

Use of Attack rate as a predictor of victory in Olympic level Judo

Lance Wicks¹

¹University of Bath, Northgate Cottage, Knowle Lane, SO50 7DX, UK. www.JudoCoach.com lw@JudoCoach.com

Introduction

Outside the sport of Judo, considerable research has been conducted into the efficacy of attacking actions. For example the 2004 European Cup Soccer Tournament was analysed in detail with the focus being on descriptive statistics and efficacy of aspects of team play (Carmichael & Thomas, 2005).

Football and Baseball have had considerable research into this area conducted (Act, 2004; Papahristodoulou, 2006, 2007; Schwarz, 2005). In sports that have gambling opportunities, more research has been put into the study of predictive probabilities than in minority sports such as Judo. Tennis for example has had examinations into predicting results (Forrest, 2007). Research into greyhound and horse racing has also been conducted (Clarke, Bailey, & Yelas, 2008; Hausch, Ziemba, & Rubinstein, 1981; Snyder, 1978; View, 1994) which extends firmly into predicting outcomes based on a variety of performance indicators.

The works of Papahristodoulou (2006, 2007) are interesting in relation to this study as his conclusions suggest a relationship between “shots at goal” and “victory”; as this study proposes a relationship between “attacks” and “victory” in Judo.

Within Judo there is not a standard set of performance indicators that can be analysed statistically to determine probabilities. By following the examples from Basketball (Kubatko, Oliver, Pelton, & Rosenbaum, 2007), Rugby (Bracewell, 2002) and American Football (Harville, 1980), and from research in other sports, this project aims to determine if the elements being analysed are useful performance indicators within a Judo match.

Unlike previous studies, this project aims not to just to describe Judo matches, rather decide if the data being analysed is able to predict the result of the match. This may, as with Bailey & Clarke (2006), allow coaches and team managers, etc. to predict the winner of matches whilst the match is in progress.

Materials and methods

Based on the work of Hughes & Frankes (2004) and the lectures by Simon Hicks (2005), a paper form and then custom computer software was used in this research. In reviewing the design of previous research (Boguszewski, 2006; Boguszewski & Boguszewska, 2006b; Sterkowicz et al., 2007; Sterkowicz & Maslej, 1999) it became apparent that the earlier designs had solved the design problem of deciding what was or was not an attack. These earlier studies either ignored all non-scoring attacks or found objective definitions of a non-scoring attack. For example, deciding an effective (though non-scoring) attack was any occasion where the opponent touched the ground with any part of the body except the feet. Within Judo there are non-scoring attacks that do not force the opponent to touch the floor which could be considered valid attacks. Excluding these attacks from an examination of Judo could lead to inaccuracies that would be expected to affect the inferences possible from the data collected (Mike Hughes & Ian M. Franks, 2004). To address this design limitation, the author developed a method of notation that includes all three types of attack. A "Ineffective Attack" (IA) will be recorded if the opponent does not touch the floor with another part of the body other than the feet. These attacks include any attacking action where the attacker turns their body past 45 degrees and any attacking movement where they “grab” the opponent whilst facing forward. It also includes any attacking movement where the players feet touch the opponent. An “Effective Attack” (EA) was recorded if the attack caused the opponent to touch the floor with any part of their body other than their feet, but no score is given. If a score is given, no IA or EA was recorded, rather the score awarded. Penalties are recorded against the player being penalised, not the player benefiting. When Matte is called, the recorder pressed SPACE and a new "segment" starts. The final score and duration of the match shall be recorded on the form from the official results.

11-20 seconds stated in 1987).Main conclusions

67% of fights won by medalist in the Beijing Olympic Judo Tournament were won when the medalist attacked more than their opponent.

The structure of Judo matches has altered very little since 1987. The average duration of a fight was 3:52 (3:56 in 1987) and the average length of a segment of action is 17.32 seconds (11 to 20 seconds stated in 1987)

By examining the data we can suggest that it is the number of attacks that result in a score, and the penalty rate, that result in victory and not the non scoring attack rate.

Acknowledgements.

The poster was created by the software Scribus (<http://www.scribus.net>). Data was analysed using SPSS and PSPP (<http://www.pspp.org>). The notation software is available from <http://github.com/judo-notator> The notation software was written in Perl (<http://www.perl.org>). Thanks to Mike Callan for his support during the authors time at University of Bath and in conducting this research project.

Results and discussion

Medalists at the Beijing Olympic Games 67% of the time won their matches when they attacked more than their opponent.

This study provides evidence to support a hypothesis that attacking more will increase the likelihood of a Judo athlete winning a match. Although not conclusive the study found that at the 2008 Olympic games 55% of fights were won by the player who made the most attacks.

The study confirmed the structure of Judo matches as described by Sikorski et al (1987). Despite over 20 years of development in the sport the average duration of a fight has altered by only 4 seconds (3:52 in 2008, 3:56 in 1987). The average length of time between Hajime & Matte is also similar (17 seconds in 2008, 11-20 seconds in 1987).

The study provides descriptive statistics about the structure of Judo at the elite level. 54% of all scores were penalties, 16% Yuko, 15% Ippon, 12% Wazari, 3% Koka. The mean number of attacks per match was 21.03, the mean number of segments of action per match was 13.38; giving an average of 1.57 attacks per segment. There were an average of 2.97 scores per fight (1.36 scores per fight if penalties are excluded).

Structure of Judo fights at the Beijing 2008 Olympic Judo Tournament

Data relating to the structure of a Judo fight at the Beijing Olympic Judo Tournament is interesting as it repeats aspects of the work of Sikorski et al. (1987). The structure of Judo fights identified in this study and in the 1987 study is nearly identical in terms of duration of overall fights, segments of activity and penalties being the most frequent score.

The average fight in Olympic Judo, according to this study, is 3:52 minutes long and consists of 13 segments of action; with each segment being 17 seconds in duration. Over half of all scores at this level are penalties. Scores earned by the players are almost evenly distributed between Ippon, Wazari and Yuko; with Koka scores being infrequently scored.

Population and Sample

The total population for this study is 386 fights (Fischer, 2008), the sample size of 58 fights is therefore 15% of the total population. The sample is taken from six of 14 weight categories. Within these categories the sample represents between 14% and 17% of the population of that weight category's fights. The total video footage observed was 75 fights, however 17 fights were rejected as the footage was either incomplete, interrupted or periods of action were not visible due to video replays, etc. The sample is an opportunistic sample and as such consideration must be made of the fights notated and their position within the structure of the tournament. A majority (55%) of notated fights being sourced from the second round of fights at which point half the competitors have already been eliminated.

The data, it can be argued, does not accurately represent the effectiveness of attacks. The selection of throwing techniques can affect the statistics. For example, Uchi Mata attacks were observed to be effective (although non-scoring) from a Judo perspective, in that the opponents balance was broken demonstrating good “kuzushi” (Kano, 1994; Almansba et al., 2007; Sugai, 1992) but were notated as ineffective in this study as the opponent remained standing, despite being very close to being scored against. The opposite effect was observed of players using “drop” techniques such as Drop Seoi Nage or Drop Kata Guruma (Inman, 2005; Nakanishi, 1998). Attacks that Judo terms would be considered ineffective were notated as effective as the opponent often used standard defensive tactics that involved dropping onto their knees, often to move into an attacking position in ground fighting.