

# Dynamics of judo contests performed by top world judokas in the years 2008-2012

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## Summary

**Introduction.** Analyses of the actions taken at start by the contestants of combat sports can deliver a considerable amount of information for training staff. The purpose of this study was the evaluation of struggle dynamics of top world judokas.

**Material and methods.** The research has been executed on the basis of DVD records from 70 final combats from the most important worldwide judo tournaments (2008-2012). 108 contestants, representing 34 countries, took part in the fights. The analyses were performed on the basis of method of struggle dynamics measurement by Kalina with the author's modification. The struggle dynamics is defined by the following indexes: activeness index (AI), offensive activeness (OA), effectiveness of attacks (EA), effectiveness of counterattacks (EC), defensive effectiveness (ED) and the general struggle dynamics index (SDI) – the average of partial elements.

**Results.** The finalists of the Olympics Games 2012 were characterized by significantly lower activeness ( $p < 0.05$ ) and offensive activeness than finalists of final fights from years 2008-2010. The analyses of events did not show any significant differences of struggle dynamics of women and men. Instead there were noted essential differences in the manner of executing contests between the European contestants and the Eastern Asian ones.

**Conclusions.** Changes of combat regulations affected decrease of general struggle dynamics of contestants, what proves the lack of sensible conception of modifying judo. The low level of offensive activeness of the judokas (even gold medallists) shows that there are rarer attempts aiming at gaining advantage with judokas' own technical action.

## Introduction

Present sport apart from health-related values, educational or utilitarian ones, is also a marketing tool [1,2]. For many countries, cities or regions it is the only media's own image. However, to make this tool efficient there must be fulfilled a number of conditions. One of them is attractiveness of discipline as the sports-show. Its indicator is created not only by the number of persons watching contest of sportsmen live, but also the interest of media, and what follows also sponsors or local authorities [1].

For many years organizer of athletic events have been outdoing each other in ideas enriching the competing of contestants, and international sports federations modify regulations to improve ratings. This phenomenon does not bypass combat sports. Over the recent years in Olympian combat sports there were several changes of regulations done. Their purpose was the facilitation of reception and increase of struggle dynamics. However, as the research proves, e.g. in judo, struggle dynamics dropped and the number of practiced elements of technique diminished, too. Regulation penalties have also more often influence on a win in the fight [3-7].

Considerable changes of regulations took place in the first decade of 21<sup>st</sup> century. Changes of rules in the year 2006 were to limit a role of referee during the fight. In the year 2009 a restriction in grabbing the leg of contestant's trousers was introduced, and in 2010 it was completely forbidden to grip below the belt in direct attack (this offence was punished with the disqualification – hansoku-make) [8].

For the purpose of the verification of results of introduced changes there was executed a number of analyses of contestants' actions at start [9,10]. The influence of regulations on the manner of leading and finishing fights was diagnosed [4-7]. Preferences of combat sports fans were examined, too – the attractiveness of show was most often connected with the high dynamics of the sports-fight [11-13].

The main cognitive objective of the study was the evaluation of struggle dynamics realized by top world judo contestants. The application aim was the formulation of training-foundations and methodical instructions in relation to contest strategy and tactics optimization where present combat regulations were taken into consideration.

## Material and methods

The analyses covered final contests from world level male and female judo tournaments, which took place between 2008 and 2012, published in the Internet [14,15]. The research material comprised DVD records of gold medal fights from the Beijing and London Olympic Games, the world championships in Tokyo (2010), the Grand Slam in Paris 2010 and the World Cups in Warsaw. Seventy fights were analysed to 10-second sequences. The total time of analysed fights was 5 hours and 10 minutes, which made 1822 sequences.

The contests were attended by 108 judokas (53 women and 55 men) from 34 countries. The most of contestants represented Japan (9 women and 9 men), France (8 women and 2 men), the Netherlands (5 women and 3 men), Cuba (6 women and 1 man), Germany (3 women and 2 men) and Russia (2 women and 5 men).

For the comparison purposes, contestants were divided into study subgroups, taking into account obtained position in the given tournament (gold and silver medallists), groups of weight-categories (light: 48, 52 and 57 kg of women and 60, 66 and 73 kg of men, average: 63 and 70 women and 81 and 90 kg of men and heavy 78 and +78 kg of women and 100 and +100 kg of men) and represented region identified with a different judo school – Europe and Far East [16].

According to the Kalina's method of struggle dynamics measurement, with the author's modification, all actions were recorded (on observation sheets) in 10-second intervals: attacks and counterattacks, defence without the counterattack – defining their effectiveness, as well as preparatory actions, breaks, decisions of referees [17,18]. In each category, events are recorded in the form proportions of relations: the number of successful actions vs. the number of observed actions belonging to the group, which may be expressed in a 0-1 index of arbitrary units. Events (in 10 second combat sequences) are recorded in the form of arbitrary symbols or in the form of brief description [17]. The basic criteria for evaluating the dynamics of contests assume variable expressed in proper indexes:

1. Offensive and defensive activeness index, which forms the activeness index – in short AI. It is a proportion of 10-second combat sequences during which the contestant undertook at least one attack, the counterattack, or defence without counterattack vs. the number of 10-second combat sequences.
2. Offensive activeness index – OA, which is a proportion of 10-second combat sequences, during which the contestant attempted at least one offensive action (the attack), aiming at gaining advantage vs. the number of all sequences in the fight.
3. Effectiveness of offensive actions index that is effectiveness of attacks – in short EA. It is a proportion of the number of attacks for which points were granted vs. the number of attacks made.

4. Effectiveness of counterattacks index – in short EC, which is a proportion of the number of counterattacks, for which points were granted, to the number of counterattacks made.
5. Defensive effectiveness index – ED, which is a proportion of the number of successfully undertaken defensive actions (without the counterattack) to the number of offensive actions taken by the opponent, with the exception of attacks, which were followed by a counterattack of the contestant.

The average a value of particular components used in the description of events taking place in a fight is the struggle fight dynamics index (SDI) [17].

Standard statistical tools were applied: arithmetic mean and standard deviation. Differences between particular data were calculated by means of the t-Student test for independent groups. The minimal level of actuality was established at the level  $p < 0.05$ .

## Results

The activeness of contestants (expressed with the activeness index: AI) did not exceed 0.5 in any of analysed tournaments, which means that for over the half of fights judokas did not attempt any actions (neither offensive nor defensive) executing only preparatory actions. The lowest activeness level characterized the finalists of the Olympics in 2012. In the same event, was also the lowest offensive activeness (at women the difference between the activeness and the offensive activeness level in the year 2012 and 2008 and 2010 was statistically significant  $p < 0.05$ ) was observed. Both at women as well as men there were no significant differences noted in the effectiveness of attacks and the defence in analysed tournaments (Fig. 1 and 2). The general struggle dynamics index, being the average result of each element of struggle dynamics (expressed with the SDI), was the lowest in the year 2012, respectively 0.37 – women and 0.38 – men (Fig. 3).

There was no statistically significant difference between struggle dynamics of the women and the men in any of its elements. The general dynamics of fights at women and men was almost identical. Characteristic differences were observed instead between the gold and the silver medallists in the offensive activeness, effectiveness of attacks, effectiveness of the defence and general struggle dynamics. Analysing dynamics of fights in each group of weight categories the greatest difference was observed in the activeness of contestants. The highest activeness was recorded at contestants of light (female and male) category. Female and male judokas from heavy category showed the highest defensive effectiveness, though differences were not characteristic. Significant differences were recorded for the manner of executing fights at the European contestants and the Eastern Asian ones (Japan, Korea, and China). The biggest differences ( $p < 0.05$ ) referred to effectiveness of defence (at women) and effectiveness of attacks (at men). Differences of the general struggle dynamics were close to importance ( $p = 0.088$  – women,  $p = 0.054$  – men) (Tab. 1).

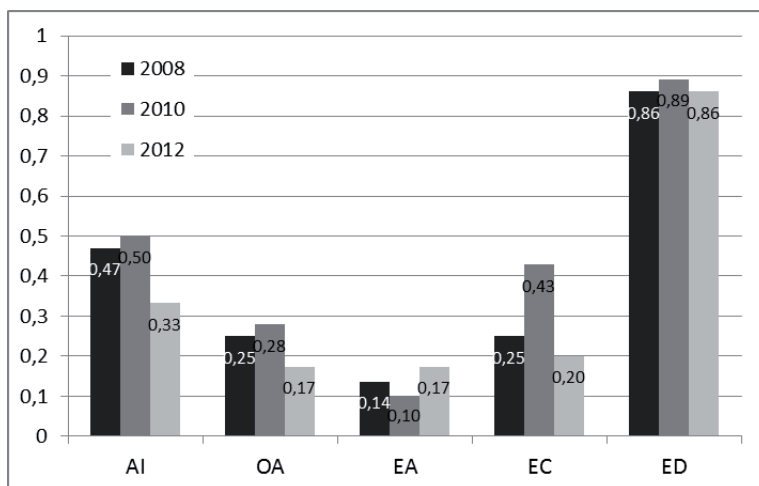


Fig. 1. Elements of struggle dynamics of female judokas

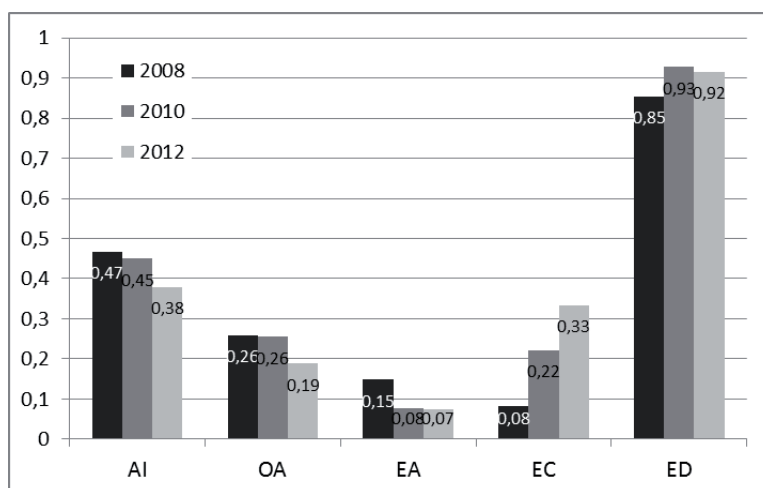


Fig. 2. Elements of struggle dynamics of male judokas

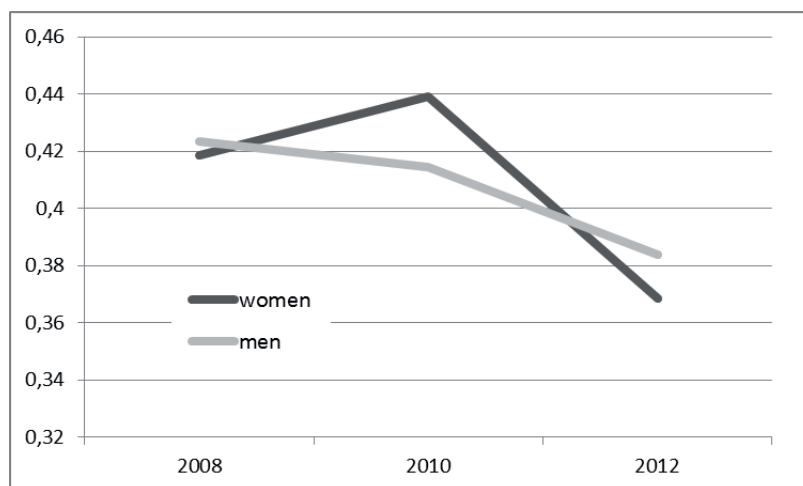


Fig. 3. General struggle dynamics (SDI) in the years 2008-2012

Tab. 1. Elements of struggle dynamics of examined judokas (in subgroups)

		AI	OA	EA	EC	ED	SDI
women		0.455	0.246	0.129	0.300	0.873	0.417
men		0.443	0.244	0.104	0.224	0.897	0.412
women	gold medalists	0.456	0.299*	0.229*	0.429	0.983*	0.488*
	silver medalists	0.453	0.193	0.029	0.000	0.764	0.345
men	gold medalists	0.451	0.316*	0.182*	0.326	0.984*	0.462*
	silver medalists	0.435	0.170	0.016	0.000	0.819	0.362
women	light	0.514 <sup>†</sup>	0.282	0.124	0.318	0.898	0.443
	medium	0.414	0.221	0.154	0.625	0.788	0.402
	heavy	0.406	0.216	0.112	0.000	0.922	0.392
men	light	0.484 <sup>‡</sup>	0.268	0.128	0.292	0.883	0.431
	medium	0.382	0.212	0.074	0.050	0.918	0.379
	heavy	0.441	0.242	0.101	0.333	0.894	0.416
women	Europe	0.481	0.234	0.116	0.222	0.852	0.408
	Far East	0.466	0.279	0.175	0.429	0.959*	0.466
men	Europe	0.422	0.197	0.026	0.417	0.834	0.364
	Far East	0.435	0.281	0.164*	0.167	0.922	0.436

\* differences  $p < 0.05$  between groups, <sup>†</sup> differences  $p < 0.05$  between women competitors in light, medium and heavy weight categories, <sup>‡</sup> differences  $p < 0.05$  between men competitors in light and medium weight categories

## Discussion

First judo contest was a demonstration, where the correctness of performed throws and grips was evaluated. First world championships, where contestants rivalled in direct encounter, took place in Tokyo in 1956. Earlier, in 1951, the championships of Europe took place [19]. Regulations of fights since then changed significantly. From 50s of 20<sup>th</sup> century, tens of regulations changes of combat sports were introduced. There were numerous motives, sometimes they created controversies and divided society. Last ten years brought changes, which were to make judo attractive as the sports-show. For easier reception, there were introduced multi-coloured uniforms (judogi) for contestants – white and blue. Traditional red-green colouring of the mats (tatami) was changed; fight in the horizontal position (ne-waza) was limited. There were also attempts to activate contestants by introducing restrictive penalties for the passive attitude [8]. Changes introduced in years 2009-2010 (which was univocally shown in the present work), did not however influenced beneficially the increase of struggle dynamics. On the contrary, enumerated indexes of activeness (AI) and offensive activeness (OA), which generally inform about the struggle dynamics, are first-hand evidence that the last modification of regulations of judo fights did not increase their attractiveness [13].

The analysis of contestants' activeness at start is a requisite link to the planning of training process [20-23]. For the instruction purposes, it would be legitimate to elaborate (on

the basis of analysed fights) individual characterizations of each contestant [24,25]. This postulate belongs to basic application recommendations, licenced on the basis of the analysed results in own study and data from the literature on the object. The training of contestants competing at all levels (from national to world ones) should take into account the improvement of most efficient elements from the point of view of sports-result. It should be stressed, however, that those are not always throws and holds defined by Jigoro Kano. More and more often sports-success is an effect of the skilful combat execution aiming at opponents' penalties, and not the use of successful technical action [4,5,21]. The ability of undertaking actions in various positions in relation to the end result of the fight (maintenance of advantage, catching up with losses) is important, too. This aspect seems extremely significant and therefore should determine the main premise to further study of the phenomenon of struggle dynamics, not only the judo one.

## Conclusions

1. Changes of combat regulations bore on decrease of the general struggle dynamics of contestants, what proves the lack of sensible conception of modifying judo, to fulfil criteria of the effective sports-marketing and to bring out (and not to lose) the utilitarian mission of judo.
2. In the face of frequent radical changes in regulations and their interpretations dictated by the need of making judo

more mediumistic discipline, it should be examined which factors have the influence on attractiveness of the fight as the sports-show.

3. The low level of offensive activeness shown by judokas (even gold medallists) confirms rarer attempts aiming at

gaining advantage by contestant's own technical action. This aspect should be taken into consideration during planning and realization of technical and tactical training of judokas.

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