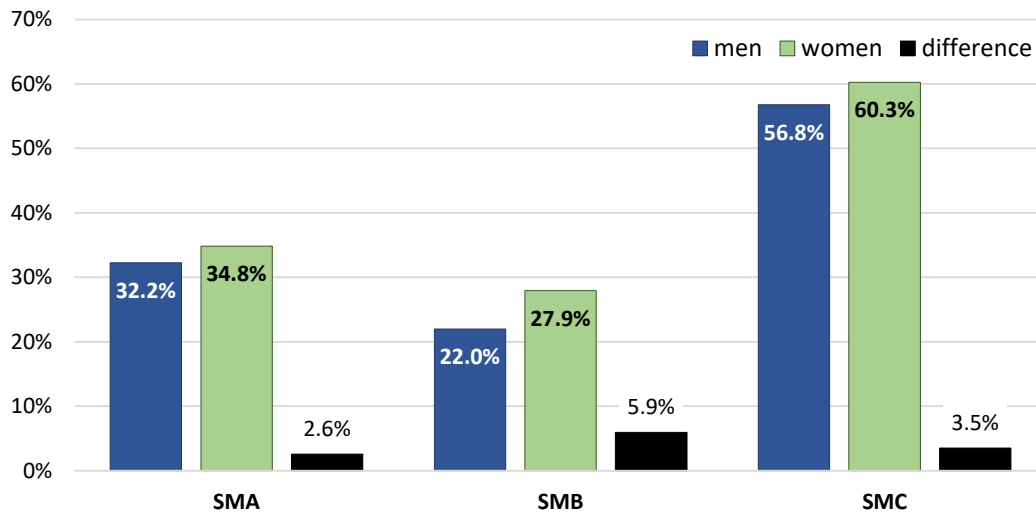
#### *3.3. Methods of statistical processing*

The differences in individual scales were tested by Mann-Whitney test. The result which did not exceed the significance level of 5% ( $\alpha < 0.05$ ) in this test was considered a statistically significant difference between two compared groups.

### **4. Research Results**

#### *4.1. Differences from gender perspective*

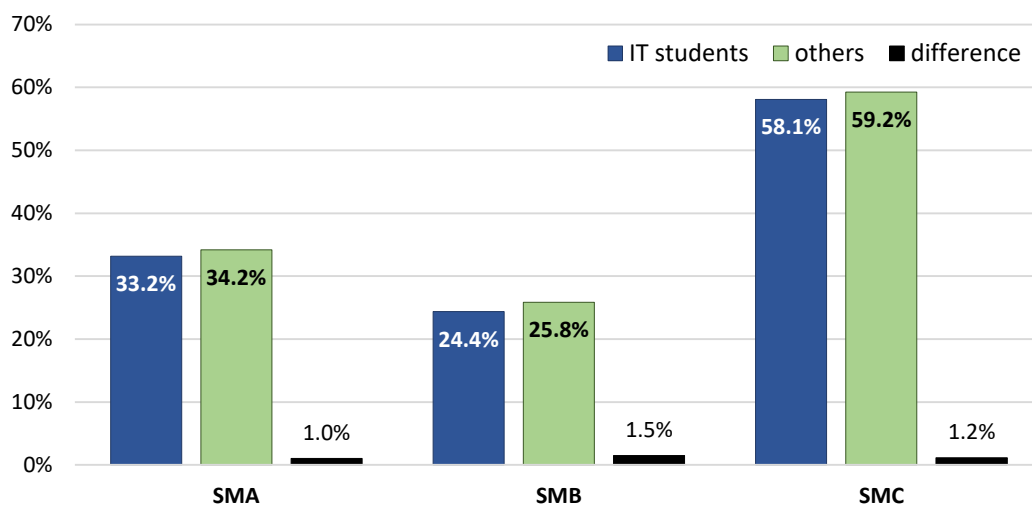
A statistically significant difference between men and women (Fig. 1) was seen in all three ways of dealing with stress situations. In harmful malcoping behaviours (SMB) women show less than 6% higher frequency of use than men. Nevertheless, coping strategies for healthy management of stress (SMC) predominate significantly in both genders, 56.8% in men and even 60.3% in women. Practices evoking negative emotions (SMA) have a similar representation in both genders, 32.3% in men and 34.8% in women.



**Figure 1.** Differences from gender perspective.

#### 4.2. Differences between informatics and non-informatics fields of study

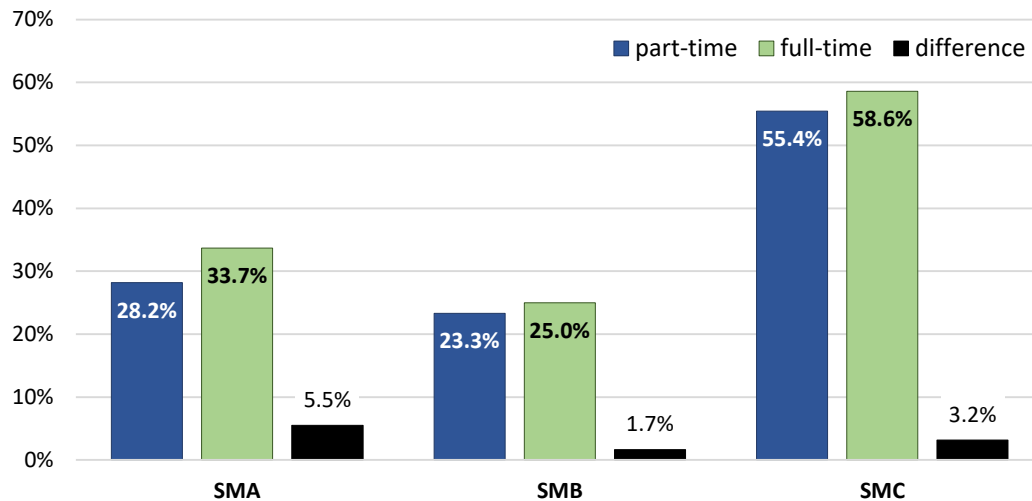
The closest to the limits of statistical weight are the ranges of procedures evoking negative emotions (SMA), where non-informatics students have higher score (34.2%) than informatics students (with 33.2%). A slightly higher difference between the two groups of respondents was shown in the area of healthy coping with stress situations (SMC), where non-informatics students achieved a 1.2% higher share than IT students (see Fig. 2).



**Figure 2.** Differences between informatics and non-informatics fields of study.

#### 4.3. Differences between part-time (distance) students and full-time students

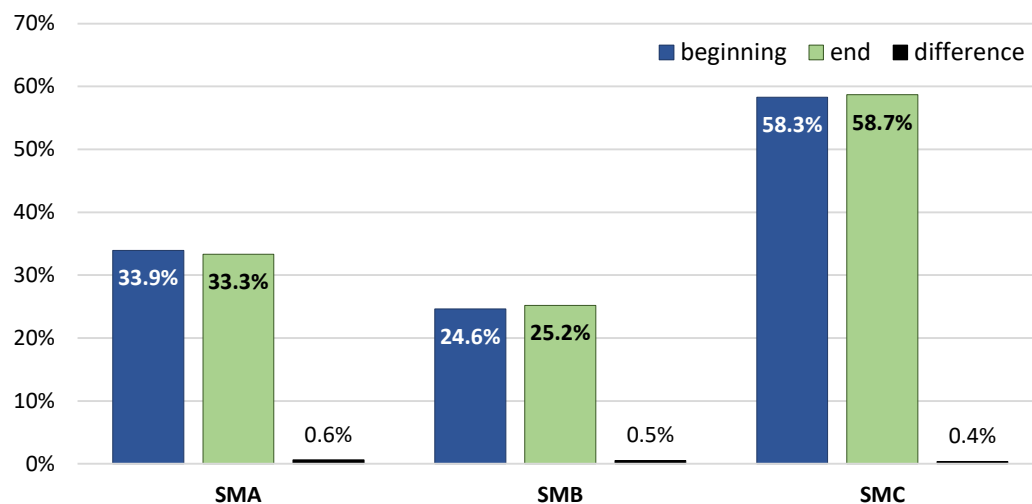
The biggest difference between part-time and full-time students (Fig. 3) was found in procedures evoking negative emotions (SMA), where full-time students showed 33.7%, which is 5.5% more than in part-time students. Also in the case of healthy methods of coping with stress factors (SMC), in general, the highest values were achieved by full-time students with 58.6%, i.e. 3.2% more than students of consultative form of study (55.4%).



**Figure 3.** Differences between part-time (distance) students and full-time students.

#### 4.4. Differences between beginning and end of semester

The ways of coping with stress situations at the beginning and the end of the semester (Fig. 4) remain approximately the same with minimal differences. The biggest difference (a drop of only 0.6%) was seen in malcoping procedures that evoke negative emotions (SMA). Again, coping strategies (SMC) were the most commonly used stress management methods, both at the beginning and the end of the semester, with a positive finding that these healthy behaviours increased slightly at the end of the semester (by 0.4%).



**Figure 4.** Differences between beginning and end of semester.

#### 4.5. Stress management

The differences between individual ways of handling stress are statistically significant. In all four areas of investigation (see Fig. 1, 2, 3 and 4), the values of healthy ways (coping strategies) of stress management (SMC) are prevalent in the vast majority of cases. Healthy ways of dealing with stress situations thus prevail (58.5%) among university students over those that are health harming (see Fig. 5).

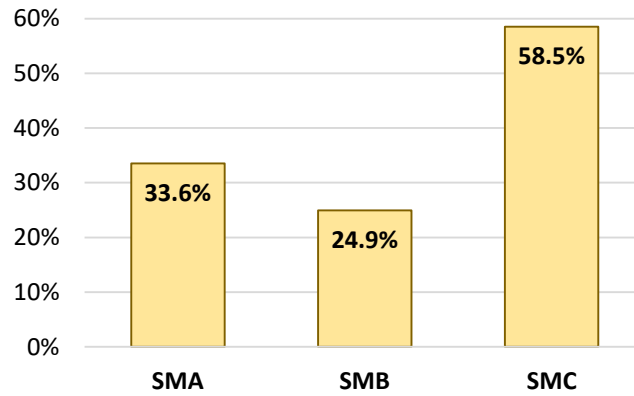


Figure 5. Differences between ways of dealing with stress.

#### 4.6. Relation between measured scales

From the statistical comparison of the studied scales by the factor analysis, principal axis factoring method with the rotation of rounds, two determining factors were identified in relation to coping with stressful situations. It is a factor of *hardiness* and *adaptability* (a degree of ability to adapt to new conditions). Both factors are correlated negatively (-0.284).

Table 1. Significant correlation of two latent factors to individual stress scales.

Factor	low hardiness	adaptability
SMA	0.800	
SMB	0.737	
SMC		0.300

These effects (see Tab. 1) are manifested by the fact that low hardiness contributes positively to the variables of the procedures evoking negative emotions (SMA), harmful ways of behaviour (SMB). High adaptability contributes positively to the variable which related to healthy coping (SMC).

## 5. Discussion

Our research has confirmed the interdisciplinary connection of the area of health economics and contemporary psychological branches – psychohygiene, psychosomatic medicine, behavioural medicine and psychology of health.

Consistent with the statements made by Ingledew and McDonagh (1998) it can be concluded that people with a *healthy lifestyle*, who eat low-fat meals, drink alcohol only moderately and have enough sleep and exercise, often report that they can manage stress events and have their life under control. This suggests that healthy behaviour can alleviate the feelings of everyday stress and reduce the risk of the occurrence of numerous serious diseases.

The research studies also confirmed the concept of positive and negative *stress management strategies* by the scientists Skinner, Edge, Altman and Sherwood (2003). People try to manage their negative emotions in many ways. Positive behavioural strategies include for example exercise and physical activity, seeking emotional support from friends. Negative strategies include alcohol and drug consumption, rage and aggressive practices. The example of a cognitive strategy is to temporarily postpone the problem and reduce the threat by changing the meaning of the situation, so called re-framing. Cognitive strategies often involve a complete reassessment of the situation and a change of attitude. As we can see, some behavioural and cognitive strategies are adaptive, purposeful and beneficial, others are maladaptive, harming us and causing additional stress. In accordance with the findings of Hallaraker, Arefjord, Havik and Maeland (2001) and Pakenham, Bursnall, Chiu et al. (2006) we can find the importance of seeking *emotional support from other people*, family members and peers.

Emotional support is a strategy that helps people adapt to the pressure of emotional and physical stressors.

We can confirm the data reported by Carano (2007) in his research that the *anti-stress influence of sport* on the psychological level lies in the mechanism of emotional re-tuning with good psycho-hygienic effects. The experience of joyful engagement, the so-called flow, has a harmonizing effect and is an expression of quality of life enhancement. Occupation and duties in everyday life lead to a build-up of tension, which is perceived as a worry. In sport, this unpleasant tension decreases. Through the unwinding process the adverse emotional tension is weakened and stress is thus reduced.

## 6. Conclusion

In terms of *fields of study* it has been proven that non-informatics students have a more hectic way of life and have to withstand higher demands of the current lifestyle than students of computer science. In both groups of students – full-time and part-time – *healthy ways of coping with stressful situations* significantly prevail (58.5% of respondents) over those that harm health. The research has confirmed *the increase in the degree of resilience and the growth of adaptive abilities* of university students with the increasing length of study. During the survey two determining factors were identified in relation to coping with stress situations. The first is *the factor of hardiness* and the other factor is *a degree of ability to adapt to new conditions*.

The empirical research described in this article was based on the assumption that body and mind interact. These issues are dealt with in the field of *health economics* and individual *psychological fields*. Simple models of stress effects on health are currently being replaced by more complex models that explain how the effects of *biological, psychological and social* impacts on health and diseases are mutually interconnected. As we can conclude from the mentioned research, the body responds to stress by characteristic physiological reactions. In people who do not have substantial biological resistance, such as those with genetic predispositions to a heart disease, physiological responses to stress can lead to deterioration in health. Nevertheless, the individual perception of stress is largely influenced by the nature of events, the individual's past, his/her assessment of events and the ways in which he/she usually copes with stress. Thus, the degree of experiencing psychological stress or deteriorating health in a stressful situation depends on the *biological and mental resilience of the individual* who finds himself/herself in the stressful situation. Due to the fact that the complex demands of everyday life often require flexible stress management, the ability of relaxation may not be sufficient in some stressful situations. Programs focused on coping with stress often combine biofeedback, relaxation training, exercise and techniques of cognitive modification.

**Acknowledgments:** This article is supported by the project No. CZ.1.07/2.3.00/20.0001 *Information, cognitive, and interdisciplinary research support, financed from EU and Czech Republic funds*.

## References

- Barták, Miroslav. 2010. *Ekonomika zdraví*. Prague: Wolters Kluwer ČR.
- Ciairano Silvia, Gemelli Fulvia, Molinengo Giorgia, et al. 2007. Sport, stress, self-efficacy and aggression towards peers: unravelling the role of the coach. *Cognition, Brain, Behavior*. Vol. 11(1), pp. 175-194.
- Detels, Rogers, et al. 2005. *Oxford Textbook of Public Health*. Oxford: Oxford University Press.
- Fishbein Martin., Triandis Harry C., Kanfer Frederick H., et al. 1998. Factors influencing behavior and behavior change. *Handbook of Health Psychology*.
- Goleman, Daniel. 1997. *Emoční inteligence*. Prague: Columbus. 352 p. ISBN: 80-85928-48-5
- Hallaraker Eli, Arefjord Kjersti, Havik Odd E., and Maeland John Gunnar. 2001. Social support and emotional adjustment during and after a severe life event: A study of wives of myocardial infarction patients. *Psychology and Health*: 16, pp. 343–355. <https://doi.org/10.1080/08870440108405511>
- Ingledew David K. and McDonagh Georgina. 1998. What coping functions are served when health behaviours are used as coping strategies. *Journal of Health Psychology*: 3, pp. 195-213. <https://doi.org/10.1177/135910539800300204>
- Kebza Vladimír and Šolcová Iva. 2000. Retrospektiva, současnost a perspektivy psychologie zdraví. *Československá psychologie*: 44(4), 309–317.



- Kebza Vladimír. 2005. *Psychosociální determinanty zdraví*. Prague: Academia, pp. 14–15.
- Kobasa Suzanne C. 1979. Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology*: 37, 1–11. <https://doi.org/10.1037/0022-3514.37.1.1>
- Křivohlavý, Jaro. 2001. *Psychologie zdraví*. Prague: Portál. ISBN: 80-7178-551-2
- Lazarus Richard S., and Folkman Susan. 1984. *Stress, appraisal, and coping*. New York: Springer. 456 p.
- Maddi Salvatore R. 2006. Hardiness: The courage to grow from stresses. *The Journal of Positive Psychology*. 1 (3), pp. 160–168. <https://doi.org/10.1080/17439760600619609>
- Micková E. et al.. 2004. *Nepodléhejte stresu, manuál poradce pro práci s videoprogramem*. Ostrava: Regionální zaměstnanecká agentura.
- Pakenham, Kenneth I., Bursnall, Samantha, Chiu Jessica, et al. 2006. The psychosocial impact of caregiving on young people who have a parent with an illness or disability: Comparisons between young caregivers and noncaregivers. *Rehabilitation Psychology*. Vol. 51 (2), pp. 113-126. <https://doi.org/10.1037/0090-5550.51.2.113>
- Schneiderman Neil, Ironson Gail, and Siegel Scott D.. 2005. Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology*. 1, pp. 607-628. <https://doi.org/10.1146/annurev.clinpsy.1.102803.144141>
- Skinner Ellen A., Edge Kathleen, Altman Jeffrey, and Sherwood Hayley. 2003. Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*: 129, pp. 216–269. <https://doi.org/10.1037/0033-2909.129.2.216>
- Wolfson Amy R. 2002. Bridging the gap between research and practice: What will adolescents' sleep-wake patterns look like in the 21st century? In *Adolescent sleep patterns: Biological, social and psychological influences*. New York: Cambridge University Press, pp. 198–219.