

Coping strategies used by professional combat sports fighters vs. untrained subjects

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- A Study Design
- B Data Collection
- C Statistical Analysis
- D Manuscript Preparation
- E Funds Collection

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Abstract

Background & Study Aim: Strenuous training regimes and participation in combat sports competitions might lead to experiencing repeated stress and use of individual coping strategies to alleviate stress. Hence the goal of the present study was to address the question of whether gender and many-year practicing combat sports are correlated with coping strategies.

Material & Methods: The investigations covered Kyokushin karate national team (15 men and 7 women, and 7 women from judo team). The control group consisted of 28 men and 14 women who studied physical education but did not practice the sport at a competitive level. They were subjected to Coping Inventory for Stressful Situations (CISS) developed by Norman S. Endler and James D.A. Parker. A two-way ANOVA followed by post-hoc test (least significant differences) were used for intergroup comparison of the obtained scores. Additionally, the distribution of the number of high assessments in individual coping strategies in men and women compared to the standards (stems) using Chi² test with Yates correction was analysed. Significance level was set at 5%.

Results: A dominant coping strategy was task-oriented strategy. The intergroup differences were found for emotion-oriented strategy (men=42.3 vs. women=47.9, $F=8.54$, $p<0.01$) and avoidance-oriented strategy, between the persons who train at a competitive level and the untrained controls (46.3 vs. 52.9 points, $F=8.54$, $p<0.01$) and the subscale of this strategy, i.e. distraction strategies (21.1 vs. 23.9, $F=5.25$, $p<0.05$). Intensification of the task-oriented coping strategy did not correlate to other coping strategies. Chi² -test confirmed characteristic differences between the groups of men and women.

Conclusions: Independently of gender or professional practicing of combat sports, a personality trait which allows a contestant to reduce the effect of stress is to focus on the performed task. The women who practice the sport tend to focus on their emotions more often. Men cope with stress by choosing the behaviours characteristic of different strategies more frequently than women.

Key words: gender • judo • Kyokushin karate • science of martial arts

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Stress – the psychological condition which occurs when individuals perceive a substantial imbalance between demands being made on them and their ability to satisfy those demands, where failure to do so has important consequence [16].

The coping strategies – are task-oriented, in that they deal with the problem at hand; emotion-oriented, in that they concentrate on the resultant emotions (e.g., becoming angry or upset); and avoidance-oriented, in that they try to avoid the problem. Avoidance-oriented coping can be divided further into two types: distraction and social diversion [17].

Kyokushin karate – in open tournament, the attack which causes opponent's inability to fight for a period of five second (*waza-ari*) or longer (*ippon*) is the basis for a win. Additional criterion in the case of even scores is body weight higher by at least 10kg and worse result from *tameshiwari* test [1,2].

Tameshiwari – the board-breaking test which consists in hitting boards with upper limb (fist, knife-hand strike, elbow) and foot. The number of boards broken is calculated to score points [1,2].

INTRODUCTION

In karate and judo, which put great demands on strength, endurance and precision of reaction in changeable situations, matches are divided by gender and weight classes (the open categories are also used). During karate tournaments with high priority, a criterion of breaking boards with knife-hand strike, foot, fist or elbow is used. Furthermore, both sports use a competition of formal exercise, *Kata* (without division into weight classes), which is aimed at conformity of the forms to a movement pattern. A number of studies have discussed the components and indexes of the course of fight based on technical and tactical preparation in *Kyokushin* karate [1,2] and judo [3,4]. Psychological preparation of athletes, besides technical, tactical and physical preparation, has a key importance to being successful in these sports [5,6]. The reactions to ease tension are frequently observed among these people. When subjected to stress connected with competition, female and male athletes cope with their discontent in a variety of forms, e.g. they get angry, swear silently or loudly etc. [7].

According to Richard S. Lazarus, the most prominent and the most frequently cited world authority on psychological stress, and Susan Folkman, a follower of his investigations, the stress is *a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being* [8,9]. An inseparable component of stress is cognitive assessment and the accompanying emotions and orientation to improvement in the relationships, regaining balance between the requirements of the environment and abilities of an entity i.e. coping with stress [10,11]. The state of stress and coping are two interrelated and mutually conditioned phenomena. Effective coping strategies alleviate stress, whereas inefficient coping leads to intensification of stress [12].

Scientific investigations aimed at identification of conditionings of behaviour typical of stress situations have led to formulation of the concept of a strategy of coping with stress [13]. This formulation was based on the thesis that people differ from each other due to habitual manner of reacting to stressful situations. Coping, approached in categories of a strategy, has much in common with the concept of trait and has a status of a personality variable. It is a specific disposition which conditions behaviour in a particular class of situation and the differences between people in terms of their behaviours [11].

The goal of the present study was to address the question of whether gender and many-year practicing of combat sports is associated with the strategies of coping with stress.

MATERIAL AND METHODS

The study included contestants from Kyokushin karate national men's team (n=15, aged 20.5 years, training experience 11.5 years) and national women's team in Kyokushin karate (n=7) and judo (n=7). Female groups were connected (n=14, aged 20.6 years, training experience 10.8 years) because no statistically significant differences were found between these groups. The comparison was based on the material obtained during investigations of male university students (n=28, aged 19.6 years) and female university students (n=15, aged 19.1 years) who study physical education but are not involved in professional sports. The study included 72 subjects in total. All the people gave their informed consent for taking part in the study and were preserved the anonymity in terms of the answers contained in Coping Inventory for Stressful Situations (CISS) by Norman S. Endler and James D.A. Parker. The questionnaire is based on the assumption that it is used for identification of the strategy of coping with stress. It comprises 48 simple statements which concern a variety of behaviours typical of people who find themselves in stressful situations. There are numbers 1 to 5 next to each statement to denote the frequency of a particular activity taken in difficult and stressful situations. The respondents were asked to express their opinion of each statement through marking a suitable score which fits the frequency of the activity. CISS allows for calculation of the scores using three scales:

SSZ – task-oriented strategy
 SSE – emotion-oriented strategy
 SSU – avoidance-oriented strategy, with two avoidance patterns:
 ACZ – Distraction
 PKT – Social Diversion.

The scales are composed of 16 items and the subjects can obtain from 16 to 80 points in each of them. The results are obtained for each scale separately, through summation of weights according to a key. The authors of the inventory recommend that individual raw scores are related to standard tens [12].

Statgraphics Centurion software was used for computation of means and standard deviations. The normality of distributions was assessed using the standardized skewness and standardized kurtosis. These statistics outside the range of -2 to +2 indicate significant departures from normality. None of considered variables show values outside the expected range and no significant differences were found between standard deviations. Furthermore, the two-way ANOVA was used, with independent variables being gender (men,

women) and being involved in professional sports (being a member of the national team, status of a student at the university of physical education and not being involved in professional sports). The ANOVA method was used for finding significance for intergroup differences between mean scores obtained from CISS scales. A multiple comparison test by means of least significant differences (LSD) was employed in order to identify differences between pairs of means in the area of the four groups separated in consideration of the two factors. Standard tests were used for comparison of distribution of the number of men and women, with focus on the scores with high priority. Due to small size of both groups, the categories of low and medium assessments were connected and Yates' chi-square test was used. The level of $p < 0.05$ was adopted for verification of statistical hypotheses.

RESULTS

The results of the investigations are contained in Tables 1 and 2.

Table 1 presents mean levels of raw scores and average coping strategies in the studied population: persons who are involved in professional combat sports and untrained controls (males and females). In three of the four groups, the profiles of results obtained in CISS scales were similar: $SSZ > SSU > SSE$. The distinguishing group was the female members of the national team, with advantage of scores in SSE scale over SSU scale. The factors of gender and being involved in sport at a competitive level were not statistically significant ($p > 0.05$) in task-oriented coping strategy (SSZ) as well as avoidance-oriented strategy which adopted a form of social diversion (PKT). In problem situations, the subjects who trained professional

Table 1. Coping strategies in the group of subjects who trained combat sports at a competitive level and in the group of untrained subjects ($\bar{x} \pm SD$).

CISS raw results	Trained subjects ^a		Untrained subjects ^b	
	Men (n=15)	Women (n=14)	Men (n=28)	Women (n=15)
SSZ	59.2±8.12	60.0±8.15	58.6±6.12	56.2±5.97
SSE #	39.2±8.06 ^{cd}	47.6±9.29	44.8±7.55	48.3±6.87
SSU *	45.8±9.51 ^c	46.7±7.60	52.2±10.2	53.7±9.27
ACZ *	20.6±4.56	21.6±4.13	23.1±5.98	24.9±4.31
PKT	17.2±4.26	18.3±2.73	19.21±3.77	19.0±3.74

Differences between men and women (SSE, $F=8.54$, $p < 0.01$), * differences between the subjects who train at a competitive level and untrained controls (SSU, $F=8.54$, $p < 0.01$; ACZ, $F=5.25$, $p < 0.05$), ^a National team, ^b University students of physical education, ^c Women who practice the sport at a competitive level, compared to men who train at a competitive level, use emotion-oriented strategies (SSE) and avoidance-oriented strategies (SSU) more frequently, ^d Men who practice combat sports at a competitive level, compared to trained women and female students of physical education, use emotion-oriented strategies (SSE) less frequently. In order to identify the differences between pairs of means in the area of the four groups, multiple comparison test by means of 95%LSD ($p < 0.05$) method was used.

Table 2. Distribution of the number of low, medium and high results for CISS

Group of subjects	Level of results	CISS				
		SSZ	SSE	SSU	ACZ	PKT
Total n=29	Low	2	3	5	0	4
	Medium	14	19	16	23	17
	High	13	7	8	6	8
Women n=14	Low	1	0	2	0	1
	Medium	5	8	9	11	9
	High	8	6	3	3	4
Men n=15	Low	1	3	3	0	3
	Medium	9	11	7	12	8
	High	5	1	5	3	4
Significance of differences	Chi ² (df=1)	1.660	5.179	0.514	0.090	0.000
	p	0.198	0.023	0.474	0.924	1.000

combat sports and untrained subjects (females and males) focused similarly on performing tasks and they sought help in interpersonal relationships to the same degree. The study subjects used a strategy of performing tasks and efforts to solve a problem through cognitive transformations and attempts to change situations. The main focus was on performing task and seeking a solution to the problem. This was particularly noticeable among the female members of the national team (Table 2), of whom 8 in 14 subjects obtained high sten scores. In the group of male members of the national team, there were 5 in 15 with such scores.

As mentioned previously, the results obtained for SSE scale significantly depended on the gender factor ($F=8.54$, $p<0.01$), whereas average level for results in SSE scale in men (42.3 points) was lower compared to women (47.9 points). In consideration of division into four groups (Table 1), statistically significant differences were found between each other ($F=4.12$, $p<0.01$). LSD multiple comparison test revealed significant differences ($p<0.05$) between SSE means in the group of trained subjects ($SSE_{\text{males}} < SSE_{\text{females}}$). Similar significant differences were also found between the group of trained men and untrained women. This was confirmed by the number of high scores obtained in SSE scale by male and female contestants from the national team, respectively 6 in 14 women and 1 in 15 men included in the study, and the lack of low results in the group of women (see Table 2). The women who took part in the study were inclined to focus on themselves, their own emotional experiences, such as anger, feeling of guilt or emotional strain. They also showed a tendency for wishful thinking and fantasizing in order to reduce emotional strain connected with stress situations. Paradoxically, these activities, aimed at reduction of stress, could have intensified experiencing a difficult situation, causing elevated strain and distress. The men who trained professional combat sports utilized these non-adaptive strategies of coping with stress less frequently.

The factor of being involved in sport affected the results in SSU scale ($F=8.54$, $p<0.01$). The national team obtained lower results on SSU scale compared to untrained subjects (46.3 vs. 52.9 points). Males from *Kyokushin* karate exhibited significantly lower intensification of results on SSU scale compared to untrained controls (cf. Tab. 1). In people who practiced combat sports at a competitive level, a significantly lower mean results in ACZ subscale were found compared to untrained subjects ($ACZ_{\text{trained}}=21.1$ vs. $< ACZ_{\text{untrained}}=23.9$ points). The national team of contestants who trained combat sports compared to people who did not practice sports at a competitive level

showed tendencies to coping with difficulties through avoidance-oriented strategies: avoiding thinking, feeling and experiencing stressful situations, mainly in the form of distraction strategy e.g. watching TV, overeating, thinking about pleasant things, sleeping etc.

In the group of men, 5 of 10 correlation coefficients between intensification of different coping strategies exhibited significant relationships. Among those who practiced *Kyokushin* karate and men who did not practice sport at a competitive level, similar statistically significant correlations were found between the scales of coping with stress. A moderate correlation was found three times: SSE and SSU (trained subjects $r=0.54$ and the untrained controls $r=0.42$, $p<0.05$), SSE and ACZ ($r=0.56$ and 0.47 , $p<0.05$), ACZ and PKT ($r=0.70$, $p<0.001$ and 0.54 $p<0.01$). High correlation occurred in SSU with subscales ACZ (0.91 and 0.90, $p<0.001$) and PKT (0.91 and 0.79, $p<0.001$). This suggests coexistence of tendencies for concentration on emotions and avoiding stressful situations through distraction strategy or social diversion. The only significant correlation in trained women was moderate correlation between SSU and ACZ ($r=0.61$, $p<0.05$), whereas two significant correlations were found in untrained controls, i.e. between SSU and ACZ ($r=0.54$, $p<0.05$) and SSU and PKT (0.67, $p<0.01$). In female national team, avoiding stressful situations correlated with distraction. Contrary to the women who did not practice sport at a competitive level, no correlations were found between avoidance-oriented strategy and social diversion. However, it is noteworthy that the task-oriented strategy (the most desirable and adaptive) which was dominant in male and female subjects who trained at a competitive level did not coexist with other strategies.

DISCUSSION

This study demonstrated that the people who practice combat sports use coping strategies which are similar to those used by untrained controls, but different intensification of these personality dispositions was observed. Task-oriented strategies used in stressful situations did not depend on gender and was predominant both in the national team of persons who practice combat sports and among students of physical education who do not practice sport at a competitive level. Another study [14] also revealed the dominance of SSZ style, whereas mean values in our study were similar to the group who performed meditation (60.9 ± 8.27) and higher in the group who did not perform meditation (56.5 ± 7.72). Values of intensification of SSU style in the compared group of karate practitioners were also similar (45.8 vs. 46.6) and identical in the case of PKT (17.2). In

traditional *Kyokushin* training, meditation in sitting position is a compulsory routine in the beginning and at the end of each training session. Hence, a characteristic similarity could be observed between the groups of trained males. Our study showed that in stressful situations women who practice combat sports demonstrated, more intensively than men, the behaviours which can be identified as emotion-oriented coping strategies, which is unfavourable under conditions of sport competition. This analysis suggests more general conclusion. Women who train combat sports at the highest competitive level obtain high results in terms of desirable and adaptive task-oriented strategies (SSZ) on the one hand, but also high results in terms of unfavourable, exhausting psychological resources and typical for women emotion-oriented strategy. This specific ambivalence or, more specifically, ambivalence, was not observed in male subjects. The presented results of investigations partially correspond to the results of the studies by Klodecka-Różalska and Kownacka [15], who diagnosed psychological gender in young people who practiced combat sports. These authors concluded that both in male and female athletes, who presented the most beneficial type of motivation for winning in sport competition i.e. orientation towards success, strong identification with cultural model of masculinity is significant.

A study limitation is that a research tool we used CISS questionnaire, which does not allow for evaluation of coping strategies in specific and stressful situation generated during practicing sports. Also, it is

difficult to decide whether it is the people with certain profile of coping strategies who selected karate as a sport to practice or it was many-year training which has changed these strategies. In consideration of the discussion, the purposefulness of investigations of the situations which generate stress during training and competition should be emphasized [18]. Nevertheless, the conclusions formulated below seem to be justified.

CONCLUSIONS

Independently of gender and whether combat sports are practiced at a competitive level, a typical personality disposition aimed at alleviating stress is task-oriented strategy.

Emotion-oriented strategy is a woman's domain, particularly in those who practice combat sports at a competitive level.

Compared to untrained subjects, people who practice combat sports at a competitive level (both women and men) exhibit tendencies to use avoidance and distraction strategies to a lesser extent.

Independently of the factor of practicing sport, men cope with stress by choosing behaviours typical of the four strategies, which are correlated with each other. This phenomenon occurs less frequently in women.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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