

柔道選手の集中維持機能についての一考察

An Analysis of the Concentration Maintenance Function in Judo Players

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I . Introduction

Generally speaking, refers to the condition of reduced ability to exert oneself. According to this definition, fatigue in the case of sports results in a decrease of speed, and a falling standard of production in the workplace.

From a practical perspective in and everyday living, fatigue has attracted attention since ancient times. As such, it has been defined by many scholars in various ways. The French scholar Lagrange stated “Fatigue is the result of excessive work; it lowers organ functionality and is accompanied with an ailing feeling.” Furthermore, Chailley-Bert states “Fatigue induces a state of low activity in organs as a reaction for self-protection.” Also, “Fatigue resembles the state of death, but invariably the main difference is that one recovers from fatigue.” Bartley and Chute refers to the decrease in functionality of organs as “impairment”, and when this is accompanied by a feeling of tiredness, this state is called

fatigue. The following three conditions should be considered in regards to fatigue.

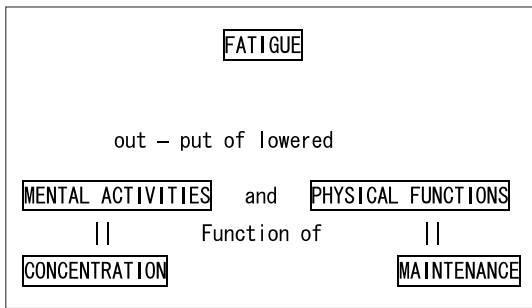
- 1) When there is a decrease in work output
- 2) The peak of fatigue, where there is psychological and physiological danger
- 3) Recovery from fatigue

In this research, fatigue is viewed as the condition induced through physical exertion resulting in a decreased will to work and lowered efficiency. Theoretically speaking, fatigue is a combined byproduct of psychological activity and physical functions. However, it is difficult to calculate or gage objectively. Over forty years ago, Takakuwa invented a machine to measure the function of concentration maintenance (TAF). The machine consists of a cylinder (gun barrel), a target, and an electro-oscillograph. When the gun is in line with the target, the oscillograph rises, and then drops when off-target. The motion of the cylinder is drawn as a continuous curve in accordance with aiming accuracy. The aiming process lasts for one minute and is repeated three times with a

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The concept of fatigue

$$Li = \frac{\sum x}{n}$$

$$Di = \sqrt{\left(\frac{\sum x}{n} - Li^2\right)} \times \sqrt{\left(\frac{n}{n-1}\right)}$$

$$L = \frac{L1 + L2 + L3}{3}$$

$$D = \frac{D1 + D2 + D3}{3}$$

x : Value obtained for every 2.5 seconds

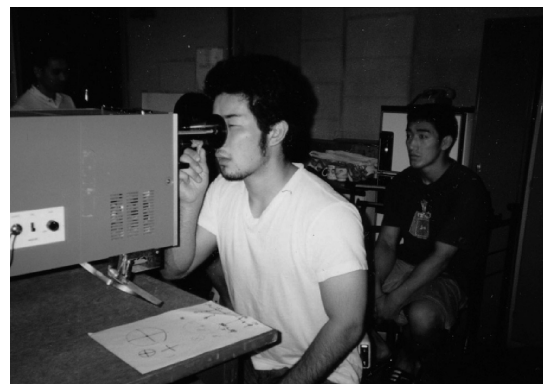
n : Number of x values in 1 minute

$L1$: Average level (Li) of the 1st minute

Di : Standard deviation (Di) of the 1st minute

ten-second break in between each turn.

The function of concentration maintenance is very important to Judo athletes, and is often the decisive factor in success or failure in matches. The TAF test is useful for assessing concentration maintenance in Judo players. The purpose of using the TAF test was to compare the findings with those from the POMS test and KRAEPLIN test.



II. Objective

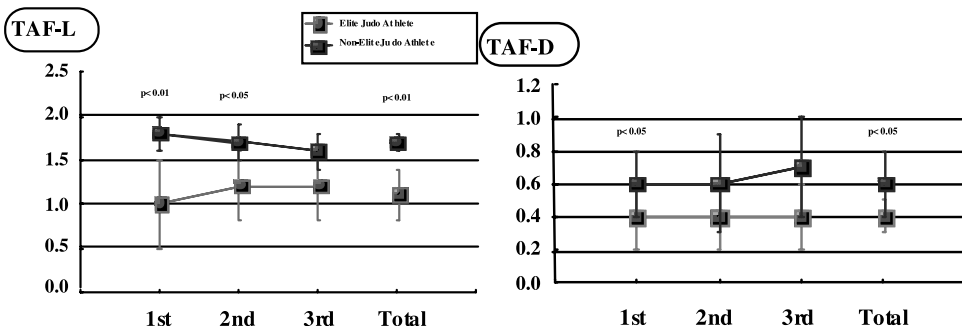
The purpose of this research is to use the TAF test to assess concentration maintenance in Judo players.

III. Method

Seventeen college Judo players were put into one of the following two groups:

1. Elite college Judo players ;

Changes in TAF



Those who had competed at the World Championships, the Olympic Games and other first-class competitions.

2. Regular college Judo players.

<TAF Test>

In a routine test, the sighting is continued for 1 minute followed by a 10-second rest, with the process being repeated 3 times. The figure below shows an example of a 1 minute sighting. From the 3 curves obtained, calculation is made in accordance with the following formula:

In a 3 minute test, the average value of 3 *Li*'s is indicated by TAF-L, and the 3 *Di*'s by TAF-D. The former indicates the level of concentration, while the latter shows the degree of fluctuation in maintaining concentration.

<POMS Test>

The mental state of each participant was calculated by using the POMS test. The POMS test is a self-evaluation questionnaire consisting of 65 adjectives. Each adjective is ranked on a point-scale of 1 to 5, and measures are made of 6 mood states:

IV. Results

1. The elite group obtained the following

results:

- The body-fat ratio in the elite Judo players was notably lower than the regular group.
- Although the elite college Judo players had higher concentration capabilities compared to the regular college Judo players, it can be surmised that this is the result of having experience in high-level Judo competitions such as the Olympic Games and World Championships.
- The POMS test clearly indicated stable mood (a tendency not to become confused).

V. Conclusion

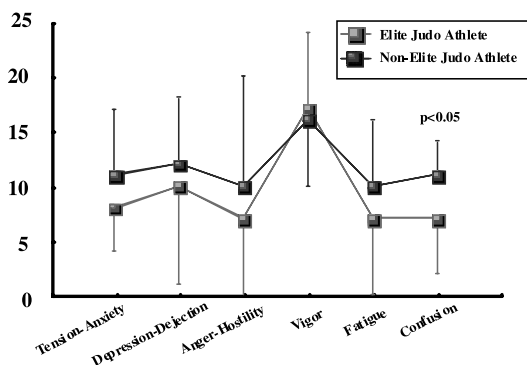
Generally speaking, Judo is a popular international competitive sport which emphasizes a union of mind, technique and body (*shin-gi-tai*). At the 28th Olympiad in 2004, Judo boasted the third largest number of countries represented. (There are 187 countries affiliated with the IJF).

In addition to strength and technical dexterity, mental power (concentration) is considered to be very important in Judo. Match time for men is 6 minutes, and women's matches are 5 minutes in duration. If either or both of the players do not

engage each other, they will be given a warning (*chūi*), so it is important to maintain a high attacking pace throughout the match. This means that the player needs to be able to maintain their concentration for 5 to 6 minutes, and is a vital factor in the outcome of the match.

Changes in POMS

1. TENSION
2. DEPRESSION
3. ANGER
4. VIGOUR
5. FATIGUE
6. CONFUSION



The internationally experienced elite group of college Judo players from T University who participated in this study, and the regular Judo players, totaling 17 altogether, were divided into 2 groups for comparison. Even though the number of participants was too small to draw conclusive results, it can be stated that overall, the elite group demonstrated superior results when compared with the regular college Judo players.

In future research the number of participants will be increased. Power is usually measured as weight x speed. If weight refers to body weight, the amount of body fat considered typical to that weight was found to be considerable lower in the elite group of college Judo players compared to the regular group. Furthermore, the results of the TAF test and the POMS test showed that the elite group had superior mental power and concentration.

I intend to continue the research to deepen the understanding of Judo players' concentration in the hope that it will contribute to better performance.

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