



What enables elite athletes to maintain vigour during a pandemic? The importance of personal resources in coping with stress

Co umożliwi elitarnym sportowcom utrzymanie wigoru podczas pandemii?
Znaczenie zasobów osobistych w radzeniu sobie ze stresem

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Abstract: Purpose of the study was to establish the relationship between the level of vigour during the first wave of the COVID-19 pandemic and selected personal resources for coping with stress: sense of coherence, hope for success and coping strategies. Participants of research were 57 individual sports players have been preparing for the Olympic Games in Tokyo, including 29 women and 28 men (aged 18 to 39 (M = 26.61, SD = 5.562)). Methods: in the study conducted in April 2020, the following questionnaires were used: *Profile of Mood State (POMS)*, *The Hope for Success Questionnaire (HSQ)*, *The Life Orientation Questionnaire (SOC-29)*, *The Inventory for Measuring Coping with Stress (Mini COPE)*. **Results:** significant relationships between vigour and two components of the sense of coherence were established: the sense of meaningfulness ($r = 0.566$; $p < 0.001$) and the sense of manageability ($r = 0.478$; $p < 0.001$), both dimensions of hope for success: willpower ($r = 0.485$; $p < 0.001$) and the ability to find solutions ($r = 0.272$; $p = 0.041$) and such strategies of coping with stress as: active coping ($r = 0.419$; $p = 0.001$), helplessness strategy ($r = -0.456$; $p < 0.001$). **Conclusions:** Strong relationships between vigour and the components of the sense of coherence confirm its important role in coping with stress by athletes during a pandemic, especially in maintaining a positive mood. Maintaining vigour by the athletes of the elite is fostered by hope for success, understood as a personality disposition. Active stress management strategies can be an effective way to maintain positive effect during the stressful period of a pandemic. Helplessness, in turn, can lower its level.

Keywords: Affective states, Coherence, Coronavirus, XXXII Olympic Games, Well-being

Abstrakt: Celem badania było ustalenie związku między poziomem wigoru podczas pierwszej fali pandemii COVID-19 a wybranymi zasobami osobistymi do radzenia sobie ze stresem: poczuciem koherencji, nadzieją na sukces oraz strategiami radzenia sobie. W badaniu wzięło udział 57 indywidualnych sportowców przygotowujących się do igrzysk olimpijskich w Tokio, w tym 29 kobiet i 28 mężczyzn w wieku od 18 do 39 lat (M = 26,61; SD = 5,562). Metody: w badaniu przeprowadzonym w kwietniu 2020 r. wykorzystano następujące kwestionariusze: *Profil Stanu Nastroju (POMS)*, *Kwestionariusz Nadziei na Sukces (HSQ)*, *Kwestionariusz Orientacji Życiowej (SOC-29)*, *Inwentarz Mierzenia Radzenia Sobie ze Stresem (Mini COPE)*. **Wyniki:** stwierdzono istotne związki między wigorem a dwoma składowymi poczucia koherencji: poczuciem sensowności ($r = 0,566$; $p < 0,001$) oraz poczuciem zaradności ($r = 0,478$; $p < 0,001$), obydwoma wymiarami nadziei na sukces: siłą woli ($r = 0,485$; $p < 0,001$) i umiejętnością znajdowania rozwiązań ($r = 0,272$; $p = 0,041$). Zaobserwowano istotne zależności strategii radzenia sobie ze stresem jak: aktywne radzenie sobie ($r = 0,419$; $p = 0,001$) i strategię bezradności ($r = -0,456$; $p < 0,001$). Silne związki między wigorem a elementami poczucia koherencji potwierdzają jego istotną rolę w radzeniu sobie ze stresem przez sportowców podczas pandemii, zwłaszcza w utrzymaniu pozytywnego nastroju. Utrzymywaniu wigoru przez sportowców z elity sprzyja nadzieja na sukces, rozumiana jako dyspozycja osobowości. Aktywne strategie radzenia sobie ze stresem mogą być skutecznym sposobem na utrzymanie pozytywnego efektu w stresującym okresie pandemii, z kolei bezradność może obniżyć jej poziom.

Słowa kluczowe: Dobrostan, Koherencja, Koronawirus, XXXII Igrzyska Olimpijskie, Stany afektywne

Introduction

In times of a pandemic, athletes also experience stress and depression (Rodrigues, Cesar, 2020; Şenışık, Denerel, Köyağasıoğlu, Tunç, 2020). However, an important indicator of affective

well-being is not only the level of negative mood states such as depression or anxiety, but also the intensity of positive states, especially vigour (Shirrom, 2011).

1. Vigour – desired affective state

Vigour as an important element of mood relates to an individual's feelings about physical strength, emotional energy and cognitive recovery. It represents an affect of moderate intensity, which is an important energy resource (Shirom, 2011). Standing on the opposite extreme to exhaustion, vigour means having a high level of energy (Schaufeli, Salanova, González-Romá, Bakker, 2002). According to Shirom (2011), the fact that it is related to the drive to act and is related to motivational processes speaks in favour of choosing vigour as an indicator of optimal functioning. Meta-analyses and numerous studies have shown that vigour is associated with physical activity. Even one-time physical exercise increases the level of subjective vigour or energy arousal (Reed, Ones, 2006). Also systematically undertaken physical activity contributes to an increase in the level of vigour. Limitation of physical activity can cause a decrease in vigour (Eberth, Smith, 2010). On the other hand, vigour is one of the factors determining sports achievements in competitive sports (Coté, Horton, MacDonald, Wilkes, 2009). Professional athletes usually show considerable vigour, as well as smaller intensity of depression, anxiety and fatigue than those non-athletes sports (Puffer, McShane, 1992). Beginning with the classic “profile of the Morgan Iceberg” (1987), positive moods are associated with good performance, while negative moods are usually associated with weaker sport performance. Athletes often attribute unsatisfactory scores to their inability to “get in the right mood” (Lane, Terry, 2017). In the light of the above reports, it seems advisable to focus on vigour as an indicator of well-being and a factor determining the effectiveness of an athlete's performance.

2. Coherence as a resource

During a pandemic, a reduction in vigour can be expected, not only because of severe stress, but also because of reduced physical activity. It is therefore important to determine what resources of the individual used in the process of coping with stress allow

to maintain vigour despite the negative experiences of elite athletes during the COVID-19 pandemic. We assume that vigour will depend on how effectively athletes deal with the stress of a pandemic. According to the salutogenic concept of Antonovsky (1987), the health costs of stress depend not only on stressors, but also on the so-called generalized immune resources and sense of coherence. Generalized immune resources are properties of an individual or collective subject that influence how stressors are assessed, how high the tension is and how the individual copes with stress (Pasikowski, 2000). One of such resources may be hope for success, understood as the belief in having competences enabling success (Snyder, Sympson, Michael, Cheavens, 2000). Hope positively correlates with positive emotions, negatively with negative ones (Łaguna, Trzebiński, Zięba, 2005) and buffers the impact of stress on mental well-being (Bernardo, Yeung, Resurreccion, Resurreccion, Khan, 2018).

The sense of coherence is understood as the global orientation of a person, expressing the degree of belief of an individual that: 1) the stimuli coming from the internal and external environment are structured, predictable and explainable; 2) resources are available to meet the demands of these stimuli; 3) these requirements are a challenge worth the effort and commitment (Antonovsky, 1987). The sense of coherence has been shown to be related to various measures of physical health, positive mood (Sęk, Pasikowski, 2001) and anxiety, depression, negative emotions, stress intolerance, aggression and auto-aggression (Eriksson, Lindström, 2005). According to Mayer and Thiel, the sense of coherence should be treated as the basic factor determining not only physical and mental health, but also high sports performance in elite athletes. The sense of coherence is understood as the global orientation of a person, expressing the degree of belief of an individual that: 1) the stimuli coming from the internal and external environment are structured, predictable and explainable; 2) resources are available to meet the demands of these stimuli; 3) these requirements are a challenge worth the effort and commitment (Antonovsky, 1987). The sense of coherence has been shown to

be related to various measures of physical health (Hakanen, Feldt, Leskinen, 2007), positive mood (Şek, Pasikowski, 2001) and anxiety, depression, negative emotions, stress intolerance, aggression and auto-aggression (Eriksson, Lindström, 2007; Hakanen et al., 2007). According to Mayer and Thiel (2014) the sense of coherence should be treated as the basic factor determining not only physical and mental health, but also high sports performance in elite athletes. The aim of the study was to establish the relationship between the level of vigour during the first wave of the COVID-19 pandemic and selected personal resources in coping with stress: a sense of coherence, hope for success and coping strategies among Polish elite athletes practicing individual disciplines. The focus on vigour results from the postulates of positive psychology (Seligman, Steen, Park, Peterson, 2005) and the willingness to determine what factors determine one of the dimensions of mental well-being of elite athletes during the pandemic.

3. Research Methods

3.1. Participants

The study group consisted of 57 Polish potential Olympians aged between 18 and 39 ($M=26.61$, $SD=5.562$), including 29 women (52.7%) and 28 men (49.1%), practicing individual sports disciplines such as athletics, rowing, fencing, shooting, sport climbing, badminton, swimming, modern pentathlon, taekwondo, sailing, wrestling, canoeing, judo, cycling, equestrianism and weightlifting. Their professional experience ranged from 4 to 25 years ($M=14.59$, $SD=5.981$). The athletes were members of the national team, they won medals in the national championships, European and World Championships, and medals in the Olympic Games. Each of the subjects was included in the preparation for the Olympic Games.

Athletes were invited by national sports associations. The University Senate Ethics Committee of the Józef Piłsudski University of Physical Education in Warsaw agreed to conduct the study.

3.2. Psychological tools

The appropriate scale of *The POMS (Profile of Mood State)* Mood Profile Questionnaire by McNair, Lorr and Droppleman (1971), in the Polish version, developed by Dudek and Koniarek (1987) was used to measure vigour. Vigour subscale of Profile of Mood State (POMS) includes 8 items concerning how subjects felt over the previous week with five-point ordinal scale (0–*not at all*, 1–*a little*, 2–*quite a bit*, 3–*moderately*, and 4–*extremely*) (McNair et al., 1992). The theoretical variability of the vigour scale is 0-32.

The sense of coherence was measured using the *Life Orientation Questionnaire (SOC-29)* in the Polish adaptation of Koniarek, Dudek and Makowska (1993). It allows to estimate the general level of the sense of coherence, as well as the levels of its three components, i.e. the comprehensibility, manageability and meaningfulness. It consists of 29 statements.

The Hope for Success Questionnaire (HSQ) by Snyder, Irving and Anderson (1991) in the Polish adaptation of Łaguna, Zięba and Trzebiński consists of 12 statements. The result is the sum of points, which determines the overall level of hope for success. Within its scale, measurement of two components can be performed: Pathway (ability to find solutions), Agency (willpower) (2005).

The Inventory for *Measuring Coping with Stress (Mini COPE)* developed by C.S. Carver (1997) is a self-report tool, used to measure coping dispositions, i.e., to assess typical responses and feelings in situations of intense stress. The Polish version of the Mini-COPE (Juczyński, Ogińska-Bulik, 2009) consists of 28 statements. As a result of the factor analysis, 7 factors were distinguished: 1. active coping (which consists of active coping, planning and positive reframing), 2. helplessness (using psychoactive substances, ceasing activity and self-blame), 3. seeking support (seeking emotional and instrumental support), 4. avoidance behaviours (self-distraction, denial, discharge). The other factors correspond to the strategies 5. turning to religion, 6. acceptance and 7. sense of humor.

All the questionnaires used are characterized by satisfactory psychometric properties.

3.3. Procedure

The survey was conducted electronically. Initial information concerned the purpose of the analyzes, the participant's consent to a psychological examination. Informed consent to participate in the study was also concluded. The invited players were of legal age. The study was supported by the Senate Ethics Committee. Informed consent started participation in the study. Only after completing the form, the competitor could fill in the appropriate questionnaires.

4. Results

4.1. Statistical analyses

In the first step, the basic descriptive statistics of the investigated quantitative variables were calculated along with the Kolmogorov-Smirnow tests, checking the normality of the distributions of the investigated quantitative variables. In the case of the scales of the sense of comprehensibility and resourcefulness, the distributions similar to the normal distribution were noted, in the case of all other studied variables, the distributions different from the Gaussian distribution were noted. In such a situation, additional verification of the skewness of the distributions of these variables is recommended. If it is in the range of +/- 2, it can be assumed that the distribution of the studied variable is not significantly asymmetric to the mean (George, Mallery, 2019). Such skewness values were noted for all tested variables. Therefore, it was decided that statistical analyzes would be performed using parametric tests, the r-Pearson correlation coefficients were calculated and a regression analysis was performed using the stepwise method.

4.2. Differences between men and women

Table 1 presents the analyzes of the studied variables. Searching for factors related to the level of vigour was performed comparing the results depending on gender using the one-dimensional analysis of variance. There were no statistically significant differences between women (M = 19.34, SD= 6.08)

and men (M = 19.64, SD= 6.30); $F(1.55) = 0.033$; $p = 0.857$, therefore, further analyzes were conducted for both sexes together. It was also found that the level of vigour did not significantly correlate with age ($r = 0.146$; $p = 0.283$) and sports experience ($r = 0.152$; $p = 0.261$).

Table 1. Descriptive statistics of the researched quantitative variables

Variables	M	SD
Vigour	19,49	6,14
Pathway (ability to find solutions)	26,84	3,46
Agency (willpower)	26,07	4,04
Hope for success	52,91	6,79
Comprehensibility	46,33	6,87
Manageability	49,14	7,12
Meaningfulness	44,44	7,87
Active coping	2,28	0,55
Helplessness	0,26	0,42
Seeking instrumental support	1,61	0,84
Cessation of action	0,83	0,46
Turning to religion	0,62	0,77
Acceptance	2,50	0,60
Sense of humor	1,16	0,66

4.3. Vigour correlates

In order to establish the relationships between vigour and psychological variables of coherence and hope for success, the Pearson r-correlation coefficients were calculated.

The vigour level was the higher the stronger the sense of coherence in its two components: meaningfulness ($r = 0.566$; $p < 0.001$) and manageability ($r = 0.478$; $p < 0.001$). The relationship with manageability reached the trend level ($r = 0.256$; $p = 0.055$). The high level of vigour was accompanied by large agency (willpower) ($r = 0.485$; $p < 0.001$) and pathway (ability to find solutions) ($r = 0.272$; $p = 0.041$). Among the strategies of coping with stress, a significant positive correlation was noted for active coping ($r = 0.419$; $p = 0.001$), in the case of turning to religion it reached the level of tendency ($r = 0.242$; $p = 0.069$). A significant negative cor-

relation linked vigour with helplessness ($r = -0.456$; $p < 0.001$). Statistically significant relationships are presented in Figure 1.

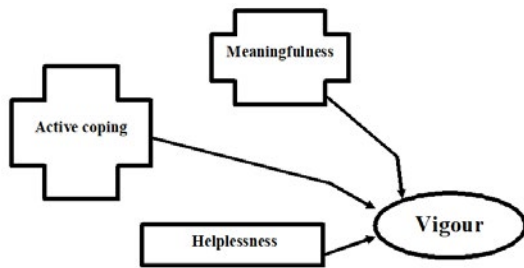


Figure 1. Positive (the shape of pluses) and negative (the shape of minus) significant relationships between the studied variables and vigour

4.4. Vigour’s predictors

In the next step, it was decided to check which of the variables correlated with vigour.

The sense of meaningfulness was clearly the strongest predictor. In the first step of the regression analysis, it explained the variability of the vigour level in less than 27% (corrected $R^2 = 0.307$; $F(1,55) = 25.86$; $p < 0.001$). In the second step, the helplessness strategy was introduced into the equation—the only negative predictor. Adjusted R^2 increased significantly to 0.384; $F(2,54) = 18.44$; $p < 0.001$; $\Delta R^2 = 0.086$; F changes ($1,54$) = 7.82; $p = 0.007$). Active coping was the third vigour predictor. Its introduction resulted in a significant increase in R^2 to 0.445; ($\Delta R^2 = 0.069$; F change ($1,53$) = 6.98; $p = 0.011$). The level of meaningfulness, helplessness strategies and active coping were introduced to the model in three steps; $F(3, 53) = 15.98$; $p < 0.001$. Together, these variables explained almost 45% of the variability in the level of vigour of the respondents.

Table 2. Variables explaining the level of vigour of the athletes

Variable	B	SE	Beta	t	p
(Constant)	-0,191	4,208	-	-0,045	0,964
Meaningfulness	0,313	0,084	0,402	3,726	<0,001
Helplessness	-4,255	1,530	-0,292	-2,781	0,007
Active coping	3,016	1,142	0,273	2,642	0,011

A high level of vigour should be required in athletes with a strong sense of meaningfulness, who often use an active coping strategy and rarely use a helplessness strategy. The results of the last step of the regression analysis are described in Table 2.

Discussion

A vigorous person is characterized by an energetic attitude to the world, heuristic ways of solving problems and efficient use of energy (Schaufeli et al., 2002). Vigour is a positive state of mood and, according to Shirom (2011), it is an important indicator of optimal psychological functioning of people undertaking physical effort, and thus also athletes. In the face of severe stress and the forced limitation of physical activity caused by the COVID-19 pandemic, maintaining an optimal level of vigour is a challenge not only for athletes themselves, but also for people who provide them with psychological support.

The study established significant relationships between the level of vigour in the first wave of the COVID-19 pandemic and selected psychological properties of elite athletes, which, according to the salutogenic concept of Antonovsky (1987) and the results of previous studies, may determine the health costs of the stress relationship in terms of mental well-being. The importance of the sense of coherence, the key construct of this concept, was confirmed. The strongest positive correlate and predictor of vigour was the sense of meaningfulness, which, according to the author of the salutogenic concept, plays a special role in shaping the sense of coherence (Antonovsky, 1997). It is a belief that it is worth engaging in situations that constitute challenges related to the sense of meaning and value of one’s own life.

During a pandemic, maintaining fitness is an important challenge for athletes. Research by Pillay and the team (2020) shows that most athletes during the pandemic trained on their own every day, usually for 30-60 minutes with moderate intensity. However, a significant proportion of the respondents felt depressed and needed additional motivation to maintain physical activity, preferring sedentary behaviour in their free time.

A correlate, but not a predictor of vigour, was also manageability, i.e. the belief of an individual that he has means or resources, both personal and social, that allow him to actively influence a difficult situation (Antonovsky, 1997). Previous research results indicate that a strong sense of coherence can reduce negative stress responses and increase vigour (Urakawa et al., 2012).

The lesser importance of manageability in maintaining vigour during a pandemic is also confirmed by the fact that the dimensions of hope for success did not allow predicting the level of this positive mood. The belief in strong will was associated with vigour to a moderate degree, while the belief in the ability to find solutions was weakly (but significantly) related. However, neither of the two components of hope for success was a predictor of the level of vigour. Of course, hope for success is not the same as the sense of manageability, but it has a similar regulatory significance and is the closest to this component of the sense of coherence.

Active coping, which consists of taking actions to improve the situation, planning what to do, and seeing the situation in a more positive light, turned out to be a positive predictor of vigour. Similar dependencies were found in the study of people in the work environment (Kaiseler et al., 2014). A positive attitude to stress determined more coping efforts. A positive attitude was related to vigour and more effective performance of tasks (Casper et al., 2017).

Problem-focused strategies are believed to be adaptive in situations where active coping is effective. Then they reduce the perceived stress. In the situation of sports rivalry, athletes are more likely to use task strategies (Litwic-Kamińska, Izdebski, 2016). Research results confirm that problem-focused strategies better serve the level of athletic performance than strategies focused on emotions or avoidance (Nicholls et al., 2012). Problem-focused coping, including active coping, was associated with positive affect and a higher self-esteem of athletic performance (Ntoumanis, Biddle, 2000). Positive emotions and positive moods, including vigour, can be treated as effects of effective coping (Louw, 2007).

The negative predictor of vigour was the strategy of helplessness (criticizing and blaming oneself, giving up efforts to achieve goals and using psychoactive substances to alleviate unpleasant emotions). The cir-

cumstances of a pandemic may create conditions for the use of ineffective, passive coping strategies leading to lower vigour (Louw, 2007).

It is also possible that a person experiencing a depressed mood, including a decline in vigour, withdraws from acting naturally. On the other hand, withdrawing from an activity and not trying to change the situation may further depress mood. And finally, the relationship between cessation of action and vigour may result from the fact that both variables are associated with depression. The symptom of depression is both a decrease in psychomotor drive and the level of vital energy (vigour), as well as a sense of helplessness, inability to plan and implement actions and a tendency to blame oneself (Gurvich et al., 2020).

The vigour state is mainly determined by the sense of meaningfulness. Individuals with a generally stronger sense of coherence and hope for success, who are considered relatively constant personality variables, show higher levels of vigour. Acceptance as both a positive and passive coping strategy turned out to be a positive predictor of vigour. This in conjunction with the positive relationship of vigour with coherence and hope for success, indicates that there is no need for increased stimulation to achieve a high level of vigour. Perhaps the maturity of the individual and its better understanding of the experienced experiences (in our study the sense of meaningfulness, acceptance) lead to mechanisms that trigger additional energy potential. In turn, helplessness (as a passive and negative coping strategy) reduces vigour.

Some mistakes were not avoided in the article. The analyses were conducted for both genders together, and the study included a small group of elite athletes. The observed regularities can only be applied to this group of players. Our respondents constitute a unique group and it is difficult to identify such very active and physically fit people with the entire population. Vigour was measured once. Such tests should be carried out repeatedly, preferably with individual observation of each athlete, to better assess the optimal level of vigour. Based on the obtained results, it can be concluded that during a pandemic, the level of vigour of elite athletes is associated with constant personality variables that determine the way of coping with pandemic stress and the coping strategies used.

Determining whether this regularity is universal or applies only to a pandemic situation requires further research under neutral conditions, without burdening the catastrophe with strong stressors.

There are doubts about the vigour measurement tool. Profile of Mood it has long been used, but is still often used to measure the affective states of athletes (Andrade et al., 2013; De Andres-Reran et al., 2019).

Conclusions

Vigour is a desirable affective state, treated as an indicator of mental well-being that favors higher athletic results. Its importance has already been analyzed by other researchers (Curran et al., 2015) who have suggested that its decrease may lead to a decrease in sports performance due to a decrease in motivation, concentration and other mental abilities related to sports (Lane et al., 2010).

Maintaining mental well-being, including the optimal level of vigour is especially important during the COVID-19 pandemic, when mood depression is usually noted. It is also a challenge for people who exceed the limits of their own abilities on a daily basis—players of the sports elite. These athletes are engaged in intense physical activity on a daily basis. During the pandemic they were forced to reduce it which could further worsen the mood (Russell et al., 2003; Schutzler, Graves, 2004).

The results of the study indicate that maintaining a high level of vigour is supported by a strong sense of coherence and frequent use of active coping strategies, and rare reliance on strategies that indicate helplessness. Further questions arise here: what level of vigour is optimal for the surveyed players and whether there is a critical level beyond which the effectiveness of performing sports tasks decreases significantly. These issues require further research.

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