REVIEW ARTICLE

The effectiveness of hand-to-hand combat is not determined by the need for a high level of aggressiveness

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A Study Design
B Data Collection
C Statistical Analysis
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Abstract

We use the term 'hand-to-hand combat' to encompass all physical confrontations between individuals and small groups (micro-scale): combat sports and non-sport confrontations, including gladiatorial combat – in historical analyses – and neo gladiators in real life. The purpose of this specific narrative review is to argue empirically that the hypothesis, which is also the title of this work, is true.

The most unequivocal evidence comes from the results of JR Syska's unique nine-month experiment (2001-2002) based on a combination of modern gymnastics and dance forms with elements of self-defence. Among 23 female students, from three different faculties, only in those (n = 6) who won all the test fights modelled on the sumo formula, the level of aggressiveness (diagnosed by the clinical method and unique INNOAGON tools) was statistically significantly negatively correlated ($r = -0.856$ and -0.849, $p<0.05$, respectively) with the more accurate indicator of the effectiveness of these test fights: S-Index (the percentage of scuffles won relative to all scuffles conducted by the given subject). Also, only their anxiety level was statistically negatively correlated with the S-Index ($r = -0.966$, $p<0.01$).

Although the results of an eight-month experiment conducted 9 years earlier by RM Kalina (1992-1993) are not based on precisely documented observations of either sumo-modeled fights or judo training fights (randori), a great many of which were fought among themselves by the military cadets of the experimental group (n = 19), the final result, which provides evidence of reduced aggressiveness, indirectly positively verifies the hypothesis. The selection criteria, out of 182 students enrolled in the first year of military engineering studies, for the experimental group were the highest possible level of aggressiveness (diagnosed by the Buss-Durkee Questionnaire) and the desire to train judo or self-defence.

Already not so unequivocally verified this hypothesis are the results of observations by S. Dadało during a project to determine the professional competence of Lithuanian security guards (n = 118). All test fights (out of 24 selected competition groups) were won by 19 guards (79% of the theoretical score), which accounted for 16% of the total subjects. Dadeło did not correlate the S-Index with 'bravery/aggressiveness' separately for this subgroup of 19 protectors. However, statistically significantly correlated ($r = 0.21$, $p<0.05$) the generalized indices of 'hand-to-hand combat effectiveness', with 'mental qualities' (where one of the three components is the 'bravery/aggressiveness' index).

Keywords: bravery • innovative agonology • modern gymnastics and dance forms • self-defence

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INTRODUCTION

We use the term 'hand-to-hand combat' to encompass all physical confrontations between individuals and small groups (micro-scale): combat sports and non-sport confrontations, including gladiatorial combat – in historical analyses [1, 2] – and neo gladiators in real life.

Following the example of the authors of the acronym INNOAGON (innovative agonology, a new applied science [3]) we avoid the term 'martial arts' (when it is not necessary), s it has been appropriated by the promoters of neo-gladiatorism. Much earlier in the public space, martial arts were seen as mysterious elements of Far Eastern culture. However, the earliest to be recognised was judo [4, 5]. The authors of an essay dedicated to the memory of Waldemar Sikorski (1937-2022) drew attention to two aspects of judo's mission in post-war Polish history, 'Dr Waldemar Sikorski belongs to a small group of informal ambassadors of the Japan-Poland intercultural dialogue initiated a few years after World War II' [6, p. 62]. Secondly, they referred to a commentary by Stanisław Tokarski, included in this very essay: 'The first generations of Polish judokas were romantics looking for great adventure and the laurels of fame. Some of them had already reached a high sporting level in some discipline, and they were lured to martial arts by the charm of novelty. In Poland of the late 1950s, a country separated from the rest of the world by a tight curtain, judo was a window on the world. It originated in distant Asia, but led us towards Western Europe, was an ancient concept of self-defence, and employed a combat strategy in hand-to-hand combat that was extremely revealing for the 20th century' [6, p. 62]. Unfortunately, neither the theoretical works of Jigoro Kano nor monographs by European authors such as Jean-Lucien Jazarin (1900-1982) [7] have followed the promotion of judo as a sport in Poland. In the recommendation of his book we read: 'Warm, clear and wise, this text invites us to discover judo as a school of life, that is to say, as a school of nobility and not as a sport' (*Chaleureux, clair et sage, ce texte nous invite à découvrir le judo comme école de vie, c'est-à-dire, comme école de noblesse et non comme sport*, in French).

The real breakthrough in the global perception of martial arts was the cinematic success of *Enter the Dragon* (1973, in Poland 1982) starring Bruce Lee. From the beginning, however, this perception has been dominated by the attraction of combat. Unfortunately, very quickly in most of such productions the attraction is based on the principle of 'responding to aggression with multiplied aggression'. The response of science, which promotes humanistic, healthy and utilitarian (identified with honourable self-defence [8]) qualities, is not noticeable in the social space. There is no logical basis for the assumption that the reason is the scarcity of scientific publications. The opposite is true, and the justification is multifaceted. Firstly, the media promotion of neo-gladiatorism identified mainly with MMA (mixed martial arts) and calling neo-gladiators as athletes precludes the parallel dissemination of knowledge about the positive virtues of competent training of a broad class of combat sports and martial arts. It is clear that this set of psychomotor activities is not homogeneous (see glossary: 'division of the combat sports'). Thirdly, public health quality and education stakeholders ignore the health and utilitarian potential of a broad group of hand-to-hand combat exercises and/or systems [9-12].

In terms of the elementary logic of fulfilling the social mission of science [13-16], it is not the number of publications that matters, but their quality. The lack of response from the actors mentioned above is evidence (and it does not matter that indirectly) that scientific knowledge is neither properly monitored nor selected and, therefore, the lack of adequate implementation in educational and healthcare institutions. The fact that there are few researchers and teams for whom these phenomena are a major area of exploration is no justification for marginalising the problem. On the contrary, it is proof that this area of scientific exploration is determined,

Innovative agonology – is an applied science dedicated to promotion, prevention and therapy related to all dimensions of health and regarding the optimization of activities that increase the ability to survive from micro to macro scales [49, p. 274].

Aggression (in psychology) – is deliberate behaviour by the perpetrator intended to either hurt the opponent, harm or distress him/her in any other way, cause pain (regardless of whether this aim is achieved), or destroy things [50, 51].

Aggression (in praxeology) – is to initiate destructive fight or move in a verbal dispute from material arguments to those causing distress to the opponent [52].

Aggressiveness – a human characteristic manifesting itself in inclinations to hurt others, to destructive behaviour. *Aggressive* = virulent, truculent, attacking [52].

Bravery – means efficiency in good deeds, efficiency combined with estimable aspirations [53].

Division of the combat sports under forms of the direct confrontation – workings of weapons; hits (strokes); throws and grips of immobilisation of opponent's body [54].

Self-defence – *noun* fighting techniques used for defending oneself against physical attack, especially unarmed combat techniques such as those used in many of the martial arts [55].

Scuffle – a short, confused fight or struggle at close quarters (in TFVP fights in the vertical posture based on the simplest forms of pressure on the opponent's body); differently than encounter (conflict, dash) in praxeology: the fight destructive during the impact phase at each of two warring parties (both sides attacking either one attacking and the other counterattacking [25, 52, p. 231].

in addition to the necessary methodological competence, by experience of the health practice of hand-to-hand combat (black belt in colloquial terms). The authors of the short recommendation of competence, quoted above, Jean-Lucien Jazarin stated: *A man of social action, he was passionate about Zen Buddhism and Hinduism. He has conducted hundreds of lectures on Bhagavad-Gita and Vedanta. Above all, he was one of the pioneers of martial arts: He discovered judo at the age of 42 and became the 111th French black belt.*

The purpose of this specific narrative review is to argue empirically that the hypothesis, which is also the title of this work, is true.

MATERIAL AND METHODS

This specific narrative review is based on the assumption that the results of either recommended psychological tests or specific INNOAGON tests, or both, are associated with the results of either hand-to-hand combat ('testing fights in a vertical posture'), or motor defence competence tests. These criteria are not met by publications evaluated by Web of Science (WoS) and other bibliometric databases, but only three monographs published exclusively in Polish, in order: RM Kalina 1997 [17]; JR Syska 2004 [18]; S Dadeło 2014 [19].

The results of the first two are based on pedagogical experiments, each lasting two semesters of academic study. The results of the third monograph are data from an interdisciplinary qualification study of bodyguard service candidates.

RESULTS

Kalina's Experiment (1992-1993)

During two first semesters of military studies (the first eight months academic year 1992/1993), from among 182 military cadets was selected 19 students characterized by increased aggressiveness. Selection was based on the results of the *Buss-Durkee Questionnaire* [20]. Military cadets from experimental group participated in special programme based on physical exercises (judo, self-defence), relaxation exercises, verbal actions – indeed realising the first time a long period health-related training basic on prophylactic and therapeutic agonology. The control group (n = 75) was realising the hand-to-hand combat training according to military standards. Average age of the persons (both groups) under examination was 20 years.

In the course of the experiment, bravery and aggressiveness in relation to the micro scale were measured with the specific INNOAGON test (KS-4M projection test [17]). Evaluation norms of bravery/ aggressiveness in conventional units (projection test score in brackets): very high bravery 6 (35); high bravery 5 (34); average bravery (defensive tendencies) 4 (26-33); low bravery (violent tendencies) 3 (21-25); deficient bravery 2 (9-20); extremely deficient bravery 1 (2-8).

The remaining INNOAGON tests are already the intellectual property of the experimenter. 'Self-defence instinct' was measured with a questionnaire (out of 7 statements, 4, randomly distributed, met the diagnostic criterion); 5 contractual evaluation units corresponded to the accepted criteria for defensive action, 4 – closeness to this algorithm, 3 – passivity, 2 – marked acute counteraction (exceeding the criteria for legitimate necessary defence), 1-extreme acute counteraction). Evaluation standards of 'self-defence instinct' in conventional units (questionnaire score in brackets): outstanding 6 (19-20); very high 5 (17-18); high 4 (14-16); average 3 (10-13); mediocre 2 (8-9); insufficient 1 (0-5) [17].

Self-defence skills were valuated with the 'basic self-defence skills test' (BSDST) – which comprises three groups of defence actions; each group consists of one-, two-, or multi-element tasks (all in all twelve tasks): G1 – safe fall technique; G2 – defence by pre-emptive strike; G3 – defence against embrace, strangling and strikes. A detailed description can be found in publications [21].

Correlation coefficient of bravery/aggressiveness with 'self-defence instinct' variables before the experiment: experimental group r = 0.361; control group r = 0.226 ($p<0.05$); after the experiment, respectively: r = 0.641 ($p<0.01$); r = 0.050).

No statistically significant correlation of BSDST indicators with bravery/aggressiveness and with 'self-defence instinct'. However, the rates are higher for the experimental group: BSDST with bravery/aggressiveness r = 0.218; BSDST with BSDST with r = 0.265. For the control group, respectively: r = 0.082; r = 0.098.

Psychomotor – *adjective* relating to bodily movement triggered by mental activity, especially voluntary muscle action [55].

Neo-gladiator – a person who trains mix martial arts (MMA) and similar forms of hand-to-hand fighting that do not meet the definition of sport according to the Olympic Charter [10].

Public health – *noun* the study of illness, health and disease in the community.→ **community medicine** [55].

Non-apparatus test – that motoric test (exercise endurance test) of the required reliability (accurate and reliable), which use does not require even the simplest instruments [56].

Quasi-apparatus test – can be conducted with simple instruments (a stopwatch, a ruler, a measuring tape, etc.) [56].

Narrative reviews – are a discussion of important topics on a theoretical point of view, and they are considered an important educational tool in continuing medical education. Narrative reviews take a less formal approach than systematic reviews in that narrative reviews do not require the presentation of the more rigorous aspects characteristic of a systematic review such as reporting methodology, search terms, databases used, and inclusion and exclusion criteria [57].

Syska's Experiment (2001-2002)

Syska's nine-month (two-semester) experiment was based on almost identical premises and assumptions of Kalina's Experiment. The main difference concerns the gender of the subjects studied. Syska studied female students of a university college of a large city in central Poland from different faculties (administration, pedagogy, political science, physical education, management and marketing). The experimental group (n = 23) followed an original programme of reducing aggressiveness and developing bravery in female students based on a combination of modern gymnastics and dance forms with elements of self-defence [18]. he experimental programme included two weekly training sessions (60 minutes each) in the free time of the volunteer students and one 90-minute compulsory physical education lesson. The control group (n = 97) attended only one 90-minute physical education lesson. Mean age of female students of the groups: experimental 21.17 years; control 20.65 years.

Differences relevant to the methodological layer include: (1) aggressiveness was measured by the *Buss-Durkee Questionnaire* [20] before and after the experiment; (2) the phenomenon of 'declared bravery' [22] was measured (before and after the experiment) by a weighted average of two simulation methods concerning the micro scale of human action (verbal simulation, KK-98 *Questionnaire* [23] and exposure simulation KS-4M projection test [17]); (3) before and after the experiment, Syska measured anxiety (as a state and as a trait) using Spilberger's STAI scale [24].

A novelty, relative to Kalina's Experiment, was the measurement of 'special psychophysical adaptation to fighting in direct combat'. Evaluation criterion (optimal model): outcome of *testing fights in a vertical posture* (TFVP) based on four sumo fights according to the simplified formula, in the system of 'everybody with everybody else' 5-person test (competitive groups) [25, 26]. The fights took place on a judo mat (tatami). The competition area was a circle with a radius of 1.8 m. Each scuffle consisted of pushing a competitor outside the competition area (with at least one foot) or causing him to touch the ground with another part of the body, not just the feet. The students used only the simplest means of combat: pushing, pulling, stepping out of a competitor's line of attack, carrying them out of the battlefield (while remaining in the battlefield themselves). The fight ended when one of the competitors won the scuffle four times (possible results: 4:0, 4:1. 4:2. 4:3). The bouts were fought exclusively by the students of the experimental group within 6 competitive groups formed according to the similarity of the students' body weight: 40-48 kg (n = 3); 50 kg (n = 4); 51-53 kg (n = 4); 55-56 kg (n = 4); 60 kg (n = 4); 61-86 (n = 4).

The leaders of each competitive groups won all TFVPs (F-Index 100%, absolute efficiency). Two of these students won all scuffles (S-Index, 100%, absolute efficiency), one lost only one scuffle (S-Index, 92%, efficiency). Very high S-Index was scored in two, respectively: 86% and 80%, and high efficiency (73%) was demonstrated by one student.

The above indicators are based on the recommendations of the authors who validated the TFVP: proportions of fights (F-Index) and scuffles (S-Index) won as a criterion for the effectiveness of TFVP: absolute 100%, very high 80-99%, 65-high 79%, average 50-64%, low 30-49%, very low up to 29%; lack of efficacy (for the F-Index not one fight won, for the S-Index also no scuffle) [25].

Only in those female students (n = 6) who won all the test fights the level of aggressiveness was statistically significantly negatively correlated ($r = -0.856$, $p<0.05$) with the S-Index. Also, only their anxiety level was statistically negatively correlated with the S-Index ($r = -0.966$, $p<0.01$). The negative correlation ($r = -0.849$, $p<0.05$) indicator of 'declared bravery' with the S-Index. With such a small set of individuals, the results of two female students whose S-Index = 100% and indicator of 'declared bravery' scored 56.43 (low level) and 49.05 (inadequate level) respectively must have modified just the negative correlation. The high and average levels of 'declared bravery' of the other four female students who won all TFVPs prove that also this unique INNOAGON research tool confirms that high aggressiveness is not a prerequisite for success during hand-to-hand combat. This thesis is to some extent confirmed by the high positive correlation of aggressiveness with 'declared bravery' indicators ($r = 0.656$). Very highly positively correlated are the 'declared bravery' with anxiety as a trait ($r = 0.796$, and aggressiveness with anxiety as a trait ($r = 0.852$).

In addition, the profile of the student whom the author of the experiment called 'bravest' accumulates the above argument: S-Index 80% (very high level) 'declared bravery' 86.55 (very high level); BSDST 210 points (high level); aggressiveness (the author reports that the student lowered this trait by 20 points as a result of the experimental stimuli); anxiety as a trait (the student lowered her score from 30 to 28 points).

Observations by Dadeło 2005

Dadeło, when he determined the determinants of security personnel competencies in Lithuania (results published in 2005 [19]) used three specific INNOAGON tools (tests): TFVP [25, 26]; KS-4M projection test [17], 'rotational test' ('RT' – pilot version [27]). The KS-4M and 'RT' scores are components of two different generalised variables. KS-4M is one of the three criteria for diagnosing mental characteristics, while 'RT' one of the seven tests of motor and coordination abilities as a generalised criterion of physical fitness. The assessment of hand-to-hand combat effectiveness was singled out by the author as the most homogeneous factor (one of seven) for a comprehensive assessment of security guard competence. TFVP performance was described by three indicators: place in competitive group, F-Index and S-Index.

The author identified 24 competitive groups, based on weight similarity, of which 23 consisted of five people and one consisted of three people. All TFVPs were won by 19 security guards, that is 79% of a possible 24. Security guards who won at least one but not all TFVPs were the most represented (n = 79, or 66.95%), while all TFVPs were lost by 20 of them (83.33% of the possible extreme result). The factor 'hand-to-hand combat effectiveness' proved to be a highly selective criterion. Two of tested security guards won all scuffles (S-Index = 100%), three lost all scuffles (S-Index = 0%), and of the others with F-Index = 0% six won 30-36% of scuffles, while 11 won only 26% or 27% of scuffles.

With a set of empirical variables, Dadeło included 118 employees of the Vilnius branch of the private security service UAB 'Falck Security' from which an 11-person so-called 'elite group' was selected in the course of the research procedure. Dadeło found that only the factor 'hand-to-hand combat effectiveness' was positively correlated with each of the other six generalised factors forming the basis of a comprehensive assessment of a security guard's professional competence. The number of detailed variables (dv) that formed the basis for calculating the generalised criterion is given in brackets. Correlations are weak but statistically significant: with supervisor evaluation (9dv) $r = 0.30$, $p<0.01$; with physical fitness (7dv) $r = 0.30$, $p<0.01$; with professional activity (3dv) $r = 0.27$, $p<0.05$; with morphological characteristics, which also included information about age (8dv) $r = 0.24$, $p<0.05$; with mental characteristics (3dv) $r = 0.21$, $p<0.05$; with theoretical and practical preparation (3dv) $r = 0.21$, $p<0.05$.

Although Dadeło did not directly correlate the 'hand-to-hand combat effectiveness' indicators with the KS-4M projection test indicators, the intelligence and mental layer component of the security guards surveyed appears in the three generalised factors. In addition, there is also an important external evaluation component in these observations (supervisor evaluation, $r = 0.30$), which mainly relates to the security guard's personality qualities.

DISCUSSION

The secondary analysis of the results of RM Kalina's and JR Syska's experiments, as well as S Dadeło's unique observations, demonstrate the advantages and methodological possibilities of INNOAGON tools used in a complementary manner. The authors of the research projects analysed did not use the name INNOAGON for obvious reasons, as this acronym was published a few months ago [3]. However, the necessity to study the phenomena of reducing aggressiveness and developing bravery in a complementary manner was written about by Kalina in the second part of his monograph *Przeciwdziałanie agresji – wykorzystanie sportu do zmniejszania agresji* (eng. *Counteracting aggressiveness – using sport to reduce aggression* – own translation) [28].

This is not an isolated idea. With a broad understanding of the word 'sport', empirical, documented evidence of reducing aggressiveness and developing bravery while increasing self-confidence, responsibility, quality of social functioning, tolerance and the degree of respect for traditional values are the results of the Trulson experiment [29]. This positive effect involved 14 individuals with 'juvenile delinquency' who

completed six months of taekwondo training based on a traditional model. The opposite effect was found among adolescents (n = 11) who realised taekwondo training according to the 'modern' martial arts training model during this time (effect, increased aggressiveness and anxiety intensity).

Although the results of Trulson's experiment were published in 1986, as a result of the political situation (Poland on the eastern side of the *Iron Curtain*) this work was only available in the University of Warsaw Library when Kalina was carrying out the experiment described above (1992-1993) [17]. Thus, Trulson's work could not have inspired Kalina either to formulate the assumptions of complementary reduction of aggressiveness and development of bravery [28], or to implement the experiment discussed above. Apparently, Trulson as well as Kalina knew, among other things, the philosophical underpinnings and health potential (but only as an alternative) of the practice of Far Eastern hand-to-hand combat systems. Not only did they know, but more importantly they knew how to exploit this potential. Moreover, they knew that a high level of aggressiveness is not a prerequisite for success in hand-to-hand combat, contrary to narratives that this is what high aggressiveness is supposed to guarantee [8 , 2]. However, unique empirical evidence of this truth was only provided by Syska [18].

This does not change the fact that the results of Trulson's and Kalina's experiments are based on empirical evidence, that researchers who are not in direct contact with each other but are tackling identical or similar questions are able to create research designs based on non-exclusive assumptions, and that although they use different research tools their conclusions overlap.

The later development of INNOAGON tools (as pointed out by the authors of the acronym [3]) by Syska [18] and Dadeło [19] should be linked to the results of Trulson and Kalina's experiments. The archetype of TFVP (1st prototype of TFVP) was the second 'defence biathlon' task – four judo fights according to a simplified formula, in the system of 'everybody with everybody else' [30, 31, 25]. A modification (2nd prototype of TFVP) of second 'defence biathlon' task were four sumo fights according to the simplified formula, in the system of 'everybody with everybody else' [32, 25]. 1st prototype of TFVP was limited by a 2-minute fight time (if the decision had not been made earlier), while the 2nd prototype of TFVP belongs to the non-apparatus test category (see glossary). However, in the course of the training sessions of his experiment, Kalina used, among other things, fun forms of sumo fights as one of the 14 within the 14 block of exercises under the common name of 'fun fights'. These exercises lasted between 60 and 300 seconds and were used 104 times. In addition, fun forms of sumo fights was one of 6 of these exercises that were judged by the students (such 'fights' lasted up to 30 to 120 seconds and were repeated 51 times) [17].

The empirical arguments presented above (for obvious reasons selectively) are, in our opinion, sufficient evidence that the complementarity of Kalina's and Syska's pedagogical experiments is not identical. Kalina evaluates (with the precision allowed by the research tools used) not only the effects, but also the causes of the effects of interactions on biological and mental matter of military cadets. Syska, on the other hand, intercorrelates 23 empirical variables (each with each) within 7 blocks of phenomena (physical fitness, comprehensive physical fitness, anxiety, aggressiveness, 'declared bravery' motor competence for self-defence, 'hand-to-hand combat effectiveness'). Dadeło also distinguished 7 blocks of phenomena (factors), however, he used the method of generalised factors. Therefore, the comparability of results is also limited for this reason.

CONCLUSIONS

We consider the complementary approach aspect to be a priority in the further development of not only INNOAGON. Examples of the availability of research results of an innovative method for assessing 'hand-to-hand combat effectiveness' using TFVP stimulate the imagination. For many years, information has been available on the motor structure of children and adolescents training judo, which was established using an identical tool – the International Committee on the Standardisation of Physical Fitness Test (ICSPFT [33]) [34-37]. It has been proven that a high level of general fitness (just measured by all or part of the trials from ICSPFT) is not a prerequisite for performance during hand-to-hand combat (measured by TFVP indices). This

conclusion applies to both children and adolescents [38] and adults [39, 40]. In pilot studies using both tools (ICSPFT and TFVP) [41] it was found that, on the one hand *TFVP are a simple tool for predicting success in judo tournament fighting*. On the other hand – *Appropriate qualifying for juvenile judo athletes tournaments in the preliminary period of training judo can effectively reduce the negative tendency of resignation from trainings of a large number of students during the first year of training* [41]. Precisely the phenomenon of judo training being abruptly abandoned in the very first months of practice [42, 43] authorises the hypothesis that it has to do with the media audience's epithet of 'success' as one of the most important values for the individual. Arguing for the use of a significant proportion of hand-to-hand combat exercises as an opportunity to enhance all dimensions of health and survival [13, 44, 9, 45, 46, 3], but also as unique means of therapy [47, 48], is not attractive to electronic media authorities.

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