

## Article

# Relationship of Sense of Coherence to Healthy Behavior in Taekwon-Do Athletes

Dorota Ortenburger<sup>1</sup>, Dariusz Mosler<sup>1</sup> , Jarosław Cholewa<sup>2,\*</sup>  and Jacek Wąsik<sup>1</sup> 

<sup>1</sup> Department of Kinesiology and Health Prevention, Jan Długosz University of Częstochowa, 42-200 Częstochowa, Poland

<sup>2</sup> Institute of Sport Sciences, Jerzy Kukuczka Academy of Physical Education in Katowice, 40-065 Katowice, Poland

\* Correspondence: j.cholewa@awf.katowice.pl

**Abstract:** This study aimed to examine the relationship between sense of coherence and the level of health behavior among men and women who train Taekwon-Do. The research encompassed 121 (69 men and 53 women) Taekwon-Do athletes. The gauging was conducted by means of standardized tools in the field of health psychology: the Questionnaire of Life Orientation, the Pain Strategies Questionnaire and the Health Behavior Inventory. The registered variables were subjected to typical descriptive analysis. Multiple regression analysis was performed. The adjustment of the regression model was checked by ANOVA. The co-dependency between the variables was defined as Pearson's correlation coefficient. The level of statistical significance was established at  $p < 0.05$ . The results of the sense of coherence are higher for men ( $36.83 \pm 12.45$ ) than women ( $33.17 \pm 10.60$ ). Diverting attention away from feelings and thoughts of pain is strongly correlated with reinterpreting pain sensations ( $r = 0.75$ ) and is moderately correlated with the behavioral strategy as well as increased behavioral activity ( $r = 0.46$ ). Constructive mobilization under pressure shows compatibility with resourcefulness ( $r = 0.44$ ), comprehensibility ( $r = 0.39$ ) and meaningfulness ( $r = 0.46$ ). Sex differentiates the intensity of constructive mobilization to act under the impact of stress according to the subjective evaluation of both male and female Taekwon-Do fighters. The intensity of healthy behavior amongst women and men who practice Taekwon-Do differs. In the case of women, the value of the global indicator of healthy behavior was higher than in the case of men. This strategy defined as catastrophizing turned out to be commensurate in a negative way with all the three elements of the sense of coherence. Catastrophizing correlates negatively with the intensity of constructive mobilization for action under stress.

**Keywords:** Taekwon-Do; coherence; healthy behavior; martial arts



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## 1. Introduction

The sense of coherence is in a salutogenic concept as a type of psychological predisposition that has an impact on the method of action and state of health [1,2]. In this concept, the state of health is viewed through the prism of the situation of the continuum from health to illness, while the practical actions undertaken regularly have an impact on the situation of the continuum [3]. The acceptance of the salutogenic perspective shows the importance of healthy behavior in this model. Previous research illustrated that the particular elements of the feeling of coherence may be a significant factor of healthy behavior in a Taekwon-Do group (among others participation in sport camps) [4]. Such behavior, when it is cohesive with the declarations (e.g., related to lifestyle, making efforts), can strengthen the sense of coherence in return. This is in accordance with the principle of Taekwon-Do, namely not to rely only on words but also cohesion with action [5–7].

The sense of coherence is comprised of elements that are measured in a sphere of three aspects: the sense of meaningfulness, comprehensibility and resourcefulness [8,9].

There are substantive arguments to support the view that Taekwon-Do is the source of such an impact, and training that involves the practice of this form of martial arts may in turn be viewed as creating the conditions that are favorable to physical health as well as psychological and social health [10]. The complete development in Taekwon-Do also necessitates (apart from the necessary systematic training) access to more profound values, such as the sense of devotion to a greater cause, being guided by certain specific principles, development of the ability to focus attention and energy as well as resilience [11]. This is associated with the cohesion of goals, principles and expression in the form of externalized behavior [12].

We know that the shaping of healthy habits is influenced by regularly repeated experiences [13–16]. A correctly conducted Taekwon-Do group, due to numerous interactions, is characterized by a high level of dynamics associated with, on the one hand, cooperation, and on the other hand, rivalry. Rivalry and healthy behavior build a higher level of executive possibility [12], which favors the building of the sense of personal effectiveness. Regular participation in Taekwon-Do training is associated with the action of mechanisms that are responsible for a change in behavior in such a way as to constitute a normal everyday element in the life activities of a human being. Together with the sense of belonging to a specific group, this creates the dimension of functioning which may be defined as a lifestyle in which the systematic participation in training leads to a healthy experience among those people creating the special reference group.

Regardless of the theoretical model, the following factors are perceived to take part in undertaking and maintaining healthy behavior: intention (motivation) to undertake particular behavior, planning actions and bringing intentions to life [17,18]. Taekwon-Do training provides experiences which shape character [12]. Research illustrates that this takes place on the way towards increasing the skill of coping with frustration as well as emotions associated with anger [19]. The ability to maintain concentration and mobilization despite stressful situations and the ability to concentrate on performed tasks of a different degree of complexity are commonly considered to be very meaningful factors in obtaining sport results. How an individual conceptualizes stress is important for adaptation and coping strategies. The ability to cope with stress and experiencing pain is a significant part of the processes of self-regulation [20,21]. Research results indicate a very low degree of catastrophizing in Taekwon-Do group athletes and relations between the adaptive, active strategies coping with pain and feeling of personal competence [22].

This study aimed to examine the relationship between sense of coherence and the level of health behavior among men and women who train Taekwon-Do. We hypothesized that gender differentiates subjective assessment of the level of one's own constructive mobilization for action under stress and the intensity of healthy behavior Taekwon-Do athletes. The following research questions were formulated:

1. What is the level of constructive mobilization to act under the influence of stress according to the subjective evaluation of Taekwon-Do fighters?
2. How is the intensity of healthy behavior shaped along with the sense of coherence and strategies of coping with pain in the analyzed group with regard to sex?
3. What is the dependence between the level of mobilization to act under the influence of stress and the strategies of coping with pain?

## 2. Materials and Methods

### 2.1. Participants and Recruitment Process

The research encompassed 121 athletes, including 69 men (56.56%) and 53 women (43.44%) (aged:  $27.05 \pm 9.25$ ; scope: 18–45 years of age). All were Taekwon-Do International Taekwon-Do Federation (ITF) athletes from 4 clubs in the Silesian province of Poland.

### 2.2. Participant Selection Criteria

A condition for inclusion in the group was a minimum of 4 years of training experience, due to the formal possibility of obtaining the 3-cup degree entitling them to compete in

the sport nationally. Other inclusion criteria were as follows: minimum 18 years of age, participation in sports competitions (regardless of the type of competition: formal systems, combat, etc.) and training at least 3 to 5 times a week of 1.5 h. Data were collected in 2017. This group included athletes who won championship titles during the Polish and European championships.

### 2.3. Ethical Issue

All participants were informed of the testing procedures and signed a consent to voluntarily participate in this study. The study was approved by the Ethics Committee of Jan Dlugosz University (number KE-O/4/2022, dated 21 March 2022).

### 2.4. Protocol

The live measurement was conducted with the aid of standardized tools in the field of health psychology [3,23,24], such as the following:

- The Sense of Coherence Questionnaire (SOC-29) serves as the measurement of the sense of coherence. The evaluation of the Polish version of the SOC-29 Questionnaire showed a high reliability of the tool. The internal consistency indices amounted to 0.92 for sense of coherence, while the internal consistency expressed in the Cronbach's alpha index was 0.78 [25]. This encompasses three components as follows: comprehensibility, resourcefulness and meaningfulness, for example, asking: "How often do you have the feeling that there's little meaning in the things you do in your daily life?" The participants assessed the accuracy of each statement with reference to themselves and to their lives on a 7-point scale [26,27].
- The Pain Strategies Questionnaire (CPSQ) is used for evaluating the strategies of coping with pain and their effectiveness in controlling and reducing pain. The ways of coping with pain are reflected by six cognitive strategies and one behavioral strategy, which in turn form a composition of 3 factors, namely active coping (re-evaluation of the experience of pain, ignoring the experience, declaration of coping); drawing attention away from pain and undertaking other activities (drawing attention away from pain and increased behavioral activity) and catastrophizing. The internal CPSQ compliance of Cronbach's alpha for the whole questionnaire is 0.80; for five scales the coefficients exceeded 0.80, and for two they were lower (0.60). The subjects answered according to the 7-point Likert scale: from 0: never to 6: always, for example, for the question "how frequently do you use the following strategies when you have pain?" [23,28].
- The Health Behaviors Inventory (HBI) 40 was used to measure health behaviors. The internal compliance of the HBI determined on the basis of Cronbach's alpha is 0.85 for the whole inventory. The respondent answers on a 5-point Likert scale (1—almost never; 2—rarely; 3—from time to time; 4—often; 5—almost always) for example: "I take seriously the recommendations of people who care about my health" [23]. A measurement was made of the general intensity of behavior favoring health as well as the degree of intensity of the particular four categories of healthy behavior: correct nutrition habits (taking account of the type of food consumed, e.g., wholemeal bread, vegetables, fruit), prophylactic behavior (relating to the adherence of health recommendations and the acquisition of information on the subject of health and illnesses), positive psychological approach (psychological factors such as avoiding excessively strong emotions, stress and tension, or situations of a depressing impact) and healthy practices (encompassing everyday sleeping habits, recreation and physical activity). The greater the total result, the greater the intensity of the healthy behavior declared. The inventory applied together with other tools may serve as help in designing the prophylactic activities, establishing the directions of modification in terms of behavior and monitoring change in healthy practices [23].

- The data were supplemented by the author's questions relating to activity in the sphere of Taekwon-Do, for example, the minimum frequency of training per unit of time and participation in sports camps.

The time spent on collecting information during each study was approximately 20–30 min. Data were collected live after training in a room without contextual interference.

### 2.5. Statistics

The registered variables were subjected to typical descriptive analysis; namely, the average and standard deviations were calculated. With the aim of achieving a quantitative notion of the relations between multiple explanatory variables and substantive variables, multiple regression was applied as a significant explanatory variable. The correlation–regression model facilitated the identification of the commensuration between the criteria variable and the predictor variable which was implemented into the model. The adjustment of the model (well-fitting regression model) was checked by applying analysis of variance. The co-dependency between the variables was defined as Pearson's correlation coefficient. The level of statistical significance was established at  $p < 0.05$ . All calculations were made in the program Statistica 12.

### 3. Results

The average values of the sense of meaningfulness, comprehensibility and resourcefulness as well as the global sense of coherence are displayed in Table 1. All the values of indicators stipulated are higher in the case of men; only in the sphere of one element is there a difference in the sense of coherence that was statistically significant ( $p < 0.05$ ).

**Table 1.** Average values of indicators of coherence with gender distribution.

Sense of Coherence	Gender	Mean	SD	F	<i>p</i>
Sense of meaningfulness	Men	36.83	12.45	0.94	0.09
	Woman	33.17	10.60		
Comprehensibility	Men	36.41	12.35	0.51	0.48
	Women	34.92	9.82		
Resourcefulness	Men	39.12	12.46	4.14	0.04 *
	Women	34.89	9.79		
<sup>1</sup> Global sense of coherence	Men	112.35	35.20	2.49	0.12
	Women	102.98	28.65		

\* Statistical significance  $p < 0.05$ ; <sup>1</sup> global sense of coherence—combined total of the three afore-mentioned elements: resourcefulness, comprehensibility and sense of meaningfulness.

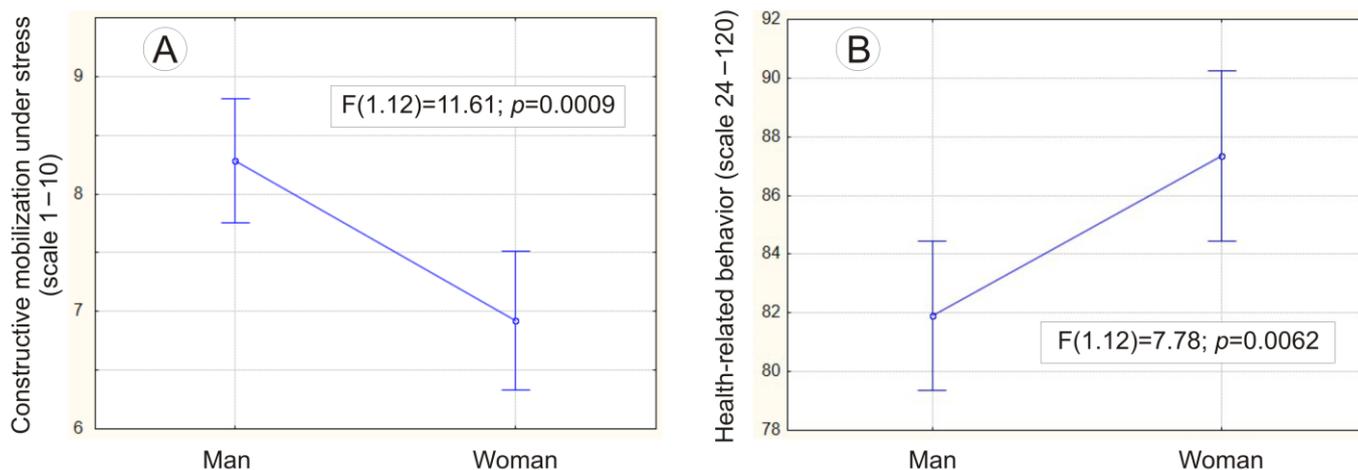
Table 2 contains correlation coefficients between the indicators of the strategy of coping with pain and the elements of the sense of coherence. It was revealed that the higher the values of coherence and mobilization, the lower the level of catastrophizing. Drawing attention away from pain is strongly interdependent with the reevaluation of pain ( $r = 0.75$ ) as well as moderation in terms of the behavioral strategy of coping with pain ( $r = 0.46$ ). Constructive mobilization in conditions of stress illustrates the relationship with resourcefulness ( $r = 0.44$ ), comprehensibility ( $r = 0.39$ ) and meaningfulness ( $r = 0.46$ ). It is visible that the particular elements of coherence positively correlate with each other very strongly.

**Table 2.** Values of correlation coefficients between the chosen indicators of the sense of coherence and strategies of coping with pain ( $p < 0.05$ ).

Strategies of Coping with Pain and Sense of Coherence	Strategies of Coping with Pain				Sense of Coherence		
	Drawing Attention <sup>1</sup>	Strategies <sup>2</sup>	Re-evaluation <sup>3</sup>	Mobilization <sup>4</sup>	Resourcefulness	Comprehensibility	Sense of Meaningfulness
Catastrophizing	−0.23	−0.05	−0.26	−0.40	−0.36	−0.31	−0.34
Drawing attention <sup>1</sup>		0.46	0.75	0.17	0.05	0.00	0.07
Strategies <sup>2</sup>			0.69	0.19	−0.15	−0.13	−0.06
Re-evaluation <sup>3</sup>				0.36	0.05	−0.00	0.10
Constructive mobilization <sup>4</sup>					0.44	0.39	0.46
Resourcefulness						0.89	0.77
Comprehensibility							0.87

<sup>1</sup> Drawing attention away from pain; <sup>2</sup> behavioral strategies of coping with pain; <sup>3</sup> re-evaluation of pain; <sup>4</sup> constructive mobilization in conditions of stress.

In Figure 1A, a subjective evaluation of constructive mobilization to act under the influence of stress amongst the participants with a distribution of sex type is presented. It was revealed that the higher values of this parameter were achieved by men ( $p < 0.001$ ). Figure 1B shows that the higher values of intensity of health behavior were displayed by women in the analysis ( $p < 0.001$ ). In Table 3, a model of regression is presented showing the dependencies occurring between the level of constructive mobilization in stressful conditions and strategies of coping with pain as well as the sense of coherence ( $p = 0.000$ ).



**Figure 1.** Relationships between selected indicators by gender: (A) level of constructive mobilization under stress, (B) level of health behaviors.

**Table 3.** Model of regression for variable constructive mobilization in conditions of stress in context of predictors: strategy of coping with pain and feeling of coherence ( $F = 13.90, p = 0.000$ ).

Mobilization	Regression Model	Predictors	<i>b</i>	SE	PC	<i>p</i>	
Constructive mobilization in conditions of stress	R = 0.61; $p = 0.000$ ; R <sup>2</sup> = 0.38; Adjusted R <sup>2</sup> = 0.35	<sup>a</sup> Strategy	Catastrophizing	−0.21	0.08	−0.24	0.010
		Drawing attention away from pain	0.03	0.11	0.02	0.033	
		Behavioral strategies of coping with pain	−0.24	0.11	−0.20	0.770	
		Re-evaluation of pain	0.45	0.14	0.27	0.002	
		Sense of coherence <sup>b</sup>	0.37	0.08	0.39	0.000	

<sup>a</sup> Strategy of coping with pain; <sup>b</sup> generalized feeling of coherence that consists of the feeling of meaningfulness, resourcefulness and comprehensibility; *b*—unstandardized coefficient (obtained after running a regression model on variables measured in their original scales), SE—standard error *b* coefficient, PC—partial correlation.

#### 4. Discussion

The research findings acquired by our team show that sex differentiates the subjective evaluation of the level of personal constructive mobilization to act under the influence of stress. It was revealed that the higher values of this parameter were achieved by men (Figure 1A). It is possible that this is the result of the existing neurobiological differences in the way in which men and women react to stress [29], though this is not the only interpretation. On the one hand, our findings may illustrate that Taekwon-Do training is insufficient to balance out the level of the evaluation of the personal constructive mobilization to act under the influence of stress in both sexes. On the other hand, the reason may lie in the manner of conducting the self-evaluation. Perhaps an additional factor that leads to these differences is actually the individual self-evaluation. A similar result was attained in research on the subjective perception of health on the part of men and women. In a group of 2784 members of centers such as wellness centers at the workplace, women (constituting 68.2%) had a low sense of personal efficacy in maintaining their level of physical activity [30].

Our research confirms that the active strategies of coping with pain are negatively correlated with the more passive ways defined as gloom-mongering, also termed catastrophizing [24]. The findings revealed by our team indicate that the strategy that involves drawing attention away from pain is strongly interdependent with the pursuit of re-evaluating the stimuli felt while also moderately correlating with the behavioral strategy of coping with pain (Table 2). It is possible to acknowledge that these strategies constitute various manifestations of broader and more active approaches to the ailments experienced. This corresponds with research on the cognitive processes in terms of coping with pain [31] and the role of other individual factors in terms of coping with discomfort and ailments [32,33].

Our findings illustrate a higher level of intensity in terms of healthy behavior is evident among women practicing Taekwon-Do than men. This result is based on a subjective self-evaluation of their healthy behavior. This indicator encompasses the degree of intensity of the correct nutrition habits (taking food consumed into account), prophylactic action (adherence to doctor's recommendations, pursuit of information on the subject of health and illnesses), positive mental attitude and healthy practices (e.g., everyday sleeping habits, recreation and physical activity) (Figure 1B). On the other hand, in other research projects, the findings showed that men felt they were as healthy as women despite having more medical problems [30]. In this large group (2784 members), women had lower self-efficacy in their ability to maintain physical activity levels, but similar self-efficacy for maintaining a healthy diet showed that women had healthier dietary habits, a higher rate of moderate-vigorous physical activity and a lower rate of smoking and obesity than men [34].

The higher intensity of health behavior in terms of women in the sphere of prophylactics is a result that is displayed in other research projects [35]. The sociomedical approach to gender differences in health related behavior has generated a variety of hypotheses. There is an ongoing discussion about the results, which indicate that on the one hand, women experience longer life expectancy, make more use of health care services, yet experience greater susceptibility to illnesses [35]. It is supposed that a significant role is played here by lifestyles, a factor that has an impact on health and the differences between men and women in this respect [36]. Likewise, ways of coping with pain in the context of sex types constitute a valid area of research [37–41].

With regard to the question on the shape of relations, the sense of coherence of strategies of coping with pain, we received an intricate answer. The results acquired indicate that the non-adaptive strategy, defined as catastrophizing significantly, correlates with the intensity of constructive mobilization to act under the impact of stress in a negative sense, along with resourcefulness, comprehensibility and the sense of meaningfulness. Likewise, this passive strategy turned out to be commensurate in a negative sense with all three elements of the sense of coherence. Hence, it is possible to suppose that the pessimistic expectations of gloom-mongering which emerged constitute one of the predictors of weaker adaptation and not only reconvalence [42,43]. Simultaneously, the

data acquired may indicate areas of intervention within the framework of Taekwon-Do training or other martial arts that place an emphasis on universal development that favors the broad perception of adaptation [44,45]. More frequent participation in training may additionally be favorable towards strengthening the individual and relatively constant sense of coherence by practicing Taekwon-Do [46]. There are data that show the attempts of intervention directed at strengthening the sense of coherence among employees with the aim of enhancing their effectiveness in the sphere of professional activity [46].

The application of the salutogenic model of health in the presented study offered a number of interesting insights to further understand the role of comprehensibility, manageability and meaningfulness in Taekwon-Do athlete group. The correlation between the particular aspects of the sense of coherence and the strategies of coping with pain may be interpreted on the basis of findings from research conducted in a biopsychosocial model on active and passive strategies of coping in severely stressful situations [47,48]. These findings provide arguments that confirm claims by authors with regard to the role that is played by the sense of coherence in terms of the broadly perceived mental health [49,50]. This factor was unequivocally identified as one of the very important predictors that play a significant role in the factors of risk and protection against the negative effects of mental stress among students [49]. The results acquired by our team illustrated that the strategy of coping with pain, which involves the pursuit of re-evaluating ailments, has a positive correlation with the level of mobilization to act despite feeling pressure in situations assessed as stressful. These findings confirm the role of active strategies of coping with situations that are assessed in a subjective manner as difficult [44,51–54]. A sufficient level of comprehensibility, resourcefulness and meaningfulness is required to feel self-efficacious to deal with these stressors [8].

The stronger feeling of meaningfulness is probably associated with the possibility of a clearer perception of the significance of current events that are transient from a broader perspective. In a certain way, this may favor resilience in terms of the execution of their long term goals [55]. The research conducted on Taekwon-Do illustrates that the increased skills of coping with frustration as well as the emotions associated with anger are favorable to health [19]. Taekwon-Do can be considered a form of training for workers to enhance the sense of coherence. We know that purpose is experienced when a person can identify with the values and goals that are aspired to and lived in the respective workplace (e.g., sustainability, profit, innovation, stability). If this is the case, people can work in unison, and individuals take responsibility for the whole. The results showed that perceived coherence plays a particularly crucial role in the experience of meaningful work [56].

#### *4.1. Study Limitations and Future Perspectives*

The limitation of this research is the moderation of the distant range of the research conducted. Further studies in a larger group are planned to solve the main problem. In future research, we will expand the research field to possible other factors, such as contextual factors and social differences between technical and fight discipline participants. Nevertheless, the results of our search provide information that is useful for the building of programs that facilitate interventions that could lead to making choices that are favorable to health, namely good wellbeing and strengthening cohesion between the declarations with regard to lifestyles and practice [57].

#### *4.2. Practical Applications*

Based on this analysis, several recommendations and considerations for further research on positive health behavior development through Taekwon-Do are provided. The diagnosis level of sense of coherence here would help to create more effective rehabilitation programs for sportspeople while also being useful for patients for whom rehabilitation, the will to fight and not giving up in the face of serious difficulties are most important.

## 5. Conclusions

Sex differentiates the intensity of constructive mobilization to act under the impact of stress according to the subjective evaluation of both male and female Taekwon-Do fighters. In the case of men, the level of constructive mobilization was higher. This is despite the fact that the global indicator of health behavior amongst men turned out to be lower.

The intensity of healthy behavior amongst women and men who practice Taekwon-Do differs. In the case of women, the value of the global indicator of healthy behavior was higher than in the case of men.

The relation of the sense of coherence of the strategy of coping with pain is intricate, and depending on the type of strategy of coping with pain, it is shaped differently. This strategy defined as catastrophizing turned out to be commensurate in a negative way with all the three elements of the sense of coherence: resourcefulness, comprehensibility and the sense of meaningfulness.

Moreover, catastrophizing correlates with the intensity of constructive mobilization to act under the influence of stress. Sense of coherence is a predictor of healthy behavior. Both theoretical and practical implications can be reported by referring to disciplines, such as health psychology, work and organizational psychology and personnel psychology [49,56].

Our research adds to the literature with new unique research findings based on a specific group of advanced Taekwon-Do athletes.

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