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Original Article

Martial arts, combat sports, and self-determined motivation as predictors of aggressive tendencies

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Abstract:
Problem statement. It is suggested that needs were positive predictors of autonomous motivation, which in turn was a positive predictor of sportsmanship attitude and a negative predictor of anti-social moral attitudes in sport. It is claimed also that the relationship between combat sports and martial arts, self-determined motivation and moral attitudes has not yet been established. **Purpose.** This study was designed to evaluate the effects of practising martial arts and combat sports on self-determined motivation, ethical attitudes, and aggression.**Material & methods.** There were 219 respondents. The diagnostic poll method with the questionnaire technique served to fulfil the assumed aims. Standardized research tools were applied. Behavioural regulation was measured with the Polish adaptation of the Sport Motivation Scale-6 (SMS-6) (Blecharz*et al*. 2015). To assess the level of general aggression index, the Buss and Perry Aggression Questionnaire (BPAQ) in the Polish adaptation by Siekierka (2005) was applied. Ethical attitudes were evaluated with the Ethics Questionnaire by Wojciszke and Baryła (2000). **Results.** The analysis of the model revealed a complete effect *c* at the statistical trend level of the type of training (combat sports/martial arts) at the level of the general aggression index ($R2$ = 2.80; p = 0.08). The positive value of the coefficient *c* means that combat sports practitioners reached a higher level of aggression than martial arts competitors. The obtained model was well matched to the data (p< 0.001) and explained 11% of the variance of the dependent variable. The model containing paths b_1, b_2, and c', with the level of the general aggression index as a dependent variable, was well matched to the data (p< 0.001) and explained more than half of the variance of the dependent variable (52%). A significant negative effect of RAI on the level of the general aggression index was observed ($R2$ = –13.87; p< 0.001). **Conclusions.** Martial arts are associated with more autonomous forms of motivation than combat sports and therefore can foster greater control of aggression and higher ethical sensitivity.
Key words: relative autonomy index, morality, ethical codes, aggression

Introduction

In the Western culture, there is a long tradition of attributing an educational function to sport, also with reference to moral education. Reaching its roots in the Hellenic ideal of *kalos kai agathos*, the tradition found its culmination in the ideology of 'muscular Christianity', which was widespread in the 19th century, and thus also in the Coubertin Olympics. However, idealistic assumptions are not always confirmed in practice, and despite the fairly universal habit of associating sport with an educational function, the question still arouses much controversy. On the one hand, this sphere abounds in opportunities to meet, learn, and establish moral values such as respect, honesty, normative sensitivity (Fabio and Towey2018, Kostorz et al. 2016, van der Kooi2020). On the other hand, pedagogical anxiety is increased by research results suggesting the existence of negative links between moral development and sports practice (Bredemeier and Shields 1995, Chandler and Goldberg 1990, Ring and Kavussanu2018). They encourage some investigators to make such readable statements as Leonard's saying that 'if sport shapes a character, it is at most the character that is useful to a criminal' (after Stoll 1999, p. 98).

However, the discourse on the educational potential of sport is more complicated than the lofty demands of its apologists, as well as the unhappy image created by its critics. The debate on the real opportunities and threats of sport is certainly not facilitated by the fact that sport is multitasking and complex, by itself and in the context of the environmental factors that may affect it from the outside (policies, values, and social expectations) and from the inside (values recognized and implemented by coaches, sports propagators or activists, parents, etc.). When we talk about the complexity of sport itself, we mean that each discipline offers a different stimulus situation, which, of course, is most visible in terms of morpho-functional aspects, resulting in

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all too often visible differences in the physiognomy and fitness profiles of athletes practising various disciplines. However, the diversity of sports disciplines, in terms of variables such as the nature of the competition (direct vs. indirect, side by side vs. against each other), the level of physical contact between players and the extent to which it is sanctioned by regulations, the level of the objective and subjective risk associated with the sporting activity, or the ethos that accompanies it, may also determine the different educational situations that they may create. The knowledge of this subject still has some limitations, and the only research conducted in the context of the relationship between the type of sport and the consequences for moral development concerned the division into individual and team sports and contact and non-contact sports (Kavusannu 2007, Lumpkin et al. 1994). According to Kavusannu (2007), the research results so far suggest that the level of physical contact that occurs between participants can affect such moral variables as moral reasoning, aggressive tendencies, or judgments about what is acceptable in sport. The closer the physical contact, the more negative the impact of sport on a moral development.

Combat sports and martial arts are among the forms of activity with a high level of physical contact, which in addition directly involve confrontation between athletes. They are of great interest to sports educators because of their potential to convey ethical and moral values, as well as to teach to control and discharge aggression in a socially approved manner. Nevertheless, they can also strengthen the competitors' inclinations to respond with greater aggression in their daily lives (Basiaga-Pasternak et al. 2020, BlomqvistMickelsson2020). Research conducted so far with reference to this potential has not yielded clear results (Harwood et al. 2017), which may to some extent be due to a not quite consistent distinction between combat sports and martial arts. Both are examples of contact sports in which rivalry between subjects takes the form of 'against each other,' but with the latter involving a strong philosophical element – usually embedded in the philosophical systems of the Far East, mainly Taoism and Buddhism – dominated by perfectionism and self-realistic approach (Brown and Johnson 2000).

Sports competition and the struggle determining both the winner and the loser are often completely rejected (Cynarski et al. 2018, Zeng et al. 2013). The key aspect of martial arts training is therefore the social and moral development of the practitioners, while combat sports prepare for sporting struggle, which in some of them may directly mean the task to inflict pain and harm large enough for the rival to be unable to continue (see boxing knockout, wrestling levers, or judo). Thus, although both combat sports and martial arts have their source in preparation for combat in the military sense of the term, the diverse paths of their development, resulting in dissimilar goals, intentions, and ethos, may significantly differentiate their potential to influence moral variables and thus to create a pedagogical impact.

Although it is considered that 'there is no doubt that the characteristics of the sport context may exert a major influence on moral variables' (Kavusannu 2007, p. 272), there are a number of other variables that also have such an effect. They can be found in a person's social environment, both closer (family, friends, colleagues, acquaintances) and further (social values, mass media), as well as in the individual themselves. Among the latter, the motivational sphere is indicated, as the reasons why athletes practise sport (the motivational component) may impact on the behaviours and attitudes they are more likely to adopt (the moral component) (Vallerand and Losier 1994). Research on the relationship between these internal factors and the issues of ethics and morality in sport was dominated by the theory of achievement motivation (Kavussanu, Stanger 2017, Ring, Kavussanu 2018), while fewer studies were conducted from the perspective of another popular theory of motivation – the theory of self-determination (Ryan and Deci 2007).

It recognizes motivation as a continuum of different degrees of self-determination, called behavioural regulation, whose extremes are amotivation and internal motivation, with four types of external regulation in between. This approach allows to understand the motivation better than the internal-external dichotomy. It is assumed that more self-determined regulations (internal motivation and identification) are associated with more positive psychological functioning, not excluding moral variables. An athlete who practises sport for the satisfaction of the very fact of practising it, for themselves and not for the external consequences it brings (recognition, gratification), should be inclined to show respect for others and adhere to written and unwritten rules of sports ethics, and less likely to follow a win-to-win philosophy (Vallerand and Losier 1994). However, the number of empirical studies available on the relationships described is limited to two. Vallerand and Losier (1994) in their hockey research found that sportsmanship and self-determined motivation were linked to each other in two ways, and the (self-determined) motives for practising sport had a greater impact on sportsmanship than the other way round. In a more recent study, Ntoumanis and Standage (2009) assessed the relationship between the variables suggested by self-determination theories (behavioural regulations and the psychological needs for relatedness, competence, and autonomy) and attitudes towards sportsmanship and anti-social behaviour in sport (e.g. cheating) in athletes representing different individual and team sports.

The authors stated that needs were positive predictors of autonomous motivation, which in turn was a positive predictor of sportsmanship attitude and a negative predictor of anti-social moral attitudes in sport. To the best of the authors' knowledge, the relationship between combat sports and martial arts, self-determined motivation and moral attitudes has not yet been established. Therefore, this study was designed to evaluate the effects of practising martial arts and combat sports on self-determined motivation, ethical attitudes, and aggression.

Materials & methods

Participants

The study sample was comprised of106 combat sports athletes and 113 martial arts followers practising in clubs and sections in the Silesia Province, southern Poland(the cities of Jastrzębie-Zdrój, WodzisławŚlaski, Żory, Rybnik, RudaŚląska, Pszczyna, Katowice, Racibórz, Gliwice, Cieszyn). The respondents were of both genders, at least 15 years old; they had been training martial arts or combat sports for at least 1 year. All individuals submitted a written consent to voluntarily participate in the research. In the case of minors, the consent was obtained from the parents or legal guardians. Out of the participants, 113 (51.60%) practised martial arts, and 106 (48.40%) were combat sports athletes. Women (n = 101) constituted 46.12% of the study group. Their mean age equalled 23.61 years (SD = 4.83). Men (n = 118) constituted 53.88% of the study group, with the mean age of 24.31 years (SD = 5.91). Among those practising martial arts, 50.44% (n = 57) were women, and 49.56% (n = 56) were men. In turn, among those practising combat sports, the majority of the respondents, *i.e.* 58.49%, were men (n = 62), the remaining 41.51% (n = 44) being women. The mean age of martial arts practitioners was 24.83 years (SD = 5.81): 24.02 years (SD = 4.91) in women and 25.66 years (SD = 6.55) in men. The average age of combat sports athletes equalled 23.08 years (SD = 4.88): 23.09 years (SD = 4.72) in women and 23.08 years (SD = 5.02) in men. In the analyses, the respondents were divided into 2 groups in terms of training experience - those who had been training for less and for more than 5 years. It turned out that 107 people, including 50 combat sports athletes, had been training for less than 5 years; 112 respondents, including 56 practising martial arts, had been training for more than 5 years. The study also involved analyses depending on the participants' training rank. It was assumed that a high rank meant having at least 3 kyu (3 kup for taekwondo practitioners) and a white and orange colour for capoeira practitioners. For combat sports, *i.e.* fencing and wrestling, the rank of a player was determined by the coach prior to the questionnaire completion by the respondent. With these criteria, eventually, 94 subjects, including 43 combat sports athletes, had a low rank, and 125 individuals, including 62 practising martial arts, had a high rank.

Procedure

Nonprobability consecutive sampling was applied in the analyses. In compliance with the identification criteria, training aims, and the training process profile suggested in literature (Figueiredo 2009; Kalina 2000), the analyses were carried out among competitors of combat sports disciplines, such as judo, wrestling, fencing, taekwondo, and karate, as well as apprentices of traditional styles of martial arts: Pszczynska Martial Art, capoeira, and aikido. Over 550 questionnaires were distributed, 243 were collected back. However, some questionnaires were not filled in completely, and these were excluded from consideration. Owing to the above mentioned inclusion criteria and conditions, and lack of complete documentation, results obtained from 219 respondents underwent final analysis.

Data collection

The research was performed between March 2017 and November 2017.

Instruments

The diagnostic survey method was applied in the study. Behavioural regulation was measured with the Polish adaptation of the Sport Motivation Scale-6 (SMS-6) (Blecharz*et al*. 2015). SMS is intended to evaluate of contextual motivation, assessing forms of motivation varying in the degree of self-determination along the motivation continuum from amotivation to intrinsic motivation, with external regulation, introjected regulation, identified regulation, and integrated regulation in between. The participants are asked to respond to 24 items anchored to the question: 'Why do you practise your sport?' and rated on a 7-point Likert-type scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*). In our study, Cronbach's α coefficients for subscales were satisfactory, ranging from 0.65 for identification to 0.75 for introjection, while according to Sokołowski and Sagan (1999), the value of α = 0.60 can be regarded as a threshold of a measure acceptability.

To assess the level of general aggression index, the Buss and Perry Aggression Questionnaire (BPAQ) in the Polish adaptation by Siekierka (2005) was applied. This is a 29-item questionnaire providing information on 4 components of aggression: physical aggression (9 items), verbal aggression (5 items), anger (7 items), and hostility (8 items). The general aggression index is the sum of the individual scales. Responses to each item are scored in a 5-point scale, from 1 (*extremely uncharacteristic to me*) to 5 (*extremely characteristic to me*). Good internal consistency was reported, with Cronbach's α values ranging from 0.75 for scales of physical aggression and anger to 0.81 for verbal aggression.

Ethical attitudes were evaluated with the Ethics Questionnaire by Wojciszke and Baryła (2000). The measure consists of 110 descriptions of behaviours aimed at assessing the level of acceptance in 5 so-called ethical codes: the Common Good Ethics (22 items), the Autonomy Ethics (21 items), the Collectivism Ethics (20 items), the Dignity Ethics (22 items), and the Productivity Ethics (22 items). Additionally, there are 3 buffer items that do not belong to any of the scales listed above. Each item is assessed by the respondents in a 7-point scale, from –3 (*very wrong*) to 3 (*very good*). The reliability of subscales ranged from α = 0.75 in the Productivity Ethics subscale to α = 0.83 in the Common Good Ethics subscale.

Statistical analysis

The basic analysis of the results was carried out by using descriptive statistics: for the whole population, as well as by martial arts practitioners and combat sports competitors, and depending on gender, training

practice, and training level. The normality of variable distribution was tested with the Shapiro-Wilk W test. Levene's test was used to verify the uniformity of variance. In turn, in order to answer the main question, the path analysis was applied, for which the SMS scale results were averaged in the form of the Relative Autonomy Index (RAI), in accordance with the formula of 3 × internal motivation + 2 × integrated regulation + identified regulation – introjected regulation – 2 × external regulation – 3 ×amotivation. The variable of 'ethical codes' was calculated on the basis of all the variables of the Ethics Questionnaire, i.e. the Common Good Ethics, Autonomy Ethics, Collectivism Ethics, Dignity Ethics, and Productivity Ethics (Cronbach's α = 0.78). The tested model is shown in Figure 1.

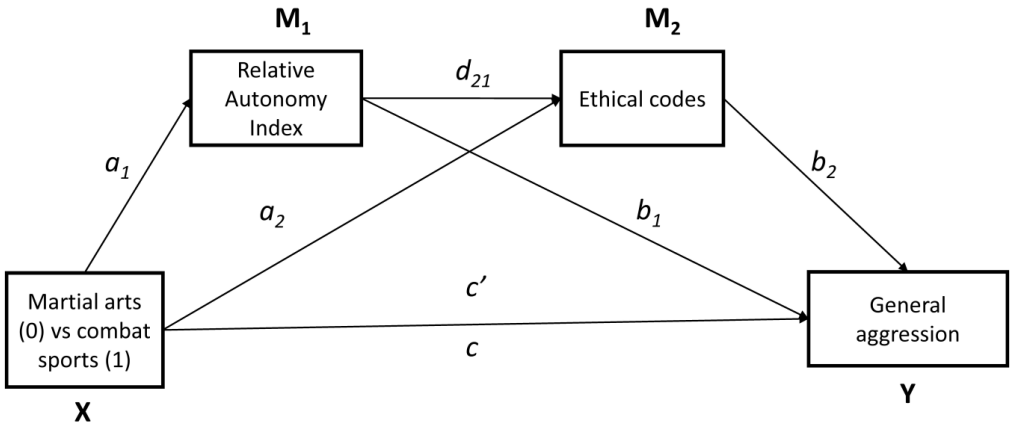

Fig.1. The conceptual model of serial mediation analysis

In the above model, path *c* is the value of multivariable regression coefficient, where the independent variable was the type of training (0 was coded for respondents practising martial arts and 1 for those training combat sports), the control variable was gender (0 for men and 1 for women), and the dependent variable was Y (the level of the general aggression coefficient, depending on the model). Path a_1 is a single variable regression, where the predictor (X) was the training type, while the dependent variable was the M_1 mediator (RAI). Paths a_2 and d_{21} are multivariable regression coefficients, where the independent variables were the training type and the M_1 mediator, while the dependent variable was the M_2 mediator (ethical codes). In turn, paths b_1, b_2, and c' (referred to as the direct effect) are multivariable regression coefficients, where the predictors were the type of training, the M_1 and M_2 mediators, and the gender control variable. Y was the dependent variable.

In this study, in each theoretical model under consideration, 3 mediation effects could be observed:

- the X -> M_1 -> Y effect, whose value was equal to the product of coefficients a_1 and b_1;
- the X -> M_2 -> Y effect, whose value was equal to the product of coefficients a_2 and b_2;
- the X -> M_1 -> M_2 -> Y effect, whose value was equal to the product of coefficients a_1, d_{21}, and b_2.

The relationship between the specified parameters is expressed by the following formula:

$$c - c' = a_1 b_1 + a_2 b_2 + a_1 d_{21} b_2$$

The above equation explains the difference between the strength of influence of X on Y in controlling only gender and the strength of influence of X on Y in controlling M_1, M_2, and gender is equal to the sum of the 3 mediation effects described above. A significant mediation effect (also called indirect effect) occurs when the product of the given coefficients is significantly different from zero. In order to perform the serial mediation analyses, the SPSS by Hayes (2012) called PROCESS, version 2.16.3 was used. In this approach, the significance of the mediation effect is tested by bootstrapping, i.e. the simulation method of estimating the value of statistics on the basis of sampling with replacements. A coefficient is significant when the bootstrap confidence intervals do not include zero, i.e. are either significantly higher or significantly lower than zero. The bootstrap confidence interval values presented in this study are based on 10,000 simulations. Other analyses were carried out with the use of Microsoft Office Excel 2010 and Statistica software, version 12 by StatSoft.

Results

In general, the lowest values were obtained by respondents in relation to amotivation and the highest in the case of internal motivation (see Table 1 for detailed information). Taking into account the results in both groups of the study participants, statistically significant differences were observed in all types of behavioural regulations. In almost each case, higher mean values were found among combat sports athletes than in martial arts followers. The latter scored higher only with reference to intrinsic motivation (Table 1).

Table 1. Comparison of behavioural regulations between combat sports and martial arts competitors

Variable	Martial arts		Combat sports		*T*	df	*p*	Effect size
	M	*SD*	*M*	*SD*				
Amotivation	1.91	0.74	2.19	0.76	2.78	217	0.01	0.37
External regulation	3.03	0.96	3.30	0.99	2.09	217	0.04	0.28
Introjection	4.70	1.16	5.14	1.14	2.79	217	0.01	0.38
Identification	4.60	1.03	5.17	0.83	4.43	217	< 0.001	0.61
Integration	5.37	0.62	5.58	0.57	2.61	217	0.01	0.35
Intrinsic motivation	5.79	0.57	5.59	0.57	–2.59	217	0.01	–0.35

Female respondents differed from males only in amotivation (M = 1.92, SD = 0.76 vs. M = 2.16, SD = 0.75; p = 0.02), however with marginal magnitude of difference (ES = 0.32).

The analysis of the model revealed a complete effect c at the statistical trend level of the type of training (combat sports/martial arts) at the level of the general aggression index ($R2$ = 2.80; p = 0.08). The positive value of the coefficient c means that combat sports practitioners reached a higher level of aggression than martial arts competitors. The obtained model was well matched to the data (p< 0.001) and explained 11% of the variance of the dependent variable. Then, the model including path a_1 was analysed. It was observed that the type of training was a significant negative predictor of internal motivation ($R2$ = –0.20; p = 0.01). Combat sports athletes revealed a lower average value of RAI, and therefore there was a shift towards less autonomous forms of motivation than in martial arts practitioners. The model was well matched to the data (p = 0.01), but it explained only 3% of the variance of the dependent variable. In addition, it was found that the model containing paths d_{21} and a_2 was not well matched to the data (p = 0.83). However, the model containing paths b_1, b_2, and c', with the level of the general aggression index as a dependent variable, was well matched to the data (p< 0.001) and explained more than half of the variance of the dependent variable (52%). A significant negative effect of RAI on the level of the general aggression index was observed ($R2$ = –13.87; p< 0.001) (Figure 2).

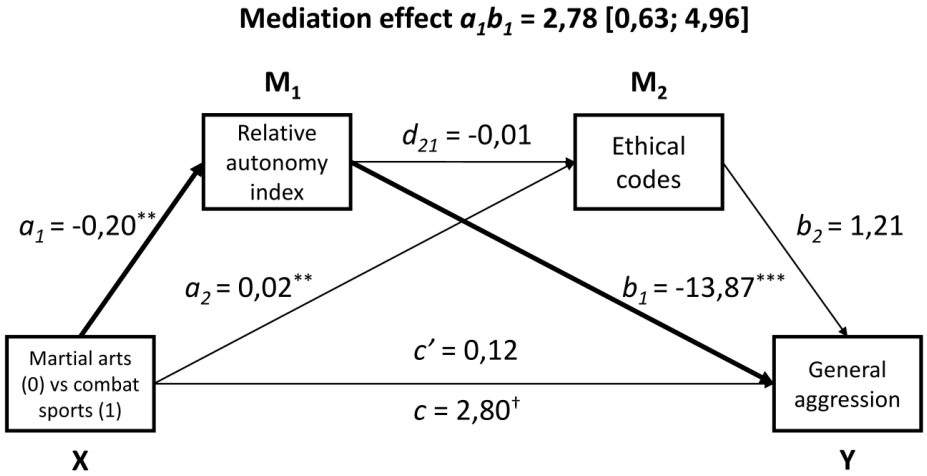

Fig.2. Main results of serial mediation analysis for the model
*p< 0.05, ** p< 0.01, *** p< 0.001

Discussion

The impact of sport in general and of its individual disciplines and forms on the sphere of ethics and motivation has long been an object of interest among sports educators and psychologists (Basiaga-Pasternak et al. 2020, Harwoodet al. 2017, Hernandez and Anderson 2015, Skelton et al. 1991, Stanger et al. 2018, Sudesh and Rathee2013, Zivin et al. 2001). Martial arts and combat sports are among those forms of activity which are perceived as having an educational value owing to the possibility of aggression release in socially controlled conditions and of learning to control its expression. On the other hand, they may also intensify aggressive tendencies and make them easier to vent in everyday life by shaping specific character traits (bravery, determination) along with increased physical possibilities of harming other people. One of the aspects of the discourse on this dilemma concerns a potential differentiation of the impact of combat sports and martial arts. The latter are enriched with philosophical elements and ethical codes dictating restraint, self-control, composure, etc. On the contrary, the former prepare for a face-to-face competition with another person with a close physical

contact, which may hinder the development of moral attitudes. However, there is little research evaluating the relationship between martial arts and combat sports and self-determined motivation and ethical attitudes. The commitment to fill this gap was an inspiration for this research, including in particular the testing of the relational model in which practising martial arts or combat sports would have a direct and indirect impact – via self-determined motivation – on ethical attitudes and aggression.

The results indicated a higher level of intrinsic motivation among martial arts competitors than in combat sports athletes. This partly confirms the results obtained by Witkowski et al. (2013), who also reported a lower level of general aggression in martial arts followers than in combat sports athletes and in men compared with women. In a study by Wrześniewski (2015), a higher level of aggression in all its dimensions was observed in taekwondo athletes than in the control group consisting of university students of physical education.

The relationships between aggression and particular types of martial arts and/or combat sports have been repeatedly assessed in research. However, the results are not consistent. For example,Vertonghen et al. (2014) revealed that kickboxing and Thai boxing athletes showed a higher level of physical aggression than judo, aikido, and karate competitors. On the contrary, Kuśnierz et al. (2014) did not observe any differences in the level of physical aggression between capoeira, boxing, and jujitsu practitioners.

We hypothesized that the relationship between martial arts/combat sports and aggression was mediated by self-determined motivation and ethical attitudes. In line with the hypothesis, we tested a model whose verification allowed us to conclude that there was a significant relationship between the type of training and motivation and between motivation and aggression but not with acceptance of ethical codes. It turned out that the impact of the type of training on the general aggression level was significantly mediated by RAI. So, martial arts practitioners were more prone to be self-determined. In turn, the stronger the self-determined motivation was, the lower level of general aggression occurred.

Although this research is a first attempt to explore the relationship between combat sports/martial arts and general aggression, as well as the way the relationship is mediated by self-determined motivation and acceptance of ethical codes, several limitations should be mentioned. Above all, the present study employed a cross-sectional design with the use of self-reports; therefore, drawing cause-and-effect conclusions should be considered with caution. A future longitudinal study is warranted to find if and how the abovementioned variables change over time in both groups of athletes. Another possible source of error is our model, which may or may not accurately reflect the investigated issue. For example, the relationship between combat sports/martial arts and motivation may also be of an opposite nature – it is possible that individuals who are more motivated internally tend to practise martial arts and thus become better people and 'study the skills while striving to unify mind, technique and body; develop his or her character; enhance their sense of morality; and to cultivate a respectful and courteous demeanour' (Greco and Ronzi 2020, Kostorz and Gniezińska2016). In turn, more external motives could encourage people to practise combat sports through an instrumental willingness to acquire the skills to cope with situations of physical confrontation, to develop self-confidence and 'hardness of character,' or to enter the path of a professional career. The relationships considered may, moreover, have a two-way character, in which the effects, for whatever reason, enter into a cycle of relationships known as 'reciprocal determinism'. Third, as in all survey research, one should expect answers that do not always fully reflect the feelings and beliefs of the respondents because of a tendency to provide socially desirable responses. Fourth, the use of RAI allows for the analysis of the assumed model and offers generalized information about autonomous motivation, but hides the exact contribution of particular types of motivation. Fifth, although attempts have been made to categorize the forms of activity in accordance with the criteria suggested in the literature, a precise distinction between martial arts and combat sports is not always possible. One cannot overlook the fact that this is still a certain simplification of a complex issue and even within the individual categories the specific ethos of particular forms of activity (martial arts or combat sports), as well as the competitors' attitudes and ethical convictions may modify the effects assumed to result from the mere belonging to the category of combat sports or martial arts. Despite the signalled limitations, we are convinced that our research makes an important contribution to the discourse on the psychosocial consequences of practising various forms of physical activity derived from the preparation of warriors.

Conclusions

Martial arts are associated with more autonomous forms of motivation than combat sports and therefore can foster greater control of aggression and higher ethical sensitivity.

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