RELATIONS OF LATENT ANTHROPOMETRIC VARIABLES TO SUCCESS IN JUDO BOUT

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In terms of structural analysis, judo is a combat sport that, like other martial arts, belongs to the group of polystructural acyclic sports. Constantly changing situations during a bout requires good technical and tactical acquisition of stereotypes that are applied, the ability of the current reorganization of these stereotypes and constantly creating new defensive and offensive action programs. In judo exist seven weight categories and, as some studies have shown, within each category a hierarchical sequence of efficiency of throwing techniques is different from the hierarchical sequence in the other categories. The logical assumption is that the difference is caused by different anthropological dimensions of judoka.

The aim of this study was to determine the effect of some anthropometric variables with success in judo bout in the standing position.

Research was conducted on a sample of 122 subjects who underwent testing of 18 anthropometric variables that define **three latent dimensions (factors)**:

ANTFAC1 - volume and body mass factor,
ANTFAC2 - subcutaneous adipose tissue factor
ANTFAC3 - longitudinal and transversal dimensionality of the skeleton factor.

These three factors represented a set of **predictor variables**.

Subjects were divided into three weight classes: up to 73kg, 81kg and up to 90kg, and each participant had five fights. Relations between latent anthropometric variables with success in the fight were determined by regression analysis.

Success in judo fight was defined with **two criterion variables**:

1. **BRPOBJ** - The number of wins,
2. **BPRAV** - number of technical points in each judo bout.

TABLE 2.
Relations of success in standing judo bout, defined with number of victories (BRPOBJ), and latent anthropometric variables

Criterion 1	R	R^2	F	p	df1	df2
BRPOBJ	**0,26**	0,07	2,77	0,04	3	118

BRPOBJ	B	SE B	BETA	T	p (BETA)
ANTFAC1	**0,41**	**0,15**	**0,29**	**2,68**	**0,01**
ANTFAC2	-0,21	0,14	-0,15	-1,49	0,14
ANTFAC3	-0,03	0,14	-0,02	-0,24	0,81

TABLE 3.
Relations of success in standing judo bout, defined with techical efficiency (BPRAV), and latent anthropometric variables

Criterion 2	R	R^2	F	p	df1	df2
BPRAV	**0,25**	0,06	2,70	0,04	3	118

BPRAV	B	SE B	BETA	T	p (BETA)
ANTFAC1	**4,14**	**1,56**	**0,29**	**2,66**	**0,01**
ANTFAC2	-1,87	1,41	-0,13	-1,33	0,19
ANTFAC3	-0,33	1,43	-0,02	-0,23	0,82

CONCLUSION

Diversity of judo allows every judoka, according to their characteristics, to choose their own Tokui waza techniques. A large number of throwing techniques, as well as competition by weight categories provides opportunities for people of different body size to choose techniques that, according to their anthropometric dimensions, will be most effective. In that case a high efficiency in the bout can be achieved regardless of the morphological characteristics of opponents. For this reason, the anthropometric dimensions are not limiting factor for performance and the selection in judo sport, as is the case in some other sports.

TABLE 1.
Factor analysis results for anthropometric variables

	ANTFAC1	ANTFAC2	ANTFAC3
MASTIJ	**.58**	.15	.49
VISTIJ	.04	-.08	**.92**
DUZNOG	-.01	.03	**.91**
DUZRUK	-.02	-.13	**.97**
BIAKRAS	.14	-.04	.63
BIKRIS	-.04	.04	**.77**
DIJKOL	.10	.32	**.46**
DIJLAK	.46	.11	.32
OPSNAD-O	**.93**	.08	-.10
OPSNAT	**.51**	.34	.27
OPSNAD-F	**.90**	.00	-.08
OPSPOD	**.85**	-.07	.14
OPSPOT	**.77**	-.07	.08
NABLEĐ	.28	**.71**	-.20
NABNAD	-.11	**.95**	.02
NABPOD	.02	**.87**	.05
NABPOT	-.16	**.91**	.08
NABTRB	.23	**.77**	-.15

Relations between latent anthropometric variables with success in the fight were determined by regression analysis.
Statistically significant but low relations between anthropometric variables and the two criteria for assessing the success of the fight were established:

1. criterion BRPOBJ (number of wins): multiple correlation R = .26
2. criterion BPRAV (technical points): multiple correlation R = .25

The most significant relationship with both criteria has factor the **ANTFAC1 - volume and body mass.** It can be assumed that, in the background of this dimension is active muscle mass that is causing a statistically significant connection.

As only the first factor (volume and mass of the body), which is defined first of all by circumferences and then by the weight of the body, partially contributes to the explanation of criteria one can conclude that, in the "background" of this factor is **active muscle mass**.

Muscle mass predominantly determines the size of the applied force in bout, which predominantly determines the success of the fight.
Of course, aligning judokas per category reduces the variability of muscle mass of the contestants in each category which is the reason that the volume and body mass explain only a part of the variance of the criteria - success in combat and technical efficiency.
It can be assumed that the rest of the variance defines the technical excellence of each judoka who from a large number of techniques, according to their morphological characteristics and preferences, choose for themselves the best techniques. Certainly, the combination of affinity and favorable anthropometric characteristics for the certain throw or group of throws resulting in faster mastery of technique, faster automation and more efficient use of these techniques in situational conditions while fighting in the competition.

LEARNING THE BASIC TECHNIQUE → CHOOSING YOUR FAVORITE TECHNIQUE → MODIFICATION OF FAVORITE TECHNIQUE – STYLE OF FIGHT → STYLE OF FIGHT IN FUNCTION OF JUDO BOUT TACTICS