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Does pain always accompany martial arts? The measurement of strategies coping with pain by taekwondo athletes

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Abstract

Background & Study Aim: In the light of the literature on health psychology individuals are active processors of information and not passive reactors. The general aim the research is knowledge about the strategies of copying with pain used by taekwondo athletes.

Material & Methods: Fourty seven taekwondo athletes participated in the study (14 female, 33 male), aged between 16 and 45 (average 25.1 7±9.73 years). Research tools: Questionnaires used in health psychology were applied in the research; Coping Strategies Questionnaire and Feeling of Personal Competence Scale. Additionally, in the presented research the data were gathered with the use of self-elaborated questionnaire. The regression technique was used.

Results: The conducted research shows that taekwondo athletes use the following strategies of copying with pain: *revaluation* (M = 27.94±6.10), *distracting attention* (M = 25.68 ±7.12), *behavioural strategies* (M = 24.49±5.97), *catastrophizing* (M= 4.51 ±8.16) and mixed strategies will combine *cognitive* and *behavioural strategies* that distract attention. Average values of how the examined persons can subjectively control negative feelings caused by pain are M = 3.62 ±1.15 was observed. The correlations between the strategies coping with pain and feeling personal competence were observed ($p<0.05$).

Conclusions: In the examined taekwondo group relations between the adaptative, active strategies: *revaluation* and *distracting attention* and feeling of personal competence were observed. A very low degree of *catastrophizing* was observed. *Revaluation* (positive predictor) and *catastrophizing* (negative predictor) explained part of the variance feeling of personal competence level $R^2 = 0.52$; $p<0.01$.

Keywords: combat sports • possibility of action • psychological measurement • sports psychology

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Taekwondo ITF – a Korean martial arts and combat sport where it uses kicks and punches with a heavy emphasis on kicks, composed of individuals who practice in International Taekwon-do Federation.

Possibility of action – praxeological conception distinguishes three derivative key terms – flexible feasibility, situational feasibility, the full (complete) possibility of action. Flexible feasibility – power, intellectual or manipulative proficiency and knowledge (ability) and sufficient willingness to carry out given action; Situational feasibility carrying out given action in determined circumstances is not prevented by this circumstances. Somebody has full (completed) flexible and situational possibility of action, i.e. has sufficient power, knowledge, and efficiency (intellectual or manipulative) in order to carry the given action out in the moment t, possibility of the non-performance of it and has possibility of putting off until later moment of carrying the given act out [8].

Sports psychology – *noun* the scientific study of the mental state of sportspeople, looking at issues such as motivation, concentration, stress and self-confidence [27].

Introduction

According to the biopsychosocial model of pain, it is a multidimensional phenomenon, which comprises physiological (sensation-related factors), psychological (affective) social factors [1, 2].

The pain perception, together with the strategies of coping with pain, are under the influence of personality and temporary mediating variables. According many authors another important concept that is related to beliefs is pain appraisal individuals are active processors of information and not passive reactors [1, 3, 4]. Many models of pain give psychological coping an important role in understanding adaptation to pain [5]. In the light of the literature concerning martial arts and health psychology, we can talk that regular exercise improves balance catecholamines and endorphins produces to make pain tolerable [6].

One of the important motives and effects of long-term practicing martial arts is aiming complete possibility of action, and more effective copying with different weaknesses and limitations [6-10]. One of the potential barriers during trainings and fighting is the feeling of ailments and pain. Opposite to common and stereotypical beliefs concerning the degree of vulnerability to injuries in different sports, it is not taekwondo but other disciplines where more injuries happen (i.e. football) [11]. However, at every moment of martial arts training, during sparing or competition the appearance of pain in highly real and the risk that pain will be intensive may be significant [12]. In the case of persons practicing martial arts this element i.e. persistence in realizing the task, despite unfavourable feelings, seems to have the key meaning.

Among the psychological factors that increase man's possibilities concerning strength and persistence in fulfilling aims, overcoming obstacles (external, such as unfavourable outside conditions) and internal (i.e. discomfort, aliments and tiredness) there is the feeling of personal competence [13, 14]. There are circumstances to examine the connection between the feeling of personal competence, also referred to as generalized self-efficacy perceived by the creator of research tools of health psychology, Zygfryd Juczyński, and the methods of copying with pain [14].

Pain as an unpleasant feeling causing a number of negative emotions (i.e. anxiety) on one hand plays a positive, alerting role and, on the other hand, limits the possibilities of undertaking an activity. In the light of literature, the distinguished strategies of copying with pain are adaptive (i.e. revaluation, distracting attention) and non-adaptive (for instance strategy of *catastrophizing)* [1].

The general aim the research is knowledge about the strategies of copying with pain used by taekwondo athletes. The following questions were asked:

1. Whenever pain appears, what strategies of copying with pain are used by taekwondo practitioners to the greatest degree and what to the smallest?

2. To what degree do taekwondo practitioners feel that they are able not to surrender to negative feelings that pain carries?

At the same time the important was two research task: checking if the strategies of copying with pain cover (correlate) with the generalized feeling of personal competence (it required controlling the age as a variable that potentially influences on the feeling of personal competence); to construct models of regression, including measured strategies of copying with pain and the age of taekwondo practitioners.

Material and methods

Participants

The research covered the group of 47 taekwondo athletes ITF (International Taekwon-do Federation) (14 female, 33 male) aged between 16 and 45 (average 25.17±9.73 years). The sample group was composed of children, young and mature adults people practicing taekwondo, from Czestochowa (Poland) and around. The presented questionnaires are of a completely voluntary and anonymous character, and were preceded by obtaining the consents. Local Ethics Committee has given consent to the study.

Protocol and research tools

The research was conducted by those who are familiar with the environment of people practicing taekwondo. Thanks to it they found it easier to choose the part of the day when taekwondo adepts had time to complete questionnaires.

Questionnaires of an accepted psychometric value, used in health psychology were applied in the research: Coping Strategies Questionnaire [1] and Feeling of Personal Competence Scale. This scale was applied that measures generalized feeling of one's own effectiveness – two key elements of generalized feeling of efficiency i.e. beliefs concerning

using the power necessary to undertake an activity and persistence necessary to continue an activity [13, 14]. Additionally, in the presented research the data were gathered with the use of self-elaborated questionnaire including open and close questions.

Statistical analysis

The obtained results were analysed *statistically:* descriptive research and regression technique were used. Thus, the research programme was concentrated on creating such regressive models that cover the examined variables and allow us to find out which hypothetical independent variables (elucidating) cause regular changes of dependent variables (being elucidated) i.e. Feeling of Personal Competence. The data was subjected to statistical analysis for the purpose of interpretation. Descriptive statistics such as mean, standard deviation, lower and upper quartile and other were computed to understand the interdependence between the variables.

Results

Table 1 includes the results based on questionnaires (descriptive statistics) concerning the psychological strategies of copying with pain. Table 2 covers the values of correlation indicators between the feeling of personal competence and strategies of copying with pain. The level of significance was set at $p<0.05$. Table 3 presents the result of regression analysis. It show the relations of three predicators and independent variable, the feeling of personal competence. The level of significance was set at $p<0.01$.

Discussion

the obtained results indicate that people practicing taekwondo use the following strategies of copying with pain (Table 1): *revaluation*, distracting attention from negative feelings, behavioural strategies, the strategy of *catastrophizing* is applied in the taekwondo group very rarely (Table 1). From other groups they differ,

Table 1. Strategies of copying with pain (scale 0-36): *revaluation* (R), *distracting attention* (D), *behavioural strategies* (B), *catastrophizing* (C).

Code	Strategies of copying with pain	Mean	Median	Min	Max	Lower quartile	Upper quartile	SD
R	Revaluation	27.94	29.00	11.00	36.00	24.00	32.00	6.10
D	Distracting attention	25.68	28.00	9.00	36.00	21.00	32.00	7.12
B	Behavioural strategies	24.49	26.00	9.00	33.00	21.00	30.00	5.97
C	Catastrophizing	4.511	2.00	1.00	36.00	2.00	3.00	8.16

Table 2. The relation between the feeling of personal competence and strategies of copying with pain ($p<0.05$).

Variables	Catastrophizing	Distracting attention	Revaluation	Behavioural strategies
Feeling of personal competence	–0.61	0.59	0.69	0.48

Table 3. Results of multiple regression analysis of observed empirical variables of examined feeling of personal competence (n=47).

Empirical variables	Regression summary for dependent variable: Feeling of personal competence R=0.724; R^2 =0.524; Adjusted R^2 =0.502; F(2.44)=24.278; p<0.01; Standard error of estimate: 5.9378					
	Beta	Standard terror Beta	B	Standard error B	t(44)	p-level
Intercept			16.65	5.86	2.83	0.01
C	0.28	0.14	0.29	0.14	2.03	0.04
R	0.51	0.14	0.70	0.19	3.63	0.00

R revaluation of pain sensation; **C** the strategy of catastrophizing

first of all, within a very low degree of *catastrophizing* [1]. People practicing taekwondo use the following strategies of copying with pain most commonly: *revaluation* and distracting attention from negative feelings (Table 1), i.e. "In order to distract attention from pain, I think about pleasant things", "I'm thinking of people for whom I am important", "I'm trying to reconstruct a past moment", "I'm trying to step aside, as if pain was behind me, not in my body", "In my head I start chanting a song, count or pray".

The taekwondo athletes use behavioural strategies (Table 1) such as i.e. attempts to relax painful muscles immediately after the training, working out one's own "home" methods of improving the mood and lowering ailments such as: aiming at "taking a shower" within one hour or two after training; obeying the sequence: warm-up, training and stretching.

The quality analysis of the answers (data were gathered with the use of self-elaborated questionnaire including open and close questions) revealed that they make a very valuable research material. It provided much additional information – we have seen mixed strategies will combine cognitive and behavioural strategies that distract attention and make a person perform a different physical activity. The examples given by taekwondo practitioners: "I'm leaving home and do something i.e. I go shopping and to the cinema", "I do something involving such as engaging computer game (on a mobile), "I do whatever else in order not to think about pain", "I do what I like e.g. watch television, listen to music".

The obtained results reveal that average values of how the examined persons can subjectively control negative feelings caused by pain are in the scale from 0 to 12. *Research shows that higher level this factor is linked to better coping with pain and controlling negative emotions caused by pain* [2, 14]. The declared degree of an ability to control feelings indirectly and directly connected with pain correlated positively with the cognitive strategy (distracting attention and reconsidering impulses). The obtained result corresponds with the data from literature e.g. with the research done by Juczyński among the patients with chronic pain – in the research the degree of controlling negative feelings was correlated with the strategy of *catastrophizing* [14].

In the examined taekwondo group certain relations between the distracting attention strategy and the feeling of personal competence ($r = 0.59$; $p<0.05$) were observed. Relation between the strategy of *revaluation* and the feeling of personal competence ($r = 0.69$; $p<0.05$); between *behavioural strategies* and the feeling of personal competence ($r = 0.48$; $p<0.05$) were observed (Table 2). The strategy of copying with pain, specified in the literature as *catastrophizing*, correlated with the feeling of personal competence ($r = 0.61$; $p<0.05$). Many psychologists and experts in human behaviour believe that a feeling of personal competence, also referred to as generalized self-efficacy, may be more important to success than other psychological factors [13-15]. Research shows that the higher catastrophizing *associated with lower levels of* complete possibility of action and mood. *Catastrophizing* has been associated with negative psychological and physical outcomes in numerous studies [1, 14, 16, 17].

In relation to pain, it has been proposed that self-efficacy beliefs may explain in part the variability between a patient's or other (sportspeople) skill level and their performance outside the treatment setting [11, 18]. Martial arts exercise has another pain-reducing effect – by endorphins way ("feel good chemicals") because it help blocking pain signals, minimize pain [6].

Psychological factors have long been shown to play an important role in training and competition in many, if, not all sports [19]. Evidence of the effectiveness of martial arts in producing affective, cognitive and behavioural benefits has come from a number of scientific studies [7-9, 20]. Specific coping styles, psychological coping strategies are intricately related to an individual's approach to stressful life events can promote physical and mental health. Many people associate martial arts with fighting, but these activities are more about teaching people self-discipline and can be of great benefit to people in recovery during the rehabilitation period [6, 20].

Martial arts have fascinated mankind for thousands of years, and have been a part of human culture ever since [6, 7, 10]. Other researchers have explored some of the physical as well as psychological gains emanating from martial arts training and for instance physical and physiological profiles of taekwondo [21-23]. Performance in taekwondo may be determinate by a competitor's technical, tactical, psychological and others. From a physical conditioning perspective, the goal of taekwondo training is to prepare to effectively manage both the physical activity and the others demands combat [22]. Effective copying with

weaknesses, limitations, anger, and pain (on a developmental perspective: children, young mature adults) can be linked to better coping with generalized self-efficacy [6, 15, 20].

From other groups examined taekwondo group differ, first of all, within a very low degree of *catastrophizing* [1]. It has been found that the strategy of copying with pain, specified in the literature as *catastrophizing*, correlated negatively with the feeling of personal competence (i.e. the strength of undertaking activities and the persistence in fulfilling them, Table 2).

It has been found out that age correlates with the feeling of personal competence ($R = 0.66$; $p<0.05$). Because the result was positive the analysis of regression in two alternatives was performed model 1 and model 2. In order to check if the examined strategies of copying with pain explain changeability of the variable explained as the feeling of personal competence, the analysis of regression in two alternatives was performed.

The first model covered the explained variable (the feeling of personal competence and three explanatory variables including both strategies of copying with pain and age. In this case the model 1 was obtained $R = 0.74$.

In model 2 we established the indicators of the participation of particular strategies in shaping the feeling of personal competence (strategy of *catastrophizing* and revaluation pain sensations) and but in the case of model 2 we did it with the exclusion of age variable. It is justifiable, as the age itself and life maturity, according to what the developmental psychology suggests, are connected with the feeling of personal competence.

After deleting 1 predictor (*age*) the second regression model of the following indicators: $R = 0.72$, $F_{2.44} = 24.28$ ($p<0.01$) was obtained. It has been found that, despite excluding "age variable", model 2 describes the dependencies well, that is revealed in $R^2 = 0.52$; (*revaluation* positive predictor and strategy of *catastrophizing* negative predictor) this coefficient of determination in regression analysis is defined to measure goodness of fit [24, 25]. The analysis of regression evidenced that described strategies of copying with pain connected with feeling of personal competence. Juczyński observed that adaptive active strategies understood under the bio-psycho-social model of therapy of pain are beneficial [1, 14].

The obtained results reveal that there are empirical circumstances, so we can say that taekwondo athletes do not exaggerate the meaning of pain; taekwondo group use the following strategies of copying with pain most commonly: the strategies referred to in literature as cognitive (revaluation and distracting attention from negative feelings), *behavioural strategies* and mixed strategies will combine *cognitive* and *behavioural strategies* that distract attention. A very low degree of *catastrophizing* was observed. The feeling of personal competence *is linked to adaptative strategy coping with pain, caused better coping with pain. Revaluation* pain sensations and distracting attention were associated with the feeling of personal competence.

They treat it as a challenge and indication to improve the general preparation that will pay back during sport fights. They use adaptively more beneficial strategies of copying with pain, such as the ones that favour the processes of regeneration of the body e.g. they try to act according to their coach's recommendations as for the progression and sequence of training activities. From other groups they differ, first of all, within a very low degree of *catastrophizing*. Different psychological factors and coping strategy with pain bring about different effects [1, 2, 4, 5, 14, 16, 17].

Conclusions

In this sense we can prove the thought contained in the title of this work – does pain always accompany martial arts? Yes, but the taekwondo athletes are not defenceless and develops strategies that let him deal with it effectively. Such a thought was included by *Iannucci* and *Horowitz* [26] in a book about coping with pain: do not be defenceless, get ready.

Competing interests

Authors declare no conflicts of interest.

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